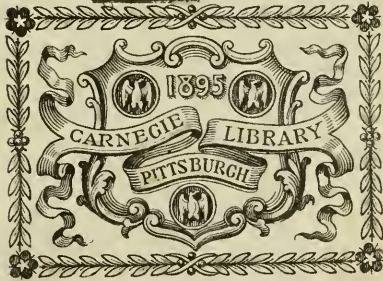




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Book



PRESENTED BY

Mr Andrew Carnegie

INDEX TO CONTENTS OF VOLUME I.

THE STREET RAILWAY REVIEW.

1891.

A

Accident, A Peculiar.....398
 Accidents, Reporting.....117-118
 Aetna Insulator Material, illus.....459
 Aid Association, Atlantic.....331
 Air Brake, Genett, illus.....47-48
 Air Motor, Compressed, illus.....335
 Allen's Safety Brake, illus.....289
 Aluminium Shades.....232
 Alone, Will go it.....452
 American Car Company's Plant, illus.....470
 Appleyard Safety Fender, illus.....530
 Ark Street Car as.....125
 Ashtabula, the Horror.....138 139
 Ashtabula Again.....357
 ASSOCIATION, OHIO STATE,
 President's Address.....490-500
 Street Cars, F. B. Brownell.....501-503
 Banquet.....593
 Delegates.....593
 Atkinson Gas Engine, illus.....231
 Aurora Flashes.....395
 Aurora Street Railway, The, illus.....81-84
 Augusta, Ga., The Electric City, illus.....305-308

B

Ball Engine, In a Coal Mine.....235
 Ball & Wood Plant.....244
 Baltimore, The Cable Line.....210
 Baldwin Locomotive Works.....278
 Baragwanath's Pump, illus.....202
 Bargion Compound Rail, illus.....141
 Barnum, P. T., on Electric System.....59
 Bates' Electrical Conduit With Closed Slot, illus.....537
 Berlin Rapid Transit In, T. Graham Gribble, illus.....215-219-
 265-271
 Belts, Buying.....452
 Bell, New Departure, illus.....411
 Bickford Radial Truck, illus.....336
 Bill Railroadng A.....3
 Bogie Man, The.....450
 Bonds, Street Railway.....505
 Boston, Big Power Plant.....510
 Boston, Fire in.....462
 Boston Letter.....60
 Boston, Statement of West End.....368
 Bracket, Double Curved, illus.....144

Brake, A New Lever.....21
 Bridgeport, An Important Change For.....4
 Bristol Enterprise.....308
 Broadway, Booming of.....518
 Brownell's Accelerator Car, illus.....458
 Brownell Fender.....493
 Brooklyn, The Trolley in.....208
 Brother-in-law, Had A.....163
 Brushburg.....594
 Burned, Car House.....108
 Burton Electric Heater, illus.....225

C

Cable, A Catskill.....532
 Cable Road Largest in the World.....6
 Cable Plant, A Model, St. Louis, illus.....8-12
 Cable, A Long Lived.....224
 Cable Line, New Clybourn, illus.....189-191
 Cable Traction.....202
 Cable Railway, Sidewalk, illus.....119
 Cable Crossing, A.....92
 Cabling Broadway.....271
 Cable in England, The.....275
 Cables, Denver Tramways.....257
 Cable, Brooklyn Bridge.....05
 Cables, More at Denver.....332
 Calorific Ventilating Heater, illus.....281
 Canadian Capital, Electrics in, illus.....453
 Capacious Car House, A.....470
 Car Brakes, Screw Safety, illus.....590
 Car Painting, Hints on.....593
 Car Seat, Handsome, illus.....97
 Car Mat, A Good.....91
 Cars, Large Electric.....3
 Car Lighting, B. & G. System, illus.....534
 Car Order, Largest.....462
 Car, A Double, Baumhoffs', illus.....399
 Car Spring, Ohlsons', illus.....278
 Car Replacer, illus.....283
 Canton Pole, The, illus.....597
 Cigarette, The Open, illus.....54
 Casing for Steam Pipes, An Improved, illus.....147
 Census Office, Bulletin of.....200-201
 Chair, A Boltless, illus.....19
 Chattanooga, Mission Ridge, illus.....516-517
 Chicago City Railway, Annual Report of.....14-17
 Chicago New Cable Work in.....355
 Chicago Notes.....336

Chicago, New Cables in.....	233
Cicero & Proviso Electric Railway, illus.....	57
Cincinnati, New Norwood Line in, illus.....	504
Cincinnati Line, A New.....	38
Cincinnati, East End Electric.....	400
Clutch Pulley, A New, illus.....	55
Chicago City Railway, Election.....	24
Collision, Avoiding at Corners, illus.....	357
Columbian Coach, illus.....	349
Columbian Movable Sidewalk, The.....	568-573
Double Reduction System, A.....	561
Duplex Street Railway Track, illus.....	595
Code, Wants a.....	230
Company With Sand, A.....	3
Condition of the Horse Market.....	559
Conduit, Love's Electric, illus.....	279
Congratulations, (A. W. Wright).....	24
Contract, Important Railway.....	80
Convention, The Providence.....	87-88
Convention City, Pittsburg, illus.....	382-391
Columbus, Ohio, New Plant of the Consolidated, illus.....	286
Conduit for Railway Wires, illus.....	335

CONVENTION, NEW YORK STATE.

President Lewis' Report.....	361-362
Executive Committee's Report.....	362-363
Electric Motive Power for Street Surface Railways, Hon. J. N. Beckley.....	363-366
Banquet.....	367
Delegates.....	367
Convention, The Tenth Annual, illus.....	396-397

CONVENTION, A GREAT, (10TH ANNUAL)

President Watson's Address.....	419 421
Executive Committee's Report.....	421-423
A Perfect Motor, H. A. Everett.....	423-426
Progress of Cable Motive Power, J. C. Robinson, The Dependent, Overhead or Underground System of Electric Motive Power, Geo. W. Mansfield.....	427-431, 519 529
Wednesday Afternoon.....	431-436
Thursday Morning.....	437
State Treatment of Corporate Property, G. Hilton Scribner.....	437-471-472
The Independent, Storage or Primary Battery System of Electric Motive Power, Knight Nettel.....	473-474
Standards in Electric Street Railway Practice, O. T. Crosby.....	475-480
Election of officers.....	481
Banquet.....	482
Excursion.....	482
The Exhibits.....	482-488
Delegates in Attendance.....	488-490
Convention Echoes.....	530
Creagehead Insulator The, illus.....	458
Crosstie, Metal.....	236
Crowther's Cable Pulley, illus.....	282
Correspondence, (New Orleans).....	224
Cushion Car Wheel, illus.....	236
Cutshaw's Cable System, illus.....	286
Danville, War At.....	347
Day Elevated Railroad.....	469
Decision, A Most Important.....	207

Detroit City Railway Sold.....	354-355
Detroit Doings.....	261
Denver Doings.....	490
Detroit, East Electric.....	380
Details, The burdens of.....	72
Dublin United Tramway Company, illus.....	76-78

EDITORIAL.

Abnormal Traffic, The Unprofitable.....	416
Accidents.....	34
Accidents, Prevention of by Headlights.....	495
Activity in Construction.....	162
Announcement.....	1
Announcement of Convention, National.....	69
Arbitrators at Toronto.....	161
Bill to Facilitate Construction of Elevated Roads.....	34
Bonus for Construction.....	2
Bonds and Stocks.....	495
Care of Cars.....	496
Cable Traction.....	415
California Calamity, A.....	38
Census Report.....	161
City Inspectors.....	71
City Parks, Track in.....	162
City & South London Underground Line.....	71
City & South London Railway.....	2
Citizen's Street Car Company, Decatur.....	69
Convention, National, 10th Annual.....	415
Convention, Place of the 11th National.....	415
Convention, 10th Annual, Massing of Exhibits.....	417
Convention, 10th Annual, Division of Exhibits.....	417
Convention, N. Y. State.....	359
Convention, Attending Value of.....	302
Convention, 10th Annual, Admission to Exhibit by Pass.....	416
Companies, How Swindled.....	498
Crossing Other Tracks.....	162
Delay of Cable Construction.....	360
Democracy of Street Cars.....	1-205
Disposition of Snow.....	35
Double Brake Chain, Preventing Accidents.....	34
Draughts in Cars.....	163
Edison's Latest.....	497
Elevated, vs. Underground Roads.....	253
Elevated Road Refused.....	253
Electric Cars Assisting at Fires.....	207
Electric Cars in Snow Storms.....	34
Electric Railway Crossing, Steam Roads.....	1
Electric Traction in England.....	1
Electric Traction in Europe.....	301-254
Electoral Power of Street Railways.....	359
English Storage Battery, Omnibuses.....	1
Enchantment of City Property.....	33-113-161-416
Exasperating, Very.....	207
Exemption from Taxation.....	34
Express and Freight.....	70-206-301
Exhibition of Supplies.....	301
Fares for Park Maintenance.....	2
Franchises.....	301
Free Tickets for School Children.....	35
Funeral Cars.....	206-301-302-360
Fuel Oil, Explosion of.....	162
Full Stop in Passing Stationary Cars.....	304
Hitching on.....	71
Hostile Legislation at Washington.....	2
Interurban Lines.....	70

Limitation of Speed,.....	34
Leave to Withdraw.....	70
Objection to Electric Traction.....	70
Metropolitan Institution, A.....	69
Municipal Control.....	253-301
Municipal Meddling.....	495
Municipal Outrages.....	360
Municipal Ownership.....	2
Multiplication of Roads.....	34
Newspaper Injustice.....	496
No Seat no Fare Fallacy.....	35
Obstacles to Improvement.....	69
Opposition to Trolley.....	162-206
Ownership, Duty of.....	303
Pantabliion.....	205
Paying for Franchise.....	253
Peculiar Damage Suit, A.....	206
Pleasant Valley Railway, Pittsburgh.....	33
Plows on Broadway.....	253
Popularity of Summer Cars.....	161
Prizes for Employes.....	161-495
Presidential Condecension.....	359
Prohibitory Ordinance, A.....	1
Progressive Institution, A.....	37
Progress in Pennsylvania.....	162
Postal Cars.....	161-206-255-496
Power, Home Made.....	303
Rapid Transit in Boston.....	302
Rapid Transit in New Orleans.....	360
Rapid Transit in New York.....	161
State Control Unfortunate.....	163
Stops at Street Crossings.....	35
Storage batteries.....	33-415
Strikes.....	205 254-301
Street Railway Attorneys.....	417
Strike for a Cap.....	206
Stopping for Passengers.....	253
Street Waiting Rooms.....	303
Sunday Cars.....	415
Taxation Unjust.....	415
Thannless People, Ehe.....	496
Thirteenth National Electric Light Association.....	33
Three Cent Fares.....	207
Tracks, Next Sidewalk.....	416
Trolley, Opposition to.....	415
Trolley Wins the Telephone Case.....	206
Two Cent Fares in Europe.....	359
Underground Railway.....	253
Underground Transportation.....	70
Uniforms.....	4
Viaducts System in Berlin, The.....	205
Wagon Wear of Rails.....	2
Yearly Tickets.....	34
Reduction in Fares.....	370
Reservation of Streets.....	254
Retail Trade Increased by Rapid Transit.....	161
Rights of Railways.....	415
Sale in Detroit.....	301
Salt on Tracks.....	69
Separated Oil Houses.....	161
Sprague, F. J., Prediction of.....	69
Speed Objection to.....	69
Street Car Benefit, A.....	253

Eclipse Clutch Works, Clutches,.....	399
Edeco Company, The.....	148
Edison Motor, The New, illus.....	185
Edison's Explanation of Ampere and Volt.....	73
Electrical Supply Company's New Home, illus.....	353
Electric Railway Company, New Underground, illus.....	186
Electrician, The World's Fair, Portrait,.....	57
Electrical Supply Company's, Pole Ratchet, illus.....	146
Electric Railways, American English Engineers' Re- port of.....	312-313
Elevated Railway, The Liverpool, illus.....	309-312
Elevated Road, Chicago's First, illus.....	120-124
Elevated Road, Victory of.....	320
Ellis Car Company's Electric Plow.....	400
Ellis, W. G. & Sons, illus.....	598
Employes, Brotherhood of.....	549
Engine, High Speed Vertical Compound, illus.....	276-277
Engine, The Everest Rotary, illus.....	100
England, Operating Expensive in.....	398
Europe, Read in.....	235
Express, An Electric, illus.....	260
Express, Parcel in Dublin.....	260
Express Lines.....	119
Express Street Car.....	308

Faithfulness Rewarded.....	548
Fair, The World's.....	241
Fast Riding, Want.....	212
Feed Water Purifier, A Mechanical, illus.....	326-327
Fender, A New, illus.....	232
Finest in the Land, The, (Chicago City Railway Offices) illus.....	345-347
Findley, Electric Line at.....	348
Fire, Sixth Avenue, N. Y.....	287
Fires of the Month.....	589
Flegel's Pipe Covering Company.....	13
Flesh to Fuel, From.....	450
Foreign Facts.....	356-457
Found Out, He.....	518
Franchise No, Motors No.....	305
Funeral Cars, Street Railway, Chapter I, illus.....	314-317
Funeral Cars, Chapter II, illus.....	392-393
Funeral Cars, Chapter III, illus.....	447-448

Gear, Wooden Toothed, illus.....	146
German Electric Companies at World's Fair.....	575
Gibbon Duplex Tracks, illus.....	96
Gill Water Tube Steam Boiler, illus.....	530-531
Girder Joint, Johnson Standard, illus.....	233
Gold for the Golden,.....	529
Gold, Good as.....	454
Golden Electric Wins, The.....	400
Graham's Door Stop, illus.....	459
Griffin Plant, The New.....	80
Gust, Gone in a.....	212

Harper's Street Railway Tickets, illus.....	455
Hathaway Transfer Table, illus.....	93
Helena Motor Line Sale.....	369
Heating Case, Cars.....	246

Street Railway Review

Healy's Happiness.....	510
Heath Rail Joint, illus.....	246
Highly Honored, T. C. Lowry.....	60
Hill Stop, Automatic Electric, illus.....	402
Harper's Sand Box, illus.....	332
Horse, The Street Car, of To-Day.....	569
Hosebridge for Protection, illus.....	381
Hustlers Can do Anything.....	510
Hydraulic Wheel Press, Belt Power, illus.....	593

I

Incline Plane Railway in Duluth.....	579
Interurban, Another.....	446
Interurban Connections.....	531
Interurban, St. Paul-Minneapolis, illus.....	223
Inter State Electric Road.....	398
Ireland, The Only Electric Line in, illus.....	42-44
Insurance and the Trolley.....	209-210

J

Jacobs' Elevated Railway, illus.....	184
Jamestown, Joyous, illus.....	450-451
Jewell Filters, The, illus.....	588
Johnson's Life Guard, illus.....	332

K

Kankakee Electric.....	325
Keokuk, Ia., Opens Electric Lines, illus.....	213-214
Kid-Catcher, California, illus.....	292

L

LaCledde Car Company.....	356
LaCledde Car Company.....	261
Lamp, A Handsome, illus.....	19
La Salle Electric Line, The.....	317
Law, Street Railway—F. H. Clark ..49, 50, 85, 86, 130, 131 132, 180, 181, 220, 221, 272, 273, 318, 319, 370, 371, 445	446, 514, 515
League, Electric Railway.....	72
Leeds and the Over Head.....	536
Lee's Self Cleaning Switch, illus.....	327
Lee's Registering Fare Box, illus.....	144
Leffman Pole, The, illus.....	97
Life After Death, The, R. W. Snowdon.....	560-561
Likes the Differential.....	232
Lincoln Lines.....	320
Littell, H. H., Goes to Buffalo.....	188
Liverpool & Wellsville Electric.....	561
London, In Deepest, illus.....	5-6
Lone Star State, Electric Lines in, illus.....	321-323
Love's Electric.....	400
Lowry, Thomas.....	574
Low's Adjustable Car, illus.....	333
Lowell & Suburban.....	232

M

Mail, The Electric.....	257
McKeesport's Pride.....	515
McGuire Electric Motor Truck, illus.....	235
Meaker Manufacturing Co.....	21
Memphis Matters.....	147
Mechanical & Horse Traction, Comparative Popularity of H. A. Everett.....	7
Milwaukee, Mixture A.....	510
Minne-Paul, The Horseless System of.....	391
Moffett Journal Bearing, The.....	592
Missionary Ridge.....	562-563

Motor Operating Automatically at Any Desired Speed or Torque and With Maximum Efficiency Under all Conditions. H. Ward Leonard.....	575-578
Montgage, A Large.....	73
Montreal at Pittsburg.....	518
Motor, A Noiseless.....	3
Motor, A New, illus.....	21
Move, A Bold.....	187
Mule Went, The.....	532
Municipal Railway, A.....	235

N

Newark Sale, The.....	323
Newburyport, Fire at, illus.....	287
Newsboy, The Festive.....	39-41
New England Notes.....	589
New Orleans, Condition of Rapid Transit in.....	75
New York, Horse Cars of.....	460
New York City Rapid Transit, illus.....	133-138, 167-173, 208
New York Third Avenue Road.....	567
Nickle Foundry Capture.....	518
Notes from Cities.....	25-31, 61-68, 101-107, 149-156, 193- 199, 247-252, 295-300, 340-344, 406-410, 464-467, 538-541, 601-606.
Nutlock, Jones Positive, illus.....	93

O

OBITUARIES.

Baird, John.....	550
Buch, John.....	550
Dukehart, G. C.....	201
Dodd, H. P.....	550
Fowler, J. W. Mrs.....	455
Payne, Col. W. H.....	32
Kemble, W. H.....	455
Lewis, A.....	201
Lyon, Lewis.....	550
Moen, P. L.....	201
Munson, Chas.....	160
Nelson H. A.....	201
Payne, W. H.....	32
Wright, J. B.....	160
Sherman, Wm. F.....	32
Object Lesson, An.....	54
Oil as Fuel, illus.....	535-546
Okonite Co's., Acme Lead Cable.....	403
Open Cars, A Chance in, illus.....	238
Open Cars, the Season of.....	211-215
Outlook, The.....	24
Over the Bay.....	576

P

Painter's Naptha Motor, illus.....	334	
Paper Wheel, The Latest, illus.....	20	
Parcel Delivery, Prize Essay, Geo. L. Fowler, illus.....	258-159	
Patton Motor, The.....	330	
Passenger, Not a.....	72	
Patent System, American Centennial of.....	89-90	
Patents, Street Railway.....	68-107-148-191-238-288-344-412	459-542
Pay Them, It Will.....	280	
Peckham's Perfect Cantalever Truck.....	491	
Personals.....	24-59-90-159-161-245-294-354	369-487-543
Portland Pointers.....	582	

Street Railway Review

Philadelphia, Plan A, Elevated Road, illus.	179
Pickets from the Golden Gate.	325
Pole, A Stalwart Steel.	328
Pole, A turned Wood, illus.	237
Policy, Our.	32
Poole, Robt. Son's Co.	293
Portland Pointers.	255-412
Portland Paragraphs.	187
Portland's Power.	532
Post, A Bent Car, illus.	20
Practical Letter, A, J. B. Hanna.	7
President Elect, J. G. Holmes.	418
Presidential, The Car, illus.	239
Prices' Composite Girder, illus.	192
Prices' Improved Construction, illus.	46
Proctor Steel Co.	275
Publications, New.	352-353
Puget Sound Notes.	541
Puget Sound, Echoes from.	338-339
Pullman's Double Deck Car, illus.	461-462

PORTAITS.

Anderson, Wm.	88
Barret, J. P.	56
Beckley, J. N.	368
Callery, J. D.	388
Dalzell, J. H.	390
Dyer, D. B.	320
Everett, A.	188
Hanna, J. B.	510
Henry, D. F.	388
Hill, G. B.	391
Holmes, C. B.	16
Holmes, J. G.	422
Lewis, D. F.	132
Littell, H. H.	52
Lowry, Thos.	571
Magee, C. L.	386
Munson, Chas.	160
M. C. of S. A., (Group)	240
Richardson, W. J.	378
Rugg, J. E.	386
Short, S. H.	454
Verner, M. A.	387
Walker John.	280
Watson, H. M.	370
Whitney, G. I.	389

R

Raised the Record.	470
Rapid Transit, Boston Scheme.	595
Rapid Transit, Jersey City.	582
Rapid Transit, Twin City.	238
Rapid Transit Commission, N. Y.	543
Railroad Shops, East Cleveland.	533
Railway Record, A Remarkable, C. B. Holmes.	14-17-18
Reading Rooms, Employees.	529
Register, The Lima, illus.	25
Review of the Year With Our Advertisers.	605-614
Robbed.	513
Rochester Railway Wrinkle, illus.	449
Room, The Oil and Lamp, L. P. Fingst.	257
Rope Driving Wheel, illus.	92
Rule Book, A Model, illus.	401
Ryan's Convertible Car, illus.	145
Rapid Transit Rarities.	549

S

Safe Investment, A.	533
Salt Lake City Plan, illus.	125
Salt Lake Railway.	71
San Jose, Electric.	93
Savannah, Georgia.	566-567
Schuylkill, The Electric Railway.	41
Scott's Electric Motor, illus.	463
Seattle, Railway System of, Part I, illus.	372-378
Seattle, Railway System of, Part II, illus.	439-441
Seattle Letter.	224
Selling Agents, Memphis Convention of, illus.	210-241
Semi-Centennial, A, John Harris.	91
Separate Coach Bill.	187
Sioux City Sayings.	578
Street Railway Patents.	604
Storage Battery Cars at the Hague, illus.	591
Such is Life.	590
Stages Not Profitable.	587
Smoking Car Season, The.	587
St. Louis, More Electrics for.	561
Street Railway Law. T. H. Clark,	564-565
Sessions' Side Seat Cars, illus.	98-99
Storage Battery Cars, Dubuque.	80
Storage Battery, Suit The.	349
Storage Battery Volts.	336
Short's Gearless Motor, Tests of.	403
Short Gearless Motor, illus.	126-127-183
Short's Railway Generator, illus.	394
Short Slow Speed Motor.	97
Short's Railway Motors, The Three, illus.	156-157
Short Circuited.	179
Shortest Road, The.	246
Shoe & Stocking, Street Car.	55
Shock, Received A.	529
Shaffer, President, Resigned.	201
Shaws Steel Spring Motor.	395
Side, The Other.	52
Sieberling's Truck, illus.	469
Sioux City Corliss Engine, illus.	234
Sioux City, Electric, illus.	256
Sioux City Elevated Road, illus.	262-263
Schneider's Combination Car, illus.	401
Snowstorm, Electric in.	4
Smoke-Stack, Steel.	323
South, Street Railways in the.	73
Speed, Increased, as Related to Accidents.	74
Spike, A Screw, illus.	238
Spring, An Ode to.	293
Sprinkler, A Railway.	226
Storage Batteries.	237
Stedman Foundry & Machine Works.	13
Stevenson's New Car Shops.	237
Stuts Cable Grip.	403
Stock, Shall New Issue of, be sold at Public Auction, 165-166	
Style. Don't Like Our.	164
Strike, in Galveston.	261
Superior, Road A.	462
Suspended Cable Railway.	91
Taper Sleeve Clutch, illus.	533
Then and Now.	73
Three Cities, Tale of, illus.	174-178
Thrown up by the Sweeper.	34-84-100-208-253-302-360
Toboggan Rapid Transit.	228
Tonawanda, Tony.	444

Toronto, Situation in.....	453
Toronto, The Trade.....	374
Torrence Terminal, The.....	563
Town, It Made the.....	208
Track Brush Adjustable Holder, illus.....	395
Track Cleaners.....	400
Trans-Missouri Company.....	127
Transfer Tickets, Tricks with.....	449
Transfer Ticket, Iron Clad, illus.....	532
Tramway Rail Co's, System, illus.....	53
Tricycle Elevated Railway, illus.....	140
Tripp's Truck, illus.....	594
Trolley, Changed to.....	244
Trolley Device, illus.....	282
Trolley, England's First.....	224
Trolley Hanger, The Latest, illus.....	88
Trolley Wheel, Aluminium, illus.....	47
Trolley Wire Clamp, illus.....	55
Truck, Equalizing Motor, illus.....	596
Turn-outs Single Tracked.....	212
Tunnel, Largest in the World, illus.....	511-513

U

Universal Electric Co., Mechanical Electric Clutch, illus.....	329-330
Up a Mountain on a Wire, illus.....	324-325

V

Veterinary, Hygiene.....	50-79-128-129-182-183-222
.....	223-264-337-338-379-380
Villard Syndicate, The.....	328
Vogel Cable Connection Co., The, illus.....	18-19

W

Wakes Them Up.....	224
Walker Manufacturing Co.....	108
Walker Manufacturing Company, New Plant of.....	583-587
Water Power, New.....	582
Wheels, Machined, illus.....	45
Wheel, Rubber Cushioned, illus.....	334
White's Cable & Conduit System, illus.....	229-230
White's Eureka Construction, illus.....	21
Westinghouse Automatic Circuit Breaker, illus.....	145
Westinghouse Co., Plant of Pittsburgh, illus.....	505-509
Westinghouse Iron Clad Gearless Motor, illus.....	142-143
Westinghouse Multipolar Generators, illus.....	227-228
Westinghouse Slow Speed Motor, illus.....	94-95
Westinghouse, Church, Kerr & Co., Direct Coupled Multipolar Generator, illus.....	460
Westrom Electric Works.....	2
Wightman Railway Motor, illus.....	274-275
William's Radial Truck, illus.....	536
Williamsport Improvement.....	581
Will Stay at Home Now.....	531
Wind, Short of.....	331
Woodland Avenue Electric.....	369

WEDDINGS.

Dean-Sisson.....	490
Greene-Thompson.....	490
Johnson-Hathaway.....	60
Rhomberg-Meuser.....	239
Robinson-Lowry.....	490
Wright-Jordan.....	24



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CORRESPONDENCE.

We cordially invite correspondence on all subjects of interest to those engaged in any branch of Street Railway work, and will gratefully appreciate any marked copies of papers or news items our street railway friends may send us, pertaining either to companies or officers. Address:

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VOL. 1

Announcement.

THIS is the first issue of the STREET RAILWAY REVIEW. It comes not with the expectation or desire to in any way supplant or diminish the usefulness of other publications already in the work, and to whom the street railway interests are so much indebted for splendid service in the past.

It does come to occupy a place now open by reason of a most wonderful and rapid development in the street railway world. While our contemporaries will continue to bring to you much which we may not, we likewise shall reach avenues and work along lines not touched by them.

Above all we shall be actuated by none but honest, earnest purposes to give our readers a thoroughly live, practical publication, for which we have special facilities; and our location in the heart of this great center of the United States, brings us very close to an extensive territory expanding in a hitherto unparalleled degree both in commercial importance and population.

Our English friends have got the start of us, or expect to have, for omnibusses propelled by storage batteries will be put in service in London in a few weeks. The driver sits in front and steers, and the outfit is promised to cast dust in the eyes of all competitors.

An interesting case, said to be the first one, with reference to the rights of electric railways to cross steam railways, is in the courts at Newark, N. J. The Rapid Transit Co. endeavored to cross the Delaware, Lackawanna & Western, at Orange, and were enjoined.

The street railway is a great "evener" in society, for here is one place in which all fare alike: where the bulls and bears of commerce sit down with the lambs of trade, and the millionaire shares the seat with the humblest son of toil, unless perchance the latter gets the only vacant place, in which event the nabob stands and pulls on a strap. This, by the way, is said to be a most excellent exercise and develops the arm and chest.

A MALE citizen in Johnstown, N. Y., a few days ago, lost his pocket book, containing \$65, in one of the street cars. When the honest driver hunted him up after his day's work and restored it to the owner, he received the munificent reward of ten cents, on which to "go out and enjoy himself." Yet it is just such contemptible people who are always ready to ring in a report of some fancied short coming on the part of the company's servant.

THE Newark, N. J., Call, which knows more about running the street car business of that city than the company, complains because the conductors on Belleville Ave. line have been put in uniforms and brass buttons at an expense per man of \$13. Probably gunny-sack would suit the Call man better. The men surely must wear a certain amount of clothing, and there is no reason why they should not wear it of a uniform character.

Down in Reading, Pa., what is officially known as "the select council" of the city, refuses an ordinance for an extension of present lines, unless the company will agree to pay 5 per cent on its gross earnings. This amounts to a positive prohibition in this case, as the business in sight will not warrant it, and so the city is hampered in its development by this fool policy. Out west citizens are mighty glad to turn in and donate large sums to encourage new lines and build up their town.

THE Electric Engineer, of London, says: "Electric traction must expand and gather strength as time goes on. For a long time England has had to take a back seat in installation work, whether for lighting or power. Assisted by peculiar conditions, America has gone ahead, but after all, there is a solidity about the English way of going to work, which, when carefully considered must be admired by all." It would seem as though the success of the city and South London enterprise should stimulate the construction of the tunnel under the British channel.

WE desire to call the attention of our readers and advertisers to the announcement on our outside cover. This plan has been adopted at the request of a number who desired the favored space, and gives everybody an equal chance to secure it at the price which they consider it worth to them. No figures except the successful one will be divulged. That will be announced next month. If any who have already taken other locations desire to change, they can do so and the amount of their contract will count on the price of the last page.

THE opening of the city and South London Railway recently created quite a commotion, in that, while its cars are run in trains, there is no class; all passengers paying before they enter the train; and all given the same accommodations at a uniform price. The so called "common people" hail the new department with delight, and while Sir John Bull turns up his royal nose perhaps, the superior facilities of the road will overcome his pride and he will find himself none the worse. The occasion probably marks an important era, and once more the street railway figures as a great social factor.

THE Jamestown, N. Y., *Vezes*, wants that city to own and operate the street railroad, and expresses the fear that perchance the men who years ago put their money into a road there, and operated it doubtless at a loss for a long time, are now making a little something, having succeeded in getting their business on a paying basis. Now, if the said *Vezes* wants something really sensible to talk about, why does it not advocate having the city run the newspapers there. That might be a really pious change for the better. Sounds as if the monthly supply of dead head tickets had been delayed in reaching somebody.

THE opening of the new underground electrical road in London, attended with all the pomp and ceremony that the presence of nobility affords, has awakened a well-spent interest in the application of electricity to street railway purposes in Great Britain and throughout all Europe. The daily press for days was filled with details of the work, and the scientific and technical magazines have devoted columns in its praise. A great and wide-spread interest has been suddenly awakened on the subject and its progress will be watched with hope and interest by all friends of electrical advancement on this side of the water.

COMPANIES that think they are in hard lines in endeavoring to defend themselves from hostile city councils, had better take a run down to Washington, D. C., the great national headquarters for all that is hard on the mourners. The latest appeared a few days ago, when the House passed a bill forbidding the companies there to use the same ticket a second time "lest they became dirty." No one ever suspected the members of the House of having such immaculately clean hands before. Not satisfied with this they generously instructed the roads to reduce their fare to 3½ cents. This is specially unappreciative, as it was not generally supposed these solons ever paid for anything, and they might at least have allowed the plebeians to pay a respectable first class fare, for accommodations which are most modern and excellent.

THE city council in Louisville, Ky., have suggested a curious proposition, which is to have the Street Railway company make a change of six cents on all passengers to and from the city park, and turn the extra cent fare over to the park commissioners for its maintenance. This scheme is more nery than just, for it would be a matter of impossibility to ever determine just how many people

who took the park car reached it, for few passengers could be found a second time, who were "going to the Park," but would if necessary get off a block or two before reaching it. Again, could a railway company having collected five cents and accepted the passenger as such eject him when within one block of the Park if he refused to pay the extra cent. On the return trip the cars would be boarded a short distance from the Park by hundreds who would insist they had never been there. But the greater injustice would be that it places a tax on a class of people whose limited means makes the street car their only carriage and on whom the extra cent would rest like the McKinley bill on a righteous Democrat.

THE communication from Secretary J. B. Hanna, of Cleveland, expresses a conviction that is daily growing among the street railway men of the country;—the wisdom and economy of the heavy and permanent track construction. Time was when the light tram rail on the wood stringer yielded from ten to twenty years service, but the constant development of traffic, especially with in the past five years, the accompanying enlargement of rolling stock to take care of it, the adoption of rapid transit methods, have all united to revolutionize the old time rules of track building. Another element, and a most important one, is the growth in every city of manufacturing interests, which are using large trucks and carrying double the loads of merchandise formerly employed. These uniformly seek the smooth even surface of our tracks as a roadway, preferring to turn out once in every block if necessary, to hauling on the street pavement. It is this constant turning in and out of heavily loaded wagons that wrenches and turns the best constructed track. In many cities the railway men complain that fully three-fourths the wear upon their track comes from this source. As it is an evil that cannot be prevented, the only alternative is a substantial track, and we cannot but feel that most lines will save money, and in no great length of time either, by spending a little more for the extra ten or fifteen pounds per yard in rail. The cost of laying is no greater for a seventy-eight pound than a sixty pound rail, and once down it should contain the elements of wear.

THE property owners in Astoria, Oregon, evidently know what is good for them, for they got together recently and voluntarily agreed to assess themselves from \$50 to \$300 per lot, as a subsidy to encourage the construction of an electric line. There was but one property owner on the entire road who refused to join in this public-spirited measure. This offers a striking contrast to the short-sighted policy pursued in many cities. We once knew a man who objected to the construction of a rapid transit line on a part of his property, on the ground that it would increase its value and he would be obliged to pay more taxes. The Astoria people evidently were not built that way, but, on the contrary, exhibit a spirit that is sure to win. The progressive policy pursued by street railways, if universally adopted, would make cities of many a village.

A Company with Sand.

SOME of the Knickerbockers conceived the idea of securing the interference by the city with the 4th Avenue surface road, from sprinkling sand upon the track on the steep grade on Madison ave., and elsewhere. But they were nicely left, as the law in that state permits any surface road in cities having a population of 5,000 or more, to place sand between their tracks in sufficient quantities to prevent horses from slipping.

A Noiseless Motor.

ONE of the officers of the Pleasant Valley Electric road in Pittsburgh, speaks as follows, of the new Westinghouse motor, now in operation on their lines: "There is above all a wonderful ease and quietness of operation that causes the cars to run along with a remarkable smoothness and silence, making the car itself conspicuous on our line, and people are enabled to converse in an ordinary tone of voice in the cars. We have now the rawhide pinions on our motors, but even then, they are not nearly so noiseless as the Westinghouse motor.

Wenstrom Electrical Works.

WORK is actively under way for the erection of the large shops of the Wenstrom Electrical Company at Gwynn's Falls, a suburb of Baltimore. The building is four stories high and has a water power of 750 horse power. More fixtures have also been placed, to be used in case of an emergency. The company will devote the most of its space to the manufacture of their street railway motors and will also furnish power to the North Avenue Railway Company, whose lines they have equipped. Six hundred men will be employed and the facilities of the concern taxed to its utmost.

Large Electric Cars.

ALTHOUGH the introduction of the modern rapid transit methods enables the owners to secure an increased mileage per car, which is in actual results an increase of cars on the street, in proportion of the shortened time; still the returns in business carried do not stop there, but invariably the riding is enlarged to such an extent as to soon require additional cars.

The West End Company of Boston is a shining illustration of this, and has already put in use part of an order for 150 new cars. The balance will be ready soon. Each car is thirty-five feet long over all, the body being twenty-five feet and is capable of seating comfortably thirty-four people. They are seven feet three inches wide and nine feet from the floor to the top of the deck. On either side are nine large windows. The interior finish is mahogany, with oak ceiling, and lighted at night with incandescent lamps. The cars are carried on two iron trucks of four wheels each, and one extra step is required, as the box is that much higher than the old style car, in order to permit the trucks to take the curves. Each car is equipped with two fifteen horse power Thomson-Houston electric motors, and will require about the same amount of power as the common box car and one small trailer.

Railroading a Bill.

MR. J. C. ROBINSON, of San Francisco, who was General Manager of the Highgate Cable road, London, tells an amusing incident in the history of the underground electric road. At the time the bill was before Parliament, it was intended to operate the proposed road by cable power. For a long time the franchise hung fire, and Mr. Robinson was called in to testify on cable matters. Finally, during one session, he suggested the committee could better judge for themselves from actual inspection. He proposed that they adjourn and make a personal inspection of the system. The Highgate road, though completed, had not yet been formally opened for travel. He relates his experience as follows:

"The idea seemed to strike the committee as a good one, and, after a little discussion, I had the satisfaction of seeing, for probably the first time on record, a committee of the House of Commons, whilst in full session, adjourn for such a purpose.

Carriages were immediately provided, and from the palace yard of Westminster we hied to the ancient hill of Highgate. Everything, including the inevitable chicken and champagne, was in readiness. The cable was started, the train ran out and loaded with honorable members of the committee, legal luminaries, engineering experts and directors of the corporation. Fifty lords and gentlemen of high degree took their seats. I took charge of the grip, and hooking in the rope began the descent of one of the steepest gradient, one in eight. The intention was to illustrate to the distinguished guests the charming ease, simplicity and safety with which a cable road could be operated. The brake efficiency attracted considerable attention, and whilst traveling down the hill at some ten miles per hour the word was given to run for a distance by gravity, then to apply the brakes quickly, and while still on the grade bring the train smartly under control. With every confidence in my brake power, I let go the rope, and away we sailed in a most exhilarating manner. From ten to fifteen miles an hour was but a momentary transition; from fifteen to twenty miles was taken with a rush, and then, with a gasp, as the wind whistled past his ears, the chairman managed, to whisper, "For the Lord's and Common's sake, ease up."

Having frequently experienced this sort of thing before, when training my gripmen, I of course anticipated no difficulty whatever in stopping the train how and when I pleased, so with an air of cheerful confidence I applied the wheel brakes, and found to my dismay they failed to act; the speed continued to increase; houses, trees, etc., seemed to fly past us as I again jerked on both tracks and wheel brakes—but no! they failed to catch on, and we continued to descend; then it was that I became really cognizant of the peril of the situation. If I failed to stop that train within the next half minute, probably death stared not only myself but the illustrious passengers in the face; ruin to the prospects, not only of the Cable Corporation, but the City and South London Bill, seemed inevitable. These thoughts and a thousand others flashed through my mind; by a great effort I contrived to exhibit no symptoms of my inner consciousness; glancing at Sir Michael Kennedy who was beside me, I saw that he alone on the train had the faintest inkling of real danger, and even he felt that I was perhaps only taking too great chances by not stopping quicker. No one ever knew, nor till now have I ever divulged the fact, that I had absolutely lost all control of that train.

The whole thing occupied only a few moments. As the train approached the foot of the incline I braced myself up, and gritting my teeth firmly together, with all the strength of despair, I grasped the brakes and at the risk of rending them asunder, swung them on and on again, until to my joy I found them bite and acting directly upon both rails and wheels, brought the train up with a jerk never to be forgotten. Without allowing the passengers time for a moment's thought, as we stopped, I jumped off and invited the engineers to measure the ground, ostensibly to determine not only the speed at which we had been gravitating, but the distance (not less than thirty feet) within which, in the midst of its mad career, I had stopped the train. This coolness and presence of mind fortunately did the business. The cable system was voted admirably, and the brake efficiency, particularly, all that could be desired. The committee returned to Westminster, impressed with the success of the experiment at Highgate, and passed the City and South London Railway bill the same afternoon."

An Important Change for Bridgeport.

THE Bridgeport Horse Railway Co., which has been in existence since 1864, has just been sold for \$350,000, to a syndicate composed of A. G. Yates; Fred Cook; W. S. Turnbull, the tobacco man; Arthur Luetchford; A. E. Perkins; Chas. Everest and J. N. Beckley, of Rochester, N. Y.; E. M. Gibbs, of Norwich, and Chas. A. Hotchkiss, of Bridgeport, Conn. The purchasers are also owners in railway lines in Rochester, and Buffalo, N. Y., Newark and Patterson N. J., and will increase the mileage in their latest purchase to twenty miles, operating by electricity. They promise to spend \$1,500,000 in the plant and system.

The syndicate have selected the Short Trolley system, which they are using in other cities. Material is already arriving and work will be crowded as soon as frost is out of the ground. Double track will replace the old single and turn-out method, and altogether the Bridgeport people are to be congratulated.

Uniforms.

THE recent large additions by many companies has correspondingly increased the number of employees, and with this change has been suggested the question of uniform.

There can be no argument as to the appearance of a well uniformed conductor and driver, but more especially the former, as compared with men engaged in the same work and wearing citizen's clothes.

Companies, by placing contracts, can secure for their men better made garments and of material superior to that which the men individually could possibly purchase. So that in point of economy for the men there is effected a considerable saving. In most places it is practical to have the garments made to order from actual measurement, and while such may possibly cost a few dollars more at the start, will prove cheaper by a greater service rendered.

But the uniform is a great help to the men. People who are most inclined to be troublesome are just the ones for whom a uniform has a certain amount of authority, and the conductor so equipped has a decided advantage over a non-uniformed man.

In companies where a uniform is worn, it is found that as long as a man appears in citizen's dress he is spotted as a new man, and the public will endeavor to take advantage of him in the way of spurious coin and the like. But the moment he dons his uniform he finds its protection a very noticeable one.

The advantage to the passenger in locating the conductor is considerable more than where only a cap and badge are worn; and even in those places where the men were inclined to murmur when notified to procure uniforms, the feeling has wholly changed before the suit has been worn long enough to take the shine from the brass buttons. Uniform the men.

THE case of Daniel Stewart vs. the Sixth Avenue Railroad Company, for \$35,000, for the loss of his arm, was decided in favor of the company.

Electricity in the Snow Storms.

WE have watched with much interest reports from all parts of the country as to how the electric lines have behaved themselves in the snow storms, which already have far out-numbered in fall and vigor those of the entire last winter. The results are very generally gratifying. Where blockades have occurred as they have in some localities, the trouble has been found to be not in the lack of power, so much as the proper application of it.

No system of artificial power can ever hope to successfully cope with a snow storm in other than one way. That is to take the storm by the ears. The minute the fall commences plows must be on the street. Very often a ten or fifteen minutes delay in plowing loses the battle; for after the fall has once got the upper hand it can be removed only at a great loss of power. To do this every road should have ample plow equipment, and to this should be added the no less valuable auxiliary of scrapers on every car. Then put out enough plows and cars to make a short headway, proportioned to the fall, and endeavor to keep a clean rail. Of course, in storms of long duration accompanied by high winds, this is easier said than done; but it will be found cheaper every time to spend more money in keeping up with the storm than trying to overtake it later on.

Most electric companies are this year experiencing their first encounter with snow and it is not to be wondered at if many meet with difficulty at first. But time was, and not many months since, when people said the system could not work in snow;—so great allowance should be made the present winter until this difficulty has a chance to work itself out, as it surely will in time.

Since the above was put in type, a splendid illustration has come to us, in the case of the Electric Railway, of Albany, N. Y. About the middle of December a storm of unusual severity raged during the day, followed by a sleet storm from 8 to 10 p. m., which literally covered everything with a thick coating of ice. Pedestrians were unable to walk along the sidewalks and it was an absolute impossibility for horses to climb the steep hills of that hilly city. But the company kept its cars out all night on short headway and experienced no difficulty in skimming up the hills which other people were sliding down. Any one who is familiar with the severe grades in Albany will appreciate the above. It was the first time cars were ever run all night there.

A FRANCHISE was granted by the Board of Aldermen for another street railway to be sold at auction. The proposed route is from the East River, through East Fifty-fourth street, up Avenue A., single track through East Eighty-fourth and Eighty-fifth streets, thence across Central Park by the transverse railroad already constructed, to West Eighty-sixth street, to Ninth Avenue, to Seventy-ninth street, to the North River. This route was named on application of the East River, Central Park and North River Railroad Company, and the controller is authorized to sell the franchise to the highest bidder.

IN DEEPEST LONDON.

THE ONLY ROAD OF THE KIND IN THE WORLD A PERFECT INSULATED RAIL.

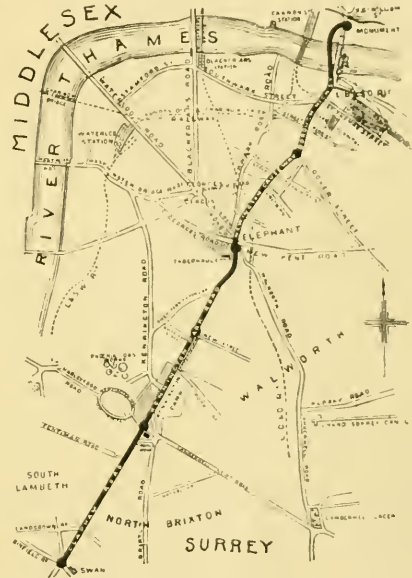
EARLY in November last a most brilliant company of nobility and engineers of rank, accepted the invitation of the City & South London Railway Company to assist in the official inauguration of a work which has occupied four years. Contrary to the general impression in this country the road was not then thrown open to the public, that event occurring more recently, the management wisely preferring to wait until every detail had been finished and the entire undertaking complete.

Stretching to the south from the Thames River at London Bridge, is one of the most densely populated districts in all the great city; and not only this territory, but much tributary to it, have for years struggled through a single street, congested with a chaotic mass of vehicles and foot passengers, in their efforts to cross the river and reach the city. The only relief thus far has been a street railway which conveniently came to an end one-half mile from the bridge, leaving the passenger to the tender mercies of omnibusses and cabs, or a most fatiguing walk, as the only means of completing the trip. As time went on the increasing volume of population, growth of business and the army of visiting foreigners, made this Jordan more and more a hard river to cross.

In 1886, the above mentioned company was incorporated by act of Parliament, and authorized to construct an underground line from King street, a short distance north of London Bridge, crossing the river a little to the west and extending to the "Elephant and Castle," at Newington, a distance of nearly one and a half miles. In this, as in the subsequent enlargement of the original plan, the route employed followed the line of the thoroughfare to more fully accommodate travel, with the tunnel laid at a sufficient depth so as to avoid all interference with sewers and underground structures. After work had been in progress three years, its magnitude becoming more apparent daily, the company was induced to accept a further concession from Parliament, which in 1887 was granted, and the route extended to Stockwell, opposite "The Swan," and at the last session still further extension was granted, from the present terminus at Binfield street to the commencement of Clapham Common. Work on this last named portion of the line has not at this writing been commenced, but soon will be.

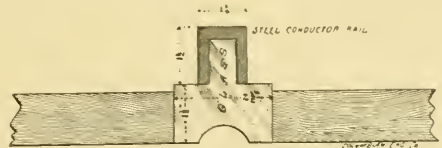
There are seven stations, which on reference to the map will be found at convenient intervals and located on King William street, Great Dover street, The Elephant and Castle, New street, Kensington Park, Kensington Oval and the last at Stockwell. Construction on the great work was commenced in October, 1886, when the tunnels were driven from the Old Swan Pier, in the River Thames. The tunnel work has been carried on by means of a specially designed shield, the invention of J. H. Greathead, the company's chief engineer, and the only difficulty encountered was the wet bed of sand and gravel,

near the end of the line at Stockwell. The details of this ingenious machine have already been published. One point of special importance, and unusual in an undertaking of this kind, especially of this magnitude, is that it has been brought through to completion without the loss of a single life. This is the more remarkable when it is remembered that this method of driving under compressed air, when the wet bed of gravel was encountered,



was a feat of engineering which had never been accomplished before, and has attracted general attention and praise from engineers all over the world, and is now in use in tunnel work in this country. The tunneling has been made without affecting any building, nor can its course be detected anywhere along the surface of the route.

The tunnels are fifty feet below the street, and passengers pay when passing through a turn-stile, a plan similar to the elevated roads in this country. They then enter a commodious room, which rests upon a hydraulic lift, which quickly discharges its load on the platform,



INSULATED STEEL CONDUCTOR RAIL.

where the train of three cars is in waiting. The cars are cylindrical, seat thirty-four passengers and are elegantly furnished and lighted with incandescent lamps. The motor car is used for that exclusive purpose, and will

develop one hundred effective horse power. The car axles are made the shafts of the armatures, each working independently and up to twenty-six miles per hour. The current is obtained through collecting shoes which fit and slide on the third rail placed mid way in the track. This rail is of high conductivity, rolled for the purpose.

The insulation obtained is extraordinarily high, so that when the full pressure of 500 volts is on the entire system, the leakage of working and feeding conductors is but one ampere: which is but a small fraction of one per cent. of the total power required. This remarkable economy is worthy of careful investigation. The power is located at one central station, and derived from

three generators, each driven by a 375 horse power vertical compound engine. These engines work under 140 pounds of steam, make 100 revolutions, which gives a piston speed of 450 feet per minute. The flywheels are 14 ft. diameter, 28 in. face, and drive the dynamos at 500 revolutions per minute, by means of 26 in. leather chain belting. The generators are the Edison-Hopkinson type, and the armature alone weighs two tons--the entire machine seventeen tons. It can be run as shunt or compound only, as desired; and is expected to deliver 95 per cent. efficiency. The construction cost was \$3,850,000, or about \$1,000,000 per mile of double tunnel for the excavation and shell.

THE LARGEST CABLE ROAD IN THE WORLD.

EIGHTY-FIVE MILES IN OPERATION.

THE enterprising city of Melbourne, Australia, with its half million of people proudly boasts of the largest and one of the best, cable roads in the whole world. The Melbourne Tramway Company was formerly an omnibus company, employing 1,500 horses, at that time there was not a mile of street railway in the city. Three years ago work was commenced to cable the routes formerly covered by busses, until now there is in most successful operation eighty-five miles of cable railway.

When the company first opened its lines, some 1,600 "wagonettes," which carried six passengers within and two outside, a four wheeled vehicle drawn by one horse, did a thriving business, running on the same streets and in regular routes, although owned by the drivers. They carried for the same fare and were then quite popular. But the grip car gong sounded their death knell, and now there is less than one third as many in use, and these chiefly to hire by the hour, as Hansom cabs are in this country.

The change in motive power was accompanied by an increase in traffic which in twelve months reached an amount four times what it had been under the old method, although the busses ran on two minute headway. The cable system comprises sixteen traffic lines, on which the cars move at from nine to ten miles per hour, a singular provision in the franchise providing that the "cars must not make less than six miles per hour." The total length of the 24 ropes is 456,448 feet, in sections 11,000 to 30,000 feet each. There are ten power stations, the larger driving three lines; and equipped with engines of 375 H. P. and 750 H. P. The engines are all in duplicate. The car equipment consists of 433 closed cars, each seating twenty-six passengers; and 430 grip cars, built on the San Francisco style, with side seats. Open cars are not popular in Melbourne, and the two put in service the past year were all the company will build. Only once or twice during the season, on some very hot night, do the public go out to cool off, and then two or three grip cars, minus the grips, are coupled

together and fully meet all demands for open cars, which in this country are so very popular. Each car averages a run of one hundred miles daily.

The barn foreman has charge not only of the car house and its men, but includes also the making of the time tables for the lines whose cars run out of his depot. The time tables are made in conjunction with the General Manager, and must be very exact, as a troublesome municipal regulation prevents the using of a man one minute beyond a certain number of hours. This works the utmost hardship to a street railway service, and is very unpopular with the men, who are thus deprived of earning the larger wages which most of them would gladly do if permitted.

The system of line or street inspectors is most excellent. Two men, selected by promotion from the ranks, and receiving a higher compensation, are assigned each line, their hours being so arranged that one is always on duty and both during the evening rush. These men spend all their time on the street, and are held responsible for cars moving on time, and being properly run, stopping for passengers, and the like; and they also look after extra crowds at special places.

The new men are taught by special instructors, and are required to pass the examination on every division of the road, including the Division Inspectors, before accepted by the company. They do not receive compensation while working as "students."

One of the best features of the management is the "No Free List," except to the company's own employes. Policemen pay their fare or walk. Firemen do the same. Ditto city officials and everybody else. The fare is six cents of our money.

The managing director, is Mr. F. B. Clapp, in which he is ably assisted by Mr. H. A. Wilcox, General Manager.

Newsboys are not allowed on the cars, and the plan works to the satisfaction of all--except the newsboy. The company employs 1,630 men, exclusive of office force, and the track construction cost \$50,000 per single mile.

A Practical Letter.

WOODLAND AVE. & WEST SIDE R. R. CO.,

CLEVELAND, O., JAN. 10, 1890.

Editor Street Railway Review:

Your letter of the 14th was received. I am happy to congratulate you upon the advent of the STREET RAILWAY REVIEW, and Chicago as the birthplace of your new enterprise, and I am sure you cannot fail to give to those interested with us throughout the country a journal that all will appreciate.

I do not know at this time that I can say anything of interest to your readers, and I am hardly clear that I should attempt it, as my experience has been confined to horses as a motive power.

On returning to my office this afternoon, from a trip over our extensions of lines, built the past season, and also over territory where the old tracks have been replaced with heavy girder rail, I was more firmly impressed than ever before with the importance of building a substantial track as a foundation upon which to do our business daily.

With the remarkable rapidity with which electric motors have been displacing horses throughout the country within the past two years, it was perhaps not possible to relay all tracks with a heavy girder rail, many have thought they could have one or two years' more service from their tram rails, and ran a motor many times heavier than the horse car over the light construction. As a result of this working over a poor foundation, the repair bills for electric motors have been very large, so much so, that we are inclined to believe it has been very detrimental to the adoption of electricity on our large roads in cities.

If we were constructing a large building instead of a track, we naturally would estimate carefully what the weight of our structure would be when completed, and lay a foundation to support it; we need a stronger bed to rest our tracks, on in proportion, than a building, as the strain is in more directions and not so evenly divided. From our observations we are of the opinion that even in small cities and towns, nothing but a heavy girder rail should be laid. We think it economy, whatever motors are used, to lay nothing lighter than seventy eight pound girder rail to the yard. We have laid about 1,900 tons of this, and a section weighing eighty two pounds to the yard, on ties of oak seven feet long, 5x8 in., three feet from centers; three tie rods to the rail, with a fish plate eighteen inches in length, three bolts in each end giving us six bolts to the joint, laid in some localities, on Johnson Co.'s chairs and in other on Wharton's, and several miles without chairs of any description, spiking the rails direct to the ties, which in this instance we laid two feet from centers. The only fault we anticipate with the latter construction is the depth between the head of the rail and top of the tie, being six inches, rather too shallow to lay paving blocks. If a rail was rolled on the principle of building girders, say nine inches deep, the increased space of three inches would admit of paving well without the use of chains; with sufficient number of tierods we believe there would be no tendency to tip outward.

We ought also to be careful if laying double track, cars operating constantly in one direction on each track, to place the tie at the farther rail joints, within six inches of the tie that supports the joint direct, as this part of the joint always receives the blow of the car wheel, and is always the first half of the joint to go down. Of course, when it is but a single track, cars operating each way, it would probably be equalized on the wear of each part of the joint.

Being tenants in the streets and subject to so many excavations under our property, as sewer, gas and water connections, paving and repaving streets, it is not to be wondered at that we should hesitate on the first cost of our track construction, but we should remember that if we are to adopt electricity—and I say electricity because, if cable, we are necessarily called upon, without choice, to put in a more permanent construction—that we are operating with very delicate machinery that is very susceptible to jolts and jarring, and the heavy weight of our cars, together with their high speed and the friction between wheel and rail, are all very important factors to the ultimate financial success of our roads.

J. B. HANNA, Sec.

Comparative Popularity of Mechanical and Horse Traction.

BY H. A. EVERETT, SEC. EAST CLEVELAND R. R. CO.

STATISTICS of earnings on street railway lines, changed from horse traction to mechanical traction, are invariably in favor of mechanical traction. The writer has had considerable experience in changing of four routes, and the percentage of increase has varied from 25 per cent to 100 per cent increase, with no shrinkage, taken in comparison with routes still operated by horse power. The horse power lines hardly show the same aggregate of earnings as the former year, and in all events, the percentage of increase on horse lines is almost *null*. It is now clearly demonstrated, we think, that horses must go. On large, compact routes, carrying upwards of 20,000 passengers daily, there is no question but that the cable is the cheapest and best; whereas, on longer routes, with less patronage, we think the overhead wire has come to stay, and firmly believe that overhead wire electricity and cable are the only two methods of propulsion that at the present time are worth considering. We have chased after the "will o the wisp" of storage batteries, compressed air motors, "concentrated, smokeless steam motors," soda engines, etc., without number, and at the present writing, none of them are worth exploiting. To say that they never will be would be folly, as the marvelous progress in all branches of mechanics in the past few years has astounded the world. We firmly believe that in places too small to operate two-horse cars the cheapest present plan is to still continue to use horses, but if electric force can be purchased without the expense of a separate power plant, we are confident that the increase in earnings will satisfy any small company that the right thing was done in changing their system to electric.

A MODEL CABLE PLANT.

THE BROADWAY LINE, ST. LOUIS. PECULIAR CONSTRUCTION NECESSITATED BY UNUSUAL OBSTACLES.

IN 1889, the Chicago syndicate, of which Mr. Charles B. Holmes was President, added the St. Louis Railroad, or Broadway line as it is more generally known, to the list of street railways owned by them in St. Louis. The demand for rapid transit was at once recognized by them, and in April, 1890, they closed a contract with Wright & Meysenburg, the well known engineers of St. Louis and Chicago, to build a first-class cable railway the entire length of the line, making the longest continuous cable line in the country. Wright & Meysenburg having already built three cable lines in St. Louis, were familiar with the road and at once proceeded with preparations for the work. The enterprise was begun about May 1st, on the street, and notwithstand-

forty-two pounds per yard and the Johnson girder track rails, weighing seventy-eight pounds per yard, are bolted with three-quarter inch bolts. After these are bolted on and lined and surfaced, the conduit is formed between the yokes, with Portland cement concrete, in the usual way used in the construction of first-class roads. The carrying sheaves on this line are filled with babbitt in the rim, making the cable run noiselessly. The bearings are babbitt blocks, dropped loosely into cast iron boxes which are filled with grease. These are keyed to cast iron frames with bolts which are anchored to concrete blocks built into the sides of the conduit. The curves on this line, fifty-four in number, are all of large radius, two and three hundred feet. The yokes for curves are heavier than for straight



MAIN POWER STATION, BROADWAY CABLE LINE, ST. LOUIS.

ing the difficulties generally met with in this class of work, the roadbed was practically completed on the 20th of September and the horse cars were back on the entire line on the 3d of October. This we believe is about the quickest time on record for cable construction East of the Rocky Mountains.

ROADWAY.

The roadbed is built in about the same style and manner used in the construction of the well known Olive Street line in St. Louis, by these same contractors, being composed of a cast iron yoke, weighing about 370 pounds, every four feet to which the slot rails, weighing

track and the curve pulleys, twenty-two inches in diameter and three and a half inches deep, are fitted into wrought iron frames which rest on brackets bolted directly to the yoke. These frames and pulleys are light and very convenient, making it an easy matter to renew them when necessary.

THE GRIP.

The grips used on this line are what is known as the bottom grip, the same as used on several roads in San Francisco, Los Angeles, Portland and other places, with some improvements suggested by experience elsewhere. The cable is clamped by this grip on the sides and comes

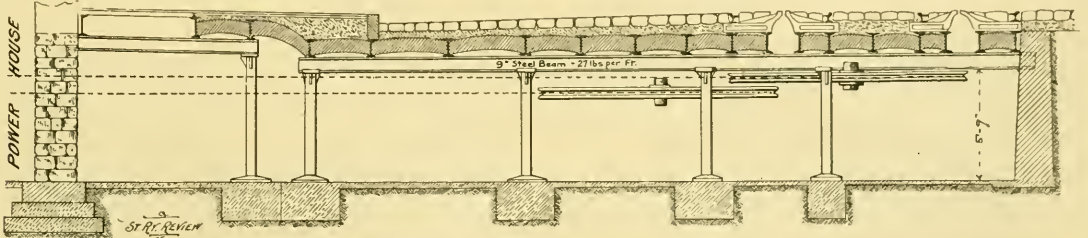
into the grip from the bottom. The grip jaws are fifteen inches in length. One hundred and sixty of these grips, made entirely of steel, were furnished by the McMurray & Judge Architectural Iron Works, of St. Louis.

PITS.

These are a radical departure from those seen in most cities. They are very light and strong, being built of twelve inch steel I beams and cast iron yokes bolted to the top. The space between the I beams is filled with brick arches. This gives the maximum of strength for carrying the street traffic and takes up very little room, the distance from the top of rail to the bottom of beams being only twenty-three and one-half inches. This allows

There are seven different cable tracks crossing it at about right angles. Each of these tracks takes two crossings, which are made of one casting, representing eight yokes cast together, the whole weighing about three tons, this makes a homogeneous mass which can not get out of shape being no bolts or rivets to get loose.

There are also two steam rail-roads and several horse and electric roads crossing this line. These latter on account of the great weight of the electric motors had necessarily to be built very strong. This was done by bolting cast iron girders between special heavy yokes, one girder on each side of the slot rail and one under each track rail. These girders carry the crossing rail and thus relieve the slot and track rails of the cable line of the

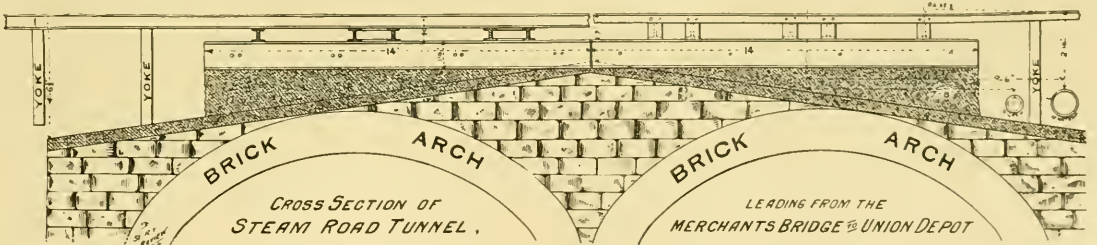


SIDE ELEVATION OF PIT IN FRONT OF POWER STATION.

the twelve foot turning sheaves to be kept up within twenty-four inches of the surface, thus doing away with the objectionable angle in the cable where it comes into and leaves the pits over the four feet elevating sheaves. There are five of these pits on this line, one at each power house, one at each terminal and one in the center of town, where the two center cables come together. One very great advantage we noticed in these pits was the ease with which a person could get around in any part of them without any danger of coming in contact with cables or sheaves.

weight which would soon break them down if the crossings were built as the ordinary steel rail crossings.

There is also a combination of circumstances on this line which we do not remember having seen anywhere outside of St. Louis. There is a double brick arch rail road tunnel running along Washington Avenue from the Eads bridge to the Union Depot. The backing over the arches on this tunnel comes within twenty-one inches of the surface, thus leaving very little room for the cable road crossing it. There is also a crossing of the Lindell electric line immediately over this tunnel. The cable



SIDE ELEVATION OF CABLE TRACK CROSSING STEAM ROAD TUNNEL.

The large twelve foot sheaves on this line are carried in cast iron U frames, with bronze bearings, these are anchored down to concrete blocks with one and one-half inch anchor bolts. These U frames and sheaves were furnished by the Fulton Iron Works of St. Louis. The carrying sheaves and curve pulleys were furnished by the Stedman Foundry and Machine Works of Aurora, Indiana.

CROSSINGS.

This line has undoubtedly more cables crossing it than any other in the country except one line in San Francisco.

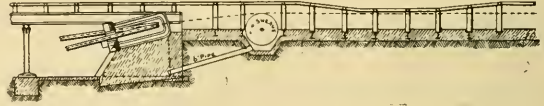
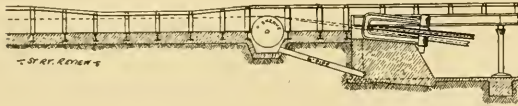
construction and this crossing are carried over the tunnel on twelve inch steel I beams and special yokes bolted to them very much like those used for the pits.

These pits and crossings were designed by Mr. H. M. Kebby, Chief Assistant Engineer of Wright & Meysenburg, who has been with them since they built their first cable road in St. Louis. He also had charge of the plans and construction of the power houses, machinery, etc.

POWER STATIONS.

There are two power houses on the line which while not exactly alike in outside appearance are yet near

enough alike inside so that one description will do for both of them. The engine room is ninety feet by seventy. To the rear of this on the left as you enter is the tension room, one hundred seventy-five feet deep by thirty-four feet wide. Root's double tension carriage is employed. To the rear of this is the spool room, forty by thirty-four feet, with room for four cable spools, which are unloaded directly into it from the cars. To the right of the tension room is the boiler room, one hundred twenty-four by thirty-five feet and in the rear of this is the coal room. Running along the rear of the



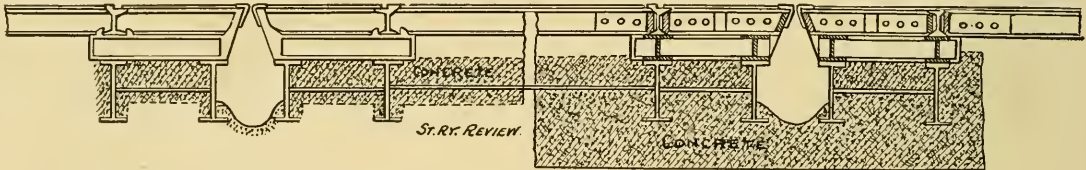
DEPRESSION IN TRACK FOR PICK-UP.

building is a private switch, owned by the company, on which they receive their cables, coal, etc. This track is supplied with a pair of fifty ton Fairbank scales. In connection with the coal room is a very elaborate system of coal handling machinery which was supplied by the McQuire Machinery Company, of Chicago. The coal is shoveled from the cars into a conveyor, which takes it to an elevator, this drops it into a bin which shoots it both ways to two other conveyors, these take it directly to the immense sheet iron tanks, holding twenty-five tons each, from which it drops directly into the mechanical stokers, of which there are two to each boiler, supplied by Westinghouse, Church, Kerr & Company.

the genial manager and vice-president. This firm also furnished the machinery for the Olive St. and Citizens' Railways of St. Louis. The machinery consists of a center driving shaft 18 inches in diameter, which is connected to the two crank shafts by face couplings. This shaft carries two 24-inch face cast iron pinions, which mesh into a mortise gear, 24-inch face and 15 ft. diameter, on each drum shaft, thus making all four of the drums drivers. The teeth on the pinions and mortise gears are staggered so that great strength and steadiness are gained. There is a pair of gears and pinions for each pair of drums and a

coupling between them on the main shaft, so that each cable can be run independently of the other if necessary. The crank shafts were also furnished by this firm, the cranks being sent to them to be pressed on. They also furnished a 24 foot diameter 60 ton fly wheel for each crank shaft. These wheels, considering their size and enormous weight are models of their kind. The driving machinery weighs 400 tons. There are five grooves on each drum, and the cable will be given two wraps. The machinery and engine foundations are 14 feet of concrete. Drums are 14 and 16 feet diameter.

The tension carriages and drums were furnished by the Walker Manufacturing Company of Cleveland, Ohio.



CROSS SECTION OF CROSSING BROADWAY AND WASHINGTON AVE.

The front of the building is composed of Missouri red granite, Lake Superior red sand stone and St. Louis pressed brick. The sides are of pressed brick with lime stone trimmings. The buildings are very handsome, airy and light. The roof of engine room is carried on a row of trusses of the Finck type, with steel channel purlins bolted to the trusses. These purlins are filled with hard wood and the two inch sheathing is fastened direct to them, thus doing away with the rafters generally used, and making a very strong and neat appearing roof. To this sheathing the slate is fastened. As a matter of fact we believe these power houses are the most complete and imposing of their kind in the country. The buildings were erected by R. W. Morrison & Co.

MACHINERY.

The winding machinery for both power plants, which is very substantial and complete, was built by the Fulton Iron Works of St. Louis, of which Mr. Geo. W. Fisher is

The Walker Differential Drum, which has given such surprising results, and which is acknowledged by all cablemen as one of the greatest discoveries yet made, is of course adopted as necessary to make a perfect plant.

ENGINES.

The engines, two of which are in place in each power house, are 36x72 Wheelock improved variable cut off. Each is 700 nominal horse power. These engines have been found specially adapted for cable work, and combine greatest economy of operation with simplicity of construction and are exceedingly sensitive, a requirement that is needed in street railway work more than in any other business.

BOILERS.

Two 500 horse power Hazleton tripod boilers are in place in each house, supplied with Hazleton vacuum heaters and purifiers. They are bricked in and are each

surmounted with a very handsome brick stack 100 feet high. Each boiler is supplied with two furnaces equipped with Roney mechanical stokers.

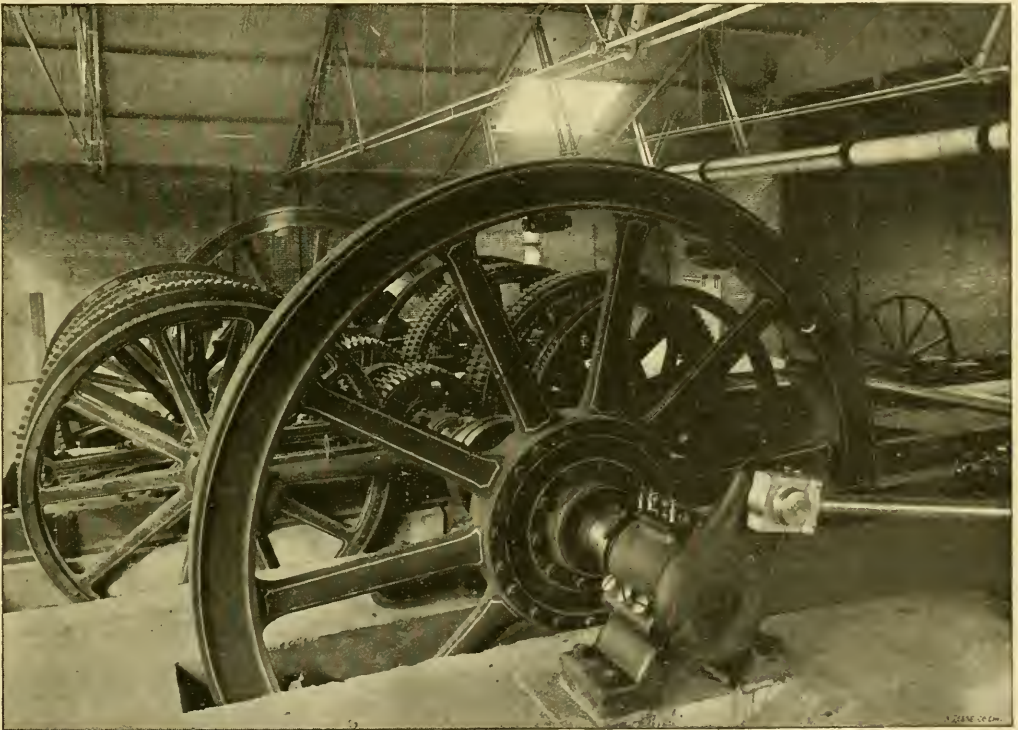
STEAM PIPES, PUMPS, ETC.

All this work, which is one of the most complete and substantial in the country, was done by the firm of Kupperle Bros., of St. Louis. The steam pipe from boilers to engines is 14-inch lap-welded pipe, with aluminum cast iron flanges. Between the boilers is a copper corrugated expansion joint, and in place of elbows where the pipe drops down to the engines there is a copper bend of five feet radius. This is to take care of the expansion between the engines. The exhaust, 16 inches where it leaves the engines at each end of cylinders and 24 inches from where these come together, is made of No. 8

one of each is used for hot and cold water and the third can be used for either. The feed pipes are so connected that any part of the boiler room equipment can be cut out for repairs or cleaning without interfering with the operation of the plant. All valves used on this work, gate, globe, chronometer, etc., are the genuine Jenkins Bros. valves. The sizes running from $\frac{1}{4}$ inch to 24 inches.

The floor of the engine room is of granitoid, no wood being in use whatever, and the exhaust pipes, where they are under the floor are either arched over or covered with iron plates so that any part of it can be readily got at without disturbing the floor.

A very unique and economical feature of these plants is the means used for saving and purifying the water for

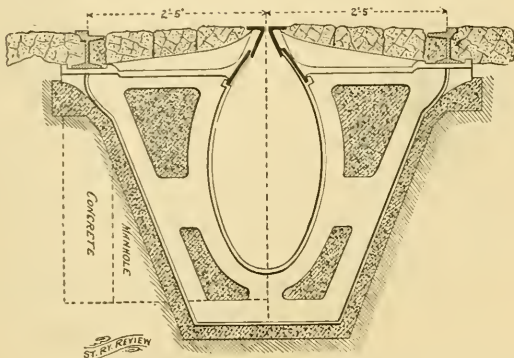


SIXTY TON FLY WHEEL AND DRIVING MACHINERY, BROADWAY CABLE LINE, ST. LOUIS.

steel riveted pipe. This runs under the floor from the engines to where it enters the boiler room. After reaching the boiler room it rises straight up to the roof, being connected on the way to the vacuum heater and just above this having a 24-inch back pressure valve. This valve is the largest of its kind ever made by Jenkins Bros. It is used here in connection with the exhaust steam heating apparatus. On the top of this pipe is a condensing exhaust head which returns the water from the exhaust steam direct to the heater and it is then again used for steam. The pumps are Hooker No. 7, three of which are in each boiler room, and are connected so that

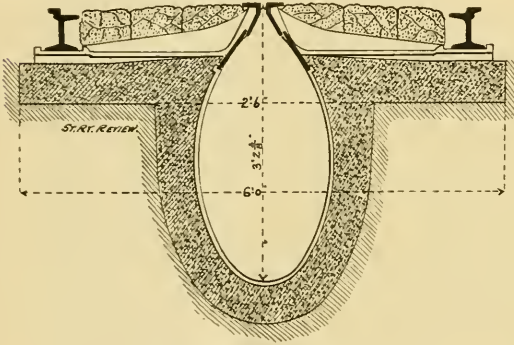
the boilers. A large cistern about 4 ft. deep and capable of holding 50,000 gallons of water is constructed between the tension pits. The water runs directly into this cistern from the street mains until it is about half full when the water is shut off by a float valve. The other half of the cistern is reserved for rain water from the roof. All the roofs of power house and car houses being drained into it. The water is settled in this tank and then pumped into two wooden tanks, 6 ft. by 20 ft., which are raised above the floor of boiler room so that the water runs from them by gravity into the heater. The hot water is pumped from the heater into a pumper above

the top of the boilers from where it drops to a second purifier standing on the floor of boiler room. after passing



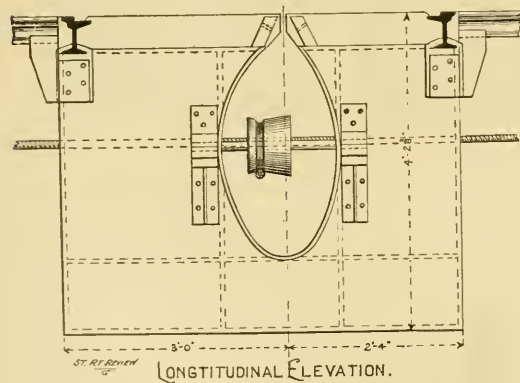
SECTION OF ROADBED THROUGH YOKE.

through which it enters the boilers near the bottom. These purifiers are filled with coke and are connected



SECTION OF ROADBED BETWEEN TWO YOKES.

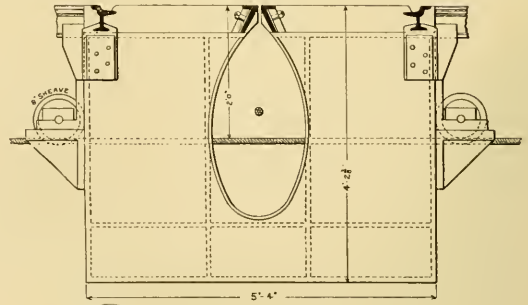
directly with the boilers with Cinch pipes. The power for driving the coal handling machinery is transmitted from a 50 H. P. vertical engine by 1-inch manilla ropes. This



LONGITUDINAL ELEVATION.

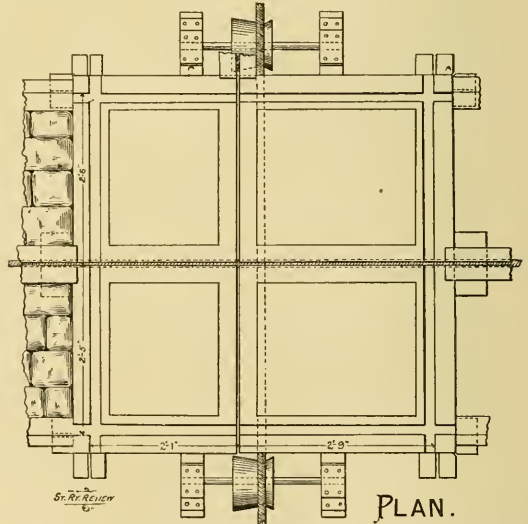
engine will also drive a 400 light incandescent dynamo, which will light the car house, power house and offices. The electric lighting plant is the Thomson Houston system.

The grip cars and coaches are very neat and are furnished by the Brownell Car Co., of St. Louis. Grip cars



END ELEVATION
CROSSING OF THE BROADWAY AND OLIVE STREET CABLE LINES.

are 20 feet long and boxes 26 feet, and are very handsome specimens of the car builder's handiwork, while strength has not been sacrificed to looks. Both wheel and track brakes have been put on, thus insuring every possible precaution. Fifty trains of two or three cars



PLAN.

SURFACE CONSTRUCTION AT CROSSING OF BROADWAY AND OLIVE STREET CABLE LINES.

each will be put in service from the start, and operate from 5 a. m. until midnight.

The cables, of which there are four, are 1 1/4 inches in diameter and 11,300 ft., 28,250 ft., 20,500 ft., 21,000 ft. in length, are made by the Broderick & Bascom Rope Co. of St. Louis. The proposed speed of ropes is 10 and 12 miles per hour.

Great praise is due Capt. Robt. McCulloch, the energetic manager of the syndicates lines in St. Louis, for the way in which the cars were kept running over this line all summer notwithstanding the way in which the street was blocked by the work of laying the cable track. He is now breaking in the gripmen on the north end and expects to be operating the entire line by cable about the 1st of February.

Stedman Foundry and Machine Works.

THE entire equipment of street pulleys for the Broadway cable system was furnished by the Stedman Foundry and Machine Works, of Aurora, Indiana. These pulleys are ground perfectly true and smooth with emery wheels traveling at high speed. Then lined with babitt metal, which gives great wearing qualities without injuring the cable. Other roads supplied by the company are the Vine Street Cable, at Cincinnati, Denver Tramway Co., Denver, Providence Cable Co., Providence, where they are giving excellent service.

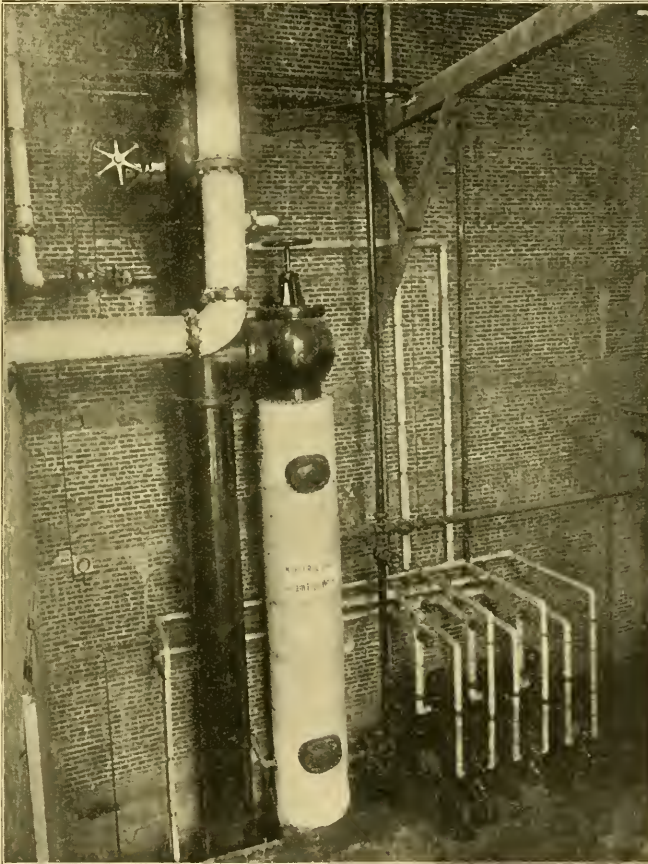
THE severe snow-storms during the past few weeks which in many places, have been the heaviest in the country since the adoption of electric lines, have given the managers the desired opportunity of determining the extra power required on such occasions.

THIS must necessarily be a matter of experiment, which actual experience alone can determine, and the fact that a few companies in some cities have met with more or less delay in this, their present combat with heavy snowfalls, is no argument against the ability of the electric system to cope with it. It shows the necessity for the adoption of plows, or cars with scrapers on at short intervals, and the need of an ample surplus power at the generators. With many Companies the business incident to the change from Horse to Electric power has grown so rapidly as to use up, in a large degree, the reserved power which they had counted on in this emergency, and the public should be patient and consider the fact that an increase in power plant cannot be accomplished in a day.

THOSE companies who have leased their power from other companies, seem to have fared the worst, and with hardly any exception are fully realizing the necessity of owning their own plant and being in a position to increase their power at will.

Flegles Pipe Covering Co.

THE entire steam piping system in the Broadway Cable Plant is covered with a wrapper made by the above named company, and composed of layers of sheet asbestos and paper felt, half an inch thick, and covered with canvass, and painted. Such a perfect covering is it that with a temperature of 365 degrees on the exterior surface of the pipe, the heat outside the covering is so slight that a person can hold his hand on the pipes without discomfort. The economy in heat from this source is considerable.



INTERIOR OF BOILER ROOM, BROADWAY CABLE PLANT ST. LOUIS, SHOWING PIPE AND VALVE SYSTEM OF KUFFERLE BROS.

THOSE of our readers who attended the national convention in Washington, will be interested in a special act of the legislature of Virginia, which has just incorporated the Alexandria Railway Company, with authority to build from Arlington to Mt. Vernon. At present this resting place of the father of our country is accessible only by boat or carriage, and the construction of this line most certainly ought to meet with very gratifying results.

THE Street Railway Company at Tyler, Texas, are piously inclined, having donated a lot to the Presbyterian Church of that city.

AN accident occurred to a lady in a Boston Street Car, resulting from a runaway horse colliding with the car; the shafts penetrated both the side of the car and the passenger.

BECAUSE it was an elevated road, from the station of which one O. T. Jarvis fell and broke his thumb and jaw, etc., he places his damages high, and would like \$55,000 from the Brooklyn Elevated Road.

A DESTRUCTIVE fire occurred on the morning of January 20th, consuming the large manufacturing plants of the Standard Metal and Belding Electric Motor Company, at Hermosa, a suburb of Chicago. Loss \$225,000, insurance \$200,000.

A REMARKABLE RAILWAY RECORD.

After Eighteen Years as President and Superintendent, C. B. Holmes Resigns.—His Last Annual Report a Most Interesting Document.—A Splendid Tribute from Two Thousand Employees.

IN 1873, C. B. Holmes was elected superintendent of the Chicago City Railway. At that time it had only twenty-two miles of road, sixty bob tail cars, and few facilities. The road was badly-run down, and on last trips drivers frequently drove into the barn with a load of passengers, leaving them to walk home as best they could. There was no discipline among the men and the accommodations given the public were very inferior, when viewed from to-day.

Steadily and earnestly he applied himself to the work, and by incessant and intelligent labor, brought system out of chaos. The first radical change was in abolishing the bob-tails. Then came double tracks, and in 1881 the first twenty miles of the cable system, for the introduction and adaptation of which Chicago is unquestionably indebted to Mr. Holmes. Other improvements and betterments have been added almost daily, until the plant to-day is second to none in the world. His policy has always been a liberal one in a marked degree, both with employees and the public. A most progressive man, he read with unerring eye the trend of the future and laid extensions here and cross lines there, long in advance of any riding population, securing not only franchises, now of inestimable value, but inviting settlement in the south division of the city by thousands. This one man by his persistent extensions of lines, rapid transit facilities and transfer privileges, has done more than any other one cause to enhance the value of south side property twenty millions of dollars and add to its population one hundred thousand residents from the other divisions of the city. Few companies have expanded with such rapidity that in eighteen years their track increased from 22 to 154 miles; their cars from 60 to 1,250; and the daily business from 30,000 to 200,000 passengers.

Mr. Holmes is acknowledged the leading street railway manager in America.

Mr. Holmes has kindly furnished the STREET RAILWAY REVIEW with a copy of his last report, made January 15th, 1891, and from this most comprehensive document we extract the following:

TO THE STOCKHOLDERS OF THE CHICAGO CITY RAILWAY COMPANY.

Gentlemen:—

In order to present an intelligent statement regarding the condition of your property and the operations of the past year it may be necessary to review somewhat matters that have been presented in former reports, but bespeaking your patience, the statement will be condensed as much as shall be consistent.

EARNINGS AND EXPENSES.

During the past year the number of passengers carried was 68,734,969, producing a revenue to the company of

\$3,436,748.46; of this \$2,311,455.14 was earned by the cable cars, and \$1,125,293.32 by the horse cars. The cost of operating the road was \$2,297,651.43, leaving for net earnings \$1,139,097.03. Out of this has been paid for interest \$220,270.88, and four dividends of 3 per cent. each on a capital of \$5,000,000, amounting to \$600,000.00—total, \$820,270.88; leaving a surplus, \$318,826.15.

The net earnings, after paying interest, amount to 18 37-100 per cent. on the capital.

The year was the most prosperous in the history of the company, as the gross earnings of the road exceeded those of 1889 by \$564,246.70. The average earnings per day were \$9,415.75; the average daily earnings exceeded those of 1889 by \$1,545.88, showing that an average of 30,917 passengers were carried every day in 1890 more than the previous year.

The per centage of expenses to earnings was 66 85-100—a decrease of 3 72-100 over 1889.

The cost of operating per mile per car was, by cable, 9 650-1000 cents; by horses, 21 985-1000 cents.

Number of miles run by cable, 12,740.480; number of miles run by horses, 4,859.200.

The net earnings of the road for the last five years were as follows: 1886, \$619,253.85; 1887, \$686,259.85; 1888, \$683,338.53; 1889, \$845,339.37; 1890, \$1,139,897.83.

EQUIPMENT.

The present equipment consists of 60 40-ft. box cars, 76 16-ft. box cars, 472 21-ft. box cars, 450 open cars, 222 grip cars, 47 snow plows, and 7 sweepers; exclusive of the 100 grip cars not yet completed.

The total number of cars now owned by the company is 1,250.

REPAIR DEPARTMENT.

During the year there has passed into the shop for repairs, of greater or less magnitude, 2,479 cars.

The cost of car repairs for the year was \$108,876.95.

TRACKS.

During the year there have been added 4.21 miles of track, making a total of 152.95 miles; of which 34.19 are cable, and 118.76 horse lines.

During the year there have been laid 73,676 square yards of granite paving. In doing the work there have been consumed 1720 car loads of material, an equivalent of 9382 days work of teams, and 66,300 yards of filling.

HORSES.

At the beginning of the year the company owned 2273 head of horses. During the year there were purchased 635 horses, at a cost of \$79,460.00, an average of \$125.13 per head. The number that died was 132, entailing a loss of \$17,230; 268 horses were sold for \$34,854.38,

which was \$24,257.38 less than they cost; making a total loss of horses that died and were sold, of \$41,487.38; leaving on hand at the close of the year 2508 horses.

At one time during the year grave apprehension was felt lest a contagious and dangerous disease, which broke out among the team horses, should extend to the various stables of car horses: but fortunately, through the untiring efforts of the Veterinary Surgeon and barn foremen and assistants, the disease was confined to the one stable. The number of horses lost from this cause was 31.

The daily cost for each horse has been: For hostlers, 19½ cents; feed, 15½ cents; loss by death or depreciation, 4¾ cents; shoeing, 3¾ cents; miscellaneous stable expenses, 2⅓ cents; bedding, ¾ cents; repairs of harness, 1 cent: a total of 47 65-100 cents per day.

PRINTING DEPARTMENT.

The printing of transfer tickets, trip sheets, and other matter is performed in the printing department, at a saving of fully \$4,000 during the year, over what the same would have cost if done in any other way, and it has the further advantage of having the work done under the company's close supervision. The amount of paper consumed was forty-three tons.

CABLE SYSTEM.

The company's cable system is composed of thirteen cables, aggregating 205,040 feet in length. The loop cables are operated at a speed of 7½ miles per hour; the cables north of Twenty-First street, at 10 miles per hour; the cables from Twenty-First street to Thirty-Ninth street, at 11 miles an hour, and south of Thirty-Ninth street, at 14 miles per hour.

The power to move the cables is furnished by three power plants—one at Twenty-First and State streets, another at Fifty-Second and State streets, and the third at Fifty-Fifth street and Cottage Grove avenue. The latter is equipped with two engines of 1,000 horse power each, and three boilers of 500 horse power each: one engine and one boiler being always held in reserve.

On some of the days, when the travel was the heaviest, the amount of power actually generated by the 1,000 h. p. engine was 1,375 h. p. As the heaviest days this year in a short time be the average power consumed, arrangements have been made to provide for increasing demands by contracting for two engines, each 44x72 inches, to be placed on the same foundations now occupied by the present engines. The cost of these engines will be \$26,500, and will be capable of transmitting 1,800 h. p. each. The displaced engines will be removed to Twenty-First and State streets, and used as additional power to the four 500 h. p. engines now in use. At the latter place no change will be made in the present machinery, except the main shaft will be extended sufficiently for these two engines to be connected with it. The machinery now in use is ample for doing the work, but the rapid growth of the business will soon consume all the power, hence the two 36x72 engines will be added for reserve.

On the 13th of October last a 9-inch shaft in the pit at Madison and State streets broke, when it was discovered that the shaft was imperfect, having a large flaw in the very center, although it had been in use for over three years. This required the use of horses for a part of the day. This was the first accident of any kind to cables or machinery in three years and three months which made it necessary to use horses on the main lines.

The power at Fifty-Second and State streets is ample for all present necessities, and so far as we are able now to judge, will be equal to even to the demands upon the company during the World's Exposition. The boiler capacity in all the plants, including reserve power, at 80 lbs. pressure to the square inch, is 5,000 h. p., and all the engines, boilers and other machinery are in first-class condition.

ACCIDENT DEPARTMENT.

Where accidents have occurred through the carelessness of employees, the same has, as far as possible, been collected from the parties at fault, and in this way \$4,222.08 has been paid into the treasury. The effect of this is very salutary in causing employees to be extremely careful in the handling of the cars.

Settlement has been made in four cases for \$7,939.50, in which judgment has been rendered for \$1,000 in excess of that amount besides interest. In these cases the amount sued for was \$70,000.

There has been paid during the year the sum of \$10,768 for the settlement of forty-six cases, in which the aggregate amount for which the company was sued was \$515,000. The sum of \$12,102.35 has been paid for the settlement of 232 cases, upon which suit had not been brought. The total expenditure was \$30,809.85. There are now 112 cases pending in the various courts, a less number than at any time for several years, and the amount claimed in these suits is \$1,288,600.

In almost every instance your agent has been shown by the party injured, the cards of from eight to ten law firms, who had solicited the case, representing to the prospective client that a fortune could be gained for him by suing the company. One attorney has gone so far as to carry with him a scrap-book containing clippings from the daily papers showing the verdicts that he has from time to time obtained in such cases; and the agents of these firms daily search through the police records and make inquiries in the drug stores and saloons along the lines of the road to learn, if possible, if any accidents have happened during the day, and the whereabouts of the party who met with the misfortune. A considerable portion of the suits brought against this company are frauds of the most amazing character, and in these cases the claimants and their abettors do not hesitate to take any steps, however disreputable, to accomplish their aims. To expose these schemes requires untiring energy and the expenditure of large sums of money, because so many different clues must be followed, so many different interests placated, so many new friendships cultivated, and so many avenues of fraud explored before the facts can be absolutely determined; for in this class of cases it is impossible, as fre-

quently no accident occurred, to meet the matter in any other way than by breaking down the testimony of the plaintiff and his abettors by exposing him.

In one case a verdict was rendered of \$6,000, for a plaintiff whose case rested solely upon her own perjury, backed up by that of a professional witness. Immediately afterwards such evidence was obtained as showed conclusively how bare-faced had been the fraud, and the plaintiff's attorneys were very glad to consent to a new trial.

In another case a witness who had made a very favorable statement, showing no fault by the company, was so manipulated that his testimony was exceedingly hurtful; but this was shown up in its true light, resulting in a verdict for the company and holding of the witness by the Judge, of his own motion, to the Criminal Court.

In one case a judgment was secured against the company simply because the plaintiff was such a violent and outrageous intimidator that witnesses were afraid to testify against him, although he had cut the coat almost entirely off from the conductor of the car and inflicted injuries upon him.

EMPLOYEES.

It is no easy problem to secure thorough discipline and yet retain loyalty and hearty good will, without which a corporation must have a disastrous career. Wages are an important factor, but not an all-controlling one. In this direction the policy of your board and executive officers has been to be liberal in compensation, exact in requirements, to exercise justice to all, and freedom to every man to make known his grievances, and persistently endeavor to make every employee feel and know that permanency and promotion depend solely upon fidelity and skill. Prompt recognition and manifested appreciation of faithful service is as potent as regular pay. That this course has been reasonably successful is shown by the fact that during eighteen years, including very turbulent periods, the company has not had a single strike, and every employee is loyal and earnest in his devotion to the company. This is worth many thousands of dollars a year to any large horse-railway enterprise, and much more to a cable line, where machinery covering thirty-five miles is wholly in the hands of the employees, and its quicker speed renders accidents more liable to occur and more serious in result. Loyalty for which mere wages do not pay and cannot secure, is proven when a furious and protracted snow storm, attended by intense cold, must be encountered. On a cable line, any negligence or lack of skill which permits a blockade, even for a short time, may so encumber the track that machinery and cable may be seriously impaired and \$50,000 of damages easily result. The writer has himself battled with such a storm for sixty hours in succession, with only five intervals of thirty minutes each, and knows whereof he speaks touching the heroic loyalty of the men who staid with him.

The fact that while street railways are proverbially and almost universally the safety valve for the ill humor of an entire community, in the case of this company, the corporation possesses the hearty good will of the public and

its employees—an asset of vast proportions—for public sentiment is the atmosphere in which a street railway must live and operate. If roses will not thrive in the snows of Labrador, neither will a street railway prosper in an antagonistic public sentiment.

In eighteen years your property has grown from 22 1-2 miles of track to 152 miles, and from 60 bobtail cars to 1,250 of the largest and best; its revenue has increased from \$600,000 a year to nearly three and one-half millions; its patronage from 30,000 passengers a day to 200,000; the speed of its cars from five miles an hour to an average of ten miles an hour. The company has developed a cable system second to none in the world in extent, efficiency and public regard.

During all this period not a new car has been built or bought, not a new horse added, not a rod of track constructed, not a building erected or enlarged, until the same was duly considered and authorized by your Board of Directors. It has been the constant study of your Board to keep pace with the tremendous growth of the city, to stimulate and guide it. While caring for the present and seeing that every quarter a dividend was paid to the shareholders, your Board has studied carefully and patiently the ever growing and widening demands of the future upon this corporation, for which it is morally and legally bound to provide. In so doing, both in your interest and equally in the interest of the public, it has been called upon to check some ambitious enterprises and earnestly foster others. Such competition as would cripple this company and thereby injure the public, it has sought to forestall and prevent, and in place thereof has reached out in magnanimous spirit and broad policy, to give the people unexampled facilities which would have been impossible for any others to furnish.

With a conscientiousness of having done what they could and having earnestly endeavored for many years to develop and protect your interests, the Board of Directors return to you the trust committed to them, with the property in better physical condition than at any former date in the Company's history: with the most marked good will of your patrons; with a thoroughly organized and efficient corps of employees; and with the earnings of the road at the highest mark ever attained, and with prospects the most encouraging.

If a word personal to the writer is permissible, he would like to say that having tendered his resignation from all connection with the Company at the close of nearly twenty years' association, and having done so in the interest of harmony and that no obstacles should interfere with the introduction and operation of any new policy or methods, the shareholders in their wisdom should deem desirable to inaugurate, he retires from a position which has been attended every hour by grave responsibilities and deeply felt anxieties. It has fallen to his lot to hold the helm through crises when the most precious interests of the Company were at stake and guidance was difficult. Prominent among these were:—

1. The change from animal to cable power, a pioneer movement involving new and untried forces, under condi-



C. B. HOLMES.

tions never before encountered, in which a mistake either in failing to act or in acting wrongly would have been fatal.

2. In securing such an arrangement with the City of Chicago, at the expiration of the first twenty-five years of this company's life, as should be beneficial to the company; rendered difficult by popular clamor and an imperfect understanding of vested rights.

3. In securing the construction of so many tracks and so locating them as to make your lines worthy the name of a system, and by binding them together by methods of transfer, the broadest, most popular and profitable known to the street railway world; and in all these and all other matters he gracefully acknowledges the endorsement and co-operation of the directors and unqualified support of the great body of stockholders, but looking back from the standpoint of to-day, one almost trembles to feel how different might have been the outcome had these and other matters been prematurely pushed or not pushed at all.

It is seldom permitted any man to impress his individuality so largely on any semi-public enterprise, extending through so many years and involving such weighty issues. For your partiality in permitting him to be identified, either in large or little measure, with your interests, to which he has devoted the best years of his life, he is heartily grateful.

To the members of the board and the stockholders, with whom his relations have always been the most pleasant and harmonious; to his fellow officers, who have labored unceasingly to carry out the policy of the company; to the heads of departments and all the employees, whose expressions of friendship are pathetic; and to the public, whose rights and comforts he has endeavored to study and promote, and who have been wonderfully forbearing and considerate towards his faults, he desires, while regretting mistakes and short comings, to return his sincere thanks and most hearty wishes for enlarged prosperity.

Respectfully submitted,

C. B. HOLMES,
President.

When it became known among the employees that there was a possibility of Mr. Holmes not being on the new board, there was great sorrow among them and the following evidence of affectionate respect is a striking testimonial of the high regard in which he is held by the men. It was signed by two thousand employees and reads as follows:

CHICAGO, January 9th, 1891.

TO MR. C. B. HOLMES, *President and Superintendent.*

It is with deepest regret, amounting to a sense of personal misfortune to us, that we, the employees of the Chicago City Railway Company, have read in the daily papers the announcement of your resignation as President and Superintendent of the company which we have so long served in common.

Permit us to avail ourselves of this occasion, not simply as a body, but each for himself and for his family to thank you, again and again, for the just and considerate treatment we have always experienced at your hands. While there have arisen situations in which your action was not in accordance with our views at the time, we recognize now that it was for the best good of all concerned. You always found a way

to maintain the rights and conserve the interests of the owners of the road without prejudice to the rights and interests of their employees and have thus advanced the prosperity of both.

When we needed a friend, you were a friend, were we in distress you succored us, were we misjudged you righted us with an even tempered justice that recognized the rights of all.

We know to how large an extent you have been the architect of success in this great corporation, not only in the harmony which distinguishes the relations existing in its service, but also and especially in the exceptional popularity which it enjoys with the public. To such a degree has your management created and cultivated this popularity that every one of us has felt a personal pride in his connection with the company.

Should you persist in severing your connection with this company, you take with you our sincere admiration as a manager; our deepest respect as a man and our warmest gratitude as a friend.

To which Mr. Holmes replied in the following:

January 13th, 1891.

TO THE EMPLOYEES OF THE CHICAGO CITY RAILWAY CO.

GENTLEMEN:—Your committee, through its chairman, Mr. D. Martin, presented to me to-day your testimonial of friendship, accompanied by very kindly expressions of regard by himself and members of the committee.

In all the years of my connection with this company nothing has so touched my heart as this assurance of your esteem and attachment. For eighteen years we have labored together and have come into closer relations than is usual in business affairs, but during all that time no employee of the company has ever spoken a disrespectful word to me or treated me with discourtesy. To sever connections so pleasant, of such long duration, and so strongly cemented, is very painful to me, but your candid and appreciative review of our relations and the assurance of your friendship will always be to me a priceless treasure, enshrined in affectionate memory.

Permit me to assure each of you personally of my regard and esteem, and my gratitude and respect for your loyal devotion to duty, for whatever measure of success has attended the operations of the road is largely due to your fidelity and skill.

That each of you and your families may be highly prospered is the earnest wish of

Your Friend,
C. B. HOLMES.

The stock of the Chicago City Railway is practically held by a very few individuals. These gentlemen a few weeks ago met in secret session, and then issued a circular to the other shareholders, stating that President Holmes was so largely interested in other roads that the City Railroad was being neglected in consequence. As a matter of fact the road has at no period of its existence been in as good condition as to-day, and furthermore, Mr. Holmes states in all his eighteen years connection with the company he has been absent from his office from all reasons combined but eighty-five working days, and only five days during the past year. The real reason why these gentlemen desired a change in the head, undoubtedly is not apparent on the surface, and only time will reveal. A claim that the road has been poorly managed is worse than wasted on any street railway man. Notwithstanding the alleged neglect the new board elected Mr. Holmes superintendent, which however, he promptly declined in the following letter:

CHICAGO, January 17, 1891.

TO THE DIRECTORS OF THE CHICAGO CITY RAILWAY CO.,

Gentlemen: The secretary of your company has notified me of your action in electing me superintendent for the company, with request to attend your meeting to-day, and for such action you will please accept my thanks.

Many friends, including gentlemen on your board, and other stockholders, whose judgment I respect and friendship prize, and many well known citizens not interested in the property, have urged me to accept the position; petitions signed by patrons of the road and a committee of

the employees, speaking for two thousand families, have also had great weight with me; my own disinclination to sunder the ties of a lifetime; and the fact that my long connection with the company has necessarily put me in possession of knowledge on many matters unknown to others, have conspired to make it difficult to discover the path of duty, and make it proper to state why I cannot accept your offer.

The subject of salary has not been mentioned and does not enter into the question. I have never raised that point with the company, but have always cheerfully accepted what was offered, although for many years, and until recently, less than half the amount tendered in other quarters.

In my connection heretofore with the company, it was my duty and privilege to study and plan for its present needs and future development; to submit my plans to the Directory, and by such arguments as I could present, secure their adoption with such modifications as other members of the board would suggest; to be, in a word, the moving and guiding spirit of the enterprise. I assumed this responsibility and bent my energies to the work, grandly supported by a united and harmonious directory.

I am now asked to assume a position in the same Company with the guiding, shaping, and controlling power of the corporation vested in another. This resolves my work into dull routine, with the romance and enthusiasm expunged. It means a life with such narrow boundaries it cannot fail to degenerate into the sordid and mercenary. Were I to enter into this relation, under existing conditions, it might be impertinent

for me to suggest a line of policy, and if not, my motive would almost certainly be misunderstood and impugned; and though I might do all in my power honestly and earnestly to carry out the plans adopted, the inevitable might prevent, leaving ground for suspicion of disloyalty, a state worse than death to one of my temperament and constitution.

In the tremendous labors which must be performed by the Chicago City Railway Company in preparing for and discharging its duties during the next three years, in my humble judgment, success cannot be attained except some one man shall put his own shoulder beneath the load and carry it, and this he cannot do except as he has the full confidence of every member of the Board and is one around whom every member can rally with enthusiastic and unqualified support, and this must be supplemented by the hearty and loyal co-operation of his subordinates, down to the humblest employe. The good name of our beloved city will be involved and the Company will be honored or disgraced before the world.

Under these conditions my acceptance of your offer might be disastrous to the Company. Moreover, there have recently come to me proposals from other institutions in this and other cities, where the positions tendered would give scope for personal development and public benefit, always precious to every earnest man.

For these reasons, I must respectfully decline your offer, with sincere thanks for its tender.

Very truly yours,

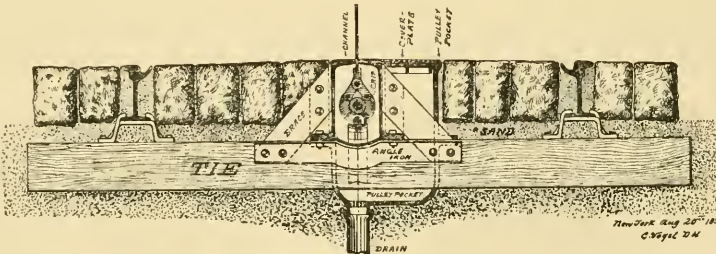
C. B. HOLMES.

CONSTRUCTION AND EQUIPMENT NOTES.

The Vogel Cable Construction Company.

OUR readers will notice in this issue the advertisement of the Vogel Cable Construction Company, a corporation recently organized to promote the construction of cable railways. The patents which were the principal assets of the late Vogel & Whelan Cable Company have been acquired by the new company, which also controls all the more recent inventions of Mr. Charles Vogel, who was the originator of the valuable improvements developed by himself and Mr. Frank Whelan.

of such width as to leave the proper slot opening at the top. The sides are braced at suitable intervals by side and bottom angle bars, riveted to the conduit sections while the latter are being manufactured. This form of conduit is greatly superior to the old form used by the Vogel & Whelan Company, in two respects—first, the constant width of the slot opening is preserved, without bracing to the ties or rails; and, second, the tight bottom of the conduit carries the drainage at once to the pulley pockets, dispensing with the former concrete sub-drain beneath the ties.



The principal new devices offered by the company are an improved form of cable conduit and road-bed, designed by Mr. Geo. S. Morison, C. E., and Mr. Vogel, and a duplex grip, and other details of a duplex cable system, recently perfected by the latter.

The new form of road-bed has many advantages, and is a radical departure in cable road construction, the rails and conduit being supported on cross ties, which is, in the opinion of the engineers of the company, the only rational method of railway construction.

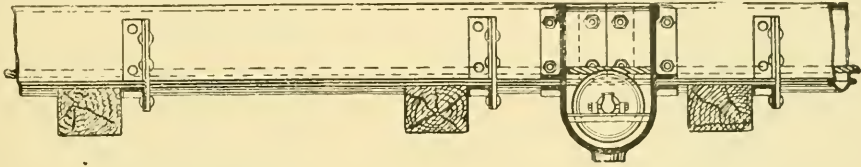
The conduit is made of rolled iron or steel in sections of about thirty feet each. The sides, which are of special Z-bar section, are riveted to a flat or curved bottom plate,

The Vogel grip, which, for the common $1\frac{1}{8}$ inch cable, is a cylinder $4\frac{1}{2}$ inches in diameter, is so compact that it requires a conduit only ten inches deep; the ties are placed ten inches below the street surface, which is about the depth usual in the construction of first-class horse railroads, and which is necessary in order to clear the paving stones. Ordinarily no excavation is necessary below the ties except at the pulley pockets. In cases where the pavement is laid on concrete, the ties, whether of wood or metal, may be bedded in the same.

At every joint the Z-bars are cut away on one side so that free access may be had to the pulley, the cover of the pulley pocket being so arranged as to take the

place of the Z-bar and preserve the continuity of the slot opening. The proposed pulley pocket is of cast iron of suitable size and shape, and provided with a drainage outlet. Full details of this and other features are shown in the accompanying drawings.

An experience of nearly two years on the road built by Mr. Vogel, at Butte City, Montana, has proved that a small conduit, even when built of wood, is easily kept clean, and



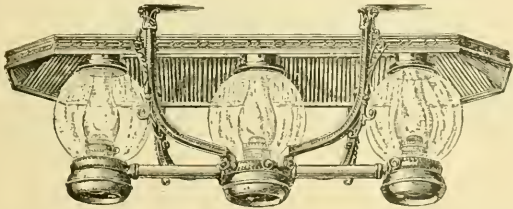
considerations of public health demand the use of a conduit which is frequently cleaned, rather than one in which the street filth is allowed to accumulate for some time.

The great advantage of the system offered by the Vogel Cable Construction Company lies in the rapidity and cheapness with which it can be constructed. The ties being once in position, the conduit sections, of the same length as the rails and weighing but little over one ton each, can be placed on the ties and bolted together and to the intervening pulley pockets almost as rapidly as the rails can be laid.

The Vogel Cable Construction Company is prepared to license such companies as prefer to construct their own roads, and to form sub-companies to undertake construction if desired. The organization of the company includes men of such high standing as Mr. George S. Morrison, the eminent civil engineer, Mr. J. F. Barnard, President of the Ohio & Mississippi Railway, and Mr. Edwards Whitaker, a well-known banker of St. Louis. These gentlemen, together with Mr. D. D. Bush, C. E. who will act as manager of the company, and Mr. W. C. Pratt, Secretary and Treasurer, will form the Board of Directors.

A Handsome Lamp.

WITH the advent of electricity as motive power, and its accompanying application for interior lighting purposes, the advantages of a well lighted car have become more and more apparent. The electric roads almost universally employ the incandescent



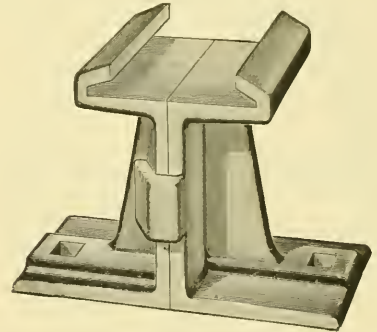
light, but the large number of companies still operating horse cars are just as desirous of furnishing as good, with oil. The lamp manufacturers have displayed very commendable zeal in their efforts to work out this problem for the railway men, and a new center light, of three

individual lamps, has just been perfected. It is strongly constructed, attractive in appearance, and by means of a canopy reflector effectually throws a soft yet strong light to every part of the car, and obviates the necessity of the objectionable end lamps.

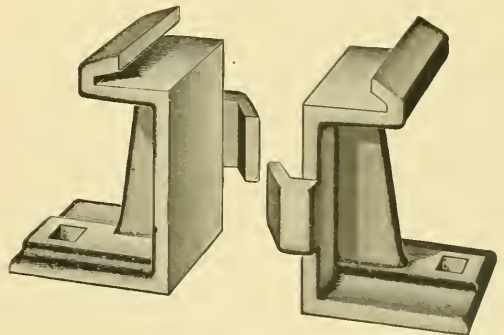
Josephine D. Smith, of 350 and 352 Pearl street, New York, is the inventor and manufacturer.

A Boltless Chair.

THE Patent Dublex Chair, shown in the accompanying illustration, exemplifies a new idea in chairs for supporting girder or T rails. The manufacturer, Geo. W. Wells, of Worcester, Mass., claims for it, ease



of application, no nuts to screw up, a firm grip on the rail and great strength and durability. Its great feature is its simplicity, there being but two parts—both identically alike, so that the laying can be accomplished rapidly, and all parts adjusted without the use of wrenches, bolts or

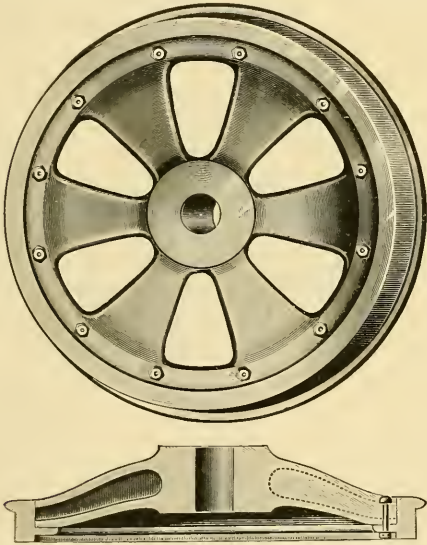


nuts. It is particularly applicable to electric roads, as there is nothing to jar loose under the heavy service of motor cars. The vertical strength of the device is very great, as the disposition of the metal is such as to provide an ample support, and the rail is grasped so firmly as to leave no question as to its alignment and guage, and also

assures a very substantial support. Mr. Geo. W. Wells is a civil engineer and street railway contractor, and he invented this chair to meet requirements which, in his long and varied experience, he has found necessary to a perfect road-bed. Although the invention is of recent date, it has been adopted by two prominent roads of the country, to one of which, the Worcester Consolidated Street Railway, the manufacturer refers by permission. Those who contemplate making extensions or alterations during the spring will do well to investigate the merits of this new device.

The Latest Paper Wheel.

IN October, 1890, the Allen Paper Car Wheel Co., of Chicago, brought out a filled car wheel for street cars, designed to be the same to the street car service that their large wheels are in the steam railroad service. In point of fact, in street cars running on only



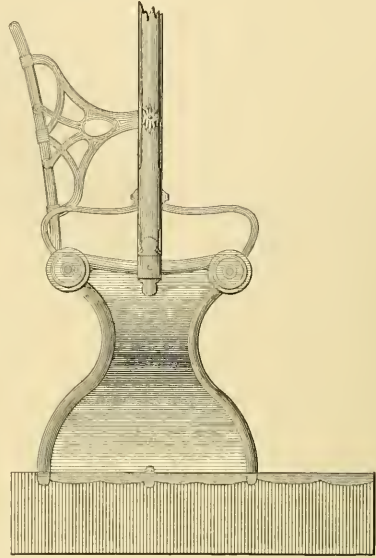
four wheels, as most of them do, the wheels are so rigidly fastened to the car sill that the noise when in motion is directly transmitted to the interior of the car; and in winter when the ground is frozen is often almost unbearable. Recently the Allen Company have made a great improvement in their street car wheel, and now make a spoke-filled wheel which is a great improvement even on the first brought out.

A Bent Post.

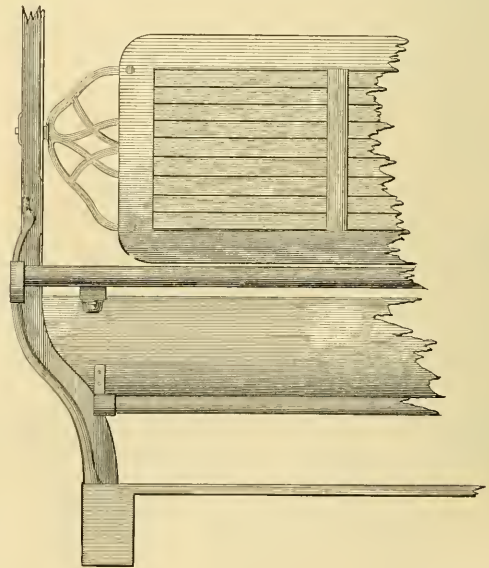
THESE posts are bent by steam and will never straighten out if bent properly, being put on a mould and pressed into shape, making the post much stronger than a post that is sawed to shape, as there is no cross grain.

The frame of the panel as shown in the smaller cut is also bent to shape and the panel let into a groove in the same, and these panels will never split when put in in this way.

Nine of these cars are being built for the Union Electric Company, of Boston, for their storage battery cars. Three will be run on the Beverly & Danvers road, at Beverly,



Mass. Six cars are also being built on this pattern for the Hopedale & Milford, Mass., road, of solid mahogany throughout; all of the wood that shows on both the outside and inside of the car is of this material, making a re-



markably handsome car. These cars are wired for electric bells, and electric registers will be used.

The lower panel of these cars are hung on a hinge to let down when changing the batteries. They are also building a lot of large open cars for the West End Street

Railway Company, of Boston, and are very busy at present getting out a lot of open cars for the summer season for other roads.

A large store house has just been finished, to be used for storing cars only, as they build cars ahead and keep all styles of standard sizes in stock ready for the color. Their capacity this year will be fully double what it was last year, and all orders will receive prompt attention.

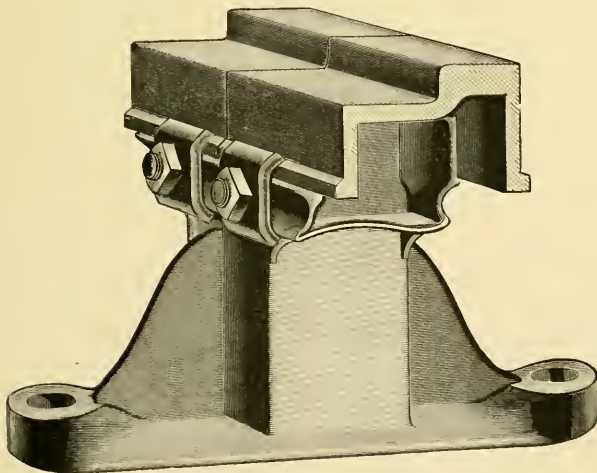
Street railway men will be always welcome and given every facility for inspecting cars in all stages of construction.

A New Motor.

THE Baxter Electric Motor Company have brought out a new motor, which was tried at Baltimore recently, and is said to have worked very satisfactorily. The inventor claims to give increased power with a great reduction in speed, the motor making but 100 revolutions per minute, and also to have lessened the weight about one ton. The motor is connected directly with the axle of the car and the gearing is enclosed in a cast iron box filled with oil. Mr. Robert G. Griffin is Secretary and Treasurer of the works, and David E. Evans, Superintendent. Their developments will be watched with interest.

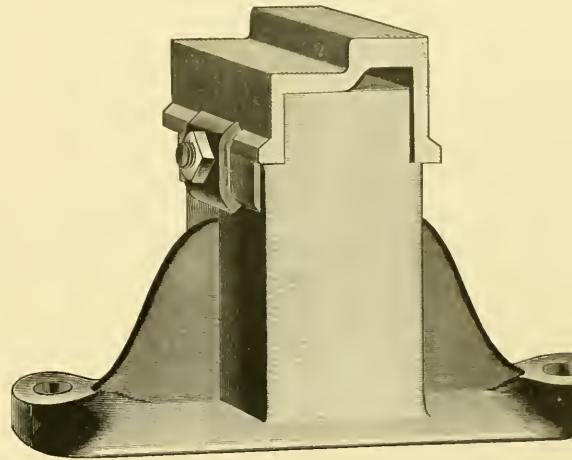
White's Eureka Construction.

THE latest from R. T. White, the prolific inventor, is his Eureka Construction, in which he adopts some of the points now so well known in his Daisy Chair. In this new rail the lower edges of the pendent sides of the rail rest upon the projections on either side of



the chair, and are held to it, by the same system of clamps that are used in the Daisy Chair. This facilitates construction work, and the paving on settling cannot work under the head and flange of the rail, and also allows the replacement of a new rail with the least possible labor, and without disturbing the chair.

For joint construction the rail ends are held by two or more bolts, which pass through the clamps and chair, and as the rail has a greater bearing on the chair, than the top of it, rolling or canting is prevented. A feature of the



Eureka Construction is also, that the rail is drawn down solid on the chair as well as so held as to withstand the lateral strain.

Mr. White claims the only patent issued on channel iron rail with clamp fastenings, and guarantees to protect all purchasers against suits for infringements.

Meaker Manufacturing Company.

ELECTRIC lines in Terre Haute, Ind., have been equipped by the Meaker Manufacturing Company with their portable fare registers, of which a daily paper in that city says: "The conductor pulls a string and the register does the rest. The company has supplied registers to remove all worry on the part of conductors in the way of securing a cash balance at the end of the day's business."

A New Lever Brake.

FOR a long time the McGuire Manufacturing Company, of Chicago, have been at work on a new brake for motor cars, and have fully satisfied themselves of what they now offer to railway managers. It is at once simple and efficient, two vital principles in every street car appliance. It can be worked from either end of the car, and leaves the center of the truck open for the motor or grip. The brake shoes are made to act as the fulcrum of the rock-shaped brake beams, and will, therefore, always receive more pressure than is on the brake-rods. As the proportion of the levers is as six to one, it gives almost 17 per cent. more pressure on the shoe than on the connecting rods. It is so arranged that the giving out of any one of the brake connections will not diminish the effectiveness of the brake, a most important factor in the operation of electric and cable cars especially.

ECHOES FROM THE TRADE.

THE RUSSELL CARETTE COMPANY have something decidedly unique in carettes, which will fill a demand never before supplied. We shall fully describe it next month with suitable illustrations.

THE BALTIMORE CAR WHEEL COMPANY are unusually crowded for this season of the year with orders for their well known wheels and duplex car gear, both of which are so widely adopted and give such splendid service.

LEWIS & FOWLER GIRDER RAIL COMPANY are now well under way with the manufacture of their new rail, and among others, are rolling the iron with which to relay the old lines of the Albany Railway Companies.

THE STANDARD REGISTER AND INDEX COMPANY, of New York, report a very prosperous year, especially through the large Western companies who have adopted a stationary register, and from whom they have received their share of trade.

THE DORNER & DUTTON Co., of Cleveland, report a continued strong demand for their trucks and wheels, and electrical road pinions, which have yielded such excellent returns. The Hathaway Patent Transfer Table is also made by them.

SMITH, OF NEW YORK, seems rather vague, as there are several families of that name in town; but when the street railway men remember that this very same Smith family are the oldest builders in the country of headlights, lamps and all styles of lighting apparatus for street cars, it is very plain to discern to which Smith family they belong.

THE ST. LOUIS CAR Co., say of the year's business, "We have been obliged to double our capacity the past year, it having been a far better year than we even expected, and we still find ourselves lacking in room, but expect with our additional facilities to handle our large and increasing business, and deliver cars as promptly as first-class work will permit."

THE FULTON IRON WORKS, of St. Louis, have every reason to feel proud of their splendid work in the Broadway Cable Power Plant, especially as it is the third complete plant they have furnished for that city. Capt. McCullough says: "We have yet to find a flaw in the construction, which speaks volumes for Wright & Meysenburg, the contractors, and the Fulton Iron Works."

AMERICAN CASUALTY INSURANCE SECURITY Co., of Baltimore, who through their General Agents, Beecher Schenck & Benedict, at 120 Broadway, N. Y., are making a specialty of insuring street railway companies against all liability, either to employees, the public, or any property belonging to the public, resulting from the operation of the road. This method of insuring is meeting with favor with many of the leading companies.

THE CARETTE LINES.—Mr. Brickwood, President and General Manager of the Russell Street Carette Co., of Chicago, has just returned from a trip to New York, Philadelphia, Washington, Buffalo, Cleveland and Detroit, taking orders and inspecting the operation of this popular style of street car, as they already have a line running in each of those cities; all of which are making preparations to place their new open cars on their lines in the early spring.

ILLINOIS STEEL COMPANY.—Mr. Yale, the General Sales Agent, says: "Although we have been rolling girder rails for nearly a year we were not able to push this part of our industry on account of all our mills being crowded to their full capacity with orders for T rails and other work; but we shall hereafter be so situated that we can fully care for this branch of our business, and will be able to deliver all kinds of street railway rails upon short notice."

THE GIBBON DUPLEX TRACK is attracting careful investigation, not only from new companies who are to decide on what track they will adopt, but older ones who contemplate renewals the coming season. Mr. Gibbon has just returned from a western trip, where he placed contracts with two of the largest steel mills in the country to make their rails, besides making complete surveys and preparations for equipping several roads in different western cities.

THE PRICE RAILWAY APPLIANCE Co., of Philadelphia, have just brought out several very interesting devices for track work, comprising a new form of flat rail and chair and sleeper construction, which utilizes a much larger proportion of the weight for actual wearing purposes than has been heretofore obtained, and especially adapted for electrical track. Our February issue will contain full details and illustrations of these, which are well worthy of careful study by all managers.

THE ELECTRIC MERCHANDISE COMPANY, OF CHICAGO.—In reply to the interrogatory of "How are you pleased with last year's business?" Manager Mason replied with a self-satisfied smile "As this is our first year we hardly knew what to expect when we came to strike our first balance; but the results were not only surprisingly gratifying, but far beyond our most rosy expectations. Although young, we feel old in the business, and the outlook for the present year is in every way satisfactory."

THE WALKER MANUFACTURING COMPANY, of Cleveland, have been obliged to greatly enlarge their manufacturing quarters, and their new building, almost completed, will be very extensive and one of the finest in the country. The Cleveland Cable Company's entire plant was furnished by the Walker Manufacturing Company, and is one to which the builders may point with great pride. This cable road has been just opened and combines all the latest improvements.

SHULTZ BELTING COMPANY, OF ST. LOUIS.—Mr. Shultz said: "Should anyone have told me five years ago there would be such a demand for my goods in filling an important part in transporting the weary people in our streets, no doubt I would have smiled. Yes, we have had our share of the street railway trade, and in a great many cases find that nothing will fill the bill for dynamo belting but my patent leather link belting, which we recommend specially for that purpose."

THE ELECTRIC SUPPLY COMPANY, OF CHICAGO. Both Mr. Terry, Gen'l Manager, and Mr. Taylor, Manager of the street railway department, report a very large trade in every branch of their business. Mr. Taylor said: "On account of many delays in getting goods for my department, many of which are our own designs, we have had to disappoint a few; but we are now past all annoyances from that source, and are in shape to push our street railway department, and anticipate a very large trade."

THE SHORT ELECTRIC RAILWAY Co.—Probably no company in the field has ever had such a successful business in so short a time. It is said that this company has contracted for equipping over 150 motor cars during the last half of the year, and has more than twenty-four separate roads equipped wholly or in part with their system. Among the latest orders are those to equip the Jamestown Street Railway Co., of Jamestown, N.Y., and the Broadway and Newburg Street Railway Co., of Cleveland.

SAWYER MANNING & Co.—Mr. C. L. Bowler, who has charge of the uniform cloth department of this firm, and who has had many years experience in furnishing uniform goods to both street and steam railroads, and who knows exactly what the peculiar demands for each are,—has brought out a new gray cloth, which is dark enough to be popular and has splendid wearing qualities. The trouble with the blue tricots has always been that the dyes killed the strength, and where severe wear, such as in street cars, was required, it gave out quickly. This has been obviated in the gray and makes it wear like iron.

THE LEWIS & FOWLER MANUFACTURING Co.—Mr. Fowler says: "Although we had a set back, caused by the burning of one of our buildings in the spring, I can say that this has been by far the most successful year our company has ever had, as we have been full of orders in every department; the car shops having been rushed and working over-time for the past year, while our many other departments never did as much. The register, on account of its popularity, having had a steady sale, an order for 200 for the new Broadway cable line in St. Louis being one of our recent large ones; while the snow sweeper and stoves have come in for their share."

THE JOHN STEPHENSON COMPANY, Limited, when read on a street car, is as much a guarantee of its superior qualities, and sound workmanship, as the stamp of the

United States on a silver dollar. Their immense facilities are constantly taxed to the utmost, and the orders already placed for delivery the present year are far in advance of any previous one in the history of this veteran company. The demand in foreign quarters continues good, and American built cars having been fully tried on many foreign lines, and given such unqualified satisfaction, the market in that direction is very inviting. No one has contributed as largely to this as the John Stephenson Co.

THE ELLIS CAR COMPANY, AMESBURY, MASS.—Mr. Ellis says: "Yes, we are now nicely established in the street car industries, and the past year has far exceeded our most sanguine expectations. We find a strong demand in all parts of the country, and managers are more and more coming to realize the economy of adopting the most improved appliances throughout, and want them in their cars. We shall pride ourselves on the wearing qualities of our cars, while not slighting those points which make them attractive. Our bent post is eliciting the most favorable comments from railway men, and we believe it will be universally adopted in the near future. We have just filled large orders for the West End in Boston, Grand Rapids, Mich., Lansing, Mich., Toledo, Ohio, and a number of other Western cities."

THE MCGUIRE MANUFACTURING COMPANY, of Chicago, have the new addition to their already extensive works completed. The new building is a three story brick, 110x115 feet, which gives them ample and much needed room for manufacturing purposes, made necessary by the rapid increase in the demand for their very popular truck. Among recent orders received by them for these trucks, are from Seattle Electric Railway and Power Company, 10 cars; Davenport, Iowa, City Electric Railway, 50 cars; Toledo, Ohio, Electric Street Railway Company, 28 cars; Tacoma, Wash., Electric Railway & Motor Company, for 24 double trucks, on which have been placed three motors for each car, made necessary by a grade of 16 per cent. part of the distance. They are also sending some of their new seven feet steel trucks to be run on the new electric line connecting St. Paul and Minneapolis.

THE UNITED STATES ELECTRIC RAILWAYS Co., at 10 Wall street, New York, under the general management of the well-known mechanical engineer, L. W. Serrell, has made a new departure in the street railway field. Besides contracting for all kinds of electric railway work, they reorganize roads, now in operation, and which desire to change their method of motive power. In this they have exceptionally good facilities, and experience, for placing securities, having already successfully worked out the problem for a number of roads, which of themselves never could have accomplished the desired results. Companies desiring to introduce electricity and not having the necessary capital to command locally, will be glad to investigate this question, and take up the matter at least for consideration.

PERSONALS.

MR. DUTTON, of Dornier & Dutton, Cleveland, called upon us to kindly express his good wishes for the new paper.

W. E. HAYCOX, who has been the efficient Superintendent of the Belt Line in Utica, N. Y., has accepted a responsible position in Cleveland.

W. W. BEAN, General Manager of the St. Joe and Benton Harbor, Mich., lines, returned from Georgetown, N. Y., a few days since where he went to attend the funeral of his mother.

MRS. THOS. LOWRY has returned after a year's absence in Paris, where her daughters have been completing their education. Mr. Lowry accompanied them from New York.

MR. GEO. C. BELDEN, of East St. Louis, has accepted the position of General Superintendent of the Electric Railway at Joplin, Mo., where he has just entered upon his new duties.

E. E. CORNELL has entered upon his duties as Superintendent of the South Bend and Mishawaka Electric Street Railway at South Bend, Ind. The plant is a very extensive one and one of the best in the State, and the public have every reason to expect a first-class service from this time on.

MR. F. D. RUSSELL, recently assistant editor of the *Street Railway Journal*, has accepted the appointment as General Agent for the Rochester Car Wheel Works, with office at Room 53 Stewart Building, New York City, where his many friends will be pleased to call, and are sure of a most hearty reception.

THE appointment by President Wheeler, of the former track-master of the Chicago City Railway to the office of superintendent, was received with great disfavor by the employes, who threatened to strike. The trouble was averted by the resignation of the objectionable party and for the present Mr. Wheeler will himself discharge the double duties of president and superintendent.

MR. S. Z. COLLINS, who has been with the C. M. & St. P. R. R. for twenty-nine years, and the past ten as Superintendent, has entered the Meaker Manufacturing Co., as Secretary and General Manager, with headquarters at 502 Phoenix Building, Chicago. He is a pleasant gentleman, as well as a very capable business man, and the street railway fraternity will not only enjoy making his acquaintance but welcome him to our ranks.

NORMAN Mc CRAWFORD has resigned as General Manager of the Electric Railway of Rochester, N. Y., to accept a position elsewhere, and Mr. Chas. K. Minary of Louisville, Ky., has been elected to that office. Mr. Crawford is very highly spoken of, and had entire charge of the work of changing the service from horse power to

electricity, while Mr. Minary is a son of President Minary of the Louisville City Railway Company, and has grown up in the work. He is a most efficient and a rising young man.

MR. H. H. WINDSOR, who has held the office of secretary of the Chicago City Railway Company for the past eight years, was unanimously re-elected by the new administration. He has now resigned that position to devote all his time to the *STREET RAILWAY REVIEW*. He was educated for a journalist and served for two years as city editor of a western daily, and now brings to his new work the practical experience growing out of a long service as officer of one of the best known railway systems in the world.

Chicago City Railway Election.

AT the election of officers for the ensuing year the following were elected by the new Board: President, Geo. H. Wheeler; 1st Vice President, J. C. King; 2d Vice President, E. M. Phelps; Secretary, H. H. Windsor, and Treasurer, T. C. Penington.

Mr. Wheeler is accounted a millionaire, is about 45 years of age, and has never before engaged in railway work. He will devote his entire time to the position. Mr. Wheeler is also President of the Washington Driving Park.

The Outlook.

REPORTS from supply men and manufacturers of street railway materials, from all parts of the country, indicate a most healthful and prosperous condition of business. The results of last year's work are now generally known, and in every quarter have proved very gratifying surprises in the amount of business done—being far in excess of any previous year.

Everything points to even a greater output in 1891, and on all sides preparations are actively under way to provide for and take care of these enormous and varied demands.

Congratulations.

PROBABLY among all the street railway fraternity there is no one more generally known, or with a larger number of friends than Mr. Augustus W. Wright. As Chief Engineer of the North Chicago Railway for many years, as the author of the first complete work on street railroads published in this country, as a most welcome speaker at the annual conventions, and recently as a builder of cable roads in Los Angeles, Chicago and St. Louis, Mr. Wright's acquaintances are found from ocean to ocean. They will all most heartily unite in warmest congratulations and expressions of good will, as they learn of his marriage which occurred in St. Louis, January 2nd, to Miss Natalie O. Jordan, daughter of Mr. and Mrs. F. G. Jordan. The bride is well known in social circles in that city where she has hosts of friends. Mr. and Mrs. Wright are now in California on their wedding trip, and intend to make St. Louis their home on their return.

FOUND ON THE RUSH TRIP.

American Street Railway Association.

HENRY M. WATSON, PRESIDENT, Buffalo, N. Y.
 W. A. SMITH, FIRST VICE-PRESIDENT, Omaha, Neb.
 CHARLES ODELL, SECOND VICE-PRESIDENT, Newburyport, Mass.
 A. D. RODGERS, THIRD VICE-PRESIDENT, Columbus, Ohio.
 WM. J. RICHARDSON, SECRETARY AND TREASURER, Brooklyn, N. Y.
 EXECUTIVE COMMITTEE—THE PRESIDENT, VICE PRESIDENTS, and THOMAS
 LOWRY, Milledgeville, Miss.; D. F. HENRY, Pittsburgh, Pa.; ALBERT E. THORNTON,
 Atlanta, Ga.; H. M. LITTELL, Cincinnati, O. and THOMAS C. KEEFER,
 Ottawa, Can.

Next meeting will be held in Pittsburgh, Pa., October 21st, 1891.

Massachusetts Street Railway Association.

President, CHAS. B. PRATT, Salem; Vice-Presidents, H. M. WHITNEY, Boston;
 AMOS F. BREED, Lynn; FRANK S. STEVENS, Secretary and Treasurer, J. H. EATON,
 Lawrence.

Meets first Wednesday of each month.

New York Street Railway Association.

President, DANIEL F. LEWIS, Brooklyn; Vice Presidents, JNO. N. BECKLEY,
 Rochester, JOHN S. FOSTER, New York; Secretary and Treasurer, WILLIAM J. RIC-
 ARDSON, Brooklyn; Executive Committee, JOHN N. PARTRIDGE, Brooklyn; CHARLES
 CLEMENSIAW, Troy; C. DENSMORE WYMAN, New York.

Next meeting, Hotel Metropole, New York City, Sept. 15th, 1891.

Ohio State Tramway Association.

JOHN N. STEWART, Ashland, President; JOHN HARRIS, Cincinnati, Vice Presi-
 dent; J. B. HANNA, Cleveland, Secretary and Treasurer; E. K. STEWART, Columbus,
 Chairman Executive Committee.

The Street Railway Association of the State of New Jersey.

President, JOHN H. BONS, Hoboken, Vice President, THOS. C. BARR, Newark,
 Secretary and Treasurer, CHARLES Y. BAMFORD, Trenton; Executive Committee;
 OFFICERS and C. B. TRUBSTON, Jersey City; H. ROMAINE, Paterson; LEWIS PER-
 BINE, JR., Trenton.

ANNISTON, ALA.—The City Street Railway Company are making arrangements for the re-organization and equipping with electric cars a large portion of the old street railway system.

DECATUR, ALA.—A new street railway company calling itself the People's Railway Company has been organized at Decatur.

MOBILE, ALA.—The *Daily Register* now operates its presses by an electric motor, and it is very sanguine that a change will be made in the motive power in the street railway to that system in the near future.

THERE is a strong prospect of the street railway company here adopting storage battery instead of the cable system as they had intended doing.

THE Mobile Street Railway Company are making arrangements to displace the mule system by the overhead electric, the change to go into effect June 1.

HOT SPRINGS, ARK.—Wiley Jones, colored, the owner of the Jones Street Railway System of Pine Bluff, has purchased the Citizens' Street Car Line, paying \$35,000 in cash and \$90,000 in 7 per cent bonds of the consolidated lines for the same. Jones owns now fourteen miles of track, which, with its equipments is valued at \$250,000 and is the only colored man in the world who is the sole owner of a street railway.

VALUABLE franchises for extensions have just been granted to the Hot Springs Street Railway Company for a period of 64 years.

BAKERSFIELD, CAL., is to have a new street railroad.

ALAMEDA, CAL.—A syndicate, headed by G. W. McNear of Oakland, is making plans for putting an extensive line here.

FRUITVALE, CAL.—Construction work on the horse lines will be finished in about two weeks. It is intended to change to storage battery in the course of a few months.

OAKLAND, CAL.—Still another franchise has been granted for an electric road which will run from 8th and Broadway into East Oakland.

H. W. MEEK has commenced the construction of the street railroad, to be operated as a part of the electric road from Oakland to Hayward.

STILL another electric franchise has been asked for. This one by E. P. Vandercook and others, who propose to construct quite an expensive system, and are said to have an abundance of capital.

VISALIO, CAL.—It is expected that the West Side Road will be in operation by March 1.

SACRAMENTO, CAL.—The Central Electric Street Railway Company have received ten car-loads of material and the construction necessary to change their lines from horse to electric system is being rapidly accomplished.

SAN DIEGO, CAL.—If the citizens will give a bonus of \$75,000 a company will construct an electric line there. Prospect good.

OTTAWA, CAN.—Twelve new cars have been received from the Patterson and Corbin Car Company of St. Catharines.

QUEBEC, CAN.—The St John's Street Railway Company recently lost by fire one of their stables including twenty horses and all the other contents of the building.

WINNIPEG, CAN.—One electric car is being operated here this winter, and if the experiment proves successful as it has thus far, the system will undoubtedly be generally adopted in the spring.

TORONTO, CAN.—The city engineer is desirous, on behalf of the city of Toronto, for bids for the purchase or lease of the street railway system in that city, the franchise for which will expire in March. The successful bidder will probably be required to equip a considerable portion of the system with cable or electricity.

ASPEN, COL.—The street railway here is shut down for the winter.

DENVER, COL.—The University Park Electric Road has been sold to the Tramway Company for \$32,000. A single five cent fare will be made to the business portion and the line extended to the center of the park.

DENVER, COL.—The Berkely Motor line has been granted necessary authority to change the lines from steam dummies to electricity: a change for the better.

THE City Council has granted the Highland Street Railroad permission to use steam motors on condition that they will employ electricity thereafter.

THE Tramway Company has added to its present service of cable systems, a five-mile extension of electric line and is to have an all night service on its main lines.

THE Eastern Capital Hill electric road has been finished and is meeting with a splendid business. Mr. Milo A. Smith is the man who is responsible for the extension of this line.

FULLY a million dollars will be expended in this city in 1891, in the extension and improvement of our street railway lines. The greater part of this amount will go for electrical appliances.

A SCHEME is now on foot to connect E. Denver with Elyria. The plan includes a tunnel under the Union Pacific Railway. A bonus of \$25,000 has already been offered as an inducement to build the line.

AN English syndicate, with \$3,000,000 capital, has been organized to operate in this city, and as a part of their plans intend to build a number of suburban electric lines to improve the property already owned by them.

CANNON CITY, COL.—A franchise has been granted Ennis Black, and associates, to construct an electric, cable, horse or compressed air street car line. \$100,000 is pledged to the enterprise and \$1,000 has been put up with the city as a guarantee that the line will be completed. Work will commence April 1st.

THE Montclair Railway Company have contracted with the Edison Electric Company for \$27,000 worth of material. Fifteen new cars are being constructed at the Woeber Works, which altogether involves an expenditure of \$50,000. A four-mile additional line is contemplated.

LEADVILLE, COL.—Within ten months the electric cars will be running through our principal streets and west a distance of seven miles to Soda Springs and the National Fish Hatchery. The line will be driven by water power. The company also proposes to construct a number of four roomed cottages at Evergreen Lakes, which is one of the most delightful summer resorts in the state of Colorado.

DR. JOHN LAW is one of the promoters of an electric railway which it is proposed to build to Evergreen Lakes, at which point the company will erect log cottages each containing four rooms. The medicinal virtues of an air loaded with the perfume from balsam trees, together with the iron and other springs which abound at this place, unite to make it one of the most popular resorts in the state.

DANBURY, CONN.—Through the negligence of the gate attendant, a street car was struck by an express train on the New England road and portions of the street car were strewn along the track a distance of 300 feet. No one was killed, although the driver, who pluckily held to his horses, was badly injured.

THE syndicate who recently purchased the entire street railway interests of the city, is treated to a reception in the form of petitions from four new companies for pretty much every street in town. The latest is the Beardsley Park Street Railroad Company, of which Mr. Jas. B. Beardsley is the moving spirit.

NEW BRITAIN, CONN.—Efforts are being made to extend the street railway system to the surrounding towns of Plainville, Berlin and Farmington.

WEST HAVEN, CONN.—The West Haven Horse Road will equip an electric line soon.

NEW HAVEN, CONN.—A company composed partly of local capitalists has petitioned for a charter for a new electric system for this city. They are very modest in their request and only ask for 62 streets.

WINDSOR LOCKS, CONN.—H. C. Douglas of this place has organized a company to build a horse railroad to Pequonnock and to Windsor, a distance of five miles.

NEW LONDON, CONN.—The company here has petitioned the Legislature to change its corporate name and charter so it will be in a position to construct its lines soon to be operated by electricity. At present the storage battery has the best chance.

STRATFORD, CONN.—A Bridgeport syndicate has perfected the long hoped for plan for a line which should connect the two places. It will be built in the spring and operated by horses at present.

MERIDAN, CONN.—The United Electric Traction Company are already at work substituting a single wire in place of the two overhead wires although the single wire system will not be completed until spring. Supt. Watts is experimenting with an electric heater which he has great hopes will "fill the bill" for the electric cars.

A NEWSBOY darted in front of one car to catch another going in an opposite direction, fell under the wheels and was instantly killed. No blame attached to the company. Still people want papers delivered on the cars.

NORWICH, CONN.—At the annual meeting of the Norwich Horse Railway Company, Wm. A. Shields was elected president, and Tracy Waller secretary and treasurer. True West, who has for many years been manager of the road, was re-elected superintendent.

FARGO, DAK.—The Fargo Street Railway Company are contemplating an extension across the Red River to Moorhead, Minn.

WILMINGTON, DEL.—The City Railway Company are preparing to avail themselves of the franchises recently granted for a number of extensions in that city.

ANACOSTIA, D. C.—The new line is finished and about ready for operation. The company has purchased 100 horses and will employ fifty men.

ALEXANDRIA, D. C.—The plan of connecting this city with Washington by an electric line has again been revived and work will be begun at an early date.

WASHINGTON, D. C.—A bill has been introduced amending the charter of the Rock Creek R. R. Co., authorizing that company to issue bonds for the construction of an electric line.

PRESIDENT HURD has petitioned the commissioners for permission to use gongs on its cable cars, which are not now allowed.

A NEW company, known as the East & West Washington Traction Railroad is petitioning the District commissioners for an extensive route in the city.

THE Metropolitan Street Railway Company, which is ably managed by Mr. J. W. Pearson, have been experimenting for several months past with the storage battery system, and have decided to generally adopt the same. Work will be pushed as rapidly as possible. They will give Washington the four systems of street car motive power, horse, cable, overhead and storage electric and offer a splendid opportunity for comparative results.

JACKSONVILLE, FLA.—The Florida Town & Improvement Company of this city has incorporated over \$500,000, for the purpose of constructing street railways, to be operated by horse, steam or electric power, in several of the great cities of this state.

ORANGE RIDGE, FLA.—The Orange Ridge Manufacturing Company has been incorporated for the purpose of building street railways in this place. Sidney S. Teson is to be secretary.

GAS MOTORS, capable of a speed of twelve miles per hour, will be placed on the lines here, and the frisky mules will be a thing of the past. The Jacksonville Electric Railway Co. has been incorporated with a capital stock of \$100,000.

ST. AUGUSTINE, FLA.—An electric belt line has been incorporated, with a capital stock of \$75,000, to build a road six miles in length.

ATHENS, GA.—Mr. Jas. T. Voss, general manager of the street railway company, is erecting one of the finest residences in the city. It is on an eminence which overlooks two lakes and from which position the entire street car system can be seen. Mr. Voss has received 15 car loads of material for his Electric railway, and construction is now well under way.

AUGUSTA, GA.—The Augusta Street Railway Company has added to its passenger service that of a baggage car. It is doing a profitable business in that line.

A. E. THORNTON has been elected president of the Atlanta Street Railway Company.

SAVANNAH, GA., rejoices over its first electric car, which made a successful trial trip on the Belt line.

THE operation of the Electric Line which was recently opened in this city, has been watched with great interest by all classes. The colored people especially have manifested great curiosity and are willing to spend their last nickel for a ride, many of them remaining on the car for several trips. On the opening day 5,000 passengers were carried on 4 cars. The former horse car drivers have been used as motor men.

STREATOR, ILLS.—Mr. Walker Miller, formerly of Keokuk, has been appointed Superintendent of the Electric street car company.

KANKAKEE, ILLS.—The city council and the Electric street railway company have at last agreed on terms, and an ordinance has been passed that will enable the construction of 5 miles of track and which must be completed by July 1st, 1891.

SPRINGFIELD, ILLS.—The city railway have opened a new electric line on North Grand Ave.

OTTAWA, ILLS.—THE street car conductors who "struck" because their pay was reduced from \$2.00 to \$1.50 per day, have had their places promptly filled with other men, notwithstanding the fact that a few of the "older citizens" resolved in a Mass Meeting to apparently hoof it unless the company allowed its men to operate the road. Walking is poor in Ottawa this winter and the business of the company never was better.

EAST ST. LOUIS, ILLS.—The right of way for the East St. Louis, Venice and Madison Electric railway has been granted to the town of Brooklyn. There is every prospect the line will be built.

ELGIN, ILLS.—The Electric railway here has proved so successful that extensive additions will be made early in the spring.

CENTRALIA, ILLS.—The city council has granted a 20 years franchise to the street railway which is composed of home capitalists.

JOLIET, ILLS.—J. A. Henry, President of the Electric road is planning extensive additions to South Joliet, which will be put in early in the spring.

FREEPORT, ILLS.—Capitalists from Bloomington are figuring on the purchase of the horse lines here, with the intention of changing to electricity.

DANVILLE, ILLS.—The street railroad system, gas plant and electric company have been consolidated into one company.

ROCKFORD, ILLS.—SNOW plows for the electric line here are being built at the Rockford Electric Company's factory.

LA SALLE, ILLS.—Track is being laid for an extension of the electric system.

THE electric road to Peru has been opened and is doing a good business.

A FRANCHISE has been granted for an electric street railway and electric light plant.

LINCOLN, ILLS.—Is trying to get an electric car system.

URBANA, ILLS.—The City Council has granted an ordinance for an electric railway. The project has every indication of success.

SPRINGFIELD, ILLS.—The City Railway Company proposes to erect suitable buildings in Oak Ridge Park in which first class amusements will be given.

RICHMOND, IND.—The Richmond Street Railway Company has given a mortgage to the Union Trust Company, of St. Louis, for \$200,000, to secure the 6 per cent. bonds which are issued for the purpose of making an extension of the electric road. President Shaffer, of Indianapolis, and Russell Harrison, son of President Harrison, are officers, and largely interested in the company.

FORT WAYNE, IND., is experimenting with storage battery cars.

ANDERSON, IND.—President Williams has decided to change his lines to electricity in the spring and add other improvements to the service.

ELKHART, IND.—The street railway and electric light companies which have previously been operated as separate concerns, have been merged into one organization. Mr. W. A. Jackson, of Detroit, who is general manager of the Detroit Electric Company, has been elected director of the new consolidation.

KOKOMO, IND.—Messrs. Avery & Snow, of Detroit, Michigan, have secured their ordinance for an electric railway and will put construction work under way at once.

PRESIDENT BOND says his company will spend \$10,000 in extending its lines to Walton avenue.

LA PORTE, IND.—SNOW & Avery, of Detroit, have secured an ordinance and will build an electric road, which next spring will be extended to the summer resorts on Pine and Stone lakes and to the Baptist assembly grounds.

LA PORTE, IND.—The La Porte County Transportation Company have petitioned for authority to construct an electric line from La Porte to Michigan City, a distance of twelve miles.

DUBUQUE, IA.—The electric street cars are to be heated by electricity. A syndicate has platted 65 acres in West Dubuque and the electric people will doubtless extend their lines to reach this territory in the near future.

MUSCATINE, IA.—The street railway company here has an ordinance in the Council for permission to operate by electricity.

AMES, IA.—A street railway has been incorporated here and the capital stock is \$20,000.

BURLINGTON, IA.—Construction of the power-house for the electric street railway is well under way, and as much of the street work as possible will be done this winter.

CEDAR RAPIDS, IA.—The street railway system of this city, including the line to Marion, has been sold to an Eastern syndicate headed by John Ely. Work will begin soon to change the system from horse to electric.

CLINTON, IA.—The city council has granted an exclusive franchise for five years to the Baldwin Electric Street Railway Company.

THE city authorities have granted the Belt Street Car Company exclusive right to operate by electricity over the territory now occupied by the Clinton & Lyons Company, and the expectation is that they will extend their lines to cover the city of Lyons.

DAVENPORT, IA.—The syndicate controlling the street railway lines in this city, Rock Island and Moline, have voted to increase the capital stock from \$500,000 to \$750,000.

DUBUQUE, IA., is to have its cars heated by electricity.

CRESTON, IA.—It is probable that an electric system will be constructed here this year.

GEORGETOWN, KY.—Work has been begun on the street railway here.

STREET cars have begun operations and the line has been leased to a Mr. Powell at 6 per cent per annum on the cost of construction.

WHITMAN, MASS.—A franchise has been granted to the Hatherly Street Railway Company of Rockland for the construction of a new electric road to Auburnville.

DANVERS, MASS.—The Company have received nine cars from the Ellis Car Works.

HAVERHILL, MASS.—The Haverhill and Groveland Street Railway have increased their equipment by new cars from the factory of E. P. Shaw, Newburyport.

METHUEN, MASS.—Permission has been granted the Merrimack Valley Horse Railroad to erect poles for the purpose of running cars by electricity.

BROCKTON, MASS.—The East Side Electric Street Railway carried 259,000 passengers during the past year with an equipment of three box and four open cars.

NEW BEDFORD, MASS.—Over 95 per cent. of the stock of the Union Street Railway Company has been pledged for sale to a syndicate who desire to introduce electricity.

HOLYOKE, MASS.—The Company here have decided to change their lines to electricity and will use the single trolley system.

ESSEX, MASS.—The Essex Electric Street Railroad Company has received the necessary authority from the Board of Railroad Commissioners to issue coupon bonds to the amount of \$100,000. Must be going to build some lines in Essex.

SPRINGFIELD, MASS.—The granting of a franchise for an electric line over Maple street has aroused the indignation of the nabobs residing thereon, but the common people, who are in favor of electric service, turned out in mass to save it.

AMESBURG, MASS.—E. P. Shaw, of this city, who recently purchased the railway lines at Norwich, Conn., has just bought the street railway system of Dallas, Texas, and has gone there to spend the winter.

RANDOLPH, MASS.—The franchise has been granted, and the Brockton Street Railway will at once prepare to construct lines here.

WHITMAN, MASS.—The electric line has opened with great success and the cars are crowded to the utmost capacity. Thomson-Houston system is employed.

BOSTON, MASS.—Wm. H. Clark, superintendent of routes and time tables of the West End Road, has been missing for some time. He probably tried to find his way across the city.

SALEM, MASS.—A few days' circulation secured 4,000 petitioners to have the Essex Electric Railway extend to Willows. Salem people know what is good for them.

BRADFORD, MASS.—A company here is trying to get a franchise for an electric railway.

CHICOPEE, MASS.—An extension of time to 1892 has been granted the company in which to complete their work.

NORTH EASTON, MASS.—Several public meetings have been held urging the granting of the necessary permission to the East Side Company to instal an electric system. The enhanced value of real estate which will result is urged as one of the great advantages.

NEWBURYPORT, MASS.—The electric road is progressing finely.

ATTLEBORO, MASS.—The People's Street Railway Co. have the people with them in their plan to put in a road there.

BALTIMORE, MD.—Work has been begun on the extension of the Columbia avenue and John street line of the Union Passenger Railway. One-third of the Baltimore & Powhattan Railway has been purchased by the North Baltimore Street Railway and will hereafter be operated by that company. The City Council recently made an excursion to Boston for the purpose of inspecting the Thomson-Houston system as operated by the West End company. They were very favorably impressed with the service which is being rendered in Boston. A syndicate representing the interests of the Union Passenger Railway have purchased the franchises and outfit of the Baltimore, Cantonsville & Ellicott Mills Railway, which was sold by auction for \$95,340. \$90,000 of which was paid for the franchises and real estate. The company had 12 cars and 30 horses and was operating 6 miles of track. President Perrin, of the Union company, is laying the ground wire in his new extension in the hope that he will be allowed to use electricity before very long.

CUMBERLAND, MD.—Mr. C. I. Duncan, of Johnstown, Pa., will make his home here and be superintendent of the electric road which he has been largely instrumental in organizing. Work has been already commenced.

ROCKLAND, ME.—A survey is being made for an electric line to Thomaston, which will be built in the spring.

BANGOR, ME.—The electric company have met with splendid success in the operation of their line during the heavy snows last month.

CAMDEN, ME.—Hon. Geo. E. Macomber, of Augusta, is engineering a deal to put in an electric line from this city to Rockport and Rockland. There is plenty of money back of the road, which is sure of a large passenger and light freight business.

LEWISTON, ME.—The Lewiston & Auburn Horse Railroad Company have leased an island at the head of the falls on the Androscoggin and will establish a very attractive summer resort.

CITY OF MEXICO.—A Denver syndicate, headed by Samuel Lessem, has secured an exclusive franchise for an electric street railway, and it is expected that construction work will be begun at an early date. An extensive system is contemplated.

CHEBOYGAN, MICH.—It has been decided to build an electric line here.

DETROIT, MICH.—The Fort Wayne & Elmwood Ry. are experimenting with a new street car motor, using compressed air as a motive power. It was made by the Jarves Pneumatic Ry. Co. of Lansing. Its working will be watched with much interest.

DETROIT, MICH.—Permission has been granted for an extension of the street railway from Mt. Elliott to Bellevue avenue.

FLINT, MICH.—Messrs. Delano & Carlton, of Detroit, have permission to commence work upon the street railway here as soon as the frost is off the ground and will push it rapidly to completion.

GRAND RAPIDS, MICH.—Reed's Lake Electric Railway people are meeting with good success in their endeavors to build into the city.

THE Valley City Cable Railway have accepted an ordinance for an extension on East street and Fifth avenue.

ANN ARBOR, MICH.—The street car line over the suburban road to Ypsilanti is now in operation and trains running at frequent intervals.

THE electric line here is almost completed to Ypsilanti, and cars will be in operation in a few days.

ESCANABA, MICH.—Jas. Lilley is at the head of a syndicate which has secured an ordinance for the construction of an electric road, to be strictly first-class, and they have offered to give the company over \$5,000 for the prompt completion and operation of the line.

JACKSON, MICH.—Jackson's Electric Street Railway is an assured fact.

CHEBOYGAN, MICH., is to have electric street cars.

THE City Railway Company contemplate the erection of a bridge to carry their tracks over the East Fourth street railroad crossing.

ST. PAUL, MINN.—The electric line to Minneapolis has met with so much popularity that another line is talked of between the two cities, to run by way of Fort Snelling.

This city is at last connected by a street railway with Minneapolis, cars running through in 45 minutes. This makes one of the longest electric railways in existence. As soon as the time is reduced to 30 minutes the company will make serious inroads upon the business of the steam lines, which charge a 25-cent fare, while the Electric carries for 10 cents, with transfer privileges.

WINONA, MINN.—Arrangements have all been made, and the existing difficulties harmoniously settled, whereby the railway line here will be changed from horse to electric power. The Thomson-Houston system will be used.

SPRINGFIELD, MO.—The trial trip of the Metropolitan Electric Railway, recently installed, proved a success. The company has completed sixteen miles of track and has one of the best equipped power houses in the country. The whole cost \$500,000. Frank B. Smith is general manager.

THE Springfield Railway Company has lately contracted for change of power to electricity. Altogether this city has twenty-five miles of street railway.

CARTHAGE, MO.—The Carthage & Twin Cities Electric Railway & Power Company has been incorporated with a capital of \$150,000, one half of which is already paid up. The object is to operate street railways in the city and extend an electric road to Webb City and Cartersville, nine miles southwest. The incorporators are headed by Mayor W. R. Myers of this city. They expect to commence work without delay.

CUMBERLAND, MO., will have its electric road after all. Construction will be commenced May 1.

JOPLIN, MO.—The electric street railway line was opened here "with bursting enthusiasm."

KANSAS CITY, MO.—The West Side Electric Line will be equipped with the Rae overhead system, on which work is under way.

WORK is being crowded as fast as possible on the West Side Electric Line.

SPRINGFIELD, MO.—The Metropolitan Street Railway Company, who have been at work for several months changing their lines from horse to the Westinghouse Electric Motor System, have opened it with great success. The improvement has cost \$300,000. The company now have seventeen miles of track.

ST. LOUIS, MO.—The new electric cars on the Mound City Line have greatly increased the running time, and is received by the public as an immense improvement.

A COMPANY is now preparing to build an electric road from the Broadway and Elm to the southwestern suburb known as Bamber Grove. Real estate in that locality has more than doubled in value.

ANOSINDA, MONT.—Work is progressing rapidly on the extension of the electric line. It is expected cars will be running within two weeks.

PHILIPSBURG, MONT.—A project is under way to build a cable road from this city to Granite, which in a direct line is two miles with an ascent of 1,700 feet.

A GOOD strong syndicate has formed for the purpose of building a cable road to Granite. Mr. Joseph A Hyde is at the head of the concern, and I. N. Smith as general agent.

HELENA, MONT.—The Union Electric Railway now operates nine miles, which may be traversed without change of cars.

LINCOLN, NEB.—Track has been laid for the construction of a street railway to Union College. It is to be an electric system.

THE Capital Heights Street Railway has been sold to G. A. Bush, Geo. E. Bigelow and the City Electric Street Railway Company is four miles in length. It is proposed to have the new road transferred into an electric system at the earliest possible moment.

KEARNEY, NEB.—The new street car line to West Beatrice has been opened with a car service for the present of every 15 minutes.

BEATRICE, NEB.—The Beatrice Rapid Transit & Power Co. has been incorporated to construct a street railway.

LINCOLN, NEB.—The lines of the Standard Street Railway Company, covering some six miles, have passed into the management of the Lincoln Street Railway Company, consideration \$60,000. This line will be made an electric one.

THE Rapid Transit Co., stole a march on their neighbors by taking possession of Twelfth street on a Sunday. A double track was laid and the work finished before an injunction could be served. While it is not the most beautiful piece of work imaginable, it is there.

OMAHA, NEB.—Track has been laid for the construction of a street railway to Union College. It is to be an electric system.

WITHIN two hours \$800,000 of stock was subscribed for the Interstate Electric Company.

THE Motor Line to Park street has been opened and is a great boon to the citizens of that portion of the city. When the Company desired to build this line a year ago there was a great howl raised against it, but they have since seen the error of their way and are glad it has come.

THE mayor of this city and Council Bluffs have signed the ordinances necessary to authorize the construction of an electric line to unite the business center of the two cities over the Union Passenger Railway Bridge. It is rumored that the Union Passenger Railway is at the back of the scheme, but in any event the work, which has already been commenced, will be pushed rapidly, and another link be added between the two cities. The line will be double track, with the best and most modern equipment, and the fare will be reduced to 5 cents.

THE Missouri River at this point seems at present a specially desirable field for the construction of electric railways. The latest scheme is that of the Twin City Railway Company, which proposes to join the two States with an electric road to run over the new steel bridge to cost \$800,000, in addition to \$500,000 which they promise to spend in building and equipping the road.

NASSAU, N. H.—The Concord street extension to Greeley is now open for travel.

PITTSFIELD, N. H.—The new electric road works to perfection, and everybody is happy.

BERGEN, N. J.—People here are pressing President Thurston, of the Jersey City Company, to place electric motors on the belt line. Horse cars are too slow for them.

ATLANTIC CITY, N. J.—The company here did not escape damage from the severe wind which accompanied the great snowstorm. Over 150 feet of their street car depot on Main Avenue was blown down and wreckage was scattered over their track to such an extent that travel was impeded most of one day.

COLLINGSWOOD, N. J.—Edward C. Knight, of Philadelphia, has guaranteed the necessary capital for the construction and equipment of an electric road from this city to Camden.

BAYONNE CITY, N. J.—President Thurston of the Horse Railroad Company, has promised the Greenville Citizens' Association that all cars on his line between the Jersey City ferries and Bergen Point will be run by electricity next spring.

ELIZABETH, N. J.—The new belt railway operated by the Philadelphia syndicate, has been completed. Cars are in operation.

MT. HOLLY, N. J.—The street railway company here have purchased a lot and will erect a new barn and car house.

THE new street railway here is nearly completed. Two new cars have already been purchased from the Harrisburg Railway Company.

LONG BRANCH, N. J.—Long Branch will have an electric line on Broadway and up the coast to Seabright, and south to Elberon and Asbury Park. It should be very profitable.

NEWARK, N. J.—The Passenger Railway has recently equipped one of its old horse cars with electric machinery with a view of rebuilding all its small cars in a similar manner.

THE United Electric Traction Company have secured their bonds for a chattle mortgage for \$700,000.00 on plants in various cities; also the same amount on real estate.

RALEIGH, N. C.—The Company here has ceased the operation of its cars and torn up its tracks to prepare for the electric system. Work will be pushed rapidly as possible, and the effect on real estate is already quite marked.

RALEIGH is to have an electric street railway. Work will be commenced immediately.

EAST CLEVELAND STREET RAILWAY.—At the annual meeting of the East Cleveland Street Railway, an appraisalment of the property was made which shows it to be valued at \$3,000,000. During the year the company has expended \$160,000 in paving and carried 8,000,000 passengers. The prospects for the coming year were never better. The entire management reflects great credit upon its officers.

NEWARK, N. J.—The Essex Passenger Railway has just discovered the scheme whereby its conductors were fleecing the road, viz., by using transfer tickets which were printed in New York. They have very promptly taken care of these unregenerate employes, who will be placed beyond the reach of temptation for a while.

THE Passenger Railway Company has made an application for franchises to construct a line to Arlington, and to lay tracks on a number of other streets.

THE Passenger Railway Company have decided to adopt a transfer system, which will be issued to all intersecting lines, good for one half hour.

ORANGE, N. J.—Another Street Railway Company has come into existence under the title of the Suburban Street Company. They ask for a number of streets and are making a hard fight for the franchises.

TRENTON, N. J.—The Traction Company here, of which H. Thompson is president, have filed a certificate with the Secretary of State, increasing the capital stock from ten to twenty millions.

Our Policy.

WE take occasion in this, our first issue, to state that it will always be the unvarying policy of this paper to conduct its advertising department on the strictest business principles and earnestly desire to assure our patrons of an absolute impartiality. Different locations in the paper may vary in rates, but every space has a fixed price which will be the same to all. We shall not vary from this just rule in a single instance. If any of our friends do not feel as though a special page was worth \$400 to them—we have others at \$300. And if any feel as if that was more than they desire to pay, we can only suggest a space proportionate to the amount desired to spend in advertising.

We, therefore, cannot make a rate one cent under the schedule price, already we have been obliged to decline no small amount of business, and from personal friends, rather than deviate from this established rule. But we cannot honestly charge one man \$300 for a page and allow a discount from another opposite. It is unfair to both, and we trust our friends will join us in our policy and not disappoint themselves by writing for a cut rate.

OBITUARIES.

THE death of Col. William H. Payne, the engineer of more than national reputation, is a great loss to the street railway fraternity. He was a man of sterling qualities and indomitable will, and one whose works are his own best monument. His death, which was from heart failure, was the result of a cold contracted from overwork in completing the Cleveland Cable Railway, of which he was the engineer. He had pushed the work to almost a completion, and while putting on the finishing touches, worked all night for seven days in succession, during weather which was bitter cold. One very cold morning he was found

asleep in a wheel pit with the lighted lantern still burning in his hand, while the flame of life was almost expiring, completely overcome by physical exhaustion. He was taken to his room on Christmas morning, and died of heart failure after a brief illness. When he died, twenty of the twenty-nine miles of cable were in operation, and the rest were running on New Year's day.

Col. Payne was born in 1828, and while yet a mere boy joined a surveying expedition that surveyed through northern Wisconsin, then an uninhabited wilderness. In 1852 he contributed valuable engineering methods for improved gold mining on the Pacific Coast; and in 1853 made a survey across the Nevada mountains from Sacramento to Utah, for the Pacific Railway.

When the war broke out he returned to Wisconsin, raised several regiments, which he accompanied to Washington, and then entered the service, where he rendered most valuable aid as engineer, securing information and making routes under the most dangerous circumstances. It was in this connection that he used a basket of different colored dresses which he had a negro woman hang on a line, and thus telegraphed his messages from the very heart of the enemy's camp.

His connection throughout the construction of the Brooklyn Bridge are well known, and on its completion it was he who adapted the cable system thereon. Col Payne was the inventor of rubber type, which he used in making figures on the steel tape for surveying.

His was a most kindly and gentle disposition, but firm as a rock on questions of principle. At one time during the war he was court-martialed for refusing to work on Sunday, but before the trial was ended, it was shown that had the bridge been built that day, it would have been captured, and so the trial was declared off.

He has been taken away in the noon-day of experience and usefulness. His loss will be keenly felt in many circles.

WM. F. SHERMAN, an inventor well known in connection with street railway rapid transit, died recently at Lowell, Mass., at the age of 65. He was the incorporator of the Sherman Electric Railway Company, of Chicago, the Denver Mine Railway, the Overhead Electric Power Company, and several others.

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With this number we add several new departments, which will be always maintained in the highest order. Mr. Frank H. Clark, the well known attorney, who has not only had a large experience in conducting street railway litigation, but who also is favorably known as a writer on these subjects, will hereafter edit our department devoted to street railway law. As far as possible decisions of value to street railways will be published in advance of their regular appearance in the law reports.

Our Patent Department will include not only a complete list of all patents issued pertaining to street railway interests, with address of patentees, but also important patent decisions from highest courts. Mr. H. Haupt, Jr., who is an expert patent lawyer of reputation, will conduct this department.

While we firmly believe the days of the street car horse are numbered, still so long as thousands of miles of lines continue for any reason to be operated by this faithful animal we shall feel he is entitled to the best that the experienced veterinary can suggest, and our Hygiene of Veterinary will be edited by one who has had years of experience in caring for street car horses and who during the great epizootic brought his 6,000 horses, belonging to a single company, through with the astonishing death loss of only five. Joseph H. Tuthill, M. D., V. S., who has written on veterinary subjects for many years and who needs but little introduction to owners of large stables, will edit this department.

Thirteenth Annual Convention of the National Electric Light Association.

THE annual session of the National Electric Light Association which convenes in Providence, R. I., February 17, 18 and 19, will be in many respects the most notable gathering that will be called together in all this country the present year.

There will be present in the very noonday of vigor and usefulness the giants whose ripening years of experience are a marvel even to themselves. No science today, or indeed in the history of the world, has ever combined so closely so much that is magical and weird with so great a degree of practical value and every day indispensable service.

It is indeed startling to look back and remember that these great advances have been made, and these tremendous forces bound and tamed, to the service of the world, within scarcely half a generation. While it is exhilarating to look back from the exalted pinnacle of today on the diverse lines which lead out through the past twenty years, each ending in rude efforts now so ridiculously small—then great: there also comes a shade of disappointment that we cannot gaze upon this same battleground a hundred years from now, when the greatest achievements of to-day, of which we are all so justly proud, will have been eclipsed and surpassed by the efforts of future genius. But those who have labored at the oars and who with toilsome strokes by night and day have brought the vessel to its moorings in the harbor at Providence, can dwell with pride on the thought that no development in the great America was possible until a Columbus had first discovered it—so whatever the future may create, will be but the broadening circles which these brave discoverers have made when exploring the ocean of an unknown world.

PRESIDENT LEWIS, of Brooklyn, says the general adoption of the electric system in that city would enhance the value of property fully \$50,000,000.

THE Lehigh Avenue Railway Co., of Philadelphia, which has been operating with storage batteries for some time, have abandoned that system and gone back to horses, the reason given being that the electric cars did not pay.

THE Pleasant Valley Railway Co., of Pittsburg, carried 6,612,913 passengers last year. This makes a startling contrast with the best year the company ever had while operating with mule power which was but 3,000,000. Their receipts averaged twenty-eight dollars per car in 1890.

ONE of President Hurt's cable cars recently collided with a hook and ladder truck, belonging to the Washington Fire Department. The commissioners sent him a bill for \$96.31 damages to the truck, but Mr. Hurt went them one better and sent in his bill for an even one hundred dollars.

THE *Washington Star* in speaking of prospective new companies in that city says: "If one railroad is good for a city, more are better in the proper proportion." This may be true and it may not. As a rule it will be found that where new lines are built by the old companies instead of some new organization greater benefits will accrue to the public, by reason of the fact that the old company has all the facilities of the new, and its other and former facilities as well. Especially is this true where the old company is in position to offer transfer privileges which the new rarely can.

IN the Illinois legislature, Senator O'Malley introduced a bill providing that elevated railroads shall not be constructed except by consent of the city councils. The passage of this would very greatly simplify and facilitate the construction of L roads, as it would change the law which now provides that franchises can be granted only to roads having a majority of the frontage in each mile, signed to their petition. Under the proposed change, five miles of frontage in the swamps or cornfields can overbalance four miles of solidly built business houses, who may not want the road in front of their doors.

THE action of the city council of Independence, Iowa, in granting a twenty-five year franchise to the street railway company there, and exempting it from taxation for the first ten years, is in striking contrast to the sand bag methods employed in many places. The citizens of Independence wanted a street railway and wanted a good one, and very sensibly reasoned that the lighter they made the burdens on the new company, the more the company would have to invest in equipment, and improvements, and the better served they would be, and many a larger and older city might learn wisdom of the bright Hawkeye town.

IN many of the smaller cities, where the people have not had an opportunity to witness the operation of electric lines, there generally prevails a fear that their introduction will be attended by more or less dangers, one of which is that horses will be frightened. At Saginaw, Mich., this was the great claim urged against the use of electricity, but a gentleman from there said a few days ago: "Before the electric road was in operation, our people expected there would be a hundred accidents a day from horses running away, but I have not heard of any bad accidents from this cause. Horses become used to them in a short time, and pay no more attention to the motor than they do to a milk wagon."

THE Electric Street Car Company, of Joliet, Ill., after having gone to very considerable expense to provide a good and frequent car service were disappointed to find that the people of that city had not been properly educated up to the proper standard of street car patronage. Some months ago, they adopted the plan of offering for sale a ticket at a specified price which would entitle the party to whom it was issued to ride as often as

he desired for the life of the ticket. The plan worked so well that this year the company offers such individual tickets for sale at \$25 each, so that with one of these the happy owner—by taking his lunch with him every morning—can board a car at sunrise and ride for eighteen hours a day and 365 days in the year.

MANAGERS of lines operated by horses, especially where those lines run on grades or cross bridges or railroad tracks, will find very great additional security in stopping their cars by use of a double brake chain, both to be attached to the beam and brake staff, but one chain a few links longer than the other, so that in event of one chain breaking at an inopportune moment, an extra turn or two of the brake handle by the driver will set the shoe up tight without any loss of time. In Chicago, a few months ago, a car went into the river, the bridge being turned, and the brake chain parting at a most of all unfortunate moment, the driver thereby losing all control of his car; and the recent accident in Philadelphia, where the brake chain broke at the top of a hill and caused the team to run down and collide with a car standing at the foot—are two illustrations of this.

A VERY stupid ordinance has been introduced into the Milwaukee council, providing that cars shall not exceed a speed of three miles per hour at street crossings. This is a restriction which has about as much merit to commend it as the law which governed the first steam cars in England and made it an offense to run at a greater speed than eight miles per hour. The process of moving at three miles an hour across thirty streets would mean that in covering a trip of three miles more than one-sixth of the distance must be limited to a speed considerably less than half that which should be made by an ordinary horse car, and to apply it to an electric motor would simply be to have rapid transit, but not be allowed to use it. The government of motor trains at street crossings may safely and should be left to the manager, who, if prompted by no other motive than that of economy, will not allow his car to operate at a dangerous speed at such places; and at streets little used or vacant at the time, there is no advantage to anyone to reduce speed. This is one of many instances where officious city fathers undertake to legislate on something the first principles of which they do not understand.

THE extraordinary snow and sleet storms which recently worked such havoc in the Eastern cities caused no small delay and annoyance to the electric lines. But investigation has proven that with but one or two exceptions the delays were caused not through any defect in the construction of the trolley wire system, but almost wholly from telegraph and telephone poles, which in falling as they did would have effectually blocked even a steam road. The trolley wires were substantially hung and never flinched an inch until some giant pole with its hundreds of telephone wires, snapped and fell across the track. The problem has been successfully worked out

for placing underground all fire and police alarm, telephone and telegraph wires and that is where they should all be. This would remove the objections to the trolley wires, which cannot at the present time be placed anywhere but overhead. All attempts so far to use the conduit wire have not been successful. Without doubt the problem will eventually be worked out, and when it is, the railway companies will only too gladly avail themselves of it, but until then the trolley wire should be a privileged character and be allowed to sit up while all other wires are sent to bed. There is nothing unreasonable in this for large cities. Of course in smaller ones and towns the conditions are very different and more latitude may be given all.

THE *Brooklyn Daily Citizen* is much wrought up over the fact that school children have to pay fare on the street cars of that city, and intimates that somewhere in Australia (he puts it as far away as possible) the pupils of schools ride without money and without price. We firmly believe too many inducements cannot be thrown around the attendance of the rising generation upon the public schools; and that if necessary to secure such attendance, that school children should be carried without expense to their parents; but we do not believe the street railway company is under any obligation, or should be asked to contribute the whole of such a public spirited move. Such a grand and noble work should be shared by all, and as children ride at reduced rates anyway, let the city, out of public taxes, toward which the street railroad has contributed a goodly share, purchase such reduced rate tickets and furnish a necessary number weekly through the teachers. But in most cities, schools are so plentifully scattered, that it is only the few attending the higher courses and who can generally well afford the expense that are obliged to use the cars. We do think it might be an excellent thing if the daily papers were furnished free to each school child, in order that they may be well informed; and we think we have heard that somewhere in Australia the daily papers are required to furnish a copy of both morning and evening edition gratuitously to each child within the years of the school age.

In a number of cities there has been considerable conflict this winter with the city officials in charge of streets as to the disposition of snow which has been ploughed from railway tracks. In one or two instances the city authorities have even gone so far as to prohibit the removal of snow from the tracks, which means the closing of the road. A noticeable instance of this is in London, Can., where the position taken is that it destroys the sleighing on that portion of the street, which, it must be admitted, is a pretty hard fact to get around. But there should be the utmost harmony on matters of this kind between managers and officials of the municipality, and it will generally be found that both will be the gainers by a little concession on the part of each. A company primarily should have the unrestricted privilege of ploughing

its tracks without let or hindrance, for delay in this work is fatal. Even a light fall will soon pile up quite a wall of snow on either side of the track, which not only is objectionable, but is liable to be carried back on the track by street traffic. The best solution of this problem would seem to be in the use of "levelers" drawn by horses and which should be put out at intervals soon after the plows begin work and which will distribute the plowed snow to an equal depth all the way from the outside edge of the track to the curb, thereby greatly improving the sledding on that part of the street, effectually removing it from the tracks, which are left clean and dry, and preventing any ridges or mounds on which to overturn sleighs. This plan has been in use in Chicago for several years, to the greatest satisfaction of the street inspector, the companies and the public.

Stop at Street Intersections Only.

NO SYSTEM of operating street cars, or steam cars either, can ever be devised which will absolutely suit everybody any more than it would be possible to furnish at the same moment a quality of weather to please all. People express their wants in these matters as the momentary whim or desire prompts them, and one of the rocks on which the public and car companies split is as to where cars shall stop to receive and let off passengers. In many cities and more generally in the smaller towns the cars stop anywhere and seven times in one block if there chance to be that number of people living within that distance on the car at once. But in most of the larger cities and in many of the smaller ones which are growing rapidly, the plan has been adopted of making stops only at the farther crossing of street intersections or in the middle of long blocks, at which points the company erects at small, neat sign, bearing the words, "Cars stop here." There ought to be no argument as to this method giving the greatest accommodation to the greatest number of people, and of this the management of the company are the best qualified to judge. The walk for any passenger in such cases could not exceed one-half block, while the saving to a car full of people by this greatly lessened loss of time for stops is a valuable consideration. Wherever the plan has been tried it has within a very short time fully demonstrated its advantages, and on a two or three-mile trip enables a reduction in running time of from five to fifteen minutes. Every street railroad man knows that it is the time consumed in starting which throws a car back and that a driver can easily make from one to two hundred feet of street in the time required to start and get a car under headway. Particularly is this true where horse power is the motor, while the expense of strength in his team is as much to make a start as to run a whole block. In many places the stops at cross streets only are made imperative by order of the city council, exceptions, of course, being made in the case of churches, theatres and similar places of public assemblage, and such places are so well known that the public become familiar with the system.

THE NO SEAT--NO FARE FALICY.

WOULD BE LEGISLATION FRAMED FROM IGNORANCE AND AIMED TO SECURE THE IMPOSSIBLE.

EVER and anon this nemesis arises from its grave, and urged by a few chronic kickers, and a desire on the part of local papers to poise as great moral reformers and protectors, has to be met and silenced by the manager.

It is not the policy of this paper to in the least excuse or condone the shortcomings on the part of any company to comply with those reasonable accommodations which unquestionably are due the public. When a company accepts a franchise it should also accept in good faith those duties which the future may bring with its development in wants and the corresponding development in the means of filling them. Foremost among such moral, though not strictly legal, duties, is that of affording a suitable means of rapid transit the very day the business of the road will warrant it; also to furnish cars of such size, character and equipment as will keep pace with the class of business to be carried warrants; and likewise a sufficient number of these cars to perform its business as a common carrier with a reasonable degree of satisfaction to its patrons, during the eighteen or entire twenty-four hours. But in judging of how well this duty is fulfilled the public and press are almost sure to fall into error either because they do not give the question any thought or else reason from a mistaken basis.

From five o'clock in the morning until four in the afternoon there is a constant stream of passengers to the business centre of the city. A small proportion of them only return during the day. Between four and five p. m. the tide turns and the succeeding two hours witness an outpouring of people from office, store and workshop. This great army now seeks facilities which shall aggregate a capacity to return in two hours what was brought down in fifteen hours; and the inevitable result is, and always will be in American cities, a tremendous congestion of travel. There is no company which in a large city can furnish a seat to every individual that wishes to ride within the entire limits of the period mentioned. The rapid transit facilities of the electric and cable lines have very greatly mitigated this evil, for by those systems extra cars can be added during the morning and evening "rush" at vastly less expense than a horse line company whose extra stock if maintained for only two such extra trips per day would eat their heads off in no time. But even with the system of street cars in trains which is the ideal method on heavy lines, no company could even then possibly afford the extra cars, and the extra men, who must receive at least fair pay, (though idle all day except the one trip mornings and the one in the evening) *necessary to provide every passenger with a seat.* Every company is glad to come as near to it as possible; for aside from the desire to furnish a satisfactory service the loss in fares missed and injury to car from overcrowding generally offset what the public really believes to be an extraordinarily profitable load. Elevated and underground roads may offer a temporary relief, but it can

only be temporary, as superior facilities always beget population. The universal history of cable, electric and elevated roads, or as we term them rapid transit, has been to draw population as a magnet draws bits of iron, and the elevated roads in New York city are now as completely deluged morning and evening as were the old slow going horse cars which were all the people had in the ante-elevated days.

If the companies were allowed a higher rate of fare they could then afford to buy extra cars, build additional barns and store them, pay interest, insurance thereon and pay the full day's wage to a small standing army for only two hours labor: all of which would be necessary to insure a seat to every passenger during the evening rush. But even then the American idea would never submit to the exclusion of other passengers when the seats were filled. Have you ever noticed an American man or woman approaching a street crossing? Apparently in no unusual haste, but just as surely as a team is seen approaching that crossing will they in ninety-nine times out of one hundred make a frantic rush to pass over in advance of the team. There was no good reason for the haste and risk; the person could not have explained to himself why he did so; but it seems to be an inherent, inborn natural instinct of the American. Now with such characteristics are they going to patiently wait while 30 people enter a car and then be satisfied to complacently read: "This car filled. Do not trespass here." The man who would succeed in getting his wife on and then be denied the privilege of riding even on the platform, but must wait and take the next car—how well would he be suited? The young man going to the theatre;—how much of smiles and tender words would accrue to him with his lady love in car 206 while he secures a seat in about 211? The writer witnessed an excellent illustration of this only a few weeks ago. It was on Sunday and two adjoining and decidedly aristocratic churches were dismissed at the same moment. Fully 50 people went to the same corner to take the same line of cars, and going the same way. There must have been some blockade down town for there came along a procession of four large cars not twenty feet apart from each other. The first car was fully seated and perhaps twenty people standing. In vain the conductor entreated them to take the car behind; but no, on they climbed until there was absolutely not standing or clinging space for one more; and in this impetuous boarding of the car the ladies far surpassed the men, most of whom were thus obliged to follow. At last the car started. About a dozen people were left and obliged to take the second car which they did a moment later, and in which there were just four passengers. The third car followed with one solitary occupant who looked as though he might be a dead-head, and the fourth car was absolutely empty, and yet all four of these cars were halted one behind the other, all went over the same route to the same destination in

the same time, one car was the exact counterpart of the others and still the people who thus insisted on literally swarming on the first car, in a manner scarcely decent, all belonged to the best circles of intelligence and society.

We wonder if the legislators ever stopped to ponder on how many cars, each seating 30 people, it would require to remove 100,000 people and have them all seated. To accomplish this would require 3,333 cars (and then one passenger would be left,) and if a car was started every ten seconds over nine hours would be consumed in the operation. And yet more than one company performs this feat six days in the week of getting this vast army home on time for supper.

We have yet to find the first American who having visited the Continent, from whence these "every passenger a seat" ideas emanate, who desires the plan adopted in his own city, or who considers it either practicable or possible here. In slow going Europe where the business and professional man spend about four hours per day at his occupation, and people have time and an abundance of cheap cabs, the plan is made to work, just as every young man is forced to serve three years in the

German army; but it does not follow by any means that he enjoys what he is compelled to do. In countries where the above drawing room etiquette is observed with reference to seats on cars, the working people cannot afford to use the cars, hence the case is in no sense a parallel one to the conditions here.

To return to our first proposition—we emphatically state that that company which, working under such privileges as permits it to keep abreast of the times and fails to do so, is not worthy the name of good management and deserves to be buried in the ruins of their unfulfilled responsibilities; while other and more progressive institutions rise to the emergency and meet public demands. But this is also true, most companies are using their best energies to provide the most and best possible service, and such iniquitous bills as were introduced a few days ago in the Minnesota state senate, are pointed with malice and aimed at the accomplishment of the impossible.

It is no fault of the public that they must all go home in a deluge, neither is it meet to legislate the car company for something no power can control.

THE STREET RAILWAY A PROGRESSIVE INSTITUTION.

PEOPLE used to complain that street railways were slow to adopt new ideas. The fact is that only within the last few years have there been but few new ideas to adopt that were of value to anybody except the inventor. Now, however, all is changed. Steam roads have never made as many radical changes in so short a time as the street railways of this country have, and are now doing. Still the public in many places continue to chant the same dolores, unmindful of the fact that they are better served every day. The street railway manager of the present time, with comparatively few exceptions, is the most progressive man in his community, and is racking his brain and laying awake of nights, devising means to accomplish plans to give his city the best facilities that are obtainable. And yet in every move he makes he is confronted with objections from people and city authorities who want new things, and yet who while raising up their voice with one accord, just as unanimously tie his hands and stand in the way of improvements when they are offered. One of the best known street railway men in the country said recently: "Street railways are proverbially and most universally the safety valve for the ill-humor of an entire community." While cases undoubtedly exist where such condition of public sentiment is deserved, it is the exception and not the rule that street railways fail to do their share, and generally even more; to keep not only abreast of the times but generally away in advance of the procession. The public before complaining should have at least the fairness to ask if they could do any better, and make sure before they censure, that the company is not filling its obligations in a spirit and to an extent commensurate with its opportunities.

It is the tendency of human nature to envy the success of

others. Not because it makes their income any less; not that they could if they would perform a service that is both necessary and it may be profitable; but the sentiment is simply the lines of character on the face of jealousy. It is the exemplification of the dog in the manger policy.

The street railway comes in for a larger share of this than any other organization, by reason of its semi-public character. Some people seem to think it is sinful for a street railway to pay a dividend, and yet these same people expect the company to pay the highest price for anything they may have to sell to it. No undertaking that requires large capital, can secure it unless it does pay at least fair returns. A street railway system can never render the service it should unless it can command large amounts of money. Tracks, cars and equipment can only be secured at the outlay of large sums, and the history of great undertakings in this line proves that adequate returns are almost never realized until after several years; and in many cities a long term of years.

The public for instance want open cars that must displace an equal number of winter cars, which meanwhile must lay idle in the barns, not only unproductive of a single cent of revenue, but carried there at an expense of extra car houses, insurance, and the depreciation of disuse. And so with many another branch of the service. The street car gives more in return for its fee than any other institution unless it be a minister, who is reputed to labor for little else than the hope of future reward; and the citizen who will but take the time to think the subject over, cannot, in all fairness but experience a change of heart and admit that while few things are perfect, their street railway company is more nearly so than they realized.

A CALIFORNIA CALAMITY.

THE latest idiocy comes from the far West, and doubtless the California street railways wish the author of the trouble, Senator W. H. Williams, would move on still further west and grow up with some other country. This alleged purveyor to the people; this, in a day, reformer of all ills laid to the street car door, girds on his armor and enters the legislature of their state with a bill in each hand.

The first manifesto reads as follows:

SEC. 501. The rate of fare on the cars must not exceed 3 1-3 cents for one fare for any distance under two miles, 4 cents for any distance under four miles, and 5 cents for any greater distance than four miles. Every street railroad company must return to passengers their fares when, for any reason, the cars are delayed, and they are unable, by reason of said delay, to convey passengers to their destination. Any stoppage of over five minutes shall be considered a delay within the meaning of this section. The passenger must demand the return of his fare before leaving the car. The rate of speed on any street railroad must not exceed eight miles an hour. A violation of any of the provisions of this section subjects the corporation to a fine of \$100 for each offense.

There is not the first redeeming feature to commend the above, which is at once as unjust as it is short sighted. The local conditions are the same in no two cities. Street railroads, like the postal department, can only live under a system that permits the averaging of a distance carried on the basis of a uniform fare. The great majority take the short ride, in which at the five cent fare there is generally a fair profit, but the longer hauls are made almost universally, the country over, at bare cost of operation, or in many instances at a positive loss. This would force a long haul service to a loss, and the short haul at bare cost. Where, in the nature of things, can any profit accrue to the operators?

It might be said in this connection, that one of the very worst things that can befall a city, is to have a street railway, which is not profitable. The street railway does more than any other factor to build up, broaden out and develop a city. A company which loses money can not thus attain to its highest mission, however strong may be the desire of its management. A company which is making money is recognized in the money market, can command increased investment from capitalists, and is in position to introduce some of the wonderful inventions of this line; but which, while most desirable and advantageous, being good things, cost money and lots of it. The Williams' bill would thus choke out the life of nine out of every ten companies in that state.

Another feature of its injustice is this: In many places, the short haul which he would have furnished for three and one-third cents will be found to be on heavy grades, which vastly increases the cost of operation. Extra horses and men are required at such points, more cars are required than on a level, and the time paid conductor and driver is as much mounting a half mile grade as for a full mile on level ground. But this modern genius makes no allowance for that, unmistakably proving his utter lack of knowledge of the subject he would have legislated on.

Still another: Any delay of five minutes entitles the passenger to a return of the full amount of fare paid. The fact that the company may have performed nine-tenths of its contract, and have brought the passenger to a point within one or two blocks of his destination cuts no figure; funerals, processions, fires and kindred delays make no difference. The senator himself can even drive an old wagon load of stone on the track, and let it accidentally break down there, easily delaying the car more than the five minutes, and the company, though in no possible measure at fault, is made to suffer a loss of all fares earned, and a fine of \$100 as a bonus. And why all this? Because it is a corporation running street cars, instead of a ring of politicians electing senators.

The second bill is like unto the first only more so. After paying taxes for state, city and county purposes, on an assessment which was never known to be too small, the company must pay to the city in addition, three per cent. of its annual gross earnings. Either bill alone would cripple most roads, but the two combined cannot fail to simply murder them. In the city of Melbourne, fares are based on various sections, and work a positive injury to the company and compels the conductor to pass through his car and make a fresh collection of fares every few blocks. Any American would rather pay five cents for a short ride than be compelled to make change for a penny to be paid five times in going five miles.

To a disinterested reader there can be but one of two conclusions: either that the author of the bill is wholly in ignorance of its effects, or is actuated by selfish or revengeful motives. It is devoutly to be hoped that the legislative body of California has but one such member, and that the rest will promptly vote him and his sand-lots bill to a place where the woodbine twineth among the big tree valleys. Such ideas do not belong to nineteenth century progress and public spirited policy.

A New Cincinnati Line.

ON the last day of the year the St. Bernard extension of the Mt. Auburn Electric Road was formally opened for travel, and the citizens of that thriving suburb indulged in great festivity. At eight o'clock in the evening a special train, under the personal direction of General Manager H. M. Littell was made up, and seven hundred invited guests boarded it and were whirled away to the centre of the city, amid the booming of cannon, a fine display of fireworks, ringing of bells, etc. Fireworks were sent up along the entire route, and the brass band seated in the first car left a trail of music all the way. The round trip was made in about ninety minutes and on the return to St. Bernard a banquet was served, during which the mayor surprised Mr. Littell with a magnificent floral piece, an exact counterpart of one of his electric cars, and accompanied by a happy little speech.

THE FESTIVE NEWSBOY.

WHAT TO DO WITH HIM, AND HOW TO DO WITHOUT HIM.



OUR friend and patron the passenger, with all due respect and yet sincerity, certainly displays a most charming consistency in his judgment as to how he should be served with the daily paper on the cars. Should he chance to provide himself before entering he looks up from the middle or rear over a paper wall and scowls at the frequent opening of the front door and its accompanying gust of cold air that sweeps from the car all the comfort the company may have provided at considerable expense in the shape of a car heater. The man seated next the door and the old lady opposite him both growl as the icy blast wraps around their limbs and side-tracks up behind the seat and down the back of their necks. The delicate passenger gets out his look of martyrdom and wears it the rest of the trip. Meanwhile young America has stood in the aforesaid doorway shouting at the top of his voice as if to some one a mile or more distant. Seeing no one wants a paper, he plunges through the car, leaving the door partly open for some passenger to close, and after carefully spotting the man with corns and walking over him once or twice, he reaches the rear door only to go back to the middle of the car again to inform the young man with glasses and an infant mustache that he has only the 3 o'clock edition and the 5 o'clock will not be out until 4:30. In the meantime, ladies have had one or more parcels knocked from their laps to the floor, people who were trying to read, suddenly found the paper jammed flat against their nose and various others have contributed their share of furnishing new overcoats as mats on which to wipe the mud and blacking with which the youngster's "shine-em-up-kit" is decorated. Finally the young cyclone blows out the rear door, and the forty or more well disposed people, try to calm themselves, to regain their patience and suppress the general desire to profane the second commandment by breaking it. Forty adults put to unspeakable annoyance and discomfort that one small boy may sell a cents worth of newspaper; which same paper might just as well have been purchased on any corner, from the self-same boy, for the same identical cent. And still some people talk about a free country.

As the purveyor of "extras" drops off the rear step another springs into existence on the front and finds a purchaser there who has just got on. The quarter proffered breaks the bank, and again the door remains open while through the car he goes to "git change" from the conductor, who slowly counts out twenty-five pennies which are promptly transferred to the small boy's mouth; from thence to the buyer of the news. The above process is repeated at regular intervals of each block, with the exception that at more prominent crossings or cross

town intersections the vandals come in swarms, each endeavoring to out-climb and over climb the other in ministering to the wants of the public.

The man who has a paper or does not want one, remarks to his next neighbor on the imbecility of a street railroad company which will tolerate such an unmitigated nuisance. The neighbor being a sensible man fully and emphatically agrees with him. On the return trip both will allow a whole car-full to be inconvenienced that they may be served with something to read, and all thoughts of its troubling a living soul will be the chief thing farthest from their mind. Such is life in a street car.

This is the winter picture. In summer when the schools are out (they ought to keep 18 hours a day for 365 days in a year) the entire small boy population en masse, arm themselves with old dailies or supplements, and spend most of the day hitching on, shrilly crying "papers" and the conductor drives them off the front platform only to find them ensconced on the rear one when he reaches it.

Especially is this true of open cars and those operated in trains of two or more. The writer has personally known of a no small number of the above cited cases; and still others who daily beat their way down in the morning and back at night by purchasing a penny paper, and riding on the platform or foot-board. If the conductor asked a fare he would yell "paper" and when driven off wait for the next car and get home on the installment plan with the original paper to sell or read as a tontine premium when he got there.

Thus far we have examined the question from the standpoint of the passenger, where does the company come in? Unfortunately it all too frequently comes out. These boys are not only reckless in taking and leaving the car while in motion but frequently jump off on the other track directly in front of an approaching car or motor train. Others who are stealing the ride, constantly watch for the approach of the conductor and if he chances to come upon them suddenly, unintentional although it may have been on the part of this agent of the company, the lad forgets all other things but that of getting off, and frequently falls on a slippery pavement or is struck by an approaching vehicle or car and injured. The boy represents to his parents that "the conductor pushed" or "threw him off." The incensed father promptly brings suit for damages large enough to support one hundred boys for a century; or that dear and "next friend" the shyster lawyer, often steps in to see justice done though the heavens fall and the company goes up. No matter how clear a case for the defense, the shyster will always represent to people ignorant of the law that a suit means *per se* a remunerative return at no expense and with everything to gain and nothing to lose. The company is summoned into court, is forced to appear with attorneys, employes and witnesses,

all of whom must be paid for their time, and when at last the corporation is exonerated, as it deserved to be, who is the loser? In but a very few states must the plaintiff give cost bonds in case of defeat, and the above process with large companies costs them largely each year. All that the passenger may purchase on the car what he should do before entering.

Now what is the remedy for all this? The company gladly desires to make the line and its advantages as attractive as possible. There are two ways. The first is practiced by a few companies and works most admirably.

Newsboys are not allowed on the cars. A printed notice to this effect, coupled with the information that such an attempted act is a trespass, not only where enforced, rid the cars of the conceded nuisance, but gives the defendant a more nearly equal fighting chance against attempted blood-money litigation.

Where tried the plan works admirably. Passengers secure their papers before entering the car, and being forced to do so find it is less trouble to make the purchase in that way, at the street corner—the stopping place for most lines—then after having taken a seat and settled for the ride. No hardship is done the newsboy for whom we wish all success so long as he conducts his avocation legitimately and with reasonable regard for the rights of others: as he sells just as many papers as before.

Many companies are deterred from taking this radical action for the reason that they fear to incur the hostility and not always fair treatment of the local press. One of the largest companies in the country a few months ago had a verdict for several thousand dollars returned against them, in the case of a newsboy who without any knowledge of either the conductor or driver jumped off a trail car moving at full speed, slipped, fell, and broke his leg. The company rendered every humane assistance to the boy and was rewarded with a big damage bill. It immediately posted in every car a notice prohibiting the sale of papers on the cars. The daily papers howled about the meanness of a soul-less corporation, which would deprive the street gamins of a livelihood. Letters was published by the yard from passengers who could not secure a daily paper, which apparently had never been for sale anywhere but on a street car. But the company said nothing and strictly enforced its rule. In less than a week the storm passed—passengers found they could more conveniently purchase on the street what they formerly did in the car—the publishers did not go into bankruptcy—the boys did not starve, everybody was as well served and better pleased.

Those companies which have prohibited paper selling, nearly, if not in every instance, have been forced into it in self-defense.

The celebrated Philadelphia case is still fresh in all our minds; where a newsboy through his own negligence was injured by one of the Traction Company's cars of that city, and in which the jury awarded the outrageous amount of \$20,000, which the unfortunate company had to pay. It probably never received at any time a single fare from that boy; it certainly was not a penny bene-

fitted from his using their cars as a portable news-stand, and they very promptly and properly prohibited the sale of papers, "not allowing newsboys on the cars, other than as ordinary passengers, paying their fare and not vending papers."

The North Chicago Street Railroad Company experienced a similar defeat on a very similar case, though in not quite so large an amount, and now both that company and the West Chicago company have posted in every car a notice that makes it a trespass for newsboys to use the cars for the sale of papers, and no difficulty is experienced in enforcing the rule. This order has also had a salutary effect upon the "hitchers" on, who have been notably decreased in numbers.

In San Francisco some of the companies tried to limit the evil by a system of permits. A well known general manager there writes:

"For many years it was our custom to grant permits to a limited number of newsboys representing the different daily papers. This worked very well until about a year ago when they became very troublesome in various ways, which resulted in our taking the permits from all the newsboys, since which no papers have been sold on our cars.

There are but few if any boys as old as 16 engaged in selling papers, most of them being little rats from five to ten years old, and one hardly ten years old recently obtained judgment against our company for \$10,000 in consequence of his jumping from a car when approached by the conductor and being injured in falling. The case is now on appeal to the Supreme Court.

Some of the papers made a great howl over our action in discontinuing the privilege, but we could stand it in view of the judgment which had been rendered against the company.

I therefore join the many in the opinion that the sale of newspapers on the cars is a great nuisance."

The following is an ordinance adopted by the city council there, which very thoroughly covers the ground.

It shall be unlawful of any child, under the age of sixteen years, within the city and county of San Francisco, to get on or attempt to get on, or to get off or attempt to get off any street car, train of street cars, grip car or dummy, propelled by wire ropes attached to stationary steam engines or by a locomotive engine, electric motor, horse or horses, or any wagon or truck drawn by one or more horses, while the same or either of them are in motion. And any child under the age of sixteen years who shall violate any of the provisions of this section shall be deemed guilty of a misdemeanor, and shall on conviction be punished by a fine not to exceed fifty dollars or by imprisonment not to exceed one month, or by both such fine and imprisonment."

Baltimore has no city ordinance and the company's rule there is to allow but one newsboy on a car at a time, and only long enough to pass through the car.

A Kansas City manager says:

"I am sorry to state that there are no city ordinances prohibiting newsboys from jumping on and selling papers on street cars in this city.

These boys are a great nuisance to passengers and to the companies, which we have tried to abate and have failed for the reason that our attempts have increased the trouble."

It would seem in this case that a total prohibition was the only solution of the question there.

Cleveland has no city regulations but some of the companies there will not allow the sale of papers on their cars and find the plan works very satisfactorily.

General Monks of the West End Street Railway, Boston, says:

"The matter of boys selling newspapers upon our cars is to-day, and always has been, a very objectionable feature. We have no city ordinance bearing upon the subject but there is a statute of the state which imposes a fine upon a street railway company allowing boys less than 11 years of age to get onto the cars for the purpose of selling newspapers. This, as you can very readily see, is a law very difficult to enforce, in fact there have been no prosecutions, that we know of, under it.

We have a contract by which, for a nominal sum, we give to a local news company the exclusive right to sell newspapers on our cars. They adopt a peculiar form of badge with a number with which each one of their boys is provided. They agree to hold us harmless from all liability or loss from claims arising from the fact that any of their boys may be injured. As the boys are carefully selected by the news company, and as we hold said company to a strict accountability as to the conduct of boys, this system has given a reasonable degree of satisfaction up to the present time. It is very much better than the previous system by which all the cars were free to all comers for the sale of papers."

From personal knowledge the writer knows the Boston newsboy to be a comparatively inoffensive object. But one takes a car at a time, he does not enter unless called by a passenger, does not shout, and remains no longer than necessary. But the cultured atmosphere of ethical Boston accounts for these angelic qualities. They certainly do not exist in the woolly west.

New York has no municipal aid for the street car company, and they must get along as best they can. A well known president there writes as follows:

"Indirectly the Truant Act and the societies for juvenile delinquents and that for the prevention of cruelty to children are all which are corrective. Public sentiment and the one and two cent papers are all in favor of this peddling and any radical move to abate the nuisance would create a howl.

Our rules forbid *all* peddling on our cars and we are beset by such a horde of newsboys as to render it almost impossible to keep them off our lines."

This would suggest as the only salvation there being the purchase at the publishing office of the entire edition.

Some lines grant exclusive privilege of sale, and try to limit the trouble.

Mr. William J. Richardson, secretary of the American Street Railway Association, thus paints the picture of the Brooklyn boy:

MY DEAR SIR:—In reply to yours of 14th, relative to newsboys, would say, that the newsboy is an everlasting nuisance, but still an incident to the operation of a

street railway. You cannot get rid of him short of blowing him up with dynamite. There are many of them who have no parents, and work hard selling newspapers in order to get money enough for a seat in the gallery of a poor theatre almost every night of their lives.

They are a nuisance so far as jumping on and off the cars is concerned; yet passengers will call them on, when they are prohibited by rule from going there. We have spasmodically tried from time to time to limit or restrict their operations on cars. We have furnished them with a badge, the property of the company, on which appears the word "Newsboy—A. A. R. R. Co.," with the number in the middle. We required the boy to leave a deposit on the badge, covering its cost, returnable at any time upon demand, on the return of the badge. We require from him a statement that he will behave himself at all times on the cars, and that he will not go through the front door: that he will be civil to conductor and passengers; that he will not be boisterous in his language or otherwise misbehave himself, and that he will not sell or otherwise dispose of the badge, but will return it promptly to the office whenever requested to do so. We limit the wearing of these badges to boys over 14 years of age. We have no city ordinance governing the question of the sale of newspapers on street cars.

OUT OF TOWN.

AS usual, Chicago will be well represented at the electric light convention at Providence, and we must say that she will make up in quality what is lacking in quantity. On account of many having business which made it necessary for them to stop, it was impossible to make up a car. Among those that have gone are W. R. Mason, manager Electric Merchandise Co.; W. A. Kridler and J. B. O. Hana, of the *Western Electrician*; E. L. Powers, of *Electrical Industries*; Geo. Cutter, E. L. Clark, of the Ill. Elec. Material Co.; Chas. Wirt and F. S. Terry, of the Electrical Supply Co.; H. K. Gillman, manager Great Western Electrical Supply Co.; F. L. Kenfield, business manager of THE REVIEW; and last of all, W. J. Cooke, of the McGuire Manufacturing Co., who could not be hired to stay away from the good things to eat and "smoke."

The advantages of these gatherings are being the better appreciated every year, as the regularly increasing attendance indicates. Each convention is also larger than its predecessor by reason of the expansion of the business and the multiplying branches of it. The value of acquaintances thus formed are worth many times the time spent in going and returning and friendships there formed cannot be measured in dollars and cents.

A NEW YORK assemblyman has studied out a great scheme, as he thinks, of having a "local transit inspector" appointed in all large cities to prod the railway companies. If the inspector really understood his business he might find the aforesaid assemblyman needed a little sense prodded into him.

THE ONLY ELECTRIC LINE IN IRELAND.

THE INITIAL ROAD TO USE AN INSULATED RAIL FOR ELECTRIC TRANSMISSION.

WAY up on the north coast of Ireland, in the county of Antrim, is that remarkable freak of nature known as the Giant's Causeway, which consists of basaltic formations of hexagonal pillars that stretch out in a platform six hundred feet in length, about three hundred and fifty feet in width and rising to a height of twenty-five feet. No work of man



could be more regularly defined, and the ancient tradition from whence its name is derived—that the giants in the dim past started to build a stone causeway to Scotland, across the Irish Sea—is not to be wondered at.

But now that modern giant of the nineteenth century has indeed taken up a work greater than any of tradition and reached out its iron arms and built not only a causeway, but a tramway as well.

When the steam cars reached Portrush the causeway became much more accessible, as tourists could take carriages from that point. But this was necessarily a slow and tiresome journey, and in 1880 construction work was commenced and continued during that and the following year and the road finally completed and perfected in 1882.

To W. A. Traill, C. E., who is the patentee, president and general manager of the Giant's Causeway and Portrush Electric Tramway, belongs the credit not only of devising a most ingenious plan but of adopting it to the peculiar circumstances of its location. And so highly was the work considered from a scientific standpoint that at the International Inventor's Exhibition in London in 1885, Mr. Traill was awarded a silver medal.

The line starts from Portrush from a depot which it uses in common with the steam road, and following the shore line for a considerable part of the distance, offers a most enchanting ride of eight miles, with alternate views of fields, ruined castles and the ocean.

The track is of 30lb. T rail, laid on wooden ties, to a 30-inch gauge. The grades are generally easy, though there is one of a rise of one foot in twenty-five for a distance of a mile, and another of one foot ascent in thirty extending for two miles. The curves which are quite numerous average a fifty-foot radius.

It was from this road that the great city and South London Company received their idea of adopting a conductor rail for use in their underground road. It will be seen at a glance that however satisfactory and economical may be its operation, in the country and in tunnels, it would not be practicable elsewhere, except on elevated roads.

The generating station is situated at Bush Mills, on the Bush River, which is nearly midway between the termini of the line. The power is derived from two American Turbine Water Wheels, made by Allcott, and are of 80 H.P. each. The dynamos are of English make, from the works of Elwell & Parker, and easily deliver 250 amperes with 500 volts. Six cars operate on the line, which is eight miles long, and the motor cars are equipped each with two 10 H.P. motors furnished by Siemens Bros. & Co., London.

The expense for power and labor for a train of two cars is but seven cents of our money per mile—for the motor and trail car combined.

A rather amusing incident developed at the causeway



Hotel where the current from the electric railway is let into the building and stored in batteries. It is then utilized to warm and light an incubator, which regularly turns out its hundred little chicks, so that while a train load of passengers are being impelled toward their



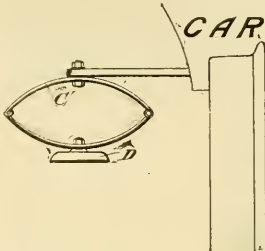
journey's end, the same unseen force has preceded them and arranged food for them to eat on arrival.

During the harvest season, on a large farm near the hotel, a wire is run from the electric tramway and carried out into the fields and there harnessed to a dynamo, and the railroad is made to do duty and operate a threshing machine, which turns out twenty-five hundred pounds of grain per hour with a Sieman's Bros. & Co. motor and two men and one small boy. This is probably the only street railway in the world that is so closely allied to agricultural pursuits and the dear people. The following illustration is taken from the line of the electric road.



At present six trains are run each way daily, leaving Portrush on the arrival of the express trains. There are two classes of fare and two grades of cars on the tramway and the fare each way is one shilling, first class.

The interesting feature of the construction is the use of a third rail as the conductor rail for the electric current. It is a light T rail, set outside the track, and at a distance of twenty inches from it, and supported on



wooden posts extending eighteen inches above the road bed. Upon this wooden post, rest two porcelain insulators (*b*), and on these rest the conductor rail (*a*) as shown in the illustration.

Where the line crosses wagon roads the conductor rail is depressed, covered from any exposure, and carried beneath the ground, while the train crosses such places on its own momentum and secures contact with the conductor as soon as the road or street is passed.

The means by which the current is communicated from the conductor rail to the motors under the car is extremely unique. At each end of the motor car, and extending out on the side next the current rail, extend two arms, suspended from the car floor, and protruding quite like the gang plank of a river steamboat. These two arms each carry at the end a light steel spring (*c*), which is quite flexible, and to the bottom of which is fastened the slipper or friction shoe (*d*), which rests on the conductor rail, and slides easily upon it. There appears to be no wear from this source, upon the conductor rail and the iron shoes, which developing no special friction, lasts all the way from five weeks to three months, but is inexpensive.

The Schuylkill Electric Railway.

POTTSVILLE, PENN. has a new electric road, which consists at present of two miles of single track, laid with 50 lb. Johnson girder rail, to 4 feet, 8 1-2 in. gauge. For the present, three motors will run, each drawing one trail car.

The power is derived from two ninety-five horse power generators, and one Ball engine of 150 horse power. The motors and generators were furnished by the Short Electric Railway Co.

The peculiar feature of the line lies in the fact that for its entire distance, it is an almost continuous grade, varying from two to ten per cent. As soon as weather will permit, ground will be broken for an extension which will require at once seven additional motors, and two extra 80,000 Watt (125 H. P.) generators. Nearly fifteen miles of new track will be laid, and a new enlarged power house will be required.

The traffic since the opening of the road Dec. 22, 1890, has averaged 1,200 passengers per day for the three cars, which is much better than the projectors had counted on. It is but proof, however, that a good thing always deserves success.

The contract for the new motors and generators has been placed with the Short Electric Company of Cleveland.

The offices of the company are Gen. J. K. Sigfield, President; F. G. Yuengling, Vice President; J. H. Zerbey, Secretary; John F. Zerbey, Treasurer; B. S. Patterson, Solicitor, and Charles G. Swan, Superintendent.

Mr. Lee H. Parker, Superintendent of construction for the Short Electric Co., has given the installation of the plant his personal attention, and the good people of Pottsville, Pa., are very naturally well pleased with the auspicious opening and bright future of the Schuylkill Electric Railway.

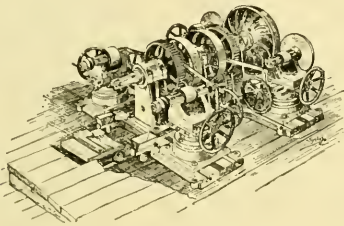
RECENTLY an ordinance was passed by the city council of Chicago, making it an offense punishable with a fine of \$25 for failure to heat the street cars. Some one discovered a Westside car not over-warm, entered suit and the company concluded to pay the fine without appearing.

CONSTRUCTION AND EQUIPMENT NOTES.

"Machined" Wheels For Street Railway Service.

A MOST valuable improvement in car wheels has within the past two years been developed by the New York Car Wheel Works, of Buffalo, N. Y. It consists of treating wheels in suitable machines to make them mechanically perfect in every respect. This company spent much time and money investigating machinery for the purpose and concluded that none had as yet been designed to do the necessary work at a cost sufficiently low to make it practical. They then turned their attention to the designing of machinery themselves, their efforts being finally crowned with success, for they now control by patent the only machine which will grind chilled car wheels absolutely round at a rate fast enough to make the work economical.

Their wheels are first bored very carefully on extra heavy boring mills, then placed in the grinding machines on self centering mandrels and turned to an absolute cir-



cle on the tread. They are then tested for balance and made correct in that respect. The operation of the grinding machine will be readily understood by the cut presented herewith.

Every mechanic knows the benefits to be derived from the use of perfect tools and machinery. In the use of street car wheels as ordinarily made, the disadvantages are not so clearly thrown into relief on account of the fact that no other practice has been generally known, but the benefits arising from the use of wheels absolutely true stand boldly out in comparison with existing practices.

The results, stated briefly, are: Smoother riding cars, less wear on roadbed and cars, loads hauled with greater ease by the horses and longer life of wheels. The use of these wheels under cars equipped with electric motors is particularly advisable. There is more perfect contact with the rails for the passage of the return current. Poor contact simply means checks to the motor and a racking of the entire mechanism and trucks. Quicker stops can also be made, which is most desirable in view of the higher speeds attained in electric service.

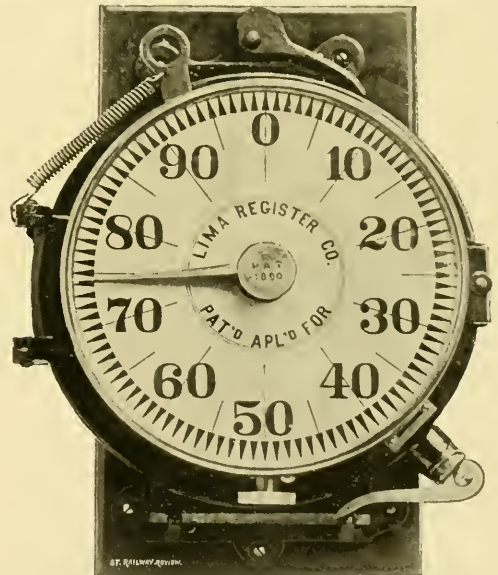
The company has issued a very interesting pamphlet giving full particulars in regard to their wheels and methods of manufacture, and we are sure will be pleased to send one to any person interested in having the best thing procurable in their line, upon application.

The Lima Register.

SOMETHING new in the way of a fare register is what the Lima (O.) Register Company have brought out. The gentlemen who are manufacturing this new device are Dr. E. Ashton and J. H. Rose.

They claim for their invention not only accuracy and simplicity, but an arrangement which will give at any time a printed statement on a card of the number of fares recorded. This enables as frequent changes in conductors at the end of any half trip or trip, or, indeed, at any special point as may be desired, as the man who is relieved "touches a button" and the register gives him a printed statement which he turns in with his trip or day's report.

The construction is such that it is not liable to get out of order. There is no glass to break and no friction hand to be manipulated by conductors. It cannot be



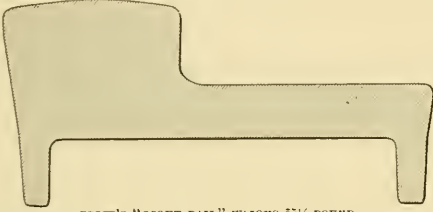
made to give an alarm without registering and does away with the extra help necessary to take statements. The register records from zero to ten thousand and the trip hand can be set to zero at the end of each trip, but does not affect the permanent count, which goes on to the highest number, when it automatically returns to zero.

To take a statement of the register, insert a card in slot, depress a lever and the number is embossed thereon and cannot be changed or tampered with.

Every good thing has its drawbacks. Down in St. Louis the other day a passenger leaned against the stove, when a box of matches in his pocket caught fire, which was not extinguished until the passenger was put out. It would naturally put anyone out.

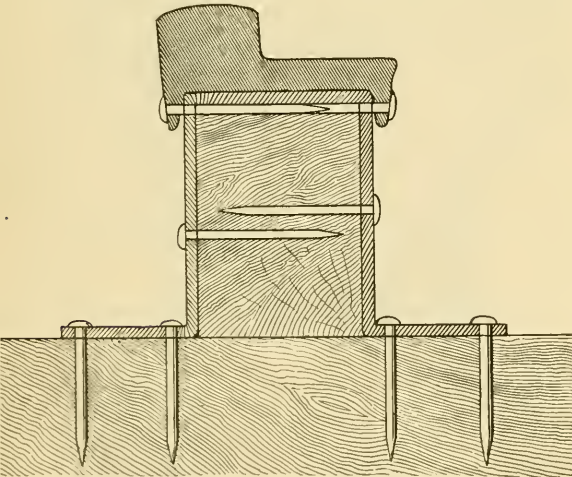
Price's Railway Appliance Company's Improved Street Railway Construction.

THE Philadelphia rail has been not only well known for a long time, but very generally used, especially in the east, and now an entirely new system of track building is offered to the street railway world from this same city and is the invention of the Price Railway Appliance Company. The disadvantages of the old tram rail which like horse cars were kept in use so long because of the absence of anything better are too well understood to require any extended notice here. The chief objections being decay of the wooden stringer



PRICE'S "LIGHT RAIL" WEIGHS 55½ POUND.

on which they are laid, causing the spikes to loosen and pull out or the rail to turn on its side owing to the wearing away by street traffic of the heads of the spikes, and broken joints which can never be kept up; all of the above causes unite to shorten the life of the rail. Necessity was the mother of the girder rail. To secure a better joint by permitting the use of splice-bars, but particularly to meet the demand which then became most urgent for a track which could carry not only the weight of



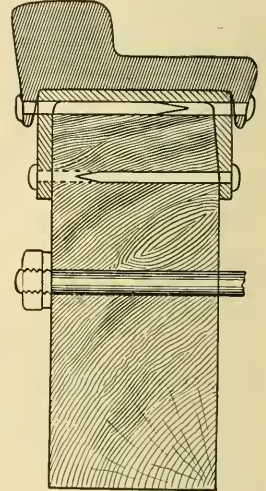
NO. 1. PRICE "CHAIR AND SLEEPER."

heavier cars which increased travel had made necessary, but also to provide something, which would be better able to withstand the terrible wear of street traffic. Even with the girder rail the joint problem has by no means been fully solved and is more or less at the disadvantage of torsional strain upon the web or stem of the rail. A greatly increased service in the rail itself is an important gain to the company, while the public gains by reducing the frequency of relaying.

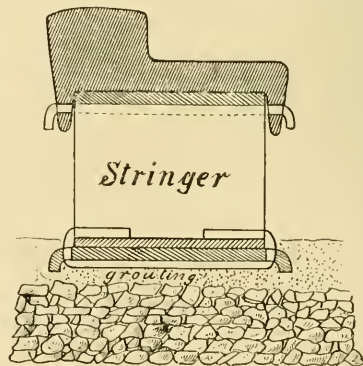
The Price Railway Appliance Co. have endeavored to remedy these defects in their new devices, which are illustrated herewith. All of them use what is practically the same rail. It will be observed that this rail is similar in its body to the old side bearing rail, but differs in having at each edge of its base a thin flange, nearly vertical through which, with whatever supports it may be laid connection can be had to the support. These holes, oblong oval allow for expansion, number 45 to the rail, and are placed eight inches apart.

One of the great advantages of the Price light rail is its economy of wear, as the portion which must eventually go into the "scrap pile" is very small in proportion to the entire weight. It is aimed in this to insure the greatest possible amount of wear.

Systems No. 1 and 3 involve the use of a wooden stringer roofed over by the rail itself but without any vertical holes for any purpose. Price's chair and sleeper system No. 1 will be fully understood by reference to the cut. At joints, chairs of double width underlie the ends of the rail, and are spaced either 24, 32, or 40 inches apart, according to weight of traffic. In Price's channel rail system No. 3 the rail rests upon a channel bar of steel astride of a wooden stringer and is held in place together with the rail by horizontal spikes eight inches apart. Occasional tie rods maintain gauge. The rail in this case breaks joint with the channel bar. Construction No. 6 is entirely of metal and consists of three chief



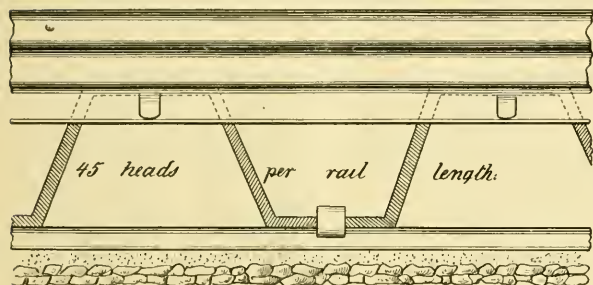
NO. 3. PRICE'S "CHANNEL RAIL" SYSTEM.



NO. 6. PRICE'S "STREET RAIL AND STRINGER" CROSS SECTION.

elements interbound by metallic straps, each of the three rolled in lengths of 30 feet or less as desired. On this system the rail sits upon a pyramidal stringer of thin steel and braced by the flanges of the rail. The steel

stringer is seated upon a shallow channel bar or flat plate somewhat wider than the stringer and the two are fastened by metallic straps, the ends of which are hammered down upon the feet of the stringer. The combined weight of sleeper and stringer is but little more than one half that of the rail. Their ends should be continuous, but this structure should break joint with the rail resting upon it. The whole should rest upon a

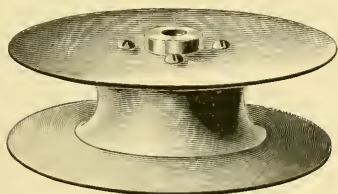


NO. 6. PRICE'S ALL METALIC "RAIL AND STRINGER."

mixture of crushed stone and cement. This gives a construction in which no wood is used and no bolts or nuts except an occasional tie rod. It is practically a Howe truss laid longitudinally through the street. It is claimed that this system is unequalled for elasticity without leverage or sagging and with less of ultimate waste in scrap than by any other system, and for electrical purposes offers a most perfect conductor. Detailed information as to construction and cost will be furnished on application to either James M. Price, 409 Chestnut street, or Joseph H. Burroughs, Secretary, 125 South 5th street, Philadelphia.

Aluminum Trolley Wheel.

A RECENT novelty is the trolley wheel manufactured by the Great Western Supply Co., of Chicago. It is of pure aluminum, weighs only one-third as much as those made of brass and transmits per-



fectly. It will not oxidize nor corrode and is another evidence of the wonderful and varied purposes to which this new metal may be put.

The Brooks Works at Dunkirk, have completed a new motor which is said to give a high speed and carry six hundred pounds pressure, which is obtained by forcing air through an upright drum filled with hot water. Eight cylinders beneath the car drive the wheels. It is claimed to be economical in operation.

The Genett Patent Air Brake For Cable and Electric Cars.

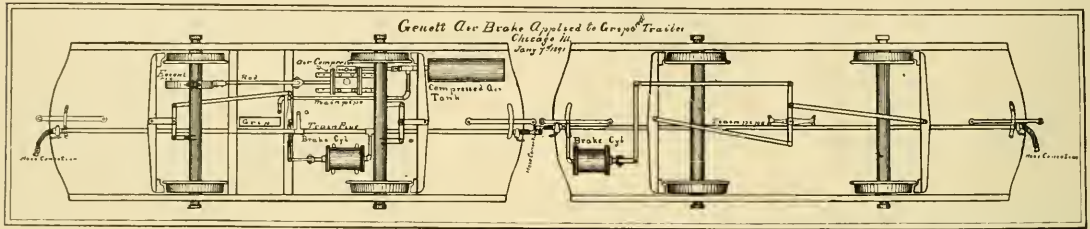
WE present to our readers a new and important invention lately patented by Louis J. Genett, of Chicago, and which solves the problem of a perfect brake for cable and electric trains. The old-fashioned hand brake will not answer to control fast running cable or electric cars, and even all the improved friction brakes have faults which only a perfect air brake can remedy. One that gives the gripman the same control over his train of cable cars as the locomotive engineer has with his Westinghouse brake, and this the Genett air brake has accomplished without the use of steam or electricity for power. This brake is simple in construction, as shown by the following illustration, and will act as effectually on a train of four or more cars as on a single car. The apparatus is small, not weighing over 250 pounds for an entire train, and is placed under the cars, out of sight, with the exception of a pressure gauge and three way valves, with which the driver sets and releases brakes, and this is placed conveniently in motor cars.

A train of three cars equipped with the Genett air brake has been running for the past four months on the Chicago City Railway Company's Cottage Grove avenue line, and the men and officers of the company are very much delighted with its working. Several other cable and electric lines have applied to the company for experimental trains on their lines, which the Genett Air Brake Company will furnish as soon as possible. The accompanying illustration gives two views of this brake, one as the same appears under a grip car and trailer and also the different parts enlarged. It will be seen that the apparatus consists of an automatically governed patent air compressor taking motion from the axle of the car, the motion being transmitted by an eccentric attached to axle, and can be attached to any car when there is a four-inch axle space to spare and about ten inches square space for compression. The compressor is piped to a reservoir where the air is stored, the reservoir having a capacity of about three cubic feet, and can be built of such dimensions as will suit the space it may be placed in, or the reservoir may be placed under the seat inside the car when space is limited under car. From the reservoir the pipe is led to a three-way valve, which is placed at the most convenient point for the man in charge to handle, and this valve is also connected with the train pipe, which couples with the different jam cylinders on the train. The jam cylinders are air tight cylinders six inches in diameter and contain a piston having a twelve-inch stroke, and this is attached to a brake rod, one jam being placed under each car.

The main feature in the Genett air brake system lies in the compressor, which is of a novel, compact and effective design, handling the air automatically in the reservoir, thus keeping it at any pressure desired to be carried, independent of employe in charge. To get these results it has been designed with two small suction valves working in ports covered on one side of the cylinder, one being placed at each end and a small governor cylinder work-

ing between. On the other side are two discharge valves, which discharge into a single covered passage leading to the governor cylinder. If the air has not reached the pressure desired to be carried, the compressor works direct to the reservoir until the pressure is reached. Then the suction valves are automatically raised from their seats, thus leaving the compressor piston to work in the free air till the brakes are applied and the pressure reduced, causing the suction valves to return

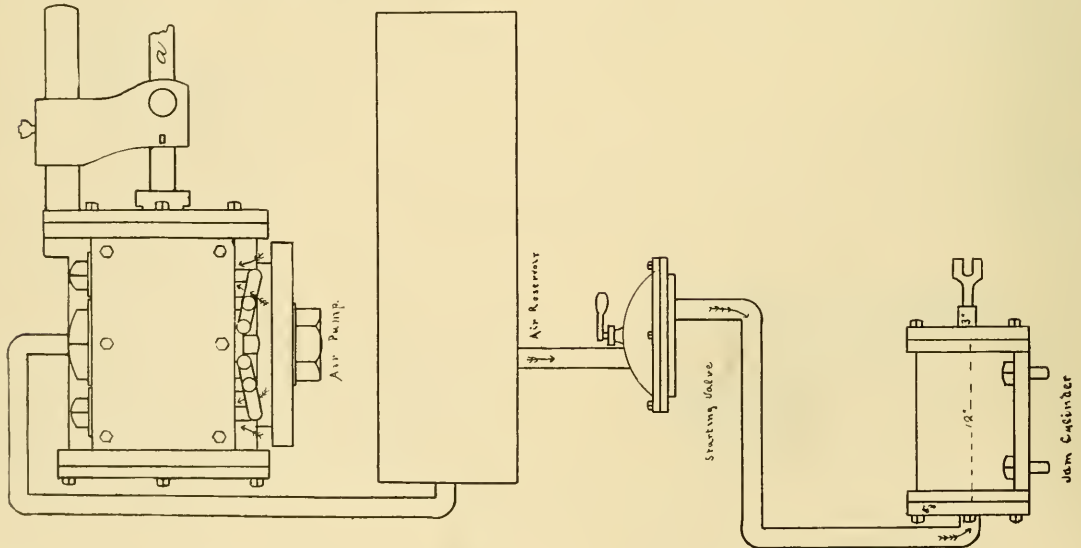
den jerk and holding back of the train incident to other brakes. During the four months in which the train of three large cars were running on the City Railway the train did not lose a single trip nor was it necessary to make any repairs whatever. An occasional oiling was all the attention given. So simple and positive is it that any ten year old boy can operate it without any other instructions than "when you want to stop turn the handle," for the brake will surely do the rest.



to their seats, and the compressor is ready to increase the pressure again. In this manner the compressor is always furnishing the desired pressure and it is impossible to exceed the amount the compressor is set to be carried.

The train running on Chicago City Railway line consists of grip car and two trail cars and carrying a pressure of 35 pounds in reservoir and this is attained as soon as train starts. When a stop is made only one sixth

The action of the brake is as follows: To apply the brake to the train, simply turn the handle of three way valves to the right; this connects the pipe from reservoir with train pipe and releases the air which travels through the train pipe and hose connection to the jam cylinders, forcing out piston rods and setting brakes instantly and all cars alike. The air, can be put on gradually or full pressure by turning valve on only partially or fully as



of the reservoirs storage capacity is used, which is compressed again before train has run sixty feet, although train can be stopped six times within the sixty feet and still have pressure left. The air supply in reservoir is practically inexhaustable.

The great feature of the brake is the ease and promptness with which it works, and there is none of that sud-

desired. By turning the handle of valve to the left the air in reservoir is held in check again and at same time brakes are released.

The office of the Genett Air Brake Co. is 236 Monroe street, Chicago, and Mr. M. L. Ratschids is secretary of the company, and who will be glad to furnish more detailed information.

STREET RAILWAY LAW.

EDITED BY MR. FRANK H. CLARK, ATTORNEY AT LAW, CHICAGO.

Where one hails a street car, the conductor and driver have a right to assume that he desires the car stopped to enable him to get on, and that he does not intend to enter the car while it is in motion. Even if they believe that he intends attempting to board the car while in motion, they owe him no duty to warn him off; he is the best judge of the risk of such an act, and the responsibility for it rests solely upon him.

THIS was an action on the case brought to recover damages for an injury alleged to have been caused by the negligence of the defendant company. At the trial evidence was offered that plaintiff hailed the street car while it was crossing a street: that the conductor pulled the bell, but the driver, mindful of the regulation prohibiting the stopping of the car at a crossing, proceeded at a very slow rate of speed, walking his horses across the street; that the plaintiff did not wait for the car to stop, and, while it was in motion, he seized one of the uprights, it being an open or summer car, and by the motion of the car he was thrown down in the street; and that the plaintiff was a cripple, having one wooden leg.

Mr. Justice Bradley, in delivering the opinion of the court, said:

In the case at bar the instruction is that if the defendant's servants saw the plaintiff approaching a moving car and about to get on and they did nothing to warn him off, or if they did not stop when they saw what he was about to do, or was doing, understanding his peril and the injury resulted, the plaintiff could recover. This is clearly erroneous for several reasons.

It makes no distinction between the duty of the defendant to the plaintiff approaching the car and to the plaintiff having hold of the car and attempting to get on, but attributes peril and corresponding duty to both.

It assumes that the defendant knew, or must have known from the mere act of the plaintiff in approaching the car that he entertained the purpose of getting upon it while it was in motion and that he was therefore in peril. But the defendant could not be required to anticipate the negligence of the plaintiff. Its servants had the right to assume under such circumstances that the plaintiff being *sui juris* and in possession of all his faculties, desired to stop the car and intended not to get on the car whilst it was in motion, but to wait until it stopped.

Had they believed that he entertained the purpose of getting on the car whilst it was in motion and they doubted his ability so to do, they owed him no such duty as to warn him off, for he was the best judge of the risk or danger of such an act and the responsibility for it rested solely upon him.

If such duty of warning existed, the failure to give it would not relieve the plaintiff of the necessity of taking care of himself, or making the resulting injury any the

less the proximate cause of his own act, for which an action would not lie. Under conditions somewhat similar in *Railroad vs. Houston*, 95 U. S. at page 702, the court says:

"The failure of the engineer to sound the whistle or ring the bell, if such were the facts, did not relieve the defendant from the necessity of taking ordinary precautions for her safety. Negligence of the Company's employes in these particulars was no excuse for negligence on her part. She was bound to listen and to look before attempting to cross the railroad track in order to avoid an approaching train and not to walk carelessly into the place of possible danger. Had she used her senses she could not have failed to hear and to see the train which was coming. If she omitted to use them and walked thoughtlessly upon the track she was guilty of culpable negligence and so far contributed to her injuries as to deprive her of any right to complain of others. * * * No railroad company can be held for a failure of experiments of that kind. If one chooses in such a position to take risks he must bear the possible consequences of failure."

The instruction does not leave the question of peril in what he "was about to do or was doing" as a fact to be determined by the jury, but it assumes the peril as matter of law and thereupon bases the duty.

The measure of the duty required is left entirely indefinite. The jury are not enlightened or directed as to what the defendants reasonably should have done to avert the injury and they are left wholly to conjecture and speculation. The existence of an undefined duty was suggested and the probable result was that the jury were misled.

Upon the facts disclosed by the evidence to which these portions of the charge related there appeared to have been no ground for the recovery by the plaintiff, and under these circumstances the court would not have erred if it had excluded this theory of the case from the consideration of the jury.

These instructions, however, assumed as established matters not in proof, viz., actions on the part of the plaintiff in approaching the car, from which an intention to board the car while in motion could be inferred, that the plaintiff was in peril in so approaching and that the defendant's servants had time to become aware of the situation of the plaintiff and to provide for it.

"To instruct a jury upon assumed facts, to which no evidence applied, was error. Such instructions tended to mislead them by withdrawing their attention from the proper points involved in the issue. Juries are sufficiently prone to indulge in conjecture without having possible facts not in evidence suggested for their consideration. In

no respect could the instructions mentioned have aided them in reaching a first conclusion." Railroad Company vs. Houston. 95 U. S., 703.

(Sup. Ct. D. C. Holahan vs. Washington & Georgetown R. Co., 18 Wash. Law Rep., 751.)

Change of Motive Power—Injunction Against Use of Electricity.

Plaintiff owns a piece of ground lying along a street extending across the square so as to front upon the cross streets. It is chiefly valuable for residence purposes and he intended to build a residence thereon. Without objection from him defendant company constructed and operated an electric railway with an overhead wire along one of the cross streets and is about to put in operation a similar road upon the side street upon a track long used for horse cars, fastening its cross wires to electric light poles already erected, so that no poles or tracks are placed in front of the premises. Defendant has expended about seventy thousand dollars in constructing its system of electric railways in the city. There was evidence that there would be some danger to men and animals from the electric current and from the more rapid running of cars, and that the current would interfere with the telephone wires in the same street. *Held*, that no present injury is shown; the apprehended injury is too remote; and, under all the circumstances, plaintiff is not entitled to an injunction against the operation of the road.

(Sup. Ct. Mich. Potter vs. Saginaw Union St. R. Co., 9 Ry. and Corp. L. Jour., 34.)

Agreement with Conductor—Forfeiture of Wages—Certificate of Company's Manager.

The plaintiff became a conductor of the defendant company on the terms, among others, that for a breach by him of the rules of the company, the company's manager might decide that wages owing to him might be retained by the company as damages for the breach. The plaintiff, having been dismissed by the manager for a breach of the rules, brought an action in the county court to recover wages due him. After the action was brought, the manager, without hearing anything the plaintiff might wish to say, signed a printed form of certificate, which he filled in with the plaintiff's name and the amount of wages due, and which declared the wages forfeited. On appeal to the Queen's Bench Division the Divisional Court gave judgment for the defendant company, considering themselves bound by the London Tramway Company vs. Bailey, 37 L. T. Rep. N. S. 499; 3 Q. B. Div. 217. *Held*, that the certificate was no defense to the action, as the manager had not given the plaintiff any opportunity of being heard on the question of forfeiture.

(English Court of Appeal, Armstrong vs. the South London Tramway Company, 9 Ry. & Corp. L. Jour. 19. *Passengers alighting—Duty of Driver.*)

It is the duty of the driver of a horse car, when signaled to stop, to ascertain what passengers intend to alight at that place, to wait a sufficient time to enable them to alight in safety, and to see and know that no passenger is in the act of alighting or is otherwise in a position which would be rendered perilous by starting the car.

(Sup. Ct. Ala. Birmingham U. R. Co. vs. Smith, 8 So. Rep. 86.)

HYGIENE AND VETERINARY.

BY JOSEPH D. TUTTILL, M. D., V. S.

THE wonderful achievements which have been made in the various branches of science and art, during the last decade, makes it apparent to all, who have given this matter any thought, that we live in a progressive age, and rapid transit through our public thoroughfares—when it proves practicable—appears to be one of the absolute necessities of this fast age. This is more particularly demanded in our large and overcrowded cities, which no doubt is to be attributed to the rapid increase of population, the natural desire of the people to settle in suburban towns, and the imperative public demand for the means necessary to facilitate transportation. We have no doubt at all that this is what first stimulated the ingenuity of our American inventors (which by the way have a national reputation) to devise some means of rapid transit, and probably explains why elevated roads, cable plants and electric motors are becoming more and more popular every year. They have already to a great extent taken the place of the old tedious method of transportation by horse power and though it must be admitted that the new system of motor power is comparatively a matter of luxury, convenience and economy to the people, we at the same time can not

afford to ignore the old system of transportation by horse power. It is a well known fact that many of the street railroad lines—especially those which are popularly known as *cross-town-roads*—are operated solely by horse power. This is also the case in many of our smaller towns, where the population is comparatively small, and the number of miles of travel so proportionately small that rapid transit is not desired by the people, or if actually needed, will not pay a sufficient percentage on the money invested to make it a financial success. For these reasons and many others, horses as a motor power for street cars will have to be used more or less for all time to come. This is the motive which has prompted the STREET RAILWAY REVIEW to devote ample space in each issue of this monthly for the diffusion of VETERINARY SCIENCE. The object in having a veterinary department as one of the special features of this work is:

First, to instruct all interested parties according to the most improved rules of modern veterinary science how to protect the noble horse in health and disease.

Second, to give all subscribers an opportunity to ask any question in relation to the management or medical or surgical treatment of disease, which they may require ad-

vice about, through these columns, all of which will be promptly answered free of charge. It is hardly necessary for us to call the attention of our readers to the many advantages of our HYGIENE AND VETERINARY DEPARTMENT to men who are operating street railroads by horse power. Those who have had experience, know much better than we can tell them, that horse power is by far the most expensive of any yet known.

The average life of the unfortunate railroad horse is comparatively a short and miserable one. Many die a premature death, from some of the prevailing diseases. Of these perhaps flatulent colic is the most fatal. Next is the so-called "lung fever," and then comes influenza and the epizootic diseases. But the great financial loss in this business is to be attributed to lameness in the feet. This is what causes the great drain on the company's treasury. The cripples, which are innumerable, are usually sold for a song, and their ranks have to be promptly filled by sound animals, or there will be soon nothing left to keep the rolling stock in motion.

The question now arises what if anything can be done to prolong the usefulness of horses as motor power for street car service. In discussing this part of our subject, we must be particular to give the superintendents of railroads generally, and their assistants, many of whom are painstaking, energetic and faithful in the discharge of their duties, due credit for much that they know from practical experience. At the same time we hope to be able to give the readers of the STREET RAILROAD REVIEW, some valuable hints on Hygiene and the sanitary care of horses—which if followed up will prevent many of the diseases incidental to railroad horses. This will include ventilation, cleanliness, dieting, watering, working, etc. Our next duty will be to give particular attention to the causes of disease—their nature, and the medical and surgical treatment of the same. In connection with this part of our subject perhaps it will not be considered egotistic for the writer to state that he has been engaged in the practice of veterinary medicine and surgery for over thirty years. During much of this time he has had great personal experience in the treatment of the diseases of railroad horses. This statement is made to let the readers of the STREET RAILWAY REVIEW know that the writer is no novice in this matter, and that what he knows and intends to communicate to the readers of the REVIEW from month to month in the HYGIENE AND VETERINARY department, is based on a practical and theoretical knowledge from personal attention in the discharge of his professional duties.

VENTILATION.

Ventilation and cleanliness are as a rule very strictly attended to in street railroad stables, but this does not prove that it is not sometimes neglected, neither does it prove that some important feature in this important branch of sanitary science is often overlooked. Proper ventilation is most important for the maintenance of health, strength and endurance, and improper ventilation and neglect of cleanliness is one of the most prolific causes of

disease. This has been demonstrated time and again during the prevalence of some epizootic. The horses kept in clean, well ventilated stables invariably escape with a very mild form of the disease, and with proper medical treatment no deaths will occur, except in cases which become complicated. Prompt recovery is another marked feature in those cases which are scientifically cared for. During convalescence they seldom manifest any symptoms of debility, and for this reason they usually are ready to resume work. How different it is with horses that are kept in a stable where ventilation and cleanliness is neglected, the death rate is invariably large, and those who recover are so debilitated and emaciated from their protracted illness, that it requires weeks and months to recuperate them. This is an expense which by proper management might be avoided—the loss of the animals labor—if a dozen or more are on the sick list, doctor's fees and medicine, eat up much of the profits which should go into the company's treasury. It proves that ventilation is one of the most important features connected with the successful management of horses. The man who wilfully neglects these very important rules of sanitary science, cannot expect to make the management of work horses a financial success.

THE Cincinnati Inclined Plane Railway Co. some time ago built an extension which they equipped with electricity. The telephone people claimed the operation of the road interfered with their service, and secured an injunction. The case has gone from the lower to the supreme court, and meanwhile the road is operating, having been allowed to file a \$5,000 bond.

THE STREET RAILWAY REVIEW takes this occasion to most sincerely acknowledge its sense of obligation and gratitude to its many friends, both of the press and individuals, who have so generously spoken in kindly words of encouragement of the new enterprise. We not only deeply appreciate the good will so pleasantly extended but shall labor incessantly to fulfill their expectations.

YEARS ago when the New Orleans roads secured the franchises something was said about paving the streets, as a part of the trade with the city. This however has never been done, and was forgotten by most people. Now it has been agitated again, and the city officials want the roads to put down a plank paving, and it looks very much as if the companies there would have "to walk the plank."

WE present our readers this month the second portrait in our series of prominent street railway men, and have selected one who was the prime mover in the organization of the American Street Railway Association and its first president, Mr. H. H. Littell, manager of the Louisville City Railway and President of the Cincinnati Inclined Plane Railway. We suggest to our readers that by framing these portraits month by month they will soon have quite a collection of the leading street railway managers with which to adorn their offices.

A WELL KNOWN MANAGER.

NO man is better and more favorably known in street railway circles throughout the United States than Mr. Hardin H. Littell of Louisville, Ky. At his home city he is regarded as one of the most progressive and wide awake business men, and he, to-day, has under his management and control what is considered as one of the best, if not in many respects the very best, system of street car service in the country. Mr. H. H. Littell, although yet a young man, has spent more years in active street railway service than any person known to the writer. In 1864, at the age of nineteen, he entered the service of the Louisville City Railway Company of Louisville, Ky., as receiving clerk. In less than one year he was made assistant superintendent, and in 1867, three years after taking employment, he was elected superintendent and continued to hold this position until 1889, when the two street railway companies of Louisville (the Louisville City and Central Passenger) were leased by the Louisville Railway Company, and he was made manager of the consolidated lines. His success in the street railway business can best be judged by seeing the excellent street railway systems under his charge in Louisville, Ky., and Cincinnati, Ohio. In 1888, in the latter city, Mr. Littell and a party of friends purchased the Cincinnati Inclined Plane Railway Company and he was elected its president, which position he continues to hold, as well as manager of the Louisville street railway lines.

In 1882 he issued the first call for a meeting of street railway companies, each company to be represented by some one of its officers, for the purpose of organizing a Street Railway Association, and this meeting was held in Boston, December 13th, 1882. Mr. Littell called the meeting to order and the Hon. Moody Merrill was made chairman. At this meeting the American Street Railway Association was organized and Mr. Littell was elected president. He presided at the next meeting held in Chicago the following November and at this meeting, although electricity then was but little thought of as a motive power, he spoke of it in his address as a solution of the rapid transit problem.

His interest in the Street Railway Association has never flagged, and he has continued to serve it each year in some official capacity, as well as through a strong personal effort at all times to have its aims and purposes high and its strength increased and maintained. He is a welcome speaker in session or around the banquet table and is one to whom many a new member recalls with grateful appreciation his gentle courtesy in the way of introduction to others and encouragement to take part.

The future before Mr. Littell is one of brightest promise, both to himself and to the interest of the important branch of industry in which he deservedly ranks so high.

Mr. Little's record is a special example of what a man with brains and energy can accomplish, and a feature of no small account in this connection is the pleasure his friends take in his success. He has had numerous invitations to go elsewhere and assume management of other roads.

THE OTHER SIDE.

THE company at Indianapolis, Ind., desiring to make extensive improvements, has asked for an extension of its franchises, which have yet several years to run. The local press and a few short sighted people, who would doubtless term themselves public spirited have joined in a great cry against any concession to the company unless it carries with it several very onerous burdens, one of which is a large amount of street paving. The company at the same time is termed slow unless it proceeds to spend large sums in giving that city the largest and latest and best that modern invention has devised. The inconsistency of expecting capitalists to tie their money up where the returns at first will not be proportionate with a similar investment in other directions and then hampering their public spirited willingness to do so with restrictions amounting almost to a prohibition is neither just nor business-like.

A street railway derives certain benefits from its occupancy of the street, it is true, but it in return affords benefits and fills the demands of actual public necessity, in a measure unequalled by any other organization. It does not monopolize the thoroughfare to the exclusion of the rights of other vehicles, and even if it did and cars were run at distances of every hundred feet, it would then be more than justified in so doing, for one car accommodates at least thirty people, while the carriage or truck, which it would displace, could not serve more than two or three. The twenty or thirty feet of street occupied by a street car gives greater returns in convenience to a greater number of persons than any use to which a similar amount of the street can be put.

A company cannot in the very nature of things give more than it receives. In these days it is the honest endeavor of almost every street railway corporation to give for a fare the longest and best ride that can be furnished. But they can only spend a fixed proportion of receipts in improvements that go to make what might be termed the luxuries of street car travel. If they are obliged to stagger under heavy burdens and carry expenses belonging to the maintainance of the municipality, they have not the money to spend as otherwise they would. It is the middle and poorer classes who suffer by such enactments, for they cannot afford a more expensive vehicle than the street car. The rich, who pay large taxes, would, no doubt, be mightily pleased to shirk a part of their duties and let the street railroad pay their bills for streets in which their carriages can roll, but care little that the money so saved to them means that much less to be expended in additional cars and comforts of riding. Time was when street railroads, in common with other semi-public corporations, traveled in a rut from year to year, but it was largely due to the fact that inventive genius, which of late has been so prolific in this direction, had not offered but few improvements to adopt.

Mr. Shaffer, President of the Indianapolis lines has had several issues with the city fathers on other matters pertaining to his road, and has always come out ahead, and it is to be presumed will win his point this time.



H. H. LITTELL.

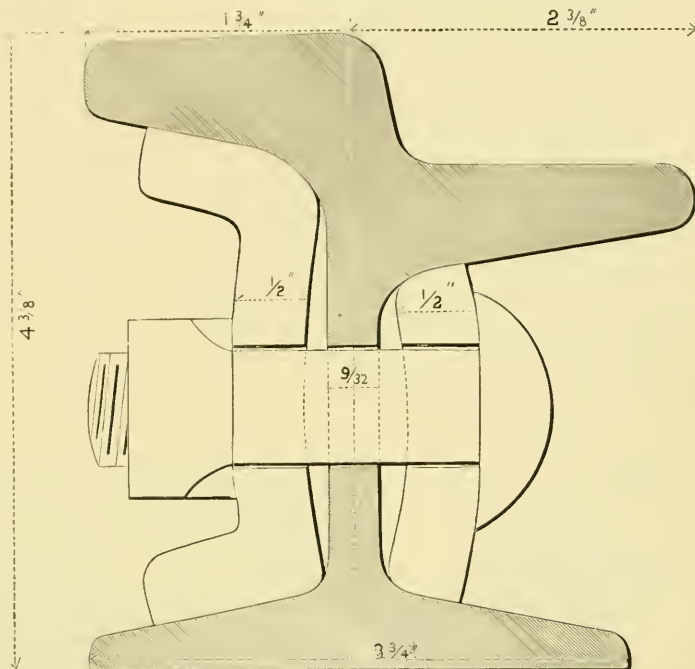
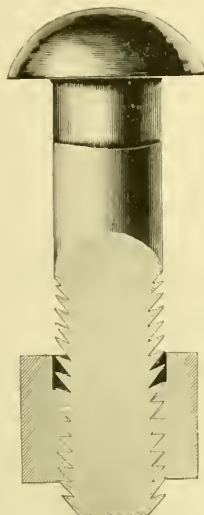
The Tramway Rail Co.'s System.

SEVERAL new features in laying girder rails are offered by the Tramway Rail Company, of Pittsburgh. Their rail has a wide head and extra wide bottom flanges, while the tram is thrown down sufficiently to clear the flange of the wheel, even after long wear on the rail.

The splice bars at the joint are one-

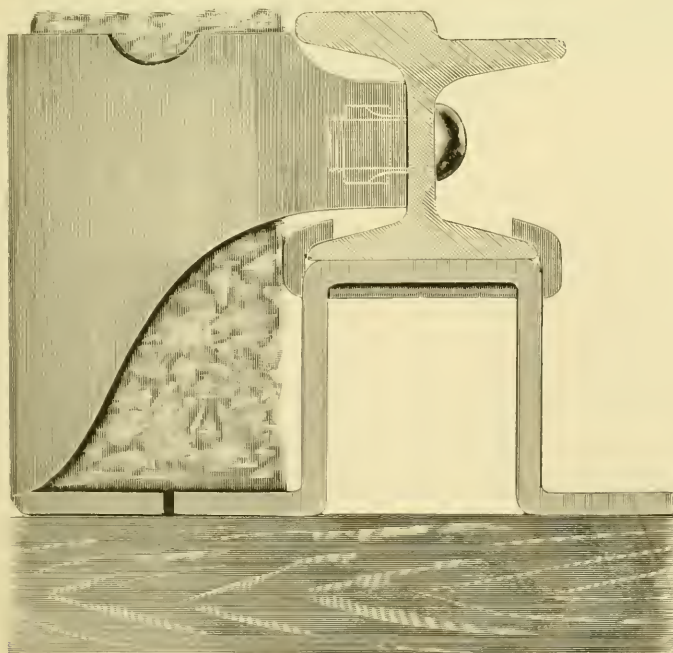
under the tram as heavy as can be made. The splice bars will bend double without breaking.

The bolt is known as the patent grip bolt, which has a ratchet thread cut on the bearing side or about five degrees



half inch thick and bolted with a three-quarter inch bolt with large head and nut, both having plenty of bearing surface. The channel bar is deep and the plain bar

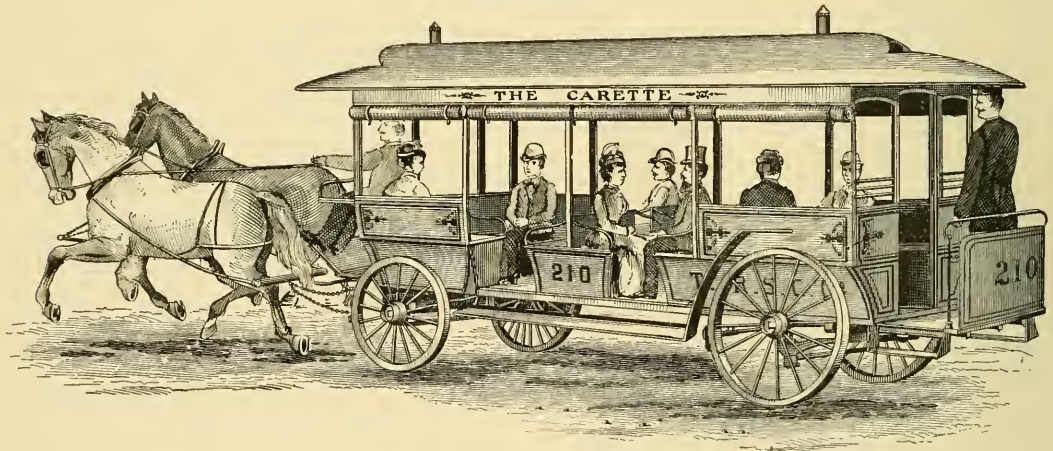
less than a right angle to the axis of the bolt, and the apex of the thread is cut to a knife edge. When the nut is screwed up tight against the splice bar the strain forces the thin bolt threads out into the nut threads, completely filling them. The body of the chair is made of soft forged steel 5-16 inch in thickness and the tongues of one and a quarter by one-half inch rolled steel. In the manufacture the clip bar is thrust while red hot clear through the chair, after which the ends are bent up and then cooling shrinks and fits the chair tightly. This chair, it will be seen, requires no bolts and is easily and quickly fitted to the rail.



The joint box is a plate of tough steel bent to shape and bolted to the rail outside the joint and is intended to be filled with whatever paving material the track is paved. When it is desired to tighten the splice bar bolts, all that is necessary is to lift the paving block that fills the joint box, thus exposing the bolt head, after tightening which the single paving block is replaced without loss of time or any expense. On steam roads the exposed joints make it an easy matter to tighten the splice-bars at any time, but with street car track it is a costly matter.

The Open Carette.

WHEN the carette first made its appearance on the streets of Chicago everyone was interested to know more about it, and as the route on which they ran included two divisions of the city, between which there was no through connection by street cars, many were led to patronize them who did not want to make the change from the cars of one company to those of another, with the incident trouble and delay and the payment of additional fare. And so from the day of its start the carette has steadily gained in popularity and business, and as it is not confined to any one street, is able to establish detour routes and land passengers at their doorstep who formerly were obliged to walk some distance to a street car. Not only were the through lines successful, but as fast as they could be made, additional carettes were built and put into short service, running exclusively in one division of the city and at such frequent intervals as to win great popularity.



During the past few months the company, of which Mr. A. W. Brickwood is manager, has had in contemplation a novelty for summer travel. While the original carette, by lowering the windows, could be made cool and airy, still, in summer, people, riding more, desire easier access. To meet this demand the open carette has been designed and a full complement are building to operate in Chicago with the advent of warm weather. The body can be carried on the same running gear if so desired, and, as shown by the illustration, is as accessible as an open car and in many respects more so. Plenty of room is provided, so that one passenger does not crowd another in getting in or out. At each end the occupants sit facing across the car. Then there are in the center three rows of cross seats as in a steam car, while a main center aisle extends the entire length, through which the conductor passes for collections and without going outside as on open cars, thereby keeping him within easy reach of the passengers at all times, which is a decided advantage. The vehicle is

amply lighted, is provided with drop curtains in case of a sudden shower and comfortably seats twenty-nine persons.

Easy steps extend along both sides, like the foot board of an open car, and the two steps on the rear platform afford ample accommodations for entry or exit.

The Russell Street Carette Co. are pushing to the front and already operate in many of the large cities. Among the Western cities who have adopted this system recently are Milwaukee and Saginaw.

In the city of Washington where a line of Carettes has just been put on, they are meeting with great favor and promise to supplant the old herdic system; with the magnificent smooth streets in that metropolis, the Carettes glide along as smoothly as any carriage, and the outlook is very promising.

The company there has organized under the name of the People's Carette Co., and the plan has been to place the stock in small amounts among as large a number of share holders as possible.

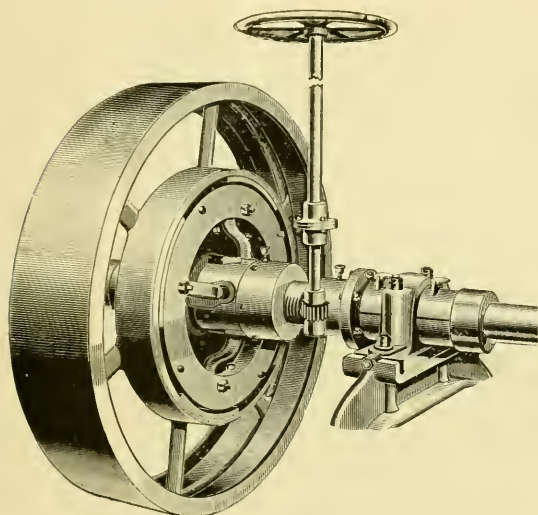
An Object Lesson.

THE city council of Lancaster, Pa., was all torn up last month over the question of whether the railway people should use a single or continue the double trolley wire, and being electrical experts in their own judgment, were about to compel the double overhead wire system.

Mr. Crane of the United Electric Traction System secured a day's delay in the decision and when the august fathers gathered in the council chamber they found a full fledged system of the single overhead wire and steel rail for return current, all properly connected with a working dynamo, and sufficient power on tap to run a whole line of loaded cars. With this practical object lesson to illustrate the claims made, the railway people promptly scored their points and the desired ordinance was quickly passed, where the day previous almost certain defeat stared them in the face. Its a pretty deep hole out of which an electric railway man cannot find a way.

A New Clutch Pulley.

THE illustration gives a very good idea of the new Friction Clutch Pulley, the invention of A. C. Price, superintendent of the Stilwell & Bierce Manufacturing Co., Dayton, Ohio. The clutch may be operated from above or below by a shaft which, as seen in the cut, terminates in a pinion engaging in the rack cut in the side of the shifter sleeve extension. When preferred the clutch may be operated by the horizontal lever and fork. The clutch acts by means of four metal friction shoes, working simultaneously, each operated by a crooked shifted arm, fulcrumed on an eccentric bolt, of which only the nut is seen. The center of each friction shoe is out of centre with its corresponding eccentric



bolt, so that when the friction shoe is forced out and against the friction rim, the shoe is made to act as a wedge, and in proportion with the increased load the friction of the two surfaces increases and a slip is impossible. An anti-friction roll running in the inclined slots in the shifter sleeve of each shifter arm, makes the operation an easy one. The clutch will not scatter oil when running, has a powerful and positive grip in action, is not complicated and all parts easily accessible. The wearing parts are few, can be readily replaced, as all parts are interchangeable and will be found both satisfactory and durable.

RECENTLY one of the officers of one of the largest roads in the country entered one of his cars late in the evening and occupied the one vacant seat. Later a woman entered who attracted the attention of all by her phenomenal weight. The officer being very tired kept his seat whereupon she sat down in his lap, and he being a very small man was nearly crushed. He started in to "sit it out," but after riding two blocks politely said in a whisper "I guess you better take this seat" to which she replied in a shout that was heard a block, "I thought you would come to it," and in the hilarity which ensued the conductor felt so good he rang up eighteen fares on himself.

New Trolley Wire Clamp.

ONE of the principal features in the installation of an electric road is the proper construction of the appliances for connecting the trolley wire, to the span wire. Objections have been made to the present means of holding the trolley wire, for the reason that it has been necessary in most cases to either solder the connections, which necessarily weakens the wire, or else to

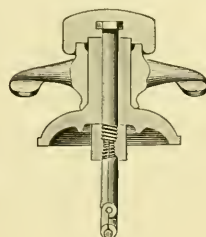


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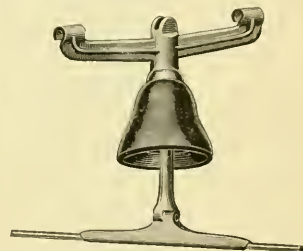


No. 2.

hammer together the sides of clamp, which causes trouble and delay in adjusting the position of the insulator. To obviate these and other disadvantages the Electric Merchandise Company, Chicago, have just placed on the market the "Brewster clamp," which we illustrate. Figures 1 and 1 show the clamp, which is made of two sections of hard and tough brass rivetted together with a



No. 3.



No. 4.

steel pin. After the clamp has been placed upon the trolley wire and closed, the insulator is screwed down upon it, firmly holding the wire without soldering or hammering and presenting a perfectly smooth surface to the trolley. Figures 3 and 4 show the clamp attached to the standard trolley wire insulator, but the clamp can be used on any trolley hanger and will be sold either separate or in connection with any other style of insulator.

A Shoe and Stocking Street Car.

A CORRESPONDENT to the Washington *Star* thus writes from the city of Rio de Janeiro, on the social rank of shoes and stockings as denoting rank of the wearer and necessary to attain unto the best in street car privileges:

There is a most excellent street car service. There are three kinds of street cars—the open ones, nicely painted and appointed, in which one pays to cents for a ride and must have shoes and stockings on. The second-class or barefoot cars, which are closed, have a tariff of 5 cents for a ride. These cars run on regular routes and follow the rails laid down in the streets. The horses and mules are good and there are enough of them to draw the cars, so it is not necessary for the drivers to beat them and the company does not allow the men to have whips. Crowding is not allowed and when a car is full it will not stop for any one. The third class is a kind of open car mounted on big wheels, and they all seem to start from the large market down on the wharves. They have a destination, which is announced on a little board which the conductor hangs on to the roof before starting. They also seem to have regular routes, but leave them at the request of any passenger. These carry the lowest classes, chiefly slaves and street vendors with their heavy packages or baskets.

WORLD'S FAIR ELECTRICIAN.

JOHN P. BARRETT, so well known in this and other countries for the many electrical improvements and adaptations in his capacity as electrician of the city of Chicago, has been elected to the above named office. Now that the appointment has formally been made and accepted, Mr. Barrett's friends are availing themselves of the desired opportunity to congratulate him.

His life has included not a little of the romantic, of which the *Western Electrician*,—to whose kindness we are indebted for the portrait of Mr. Barrett,—has the following:

Born near Auburn, N. Y., in 1837, he removed with his parents to Chicago when only seven years of age. It was not his privilege to enjoy an extended education.



though he was fond of books and made excellent use of his time at school. At the age of twelve years he went to sea, entering as a ship's boy and rising to the position of an able seaman. In a storm off the coast of Chili he met with an accident, which it was feared would cost him his life. He was flung from a masthead and crippled for life. Two other sailors who were with him were killed, but after nearly two year's suffering in a San Francisco hospital, Prof. Barrett regained his health, returning to his home in Chicago in 1865. This was the turning point in his life. Shortly after his arrival he was appointed fire watchman in the glass tower on the city hall, which commanded a view of every housetop in the city, and it was his duty to sound the alarm at the first indication of a conflagration. This was his first public service. It proved satisfactory and he has since discharged his duties most conscientiously. The fire depart-

ment of the city of Chicago has been greatly benefitted by his connection with it. In fact, the whole world is indebted to him for developing the fire alarm telegraph system which is now in general use."

The accident which unfitted him for following his original occupation gave him an opportunity to prepare himself for his new field of labor. During his confinement at the San Francisco hospital he studied diligently, and made remarkable improvement. He continued his studies while in the service of the city, and when his faithful performance of duty had won the confidence of his superiors he was prepared to perform the duties of a higher office, the promotion to which his intelligent service had entitled him."

To his many improvements in the fire department, are to be added achievements in the police patrol system, a

system of lighting the Chicago river by arc lights, of inaugurating a system by which the bridges are opened and closed from the harbor master's office very much as a train dispatcher controls the movements of trains;—and by no means least, his persistent and intelligent efforts which placed under ground all wires in the business district of Chicago, and the foundation for a complete system of public lighting of the streets by electricity.

A better selection could not have been made to secure a man of energy, good judgment and thoroughly progressive.

The electrical department of the great exposition can not fail to be the chief attraction of all the exhibits in science or mechanics and it is an honor of no small order which accrues to the man who must stand at the head and direct this important branch. Provision must not only be made for present exhibits, but future ones as well.

CICERO AND PROVISO ELECTRIC CO.

As this number reaches our readers the Cicero and Proviso Electric Railway is being opened for business. It extends through a territory rapidly being settled, and is the result of a demand from the enterprising citizens of that district who have joined hands and built the road. Starting from the terminus of the Madison St. cable line, at 10th street, four miles from the center of the city, it runs directly west on Madison street for four miles to Harlem avenue, which is the west line of Oak Park and the dividing line between that suburb, River Forest and Harlem. Thence north on Harlem avenue to Lake street, east on Lake street, through the villages of Oak

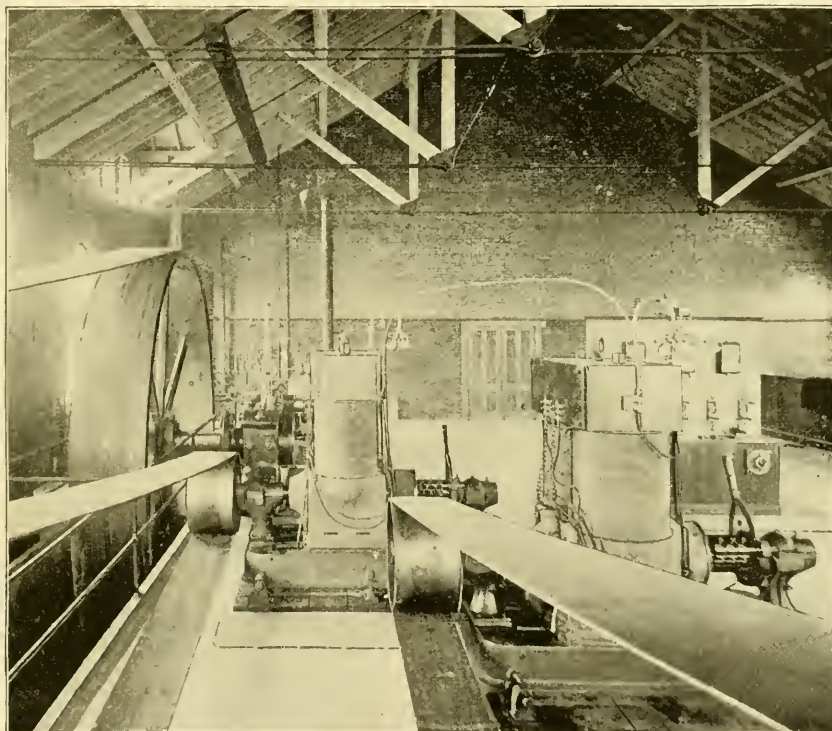
chises are secured for extending the line west to the Des Plaines river and south to Waldheim cemetery along the east bank of the Des Plaines river.

The line at present has eight miles of double track.

The belting, a most important matter in electric railway service, is furnished by the Chas. Munson Belting Co., and includes one 30 in. 100 ft. driving belt from the engine to the line shaft, and two dynamo belts.

By the use of two Beloit Wind Engine Co's. clutch pulleys either or both dynamos may be disconnected without stopping the engine.

The boiler room is made complete by each boiler being equipped with the Roney Mechanical stoker, which feeds



Park, Ridgeland, Austin, Linden Park and Moreland to 48th street, thence south on 48th street to Madison, which completes the loop.

The road is laid with 60 lb. Johnson Girder rail and steel chairs, and equipped by the Edison General Electric Co. Twelve motor cars from the Pullman Co. are already in service, each fitted with two 15 H.P. motors, and carried on the McGuire double trucks, making as easy a riding car as any palace sleeper. The power house is located about the center of the system at Ridgeland, and contains two 80,000 Watt Dynamos and one 250 H.P. Corliss, with three boilers, both furnished by the Hamson Co. The driving power will soon be doubled. Fran-

the fuel automatically from a hopper, without opening the fire door, which effects a great saving both in handling and heat.

The officers are: President, D. J. Kennedy, of Oak Park; Vice President, Taylor A. Snow, of Austin; Treasurer, George Eckhart, of Oak Park; Secretary, Frank E. Ballard, and Superintendent, P. H. Quade, formerly with the Passenger Railway Co., of Chicago.

The line is a most promising one and is a splendid start towards the electric lines which Chicago ought to have, and is to be hoped soon will own.

The investment is sure to be a remunerative one, as the already large settlement is increasing very fast.

ECHOES FROM THE TRADE.

THE BUFFALO RAILWAY SUPPLY Co. has increased its capital from \$100,000 to \$200,000.

THE ILLINOIS ELECTRIC MATERIAL Co., of Chicago, have issued a very neat catalogue, showing their electric light and street railway goods. It reflects credit on the compilers.

D. H. BATES, general manager of the Accumulator Company, has closed a contract for equipping the street line of Mt. Eckington and Soldiers' Home Railway with six of his storage battery cars.

THE STREET RAILWAY REVIEW's new Electrical Air Ship, for raising blockades on street car lines. By means

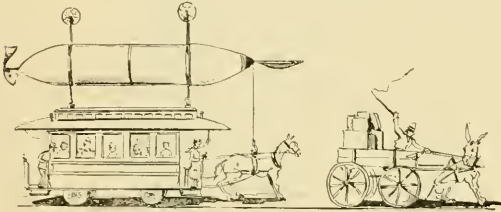


Figure 1.—The Blockade.

of this device delays of all kinds may be avoided, thus affecting a great saving in time over former methods.

THE ST. LOUIS CAR Co. keep full of orders as usual, they having just delivered the last of a very large order for the Union Depot Line in that city, and they report a large business for the far west.

G. A. E. KOHLER, manager of the western office of the Eddy Electric Motor Co., reports a growing demand for that popular motor, having sold more than twenty-five horse powers in various sizes in the past month.

THE THOMPSON-HOUSTON Co. are putting in a very complete line at Columbus, O., their order calling for the equipment of twenty cars, all to be of their new patent slow speed motor, also for the generators, which consist of six of 200 horse power, and six of 100 horse power each.

THE COLUMBIAN ENGRAVING Co. of Chicago, have special facilities for all kinds of wood and photo process engraving, and as one of the artists has had long experience in preparing plans for cable road construction work, knows exactly how to design sketches for street railway appliances.

LEWIS & FOWLER MANUFACTURING Co. Among the orders received by this company are those from the Lynchburg Street Railway Co., Lynchburg, Va., Waterbury Consolidated Street Railway Company, and large orders from Brooklyn, and report being crowded in their many other departments.

PRICE & THOMAS, New York agents for the McIntosh, Seymour & Co. engine, report among their recent orders one from the Consolidated Street Railway Company at Columbus, O., for six compound condensing engines, three of which are to be 250 horse power each, and three of 450 horse power each, requiring each engine to run two dynamos.

PHOENIX IRON WORKS Co., Meadville, Pa., report a very large business from the street railway companies. Among the recent orders being a 300 horse power steam plant for the Savannah and Rural Resort Railroad Co., Savannah, Ga., a 300 horse power plant for Lancaster, and three 150 horse power compound condensing engines for a new short line at Jamestown, N. Y.

A NEW RAILWAY LAMP. A new railway lamp is about to be put on the market by the Great Western Electric Supply Co. of Chicago, which possesses the highest efficiency, and is so constructed as to completely eliminate the possibility of breakage of the carbon from the jar of the car. It is novel in design and finish, and is, in fact, a departure from anything yet seen in the market.

THE BEMIS CAR BOX Co.'s shops are very full, being obliged to run over time on account of large orders to build the Robinson Radial Truck for that company in Boston, on which they are putting their patent gears and attachments. Mr. Bird, their western salesman, at 45 Lakeside Building, reports the outlook good for an extensive trade for his company throughout the west this season.

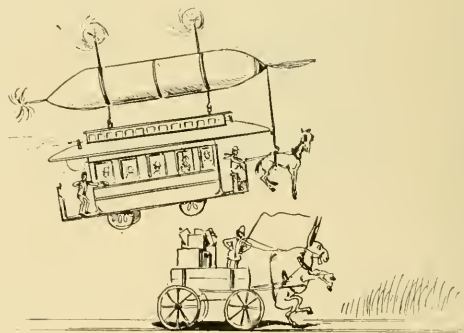


Figure 2.—The Air Ship under full sail.

THE Thomson-Houston Electric Company has just issued a 110 page book, containing valuable statistics, showing the number, system and geographical location of every electric lighting station and street railway in the United States. It makes a good sized volume, shows great labor in compilation, and reminds one of a physical geography. The T-H people lead the list with 666 lighting plants and 103 electric railways.

THE MCGUIRE MANUFACTURING Co. report a very large month's business for January. Among the orders received by them for trucks were from the Grand View Beach Railway, and Rochester Street Railway, Rochester, the Galveston Street Railway, Galveston, Texas, the Newark and Grandville Electric Street Railway, Newark, O., and a number of others. This company have just printed a new catalogue showing their goods.

THE JOHN STEPHENSON Co., (limited), as usual are busy in all their departments, having orders for a large number of cars, not only from the home market, but from Mexico and Brazil. Among the large orders being completed by them are those from the Cleveland cable line, for grip cars, also Fourth avenue line in New York, and they have recently shipped a large consignment to Salt Lake City, Utah.

THE NEW PROCESS RAWHIDE Co., Syracuse, N. Y., report a very large trade in their goods and are showing some very flattering recommendations from street railway men. Mr. J. H. Vanderveer, general manager of the People's Street Railway Co., writes of them "that he has tried most everything in the market in the way of motor pinions and found none so satisfactory" and is thoroughly satisfied that the rawhide pinions are the best, and that he has equipped all of his cars with them, and will not look at any other kind.

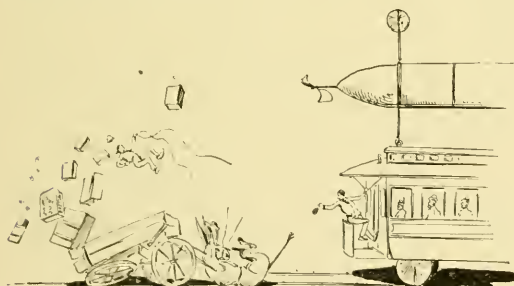


Figure 3.—Two Bells: the country saved.

P. T. Barnum on the Electric System.

THE proposition to change the Bridgeport, Conn., lines from horse to electric power elicits the following sentiments from this well known man. From a personal inspection in his travels on more electric railways than almost any other person, he says:

"As a friend to that noblest companion and aid to man among dumb animals—the horse—I wish to declare myself emphatically in favor of the new scheme for street railways, which should be of double tracks, and I am distinctly in favor of the single trolley system. My public interest in this matter is actuated by the desire to promote the growth of our city and the comfort and welfare of its citizens, which I believe can be best accomplished by the transition from our present inadequate system of street railroad to the best known to science and the public."

EDISON GENERAL ELECTRIC Co. are progressing nicely with their work at Raleigh, N. C., the construction being in charge of Frank P. Lewis, who formerly resided in that city.

THE OKONITE Co., so well known among wire men, have made a special department for the street railway work and find this new branch a very large one, as they are full of orders from this source.

THE PULLMAN Co. have furnished the car equipment for the West Superior electric line, both motors and trail cars, twelve in all, and the new Cicero & Proviso Co., of West Chicago, have just started twelve of their latest style of vestibule cars.

PERSONALS.

B. J. WEEKS, of Boston, has been elected superintendent of the Boston & Quincy Electric Railway.

MR. GAGE, of the Baldwin Motor Co., has just returned from Provo City, Utah, where he has furnished a Baldwin motor to the line there.

GEORGE B. HATHAWAY, president of the Belle City Street Railway, Racine, called at our office when returning from the wedding of his sister.

J. F. HEYWARD, general manager of the Montgomery, Ala. Terminal and Street Railway system, has resigned and will remove to New York.

JOHN PUGH, of the Baltimore Car Wheel Co., while looking after his company's interests in Chicago, kindly found time to call on the REVIEW and cheer us up.

MR. UPRIGHT has been elected superintendent of the Horse Railroad Company, and has entered upon his new duties. He should make a model superintendent.

DR. AUSTIN, of the Electric Street Railway Advertiser, was in Chicago a few days since, called here by the serious illness of his father, and made us a pleasant call.

WALTER H. HOLMES, President Grand Ave. Cable Company, Kansas City, his wife and two children, and two guests, were almost suffocated from the furnace setting fire to the mansion.

GEO. W. WELLS, general manager of the Duplex Railway Chair Co., of Worcester, Mass., made this office a pleasant call the first of the week. Mr. Wells is calling on the Western street railway men in the interest of his chair.

B. E. SUNNY, the General Western Manager of the Thompson-Houston Company, is the proud father of a bright little son, who will never want for a splendid example of executive ability and friends, so long as he follows in his father's footsteps.

J. C. ROBINSON, President of the California Contract Corporation, paid this office a visit on his way to New York, where he sailed for England on January 31st. Mrs. Robinson has had a long and dangerous illness, and it is hoped a change of climate will benefit her.

BROWNELL CAR Co., of St. Louis, have remembered their friends during the past few days with a handsome little match box of vulcanized rubber. Mr. Brownell always takes time from the conduct of a large and fast increasing business to remember his many friends.

C. DENSMORE WYMAN, Vice President of the Central Park, North and East River Railroad Co., New York, and who will be remembered as having so happily presided at the last annual banquet of the association, has sailed for Cuba, where he will spend a month. Overwork during the past fall and winter, has made a rest imperative.

THE LACLEDE CAR Co. are now working under their new organization, which is composed of the following well known men: Wm. Sutton, president; Emil Alexander, secretary; and Thomas F. Calfer, vice-president and treasurer. This makes a strong working force of officers.

MR. CHARLES HATHAWAY, accompanied by his son-in-law, Mr. H. H. Johnson, also of Cleveland, paid the REVIEW a most welcome visit. Mr. Hathaway reports the new cable road there as doing a surprisingly large business, which exceeded their highest expectations.

JAMES R. CHAPEN, of Kansas City, late superintendent of bridge construction of the Denver & Rio Grande R. R. and a street railway manager of large experience, has accepted the general management of all the street railway lines in Grand Rapids, Mich., and is already making plans to convert the whole system into electricity.

D. B. DEAN, who has so ably represented the Electrical Review, of New York, as western general agent, has resigned to accept a position as traveling general agent for the Electric Merchandise Co. Mr. Dean has made a large circle of friends, all of whom will be pleased to learn of his advancement.

HON. JULIUS S. GRINNELL, who attained such prominence as the judge before whom the famous boodler cases were tried, has resigned, to take the office of counsel for the Chicago City Railway Co. Judge Grinnell is a most popular man, an able jurist, and was the prosecuting attorney during the celebrated anarchist trial in this city a few years ago.

T. N. VAN DYNE, who for many years has been the popular superintendent of the Chattanooga, Tenn., Street Railway, was married on February 4th, to Miss Maude Farquhor, the occasion being quite a society event. Among the five hundred presents was a very handsome one from the employees of the Electric Co. who availed themselves of this occasion to express their regard for their superintendent.

GREAT WESTERN ELECTRIC SUPPLY Co., Chicago, report a phenomenal business. Even in January, which was supposed to be a dull month, they report a fine business. This company certainly deserves the generous support which they are receiving. They have an enormous business, which is conducted with great ability, and the wants of their customers receive most careful attention.

HIGHLY HONORED.

THE name of Thomas C. Lowry is being very favorably mentioned as one well qualified and not unlikely to receive the appointment as Secretary of the Treasury. Mr. Lowry is a man of large and liberal ideas, a most successful financier, and one whose natural abilities are fully equal to the trying demands of the position. Senator Pierce has taken the matter up with the President, who is said to consider it with evident favor.

JOHNSON-HATHAWAY.

ON Tuesday, the 10th of February, at Cleveland, Mr. Henry H. Johnson was united in marriage to Miss Helen Adalyn Hathaway, daughter of Mr. Charles Hathaway. The entire street railway fraternity, to whom Mr. Hathaway is so widely known, will feel an interest in the success of the young people and join in wishing them happiness and prosperity.

Mr. Johnson is one of the prominent young men in Cleveland, and conducts an extensive and important real estate business, and both young people are great favorites among a large circle of acquaintances.

A part of the wedding trip included several days in Chicago, at the Auditorium, on their return to Cleveland. Mr. and Mrs. Johnson will be at home at the Hollenden.

BOSTON LETTER.

BOSTON, MASS., Feby. 12.

MR. R. T. WHITE has returned from an extensive southern trip in the interest of his new patent rails. Mr. White reports a very successful trip, and is very much flattered by the report received from the Washington Street Railway men, who have been making a careful examination of this type of rail.

The Robinson Radial Car Truck Co. have removed their office from 95 Milk street to 188 Summer street, in a more convenient location for this business, that being the location of the electrical houses and most of the street railway supply men of Boston. The company are now filling large contracts for Eastern roads, and are soon to open a Western office at Chicago, so they will be better able to care for their Western trade.

The Office of The Electric Street Railway Advertiser has been moved to larger and more convenient quarters in the same building, and have put in a new line of type, so that they can do their own typesetting hereafter.

Dr. Austin, of the Electric Railway Advertiser, has been called to Chicago on account of the illness of his father, who resides in that city.

There will be a large delegation from this city to the Electrical Convention at Providence.

FOUND ON THE RUSH TRIP.

American Street Railway Association.

HENRY M. WATSON, PRESIDENT, Buffalo, N. Y.
 W. A. SMITH, FIRST VICE-PRESIDENT, Omaha, Neb.
 CHARLES ODELL, SECOND VICE-PRESIDENT, Newburyport, Mass.
 A. D. RODGERS, THIRD VICE-PRESIDENT, Columbus, Ohio.
 WM. J. RICHARDSON, SECRETARY AND TREASURER, Brooklyn, N. Y.
 EXECUTIVE COMMITTEE—THE PRESIDENT, VICE-PRESIDENTS, and THOMAS
 LOWRY, Minneapolis, Minn.; D. F. HENRY, Pittsburgh, Pa.; ALBERT E. THORNTON,
 Atlanta, Gr.; H. M. LITTELL, Cincinnati, O. and THOMAS C. KEEFER,
 Ottawa, Can.

Next meeting will be held in Pittsburgh, Pa., October 21st, 1891.

Massachusetts Street Railway Association.

President, CHAS. B. PRATT, Salem; Vice Presidents, H. M. WHITNEY, Boston,
 AMOS F. BREED, Lynn, FRANK S. STEVENS; Secretary and Treasurer, J. H. EATON,
 Lawrence.

Meets first Wednesday of each month.

New York Street Railway Association.

President, DANIEL F. LEWIS, Brooklyn; Vice Presidents, JNO. N. BECKLEY,
 Rochester, JOHN S. FOSTER, New York; Secretary and Treasurer, WILLIAM J. RICHARDSON,
 Brooklyn; Executive Committee, JOHN N. PARTRIDGE, Brooklyn; CHARLES
 CLEMENSCHAW, Troy; C. DENSMORE WYMAN, New York.

Next meeting, Hotel Metropole, New York City, Sept. 15th, 1891.

Ohio State Tramway Association.

JOHN N. STEWART, Ashtabula, President; JOHN HARRIS, Cincinnati, Vice President;
 J. B. HANNA, Cleveland, Secretary and Treasurer; E. K. STEWART, Columbus,
 Chairman Executive Committee.

The Street Railway Association of the State of New Jersey.

President, JOHN H. BONX, Hoboken; Vice President, THOS. C. BARR, Newark;
 Secretary and Treasurer, CHARLES Y. BAMFORD, Trenton; Executive Committee,
 OFFICERS and C. B. THURSTON, Jersey City; H. ROMAIN, Paterson; LEWIS PERLINE, Jr., Trenton.

ALABAMA.

GADSDEN.—The dummy line will be extended, and the new portion of the system operated by horse cars for the present. Work is under the direction of Capt. Elliott.

TUSCUMBIA.—A street car line is projected to connect this place with Sheffield.

CALIFORNIA.

LOS ANGELES.—The San Gabriel Valley Rapid Transit Co. have signed a contract for the survey of a line up Wilson, and there is every indication that the line will be built.

OAKLAND.—The Consolidated Piedmont Cable Co., will proceed at once to cable Fourteenth street, some of the machinery having already been placed. As soon as this line is finished they will cable to the cemetery.

SACRAMENTO.—The electric road here which has been changed from horse power, is nearly completed and will be opened this month.

SAN BERNARDINO.—Louis Jacobs has applied for a franchise to operate a street railroad on several streets. It will probably be granted.

SAN FRANCISCO.—George Ross, the shipright, and E. Fraley, the electrician, have united on a scheme to run a

ferry from the city to Sausalito, to connect with electric lines which they will build there, for which the franchise has been already granted.

C. E. MAYNE & Co. have secured a franchise to build an electric road south of the park, and property is advancing rapidly.

ALTHOUGH the legislature has not passed a bill permitting the use of overhead wires in large cities, the San Francisco Syndicate & Trust Co. have commenced operations for the construction of such a line. The directors are very confident the bill will become a law.

THE San Francisco & San Mateo Railway Co. has incorporated for \$2,000,000, with the following directors: Behrend Joost, J. H. Gilmore, J. W. Hartzell, Fabian Joost and W. F. Thomas. Their object is to construct and operate street railways in this and San Mateo counties, but particularly to construct a large amount of cable road in this city, aggregating nearly forty miles.

CANADA.

OTTAWA.—The city council are all torn up over the question of allowing the Electric Railway Company to construct and operate electric lines in Ottawa. The mayor, especially, has been hostile to the new departure.

COLORADO.

BOULDER.—Dr. D. C. Brace, of this city, has asked for a franchise to operate, by either electricity, cable or horse power, for fifty years, the first ten of which are to be exclusive to his company. He agrees to build three miles at once, and has associated with him in the enterprise, Henry Stevens and George Orr, of Boulder, and a Mr. McLean of New York; the latter named, being the promotor of the Denver, Salt Lake & Pacific Ry.

COLORADO SPRINGS.—The Electric Line here struck a short circuit recently, in reducing the wages to motor men from \$55 to \$49.50 per month. The prospect is, however, that the company will come out best.

DENVER.—The suburb of Harmon is thoroughly waked up over the proposed extension of the Suburban Electric Road, and have nearly finished the raising of a bonus of \$15,000 to secure the same.

A CONTRACT has just been made between the Golden Electric road, and the Lookout Mountain Resort Co., whereby the electric company are to extend their line up Apex gulch, and land passengers at a new hotel which is building there. The entire scheme involves an expenditure of \$300,000.

GOLDEN.—Local capital, headed by C. W. Little, F. Butler, Chas. T. Clark, A. Townsend, S. A. Cunningham and J. G. Hartzel, have secured right of way and franchise from the city for lines here.

LEADVILLE.—An electric line will be built through Graham Park to Oro.

TRINIDAD.—Boston capitalists have made a proposition to build an electric line here, on condition of a certain bonus being given by the city. At a meeting of citizens the matter was very favorably received, and there is good prospects of the deal being consummated.

SWANSEA.—A committee of citizens have petitioned the electric company to extend their line to the cemetery and put in service a funeral train. The route will yield good returns from other sources and there seems little doubt but that it will be put through.

The franchise for the Denver, Lakewood & Golden Electric has been passed, and provides that cars must be in operation by March 1, next, for the accomplishment of which the company has given a bond of \$10,000. A fifteen minute service and a five cent fare to the city are required. The company may also operate its electric freight trains for express business, from the hours between the hours of 6 P. M. and 6 A. M. Electric motors of forty horse power will be used, and the company are erecting a very handsome depot.

DELEWARE.

WILMINGTON.—The Wilmington City Passenger Railway Co. has been granted permission to erect poles and overhead wires on Market street.

DISTRICT OF COLUMBIA.

WASHINGTON.—The Survey for the Washington and Marlborough electric road is completed.

GEORGIA.

ATHENS.—Work is progressing quite satisfactorily on the electric line here: one mile is already completed.

GRIFFIN.—The Griffin street railway is now an assured fact, the surveys having been completed, ties and track material ordered, and work commenced. The line will be about two miles long, and is to be in operation June 1st.

LAGRANGE.—A number of gentlemen here have offered to build a street car line, and it is likely the application will be granted.

ILLINOIS.

CENTRALIA.—The stock has all been subscribed for the street car line here and everything is favorable to substantial improvements.

COLLINSVILLE.—A franchise has been granted to Luther Robinson and J. L. P. Gordon to build and oper-

ate an electric road to East St. Louis. The permit runs for thirty years and the road must be in operation by July 1, 1892.

DECATUR.—The Citizen's Company expect to add about two miles to present system the coming summer.

FULTON.—The Fulton and East Clinton Street Railway and Power Co. has been incorporated, with a capital of \$20,000, to build a short electric line. Incorporators: T. A. Hard, G. S. Sardham and Clarence Green.

JONESBORO.—Parties from DuQuoin have been here inspecting the prospects for a line to be run by electricity to connect the place with Anna.

KANKAKEE.—The franchise has been granted for the electric road here, and work will be commenced as soon as material can be secured. It will be the single trolley system.

A FRANCHISE has been granted the Illinois Illumination Company to construct an electric line. The franchise runs twenty years, but the road must be completed within one year.

MOLINE.—The Holmes syndicate have accepted the ordinance for an electric line on Third avenue.

PEORIA.—The Peoria and Mt. Hawley Street Railway Co. has been incorporated, with a capital of \$250,000, to construct and operate street railways in this and adjacent cities.

STREATOR.—The electric road here suffered a \$5,000 loss by fire in its power house recently.

SULLIVAN.—Franchises have been granted for an electric street railway and light company at this place.

URBANA.—The electric line has been extended to the Big Four depot in Champaign and will make an excellent property.

INDIANA.

BRAZIL.—Now the plan is to extend the electric line here to the town of Harmony, a distance of four miles, and involving an expenditure of \$60,000. A company that can operate in Harmony ought to be happy. A syndicate from Terre Haute are interested.

ELKHART.—Capitalists of this city and Detroit have purchased the Elkhart Street Railway and have changed its name to the Elkhart Electric and Street Railway Co. Mr. Jackson, manager of the Detroit Electrical Works, is one of the directors and extensions are already planned to the present seven miles of track and new cars and other improvements will follow.

INDIANAPOLIS.—The proposition to connect Knightstown with the Soldier's Orphan Home, by an electric line, is receiving great encouragement.

The Broad Ripple project is progressing nicely and \$30,000 has already been paid in.

MICHIGAN CITY.—The Citizen's Street Railway has been purchased by a Chicago syndicate represented by E. D. Cummings. Consideration, \$22,500. The line is to be extended and equipped with electricity soon.

NEW ALBANY.—A syndicate is figuring on an electric line here.

TERRE HAUTE.—The Terre Haute Electric Street Railway, which recently purchased the Blake street line, have not yet decided what electric system they will adopt on their new branch.

IOWA.

COUNCIL BLUFFS.—The route of the new Inter-State Street Railway, between this city and Omaha is announced as follows: from the bridge approach to Avenue B, thence to Eighth St., thence to Washington Avenue, thence to Sixth St., and from there to Pearl St., making a loop with the present motor line.

ARRANGEMENTS are well under way for a motor line to the grounds of the Chatauqua Assembly, which has been so popular here for the past few years. The attendance the coming summer has every indication of being very large.

DAVENPORT.—The Central Railway has petitioned for right to extend to the grounds of the Davenport Fair and Exposition.

WORK is progressing most satisfactorily on the Holmes electric system here, and the machinery is being placed and motor cars have already arrived. The date for the opening has not yet been fixed.

INDEPENDENCE.—C. W. Williams stands at the head of the enterprise which will give this city a first-class street car system. The plan is to build from the I. C. R. R. through the city to the Q. road, and thence past Rush Park to the State Hospital for the Insane. It is hoped to have it in running order by June 1st. Mr. Williams is well known as a famous breeder, and the one who raised Antell.

KEOKUK.—The city council passed by unanimous vote the franchise for electric lines on several streets, as petitioned by the Electric Street Railway Company.

MARION.—The Cedar Rapids & Marion St. R. R. Co. have secured an ordinance for twenty-five years and will probably equip the line with electric power.

SIoux CITY—is getting to be a very completely railroad city. What with horse lines, elevated, electric and cable, its growth has been rapid and substantial. But its companies are not contented with a good past record, and are now before the council, each with petitions for extensions to be commenced as soon as weather will permit. The Leeds Electric Railway has suffered a heavy blow in the death of Mr. Knight, but arrangements are under way to push it at once.

DES MOINES.—President Polk says, "We expect to make extensive improvements on our road this spring. We have ordered new cars and shall build the Sevastopol line this spring. Shall put in a large number of improved crossings at steam roads, and broaden our gauge on that portion of the road which is old style. We intend to make the Des Moines the best system in the west."

ARRANGEMENTS have been made to unite the Belt Line, a steam railroad some four miles in length, with the electric system, thus giving the city one complete system of electric street railroad.

THE Des Moines Street Railroad Company, at their special meeting of stockholders, February 21st, will authorize the increase of their capital stock to \$2,000,000, and empower their directors to purchase any railways or franchises in the adjoining suburbs. The Des Moines company is the strongest in the state.

KANSAS.

LYONS and Sterling are to be connected with an electric line.

STERLING.—The Sterling & Lyons Electric Railway has filed its articles of incorporation, with the following directory: H. M. Maxwell, P. Hackett, J. A. Hackett, of Sterling, and A. Jones, A. W. Hoyt and J. A. Blair. The plan is to connect the two towns by electric line.

KENTUCKY.

LOUISVILLE.—Boston capitalists have organized, and the contract has been let for an electric line to Jacob Park, a southern suburb. The line is to be handsomely equipped, and must be in operating order by April 15.

MAINE.

PORTLAND.—The Portland & Rumford Falls Railway Company have petitioned for extension of its lines.

PORTLAND.—The officers of the Portland Railroad Co., for the year, are: A. Libby, President; E. E. Newman, Treasurer and General Manager. The directors were authorized to equip the Deering line with electricity, with a view to its general adoption on all the lines. The company carried nearly 3,000,000 passengers in 1890, an increase of 400,000 over the previous year.

WATERVILLE.—The Waterville & Fairfield Street Railroad Co. have applied for permission to use electricity and to extend their lines through Winslow to North Vassalboro; and will increase their capital stock.

MARYLAND.

BALTIMORE.—The Union Passenger Railway are making a hard fight for permission to use electricity, and agree to erect ornamental poles.

THE Traction Company have also obtained permission to extend several of their present lines.

MASSACHUSETTS.

BROCKTON.—The East Side Street Railway are desirous of adopting a motor on the lines there and are investigating in several cities with a view of determining their choice.

COTTAGE CITY.—The City Street Railway Company have petitioned for a franchise to construct lines on eight streets and avenues in that place.

FALL RIVER.—There will soon be an electric railway here, but used exclusively for a freight business.

HOLBROOK.—President Thompson, of the Brockton East Side Electric Railway, has inspected the streets here and secured permission to extend his lines to this place.

LOWELL.—It has cost the street railway company here over \$7,000 so far this year to take care of the snow on its tracks. Last year the entire expense was but \$1,500.

W. R. SCOTT, of New York, is here in charge of the placing of additional feed wires which will be needed on the extensions which are to be made in the spring. The electric station of the Lowell & Dracut road is being changed to Belvidere street.

LYNN.—Employes of the Lynn & Boston Horse Railroad Co. held a banquet, which was largely attended and everybody had a good time.

LAWRENCE.—The capital stock of the Lawrence Street Railway has been increased to \$300,000 and electric lines to Andover are a part of the coming summer's work. At the election of officers Mr. Morton was re-elected superintendent and A. E. Butler treasurer.

NEW BEDFORD.—It is said a bond of \$10,000 has been put up for the purchase by a Boston syndicate of the lines of the Union Street Railway Co., in this city and Fairhaven.

NEWTON.—The Newton street railway has made application to increase its capital in the sum of \$300,000. The company has some big plants which include lines in Watertown, Natick and other localities.

PITTSFIELD.—The Street Railway Co. have petitioned for authority to erect poles and string overhead wires. It will probably be granted.

SPRINGFIELD.—The Street Railway Co. have petitioned the legislature for authority to increase its capital stock \$300,000.

WEYMOUTH.—Permit has been granted to Hatherly Street Railway Co., of Rockland, to construct lines in this place.

WOBURN.—The East Middlesex Railway are considering the matter of using electricity for the road between Woburn and Melrose, with a strong probability of its adoption this spring.

MICHIGAN.

ANN ARBOR.—Mr. H. P. Glover, of Ypsilanti, who now holds a controlling interest in the electric line between the two cities, assumed control Jan. 31, and the event was made the occasion of a banquet to city officials and directors of the old and new companies.

CHARLOTTE.—Charlotte and Eaton Rapids will probably be connected by electric railway. Capital stock, \$75,600. William Smith is the leading promoter.

MANISTEE.—Gen. Geo. A. Hart has petitioned for franchises to construct several electric lines here, with extensions to two suburbs.

PEQUAMING.—It is said Marquette capitalists are figuring on a line from this place to Baraga via L'Anse. The plan is considered a feasible one.

SAGINAW.—The electric street railway company has secured a verdict of \$993 in its famous suit against the Michigan Central Railroad for cutting wires that crossed their track.

MINNESOTA.

DULUTH.—Supt. Chase has returned from the east having been successful in placing the desired amount of bonds. He also purchased new cars to increase his equipment.

MINNEAPOLIS.—It seems quite definitely settled that an electric line will be built to Medicine Lake, although the route is not yet fully determined on.

THE street railway company is credited with the intention to extend the St. Louis Park Road with electricity to Lake Minnetonka, that famous summer resort near the city. It is one of the most largely patronized summer resorts in the whole west, and the steam roads do a large business all summer. The line ought to be very profitable.

ST. PAUL.—By the 1st of March it is probable that the last street car horse, for that work, will be removed from the streets, and the entire passenger service of the city be supplied by electricity and cable.

MISSOURI.

CAPE GIRARDEAU.—A company composed of Maj. C. C. Rainwater, of St. Louis, Jas. Hallen of Williamsville, S. P. Cullen, of Illinois, and Dr. S. S. Harris, of this place, have secured a charter to construct a street railway here, and will begin work early in the spring.

EAST ST. LOUIS.—The poles have all been set, the wires strung and work is nearly completed on the electric line here.

KANSAS CITY.—The Metropolitan Cable Co., have purchased the slot rail of the old cable line owned by the Elevated, and will use it in extensions which they will make, commencing March 1, and which will reach the

park which the company has purchased, and which they will make very attractive with artificial lakes, landscape gardening and other attractions.

T. J. ENRIGHT, president of the proposed Seventh Street Electric Ry., states that his company will ask no extension of time in which to build, but will proceed at once. The tightness of the money market had delayed them somewhat, but all arrangements are now completed.

THE Tenth St. Cable Line, which is being operated by the bondholders, and which has never been a very profitable piece of property, for the reason that it runs through an unpopulated district with nothing at each end, is asking to be released from complying with the promise made to add certain extensions. There is some talk of the road being absorbed by the Kansas City Cable Co.

ST. CHARLES.—The street railway company are before the council for electric franchises, which they ask to run for forty years.

ST. JOSEPH.—The Union Street Railway Co. have purchased the Wyatt Park St. Car Co. for \$250,000, and hereafter will operate both companies under one management.

ST. LOUIS.—Gen. Man. Robt. McCulloch, of the Broadway Cable Line has been petitioned by the residents to extend his line with electricity, and make a single fare to business centres.

THE difficulty between the Southern Railroad Co. and the Union Depot Railroad Co., growing out of the desire on the part of both companies to use the same track on Ninth street, has been adjusted by Congressman Johnson, of Cleveland, who is a large owner in the first named company. Both will use the same track and trolley wire.

WEBB CITY.—The electric line between this city and Carthage is being surveyed. The line will parallel the Missouri Pacific between these two points.

NEBRASKA.

NEBRASKA CITY.—The City Railway is very favorably inclined to the storage battery system and hope to adopt it before long.

SOUTH OMAHA.—The election on the ordinance of the Metropolitan Street Railway for right to lay tracks on all the streets of South Omaha, resulted in a victory for the company. Edward A. Cudahy of the Cudahy Packing Co., is one of the prime movers in the new railway.

NEW JERSEY.

BRIDGETON.—Local capitalists have organized and applied for rights to lay electric track lines on a number of streets.

CAMDEN.—The electric cars which were discontinued some time ago owing to certain difficulties between the

company and the Daft Electric Company, have again gone into operation, the difficulties between the two companies having been adjusted.

TRENTON.—Mr. C. T. Hughes, one of the experts of the Edison Co., has finished his examination here and work will now progress rapidly in changing the Trenton Horse Railway Co. lines to electricity.

EGG HARBOR.—The Egg Harbor Land Co. has received its permit for lines here. The proposed system is to extend to Gloucester Lake, a distance of four miles.

NEWARK.—It is finally settled that the South Orange Horse Line will be equipped with a first class electric system, which it is hoped to have in operation by May 1st. The road is now owned by John Randell and his sons.

NEW YORK.

BUFFALO.—Certificates of the surrender of the capital stock of the Buffalo East Side Street Railroad and the Buffalo Street Railroad Company to the Buffalo Railway Company were filed with the Secretary of State on Jan. 31st.

DUNKIRK.—It is intended by the Dunkirk & Fredonia Rapid Transit Co. to operate nine miles of road. Capital, \$90,000. Incorporators are Wm. Martin, O. W. Johnson, R. B. Day and others.

GLENS FALLS.—The railroad commissioners have granted the application of the Glens Falls, Sandy Hill & Fort Edward Horse Railroad Company to change its power to electricity.

GLOVERSVILLE.—The Gloversville Electric Company has been incorporated, with a capital of \$40,000, and intend to build three miles as a starter.

OLEAN.—Cady Silsby, of Seneca Falls, has nearly completed arrangements for an electric line here.

ROCHESTER.—The directors of the Manitou Beach Railway have decided to adopt the Rae system of electric motors. Each car will be equipped with 40 h. p. and draw in one train sufficient cars to carry three hundred passengers.

TROY.—The railroad commissioners have authorized an increase in the capital of the Troy and Albia Horse Railroad Co. from \$50,000 to \$400,000, made necessary by the change to electric power.

NORTH CAROLINA.

ASHVILLE.—An electric line between this place and Rutherfordton is being talked of.

OHIO.

AKRON.—The Akron City Street Railway Co. has applied for an extension of its franchise with a view to constructing two miles of track.

ASHTABULA.—The construction work on the new electric line from this city to the harbor will be commenced shortly.

CINCINNATI.—The Mt. Auburn Cable Railway have applied for an extension of their line.

DENISON.—There is good prospect of an electric line from here through Uhrichville to Edgeville.

MANSFIELD.—The electric lines here will soon be changed, and the single wire, Sprague system, substituted instead. The line will also extend to the new penitentiary which will necessitate the purchase of ten new cars.

MASSILON.—An electric line to Canton is one of the things which ought to be and is receiving considerable attention from citizens of both places.

TOLEDO.—A plan is well under way to construct an electric line to Maumee, to come into the city over the lines of the Consolidated. The road will pass the Children's Home, and in summer do a large excursion business that has heretofore gone by water.

THE Robinson's were granted an ordinance to extend their electric railway on Ontario street to Jefferson and also to Summit.

OREGON.

ALBINA.—Articles of incorporation have been filed to form a company with capital stock of \$300,000, and it is expected that street cars will be running here within sixty days. Among the promoters of the enterprise are John Parke, Peter Lynch and W. N. Carter.

BEAVER.—The Beaver Valley Street Railroad Co. has been granted authority to change from horses to electricity, and the transformation will be undertaken at once.

BRADDOCK.—The contract for the Braddock & Turtle Creek Street Railway has been let to the Duquesne Forge Co.

NORRISTOWN.—The Norristown Traction Company has been organized with a capital of \$10,000. Electric power will be the motive force.

PITTSBURG.—The Squirrel Hill Electric Railway has again changed hands after having been sold several times, and is now known as the Schenley Park & Highlands Railway Co., with capital stock of \$100,000. The line is three and one half miles in length, and one and a half miles remains to be completed. It was originally started by residents of Squirrel Hill, who found street railway construction more expensive than they imagined, and gave it up, and the road has had a checkered career ever since.

POTTSVILLE.—The Schuylkill Electric road will increase its capital \$50,000 in order to make extensions.

SCOTTTDALE.—James Cochran, the millionaire coke operator, and Col. A. J. Hill, of Dawson, propose to build an electric line from Dawson to Juniata, taking in the towns of Liberty and Vanderbilt. Capital stock, \$200,000.

YORK.—The York Street Railroad Co. have applied for rights to use electricity.

TENNESSEE.

CHATTANOOGA.—The electric railway has started out with a commendable policy this year and have called in all the passes to aldermen, policemen and other members of the free list aristocracy. The newspapers are also rewarded in a similar manner for their ungallant treatment of the company of late.

KNOXVILLE.—At the annual meeting of the West End Street Railway R. M. Rhea was elected president and T. J. Thomas secretary and treasurer. It was also voted to make a number of extensions.

THERE is a great boom here in street railway charters and a number of lines will surely be built, though probably not all for which franchises have been given. The Knoxville Street Railway Co. will make extensions to its old lines. The West End Street Railway, the North Knoxville, South Knoxville, the City and Suburban, the Rapid Transit Company and the Lonsdale Land Co. all promise to construct lines.

NASHVILLE.—T. W. Wrenne, of the United Electric Railway, is after the steam roads with a long trolley pole and has brought charges of discrimination for charging him more freight on his coal than other people.

SOUTH PITTSBURGH.—All of the stock of the Deptford & South Pittsburgh Street Railroad has been taken and the line will be constructed at once. The power has not yet been decided upon, but a majority of the stockholders favor steam. Louis Baringer, of Philadelphia, and William Duncan, of Nashville, Tenn., are among the leading stockholders.

TEXAS.

BROWNWOOD.—An electric belt line is one of the things about which the Board of Trade has been stirring itself, and it is now in a very fair way to be built.

DALLAS.—The North Dallas Electric road has been successfully opened. It is equipped by the Thomson-Houston Co. Iron has been ordered for a cable line to connect the business center with the State fair grounds.

GALVESTON.—President Sinclair gave a formal opening of his new electric lines on February 2nd, on which occasion a large number of guests, including distinguished gentlemen, were present from different parts of the state. The banquet was served at the Beech Hotel, and cars are now running regularly.

HOUSTON.—The street railway company, under the leadership of President Allen, have commenced actively the change to electric power. Street work is well under way, the power house has been commenced, and the system, which is the Edison-Sprague, will be completed in about two months.

HENRIETTA.—Work has commenced on the street railroad, and it is hoped to have the same finished within 100 days.

OAK CLIFF.—The crosstown electric line will have numerous scenic attractions, including two parks, which it crosses, several lakes and deep ravines.

SAN ANTONIO.—The City Railway while constructing for the use of horses for the present, are putting in a track which can be used for electric cars, as soon as they can get around to making the change.

WACO.—The dummy line just opened to Alta Vista is a great novelty and is doing a big business. The distance is four miles.

FIVE miles of posts, and the span wires are already in position for the trolley system of the Electric Street Car Company.

RHODE ISLAND.

NEWPORT.—The Newport Street Railway Company have taken out an insurance for one year which covers all damages which may arise to passengers, vehicles or employees arising from accidents of all kinds. It ought to be a very desirable risk for an insurance company, however, as the president's report shows that in 1890 out of 781,000 passengers carried, not one received any serious injuries.

THE Electric Street Railroad Company has been offered \$33,000 by the association composed of summer residents, if the company will construct their line on other than the main driving street to the beach.

PROVIDENCE.—Great preparations are being made to make the convention of the Electric Light Association a great event, and our people are anticipating the occasion with unusual interest.

SOUTH CAROLINA.

COLUMBIA.—The organization has been completed of the Columbia Electric Power and Suburban Railway Co., with the following officers: President, Col. J. Q. Marshall; treasurer, W. G. Childs; secretary, J. S. Verner; solicitor, B. L. Abney. Negotiations are already progressing for the purchase of material and equipment and there seems every prospect that this enterprising city will have a finely established system in a short time.

SPARTANBURG.—A dummy line will be built here and work commenced in a week or two.

VIRGINIA.

NEWPORT NEWS.—Col. C. M. Braxton is engineering a street railway system for this place and promises to have it in operation within ninety days.

WASHINGTON.

OLYMPIA.—Plans are under consideration for a railway on the West Side, to be operated at first by steam, but electricity substituted in the near future.

ORTING.—A syndicate headed by Geo. W. Cornwall has secured franchises for electric lines in this city.

RAINIER.—Track work is nearly completed on the electric line to Latona and the bridge across Lake Union at the latter city is finished.

SEATTLE.—The new motor line to Brooklyn will be completed in about 30 days and will have been one of the most rapid street car constructions ever made on the Pacific coast. The line runs along some of the finest streets and terminates at the entrance to a park.

THE Commercial Street Motor Railway Co. have completed a second track to the southern limits of the city, but during the spring it will be extended several miles up the Duwamish River.

EASTERN parties have made a proposition to the Seattle Electric Railway and Power Co. for their lines. The company invested \$720,000 at the start, have added all the net earnings for two years and a half and also have \$100,000 worth of real estate that is clear profit. Officers just elected are: President, L. H. Griffith; vice-president, J. F. Hale; secretary, V. Hugo Smith.

SPOKANE FALLS.—The motor line has been surveyed to Granite Lake, and may possibly be extended to Medical Lake. R. Abernethy is at the head.

TACOMA.—It is said the Tacoma Railway & Motor Co. has made its final placing of bonds, and that its cable and electric system will be fully completed by April.

THE cable road here has met with another unavoidable delay in opening its line. The driving pulley, which was en route, was demolished in an accident which occurred in the Cascade mountains, and the company ordered another by wire, from the Walker Manufacturing Co. It was valued at \$3,000. The boilers, which are Babcock & Wilcox, are all in place, and the car houses and other auxiliaries ready.

AN effort will be made to operate the Point Defiance R. R. by electricity in the spring. It was intended at first to operate this line by storage batteries but that has now been abandoned.

WEST VIRGINIA.

CLARKSBURG.—It is now an assured fact that a street railway will be completed and in operation by early summer.

WHEELING.—A bill has been introduced in the legislature to consolidate the local street railway companies here. As each possesses certain valuable privileges not common to both, the union of the two would give advantages of the highest commercial value, and place the new company beyond the reach of the city council in many important matters. It is believed the passage of the bill will mean important improvements and extensions to Wheeling.

UTAH.

EUREKA.—A committee of business men has been appointed to work with a similar committee from Provo, with a view to uniting the two by an electric line.

OGDEN.—Work is now progressing nicely on the electric line, having been delayed owing to the difficulty in getting material.

PROVO.—The Provo Street Railway Co. do a flourishing business during winter months in hauling ice. A number of other companies scattered through the country likewise do the same. It is a subject that is at least worth the careful investigation of many managers, and who it may be will find that another year they can realize a handsome revenue from this source, where their lines are near enough to any suitable body of water to make the plan feasible.

SALT LAKE CITY.—The City Railroad Company has completed its line to Fort Douglass.

THE Silver Lake Rapid Transit Co. has incorporated with \$15,000, and hope to do some building. J. M. Nelson and J. M. Lawrence are among the promoters.

ANOTHER Electric line is being planned, and known as the Second, South and West Jordan Rapid Transit Railway Company. If the road is as long as its name it ought to reach a good ways.

L. C. HAMILTON has been granted a franchise for what will probably be a dummy road, but which may by the terms of the ordinance be operated by either dummy, cable or electricity.

STREET CAR PATENTS.

GRANTED DURING JANUARY 1891, BY THE UNITED STATES.

JANUARY 6, 1891.

	NUMBER.
Axle Boxes, Dust Guard for Car.....F. J. Cole and E. W. Grieves	444,241
Anti-Friction Bearing.....P. Arnold	444,311
Anti-Friction Bearing.....E. Stempel	444,224
Brake Beam.....J. Pearce	444,159
Brake Beam.....W. A. Pungs	444,017
Car Brakes.....W. T. Bothnell	444,145
Car Brakes, Elastic.....B. L. Randall	444,110
Car Brakes.....H. M. Elliott	444,168
Cable Car for Street Railways.....W. Robinson	444,184
Car Indicator.....P. J. Boris	440,040
Tightening Device for Suspending Electric Conductors,.....D. Mason	444,005
Tightening Device for Suspending Electric Conductors,.....D. Mason	444,006
Fare-Recording Register.....J. Dane, Jr.	443,988
Elastic-Wire Insulating Cleat, J. S. Patten and D. J. Cartwright	444,317
Railway, Current-Collecting Device for, Electric.....R. M. Hunter	444,397

JANUARY 13, 1891.

Car Axles, Rolls for Manufacturing.....D. L. Evans	444,746
Controlling Device for Electric Car.....E. M. Bentley	444,479
Electric Railway Car.....E. M. Bentley	444,480
Electric Railway Car.....L. A. McCarthy	444,539
Electric Motor.....W. A. Anthony	444,416
Cable Railway.....P. Noble	444,581
Cable Street Railway.....L. Heynemann	444,437
Electric Railway.....E. M. Bentley	444,740
Railway, Current-Collecting Device for, Electric.....R. M. Hunter	444,566

JANUARY 20, 1891.

Car Axle, Bearing.....W. B. Smith	444,943
Car, Electric Railway.....R. M. Hunter	444,144
Car Heating Apparatus.....J. H. Sewall	444,090
Mounting for Electric Car Motor.....E. W. Rice, Jr.	444,922
Fare Collector.....M. D. Greengard and F. Harris	444,882
Apparatus for Recording Fare for Omnibus, etc., A. Carrara	445,042
Electric Railway Trolley.....H. H. Blades	444,893
Support for Electric Railway Trolley-Wire.....J. S. Hughes	445,142
Registering and Recording Apparatus for Tram Cars and Omnibuses.....T. Gregory	441,883
Trolley-Wire Clamp and Support.....W. Vogel	445,103

JANUARY 27, 1891.

Car Axle.....H. N. Pomeroy	445,199
Street Railway Car Guard.....F. W. Wood and J. Fowler	445,236
Machinery for forming Car Wheels.....C. B. Beach	445,238
Electric Connection for Track-Wiring.....S. H. Short	445,479
Cable Railway.....G. W. Bowman	445,157
Switch for Electric Railway Conductor.....F. J. Sprague and J. F. S. Branth	445,515
Turn-Out for Electric Railways.....R. M. Hunter	445,409

The above list of patents is Prepared for The Street Railway Review each month at the Patent Law Office of Haupt Bros., 606 Rialto Building, Chicago, Ill., where your readers and others can procure all the information they desire upon the subject of patents and patent law, either by mail or personal interview.



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THE Inventors' Centennial Anniversary, which will be held in the city of Washington, April 5th, 9th and 10th, cannot fail to have great attractions for all interested in mechanics. The inventors and manufacturers of railway appliances, especially in electrical lines, will not only form a large representation but their exhibits will be among the most practical and interesting.

It would be difficult to suggest any improvement either in topics for discussion or their assignment, on the selection announced by the Executive Committee of the American Street Railway Association, for the next meeting. The subjects are eminently suitable and practical, and the well known ability and experience of the writers is alone sufficient to create an interest never equalled in the history of the Association.

A Perfect Electric Motor.

H. A. Everett, Secretary East Cleveland Railroad Company, Cleveland, Ohio.

A Year's Progress of Cable Motive Power.

J. C. Robinson, formerly Vice-President Los Angeles Railway Co., Los Angeles, Cal.

Public and State Treatment of Corporations,

G. Hilton Scribner, President Central Park, North and East River Railroad Company, New York City.

The Dependent—Overhead or Underground—System of Electric Motive Power,

George W. Mansfield, Director Attleboro, North Attleboro and Wrentham Street Railway, Attleboro, Mass.

The Independent—Storage or Primary Battery—System of Electric Motive Power.

Knight Neffel, Electrician, Lancaster City Railway Company, Lancaster, Pa.

Next meeting Pittsburg, Wednesday, Oct. 21, 1891.

THE Quincy, Ill., paper bears evidence of the good influence of their electric road, and says: "The electric lines have done more to give Quincy a metropolitan appearance than any enterprise we have had for many a year."

A JACKSONVILLE, Florida, paper sums up in a few terse words as are often seen the whole question of betterment of old systems and encouragement of the new. It says: "Throw no obstacle in the way of improving our street railways. Gas and electric motive power is much better than mules, which writhe under the continued application of the lash. Those who see so many objections to every enterprise here already, see some to this contemplated improvement of street car service."

THE authorities of Syracuse, N. Y., object to the use of salt on street railway tracks, claiming that the practice is injurious to horses feet and an obstruction to sleigh traffic. If they will take the trouble to inform themselves, they will find that salt is very generally used and is not at all objectionable, although it may be conceded that it does not improve the sleighing on the eight feet of street occupied by the railway tracks.

AS AN illustration of rapid and satisfactory development in one of the smaller cities The Citizens' Street Car Co., of Decatur, Illinois, is a good example. Seven years ago the plant consisted of one mile of track and two mule cars, the whole equipment of the company costing \$17,000. Now the company has seventeen miles of track, nineteen cars, is operated by electricity, and represents an investment of \$150,000. The tracks have been paved at an expense of \$30,000 and the road is a splendid property.

AT the recent Providence Convention Mr. F. J. Sprague made the following prediction: "The gearing of the present motor will disappear from the electric motor of the future, and it is a very near future. It will be an electric motor driving direct without any reduction whatever. Its revolutions will be coincident with the revolutions of the wheel. The day of the gearing is fast approaching an end, and surely those who have had experience with gears of electric motors can feel encouraged by that fact."

AN Iowa country paper has the chills and shudders at the mention of rapid transit in its town, thusly:

"And still the cry is faster: though death follows in the wake of increase of speed, it is heeded not, and everybody is eager to take the fast train, limited."

As a matter of fact the fast trains are the safest and experience less accidents than the slower ones: and street railway service operating under a high speed has more safeguards thrown around it than are used on horse cars. It will be found to-day the proportion of death accidents on the basis of numbers carried is very greatly in favor of the electric and cable roads and against the horse lines, unlikely as this may seem to people who don't know.

We should not hesitate a minute as to the safety of rapid transit when compared to the danger of conducting a country newspaper.

THE Philadelphia *Telegraph* whose name suggests more modern ideas than its editor seems to possess, belongs not to this age but to another, whose moss covered memories have long since faded and whose bones have turned to dust and blown away even as men's ashes are scattered to the winds from Liberty's Statue top.

Forgotten and unspoken are the names of those who laughed at Fulton and ridiculed steam cars, and made it both a sin and a penal offense to eat mince pie on Sunday. But not even the charity due a weak minded and credulous one, can be extended the *Telegraph*, for the electrical car has so long since passed out of its experimental stage and put on man's garments, that like the telephone we almost cease to remember when it was not.

This exponent of bob-tail-car ideas, sticks his head in the sand and indulges in this wise:

"There is no one who can give a single reason for the setting up of the trolley nuisance except that of cheapness, and that falls to pieces as soon as the light is turned upon it. It is cheap only to those who own and operate it, and what they save is paid a hundred fold by the public in the unsightliness of the poles and wires, in the inconvenience of the obstruction they make, and in the danger the system carries with it to life and property. The experience of the people of Boston with the trolley poles and wires should be sufficient to exclude this public nuisance from every other city. It has been particularly objectionable and costly to the community because of its interference with the operations of the fire department, and it has been the cause of death in the cases of persons and animals. There is no one who does not know that as a means of propulsion it is a dangerous makeshift, and that it is but one of many better devices of propulsion. A great city cannot afford to put life and property at stake solely that a handful of railway speculators may get rich quickly by using cheap and perilous machinery in the streets. The nuisance should have an injunction issued against it everywhere, and if that is not possible, public opinion should render the extension of the trolley system impossible in cities and towns. It is not only the cheapest of motors it is the worst of them."

As a curiosity of a voice from the tombs, of an old Rip awakened after we don't know how many years of sleep, the above is interesting; as in the slightest degree representing a public sentiment of the nineteenth century it is simply pitiful, and an insult to the memory of that noble old man who caught the lightning with a kite and dying in this same town a full century since had more of common sense and progress than this modern printer, whose bald-headed notions would indicate a time long since past in which he and them should have been gathered unto the grand-fathers.

We are not called to rise in defense of the electric system, which stands for itself, and whose trolley poles even have to be held down with ropes. Life is too short to blow out our breath against such a wind as this: but as a first lesson in easy steps, suitably weakened to the abilities of the *Telegraph* man to understand, we suggest the "nuisance" will dart to and fro by day and night in city and in vale long after the *Telegraph* has ceased its click, and its owner has been safely planted "under green bed-clothes."

Down in New England they have a most charming and polite way of declining to grant a petition from some aspiring street railway. When the committee desires to render an adverse decision it does not in so many words refuse the application but wraps its answer in an oil-skin sarcasm and smilingly gives the petitioner "leave to withdraw," all of which must be a balm to the wounds of defeat.

MANY papers and people throughout the country are very enthusiastic at present over the future of the underground system of city transportation, and base their arguments largely on the fact that the perfection of the electric motor, operating as it does without smoke, has removed the chief barrier which has hitherto blocked the way.

The electric motor part of it is certainly all right, and stands ready to do its work underground, on the surface or even in the air, but few people who so lightly speak of underground roads have any reasonable conception of the cost. The modern methods of tunnel-driving by the use of the hydraulic shield have made this work feasible from a mechanical standpoint; but under the most favorable circumstances is attended with such enormous first cost as to make it impossible except in a very few of the largest cities of the world.

The City and South London Line, from whence this idea has spread, cost over a million dollars a mile, and it is doubtful if such a road could be constructed in this country for anything like that amount, labor being higher. Then, too, Americans would always prefer the light and air of an elevated road to riding in a tunnel under the most favorable circumstances. For New York, whose geographical confines are so closely drawn, it would seem the only salvation, and possibly for some portions of one or two other eastern cities. Aside from these, nearly every other large city is laid out with greater uniformity and has more avenues of exit, which permit of emptying the business center in every direction, and to accomplish this, rapid transit surface systems, with perhaps an occasional elevated road, can do the work quickly.

BEFORE half of the cities in the country have put in electric railways, the application of the same principle is being applied to short lines to connect neighboring towns. This is in marked contrast to the general belief three or four years ago that the system was possible in the nature of a curious experiment, but impracticable from a commercial standpoint. Already a number of inter-urban lines are in successful operation, and the indications are that the number will be rapidly and largely augmented. Ann Arbor and Ypsilanti visit back and forth on an electric line ten miles in length; Macon and Athens, Georgia, are being connected by a five mile line; St. Paul and Minneapolis, twelve miles, are bound with the same electric belt, and Denver and Golden, fourteen miles between, are building a line.

All of these, except the St. Paul road, have added to the usual passenger traffic an express and freight department, which is found to be not only of the greatest convenience to the public, but will in time, with systematic management, prove a good investment to the Company.

The day when the fast mails and limiteds shall be hurled from ocean to ocean by the unseen force may not be as far removed as people of to-day imagine; and we predict that when it does come, the change will be a rapid and general one. It would seem as though many harder problems had been worked out than the adapting of electricity to long and rapid hauls.

PROPOSED STREET RAILWAY INSPECTOR FOR NEW YORK STATE CITIES.

THE bill recently introduced in the New York legislature for street railway inspectors for surface, underground and elevated railroads provides that such officer shall be appointed by the mayor of each city, and shall draw a salary of from \$2,500 to \$5,000 per annum. His proposed duties are to enforce all state laws and city ordinances relating to street railway companies and to prosecute companies not complying with the same after not less than three or more than five days written notice served upon any of its officers or directors. Failure to comply with the inspector's demands involves a penalty of from \$100 to \$500 with \$100 daily added for each day succeeding the first. Briefly his duties are named as follows:

1. He shall have power to serve written notices and demand at least 24 hours in advance that the corporation furnish the public with sufficient cars to accommodate the public as in his judgment are required.
2. To compel them to ventilate and heat their cars.
3. To examine books of the company at least twice a year without advance notice to the company.

There may be cities where some company is short-sighted enough to warrant a portion of the above inspection, but in these days of improvements most companies find a personal pride and the competition of other means of conveyance sufficient to keep them watchful of the comforts of their patrons.

The bad feature in the bill is the danger, and a well founded one too, that the position becomes a part of a spoils system, and the mayor has it in his power to appoint a man unscrupulous and incompetent who can use his authority to harass and annoy the almost helpless companies. The first paragraph above cited delegates altogether too much authority when it attempts to base the needs of the public and the inspector's action on what "*in his judgment are required.*"

What this one man's judgment may require is altogether too uncertain a court to pass on matters of so great moment. There is no provision made and no guarantee that a mayor would appoint to the office a man who had ever had actual experience in the first elementary principles of practical street railroad work. On the contrary, the office would unquestionably be filled from personal choice, and presumably as a return for political service in the preceding municipal campaign.

The local ordinances already contain ample of regulation and restriction to fully protect the public where it is needed, and to appoint an inspector is to pass a law to enforce a law already in force. There are times of specially large and unusual assemblies where the entire car service of a city falls far short of what is necessary to carry all who desire to ride—just as there are occasional gatherings that the largest place of public resort is unable to contain. But neither of these circumstances are the every day order of affairs: they are exceptions. However, under the law, an unprincipled inspector could take advantage of such occurrences to harass the companies,

none of whom could in twenty-four hours comply with his requirements for extra cars: and could better afford to pay an occasional fine, heavy even as proposed, than carry the extra equipment an entire year for use once or twice during that time. It is granted in this article that the law does not intend to work an injustice such as this would be; but what protection would the companies have from the hands of some ignorant vindictive inspector?

TRAFFIC has so rapidly increased in the City and South London Electric Ry. that the original schedule by which trains ceased running at 10 p. m. will be lengthened to 12.30 a. m. There will be no night cars.

The average rate of speed, including all stoppages from terminus to terminus, is twelve miles per hour. The maximum speed at which motors will draw a loaded train is thirty-two miles, but it is not usual for them to exceed twenty-five miles an hour. For the present there will be no advertisements displayed in the cars. The men work in shifts, which allows them one day off in each seven. Trains as now run consist of the motor car and three passenger cars, and carry one hundred passengers. During the first three weeks the road carried 250,000 with an equipment of 21 passenger cars.

ONE of the greatest banes in the unhappy existence of the street railway manager is that arising from his almost helplessness in small boys "hitching on." It was bad enough with the old horse cars, but infinitely worse when electric or cable trains are operated, for they move at higher speed and at more frequent intervals, which enhances the sport for the small boy. A conductor cannot be allowed discretionary powers in this matter, with authority to use such means as his judgment or desire may prompt to rid himself of their presence. The little rascals know this, and take advantage of the rule which thus binds his hands, to ridicule him while they continue in their dangerous pastime. About once in so often some one is seriously injured or killed, when the aggrieved parents promptly avail themselves of an opportunity to make the company stand the costs of the criminal carelessness of their children.

In many cities there exists a remarkable laxity in law governing such matters, but parents are and ought to be as vitally interested as are the companies in making it a trespass subjecting the offender to arrest and fine, to steal rides on the cars. The steam roads have such protection—the street railways should have the same. Several of the large companies who can afford it employ a private policeman who spends his entire time gathering in these youthful offenders and leading them home for parental chastisement: but too often the parent resents this curtailing of the enjoyments of young America, and refuses either to punish or reprimand. The police powers of a city which protect the helpless at street crossings or rescue them from other dangers, are the ones to protect these thoughtless, careless boys who are daily maimed for life, and wholly through their own needless, heedless and senseless folly.

THE BURDEN OF DETAILS.

THE street railway manager who has achieved success in this many varied work, cannot but say that it was largely due to close and persevering attention to details. Day after day the same unflinching scrutiny covered every department, and the feed boxes were known to be sweet and clean and the shoes properly set, from personal examination. With increasing mileage and new lines, more cars to run and a corresponding enlargement of office cares, many a manager to-day is overworked and has barely time to eat, to say nothing of keeping up an acquaintance with his family.

When to these increasing duties are added, to many men, the new ones incident to the installation of electric or cable powers, and the necessity for a complete knowledge of all their minute, it becomes a physical impossibility to personally attend to the thousand little details that once occupied much time. And right here is the point where many a manager is overtaking his strength and actually lessening his usefulness to his company. In his zeal to manage economically he still carries the burden of hundreds of petty matters which he should rid himself of and delegate to others.

By placing a part of the responsibility on your assistants you will develop in them capabilities you never suspected; for there is none so high or experienced but may learn at least something from his employee even lowest in the ranks. It is the part of wisdom and not an exhibition of weakness to encourage every employee to report what he may discover as an improvement or saving. While much will come to you that is impracticable and useless, a great deal also will appear that is valuable. When you have delegated certain responsibilities to assistants make them feel that responsibility, and also have them realize that you have not relaxed your watchfulness one iota and that you are "always at the door";—but let them actually perform the mechanical part of it. With judicious selection the result will be a gratifying surprise, and will stimulate in those men the very best of their energy and talent, which aggregated and carefully directed yield a tremendous working power.

It is a harder matter than at first thought would seem possible, for one who has exercised government in details to part with even the slightest portion of his authority; but is nevertheless the part of wisdom to do it, and the result cannot but be a stronger arm at the helm, a clearer eye to guide into the future, and a mind filled with the practical experience of years, free to exert its greatest usefulness.

There must be generalship and a central governing and shaping power, but no general could win a battle without good captains and lieutenants, as well as troopers.

Only recently a gentleman who had built up an enormous mercantile business in a few years, who had made a great deal of money, and while still a young man is

almost a wreck physically, said to the writer: "Slavery to details has done it. I endeavored to do as much of my office work with vast interests on my hands, as formerly when I had barely enough to keep me busy. But the habit of doing everything myself became so firmly fixed, I simply wore myself out doing work much of which could doubtless have been as well done by a ten dollar a week clerk."

It is true that what a man does himself he knows is surely done; but it is also true that with reasonable selection of assistants, and the feeling instilled that they are strictly accountable for what is in their immediate charge, just as the manager is to his company, that they will take to heart the responsibility that is placed with them, and make it the object of their best efforts and concern.

NOT A PASSENGER.

A DAMAGE case quite unusual in its character was decided in Ireland last month. A lady, who was among the survivors of the disastrous Armagh railway accident and received £800 damages for the injuries she sustained, brought further action against the railway company in respect to her infant, which was born prematurely after the accident, and so malformed that it will probably be an incumbrance for life.

The Judge held the company had entered into no contract to carry the unborn babe. They had issued no ticket for it and had no knowledge of its being in the train. In the eye of the law the mother was the carrier of the babe, and not the railway company, and she must bear the responsibility. The mother was non-suited, accordingly.

THE ELECTRIC RAILWAY LEAGUE.

THE employes of the Electric Motor Company in Newark, N. J., have organized a Mutual Benefit and Aid Association, which they will invite all of the employes of the electric roads throughout the country to join.

By the plan proposed, a member pays \$2.50 to join, \$1.00 as quarterly dues, and a death assessment of from 50 cents to one dollar. Disabled and sick members will be entitled to draw \$6.00 per week, and in case of death, \$250 will be paid to the family, with which to defray funeral expenses. Members must be at least twenty-one years old and not over fifty, and must have worked on some electric railroad and understand the electric system. The badge will have engraved upon it an electric motor car which will be used as a travelling card by the members, who will be assisted in case of discharge, but will not be allowed to take part in any strike or labor unions.

The object of the order will be for the mutual benefit and improvement of the employes of the various roads throughout the country.

EDISON'S EXPLANATION OF THE AMPERE AND THE VOLT.

DURING a recent examination a lawyer put the following question to Thomas A. Edison:

"Explain what is meant by the number of volts in an electric current?" To which he replied:

"I will have to use the analogy of a waterfall to explain. Say we have a current of water and a turbine wheel. If I have a turbine wheel and allow a thousand gallons per second to fall from a height of one foot on the turbine, I get a certain power: we will say one horse power. Now one foot of fall will represent one volt of pressure in electricity, and the thousand gallons will represent the ampere or the amount of current. We will call that one ampere. Thus we have a thousand gallons of water or one ampere falling one foot or one volt or under one volt of pressure, and the water working the turbine gives one horse power. If, now, we go a thousand feet high and take one gallon of water and let it fall on the turbine wheel, we get the same power as we had before, namely, one horse power. We have got a thousand times less current or less water, and we will have a thousandth of an ampere in place of one ampere, and we will have a thousand volts in place of one volt, and we will have a fall of water a thousand feet as against one foot.

Now the fall of water or the height from which it falls is the pressure or volts in electricity, and the amount of water is the amperes. It will be seen that a thousand gallons a minute falling on a man from a height of only one foot would be no danger to the man, and that if we had one gallon and took it up a thousand feet and let it fall it would crush him. So it is not the quantity or current of water that does the damage, but it is the velocity or the pressure that produces the effect."

THEN AND NOW.

THE Railway Manager of a very large electrical company, in speaking of the advance made in electrical railway construction equipment in the last two or three years, said to us a few days ago: "Doubtless there is no better illustration of this fact than is shown in the attitude of those contemplating the adoption of electricity for railway work. Formerly, managers would come in with a list of questions a yard long involving details as foreign to the subject as you could imagine. But now all that is changed, and when a purchaser enters he has just two questions after stating how many miles he desires to equip: they are, 'How soon can you have it in operation?' and 'How much will it cost?'"

The over cautious ones, who would want St. Peter to show his credentials at the door, and who have been waiting to see whether or not the "thing would really go," are left away behind, and the sagacious and keen-sighted men who recognize merit have availed themselves of what invention has provided and are rolling finely along the highway of success. It is a good thing to be sure, but progress does not wait.

STREET RAILWAYS IN THE SOUTH.

THE great South, is at present undergoing a development and growth that is phenomenal, and toward it is more and more Northern and Eastern and foreign capital being attracted. This is a good thing for the South, and it should not fail to be a good thing also for capital, just as the large cities in the West drew their strength from the Atlantic seaboard for many years, and in return sent back great revenues of dividends and interest coupons. Without this financial aid the West would still be a blooming prairie, and the South while not so sparsely settled still is in its infancy when the conditions of to-day are compared with the possibilities of to-morrow.

No one other factor can do more to metropolize and quicken into life at one leap, resources and opportunities now dormant, than the modern electric railway for the operation of which the natural advantages of climate far exceed the most favorable conditions in the north.

Chicago, Cleveland, Cincinnati, Milwaukee, St. Paul and all the rest, had to begin with the bob-tailed car whose progress was uncertain and full of weariness to spirit and bones, but it was the best those days afforded, and did its work after a fashion, and was better than none. But today the growing towns of the South, hundreds of which have not yet laid a street car rail of any kind have the advantage of eastern experience and experiment, and can commence with as good as that unto which older cities are just attaining.

We predict the installation of electric lines in the South will be one of the greatest features of electrical industry in the next five years, and then for every year an electric road operates in a southern city it will mean five years of ordinary progress which otherwise would have been the result. Many of the larger cities along the Gulf, are already enjoying the immediate fruits of rapid transit, and in others we observe that there is a most inviting crop of ripe and juicy dividend persimmons that are only waiting to be brought down by a trolley pole in the hands of outside capital.

There are any number of places that have not as yet been counted as cities that are destined soon to be, and if these same towns join in proper inducements and bring their opportunities to a proper hearing, and supplement this with franchises on liberal terms, there is no reason why the South should not press to the front with its street railways and bring up fully abreast of older cities which are now enjoying the benefits of an almost perfect rapid transit.

A Large Mortgage.

The Villard syndicate, which has secured control of the Milwaukee Street Railway Company and the electric light plants in that city, has just given a mortgage on all its property to the Central Trust Company, of New York. Bonds may be issued from time to time, as needed, not to exceed in all \$10,000,000, although it is not likely that more than \$5,000,000 of the bonds will be issued in the immediate future.

INCREASED SPEED AS RELATED TO ACCIDENTS.

THE demand, which is daily becoming more clamorous of the street car riding public, for greater speed in transit, is one involving many phases, which, while they are not understood by the public, must all be carefully foreseen and considered by the manager. In this, as in most other questions regarding the transportation problem, this same public usually consider they know better as to how and where it should be done than those men who have made it the careful study of years and who, while endeavoring to grant the demands of patrons, must at the same time throw around these new means, a cloak of safety to which the impetuous public never stops to give a moment's thought in their requests. Something strikes them as new and novel, no matter how impracticable. All they know is that they want to get somewhere and get there quick. In many instances the call for better facilities in point of time, is well founded, and the sagacious manager gladly hails the day which enables him to achieve this much desired result.

The rapid strides in this direction which the application of electricity has made possible, are most gratifying. Greater progress has been made in the past twelve months than in almost as many previous years.

An interesting and vitally important feature of this new departure, and one which has caused no little anxiety was,—would an increase in speed from the six-mile horse car to the twelve-mile electric or cable car double the accident record and the accompanying claims for damage?

Many have claimed that doubling the speed of a car through the busy streets of a city would necessarily cause such loss of life and limb as to work a practical prohibition. In some cities municipal authority fixes the rate, beyond which the operation of a car involves heavy fine and in some cases the imprisonment of the driver.

It is conceded that the handling of such vast volumes of business, amounting in all cities to millions of people every year, is and always will be attended with more or less accident. It is naturally the strenuous effort of companies to keep this as small as possible, though it often seems as if the sole object in life of many people is to make it as great as circumstances will permit. An opportunity to alight backward directly in front of a rapidly moving car coming from the opposite direction is apparently hailed with delight by some persons.

But the records for many years past show that in proportion to the people handled, the street railways are operated with a vastly less per cent of danger than the steam roads. Hence the advent of rapid transit has developed the question "Can increased speed be attained with reasonable safety?"

The answer to this is every day becoming more and more apparent. It unquestionably can.

When a road first increases its speed from the plodding horse car, off which the hurried passenger jumps at any

point which sudden inclination may suggest, to more modern operating methods where the car running as smoothly seems to be going no faster than before, there is usually a slight increase in injuries caused by the passenger slipping on the pavement. But in a very few days the public becomes educated to the new order of affairs and are willing to ask the conductor to stop when they alight where formerly they ignored him. This is more particularly the case in western cities than in the East, where people have more time and patience.

But with the improved brake facilities which have come with the advent of speed, there can no longer be any doubt that as a rule a ten mile rate can be maintained with far greater safety than six, and that instead of an increase in accidents they are largely diminished. Passengers are forced to use more care, and exercise it. Drivers realize they will reach an obstruction on the track sooner than formerly, and are much more careful and take no chances.

Except in the very heart of cities where the jam of vehicles and pedestrians, in the nature of things, precludes anything but a low speed, high speed is far safer, and in most cities this densely crowded district is quite limited. Higher speed will from this time on be the order of the day and when universally established will be hailed with delight by all.

SALT LAKE RAILWAY.

FEW of our readers would expect in asking if they had street cars in Salt Lake City to be informed that they most assuredly did, and sixty-five miles of them, and best of all, every car operated by electricity. But such is the fact.

Two years ago the railway service was nothing to be particularly proud of, and the managers of one of the roads visited the east, saw, were convinced, and gave an initial order for six miles of electrical equipment. Since then there has not been one week, winter or summer, in which construction work has not been under way on the Salt Lake City Railway, until to-day its lines embrace thirty-two miles and forty electric cars. The change from mules to lightning had its immediate effect on the city and greatly added new life and infused a fresh animation to a by no means slow town.

There are two other companies—The Rapid Transit and the Great Salt Lake; and three new ones not yet in operation, The West Side Rapid Transit, The Beck Hot Springs R. R. and the East Beach Railway.

From bob-tailed cars drawn by bob-tailed mules to modern electric cars with all their conveniences, in two years is rapid development: and again goes to show the street railway is a progressive institution and is making strides in these days that set the pace for nearly every other enterprise in the cities which they are so largely aiding in rapid growth.

THE CONDITION OF RAPID TRANSIT IN NEW ORLEANS.

THE question for rapid transit has struck New Orleans and is taking hold in earnest there. Ever since the first lines were built the "swan-necked mule" has had the cars, and we have yet to hear of any of them getting to the end of the route ahead of time.

A local paper recently interviewed the Street Railway Presidents on the subject. Col. Walker, president of the New Orleans City & Lake Railroad Co., which embraces a majority of the largest roads operating in the city stated that the ordinance limiting the companies to a speed of six miles per hour stood in the way of any immediate relief in this direction and that the necessity of stopping between blocks to receive and let off passengers consumed a great deal of unnecessary time.

Gen. W. J. Behan, president of the Crescent City road said: "If the people want rapid transit they can get it by exchanging the motive power now in use for electricity. What we want is to give a quick service to the public."

President E. J. Hart, of the Canal & Claiborne road comes out with a most astounding policy for a railroad manager, in the year of our Lord one thousand eight hundred and ninety-one. He not only believes in stopping as many times in a block as passengers may desire, and believes that a car cannot be so heavily loaded that a mule would be unable to start and draw it. Just how fast time is possible under these conditions is not given, but evidently Mr. Hart has great loyalty for his mules for he pays them the following tribute which will not be agreed in by many people. He says: "I do not know of any possible improvement on the present system. The six miles an hour, which is about the maximum speed that a short-winded animal like the mule can be run, is quite fast enough for safety through the crowded streets of a city. If your visit to me and your request for an interview on the subject of rapid transit has anything to do with electricity as the motive power of cars in New Orleans, I have to say that I am, have always been, and always will be opposed to any other motor than the mule. I do not think that the destruction of human life is compensated by any saving of time. Electric motor cars should not be allowed here. In Chicago, statistics show that 300 lives have paid the forfeit of rapid transit. You can go faster than you do at present, but you will grind up people. That is the price you pay for electricity on streets of a city. The killing that is done by steam and electric roads will not be confined to the drunken sots of the city, but will include our wives and children. They will be the sufferers for rapid transit, if reached by the adoption of electric motor cars. I would not trade off my wife or one of my children for all the railroads of the state. We have not been placed here to make money simply, and we should not attempt to do so when the price of our wealth is the life of a human being. If rapid transit is had and electric motors are put in use, a man might just as well tell his children good-by when he leaves his home in the morning, for he is not sure that he will see them again when he returns to his house."

The above would be a serious argument against rapid transit and in favor of his docile mules, if it was based on truth, but the facts are as far from his statements as the east is from the west. In Chicago, which he quotes, there are more people killed every year on the horse car lines of that city than by the cable roads, which operate into the very heart of the business centre where the streets are certainly as crowded as in New Orleans, at a speed of nearly ten miles per hour. The record of the Chicago lines for years past show an accident ratio of three accidents on horse lines to one on the cable lines, and this too, in spite of the fact that the cable roads carry nearly seventy-five per cent. of the total number carried by the two systems. Mr. Hart has confounded the accidents by steam lines to persons crossing such roads at grade crossings where the mortality is admitted to be frightful.

Cleveland has both cable and electric lines which start from the centre of the city, operate at a high speed and to the entire satisfaction of public and city officials. The electric system there has increased until the several lines so propelled have in daily service one hundred and fifty cars, and any attempted return to animal power would be the signal for a general uprising of indignant citizens, and would not be permitted.

Boston makes yet a better illustration where the rapid transit is by the trolley system entirely. The West End road there during the great gathering of the Grand Army of the Republic last fall was taxed as few systems have ever been in any city. During that week the company transported over three millions of passengers, and through streets whose narrow confines and tortuous windings are one of the seven wonders of this country, and yet this feat was accomplished by the electric motor without a single attending death accident and only one injury that could be considered at all serious. It would surely seem that a man who was open to conviction could not fail to be convinced from such undisputed facts as these. Rapid transit if managed with any kind of judgment is far safer than the slower going animal power cars, for reasons which are stated elsewhere in this issue: and a railway manager who so far lacks in progress and public spirit as to go on record with mules as good enough for him and his patrons cannot be a man who is very far in advance of the times. If his company cannot afford to make the change to rapid transit they should say so, but not drag the enterprising electric motor on behind a four-mile an hour mule whose only lively feature is a retrogressive one, as a phenomenal kicker.

New Orleans can never take its proper place as chief of southern cities until the mule has been displaced by electric or cable power, and in this she can well learn of other and smaller cities on the gulf whose enterprising citizens are already enjoying the vivifying influences that are set in motion at the sound of the gong and flash of the electric headlight as the motor car swiftly glides from centre to suburb and quickens and unites all parts of the city in which it is working out its great problems of rapid transit.

THE DUBLIN UNITED TRAMWAYS COMPANY.

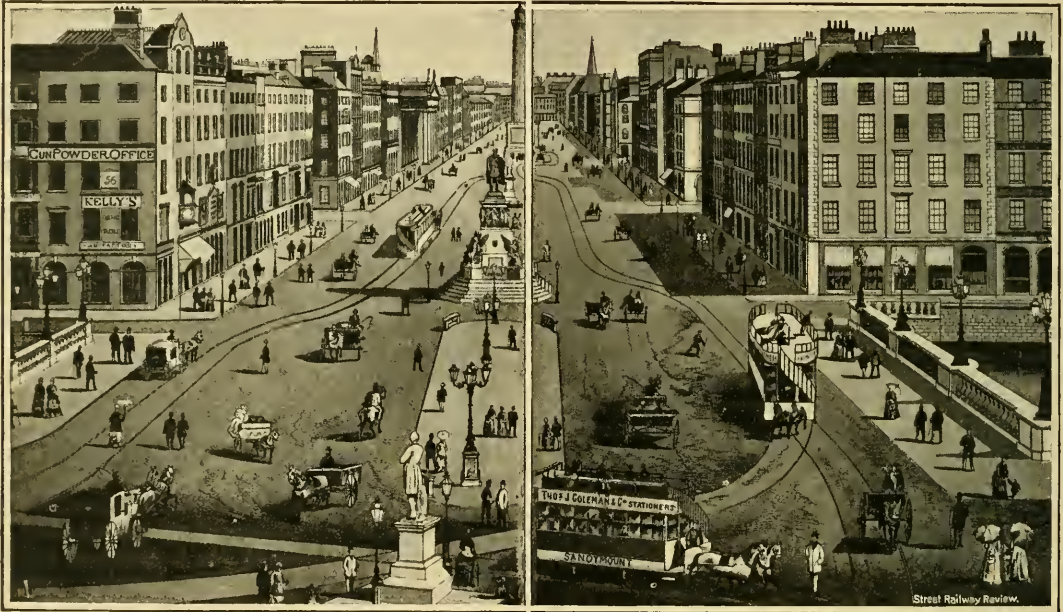
BY FRANK X. CICOTT.

DUBLIN, the chief city in Ireland, is situated on the eastern side of the island and contains a quarter of a million of inhabitants. The river Liffey, running from west to east, divides the city into two nearly equal parts. Tradition speaks of this city in A. D. 279, and many of the public buildings still in use bear the history of more than six hundred years.

The general offices of the Dublin United Tramways Co. will be seen on the right in the view, which is looking down Sackville street, in the business center of the city.

PARCEL DELIVERY.

An interesting feature in the operation of the Dublin Tramway Co. is its organized system for the delivery of



SACKVILLE STREET, SHOWING CARS CROSSING O'CONNELL BRIDGE OVER THE LIFFEY RIVER.

Dublin owes the inception of its now very complete and well conducted tramway service to an American. In 1859 George Francis Train visited both Dublin and Glasgow and agitated and advocated the subject. While he did not succeed in completing the organization as he desired, he may fairly be considered the original promoter of the scheme, which was some time later taken up by capitalists who worked it out and carried the plans to a successful finish.

The Dublin Tramway Co. was established in 1871, the North Dublin Co. in 1876, and the Central Dublin Co. in 1878. The three companies operated separately until 1881, when a plan was consummated whereby they were consolidated into what is now the

DUBLIN UNITED TRAMWAYS CO.,

with a capital of £750,000, and an issue of bonds amounting to £76,600. The Secretary and General Manager is Mr. William Anderson, one of the most thoroughly informed men in the tramway service in the United Kingdom. A sketch of his railway career and a full page portrait appear elsewhere in this number.

parcels and light express packages. The municipal authorities grant the company the privilege of operating an express department, which is not only a great convenience, but is likewise a source of no small revenue to the stockholders. A central station or depot is located in the heart of the business district.

On receipt of a telephone message a messenger boy is sent to bring the parcel to the forwarding station; and also from 8:30 A. M. to 5:30 P. M. packages may be handed conductors, who take them to the general office, where they are sorted and sent out in large quantities to the sub-station nearest the destination, to which it is finally carried by a messenger boy. Stamps are sold by the company and special rates made to business men. From the main distributing office parcels are dispatched to the sub-stations once each hour. A printed tariff and time card enables senders to know just how many stamps to affix and when the package will reach its destination. The Tramway Company also delivers to express companies who forward to other cities. The charges for ordinary distances in the city are for 7 lbs. weight 4

cents (of our money), 14 lbs. require 6 cents, and 28 lbs. 8 cents. The revenue from this branch of the business the past year was about \$7,500 and the expenses \$4,000.



The Bank of Ireland in front of which pass nearly all of the lines of street cars, was formerly the Parliament House, and was built in 1540. It cost £95,000. In 1802 when the seat of government was removed to England, it was purchased by the bank, and still contains many relics of historical value.

CARS.

The cars are of the class known in this country as double-deckers, or as termed abroad "Garden Seat Cars." The genial climate of the Emerald Isle permitting of outside riding the year round. The car seats twenty-one passengers within and thirty outside, giving a total seating capacity of fifty-one. They are twenty-six feet in length, seven feet in width, and twelve feet high and weigh four tons. They are carried on four wheels the life of which is about 40,000 miles. Where there are double tracks cars run on the left hand track, and on single track lines the turnout is always made to the left.

GOVERNMENT SUBSIDY FOR HORSES.

A system that has certain advantages to the company, but which might not meet with favor here, is the subsidy by government of the live stock. This includes all the tramways in the United Kingdom, whereby the crown pays an annual subsidy of 10 shillings on each horse belonging to the railway companies that is up to a certain standard of excellence in size, weight, age and general good qualities. The inspection is made as often as desired, by an army officer detailed for that purpose. In return the government assumes the privilege in case of war of purchasing all of the horses so subsidized, by paying the company £40 per horse. This enables government on a few hours notice to mass an enormous number of splendid horses, already inspected and accepted, for use in equipping a cavalry force, without maintaining them in idleness perhaps through a long term of years. The revenue to the Dublin Company from this source last year was £250. Of course, if any company desires to evade this arrangement, it can easily do so by taking less pains in the selection and care of its stock; and in no event would they be called upon to furnish all their live stock. But the companies generally are very

glad to secure the acceptance by the inspector of as large a number as possible; and as the average cost per horse in nine of the larger cities in the Kingdom is less than £30 per head, the companies would, in event of compulsory sale to the government, realize a profit of upwards of £10 per horse. In Dublin, horses suitable for street car service are bought at an average of £28 per head. The horses used in England and Ireland for car service are greatly superior to those employed in the same work in America.

BEDDING AND FEED.

In this city the bedding used consists in summer of a mixture in equal proportions of sea-sand and sawdust; a greater amount of sawdust being added for the winter months. This furnishes a very sweet, clean and healthful bed, and is also inexpensive, and gives excellent satisfaction.



O'CONNELL MONUMENT—STARTING POINT FOR CARS.

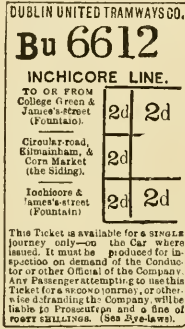
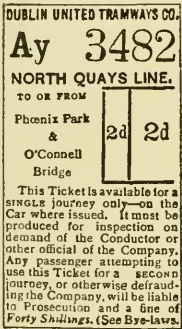
The feed is composed of cut hay and grain, this method having been in use for many years, and is similar to the method employed by many companies in this country, though a larger proportion of grain is fed than is usual here.

The greatest care is taken to keep the stables neat and clean. They are floored with brick, which is constantly swept, and the whole interior whitewashed at frequent intervals. The ventilation is also vastly superior to American stables. The cheapness of labor for this work enables them to afford a large amount of labor, which while most desirable could hardly be afforded here.

For the last six months of 1890, the car mileage was 1,198,284, at a cost for all operating expenses of every nature, of 17.59 cents of our money per car per mile. Advertisements in the cars yielded a revenue of \$7,530. The parcel delivery earned \$4,240; sale of manure \$730, and for carrying the mails \$130. The entire revenue for six months was \$328,000, showing a good increase over the same months of the preceding year. The par value of the stock is £10, and pays a dividend of 5 per cent. per annum in addition to setting apart a sinking fund for new construction. One million passengers were carried in 1890 in excess of 1889.

FARES.

When a person enters a car the conductor inquires how far the passenger wishes to go, and collects according to a fixed scale of distances, and gives a ticket punched in



accordance with the amount of fare paid. This precious ticket must be ready for the watchful inspector's examination as often as that dignity may desire, and when you leave the car, it is destroyed.

WAGES.

The subject of wages is always an important one, as it involves the greatest of all operating expenses. The men in all departments work an average of twelve hours daily. Time-keepers receive an equivalent in American money of \$1.25 per day; drivers, 87 cents to \$1.00 per day; conductors, 75 to 87 cents per day; stablemen, \$4.25 to \$4.75 per week.

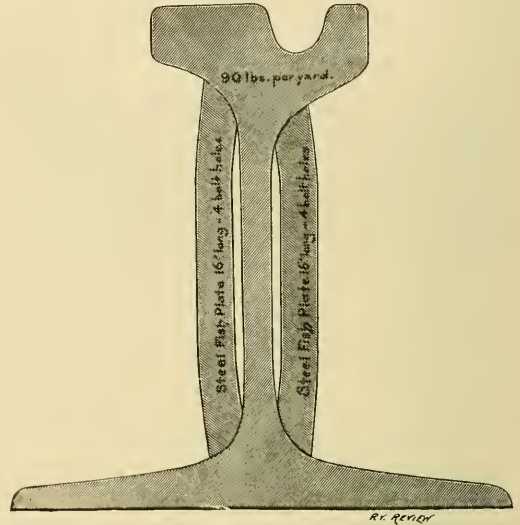
An excellent class of employes is secured at these rates, and as a rule remain in the same employ for a long term of years unless discharged for cause. There is much less changing than in the United States.

TRACK CONSTRUCTION.

One of the most celebrated English tramway managers, when making a tour of inspection among the American street railways a few weeks ago, while in the office of the STREET RAILWAY REVIEW, said to the writer: "We across the water are considered slow by you Americans,

but the fact is we let you do the experimenting and then adopt what you have demonstrated as the best. Another reason, too, why we move less rapidly is owing to the

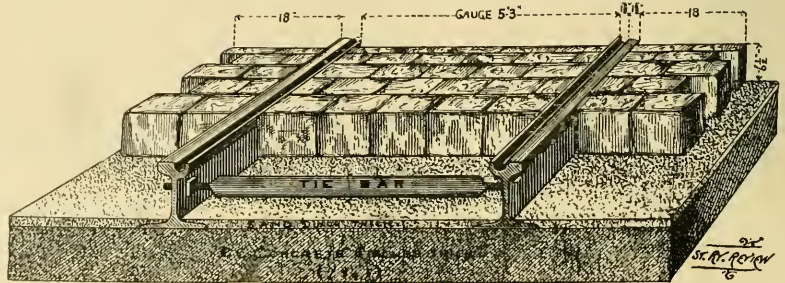
SECTION OF STEEL RAIL ONE HALF SIZE



fact that it is an exceedingly slow and laborious matter to secure the necessary legislative authority for any changes, so that when we do build we are forced to be absolutely sure of both its efficiency and durability."

In laying the Dublin tracks an excavation was first made to the depth of 12 inches and a layer of the best concrete laid and tamped to a uniform thickness of 6 inches, making a solid foundation 8 ft. 6 in. wide for each track. This is then allowed to set. Next the rails are laid resting directly on the concrete and the tie-bars placed and the track brought to a guage which is 5 ft. 3 in. A half inch of sand follows the concrete, and in this are set the paving blocks, which are 6 in. high, making a solid construction, and all of lasting materials.

The rails are flush with the pavement, and make a perfectly smooth crossing for carriages. The paving is thoroughly tarred and made impervious to water. Of recent years the average cost of construction has been about \$10,000 per mile of single track; which amount varies somewhat according to local conditions of ground and cost of labor.



HYGIENE AND VETERINARY.

BY JOSEPH D. TUTHILL, M. D., V. S.

IN OUR HYGIENE and VETERINARY DEPARTMENT of last month's issue of the STREET RAILWAY REVIEW we called attention to the fact that a pure uncontaminated atmosphere is essential for the maintenance of health, strength and endurance, and that a vitiated atmosphere is one of the prolific causes of disease. These facts are worthy of the most careful observation by all horse owners, because they call special attention to a most important sanitary law, viz.: that of the proper VENTILATION OF STABLES. The popular idea, however, of ventilation and its relation to the health of animals is so very indefinite that it is no wonder at all that it is so often neglected. Very few men outside of the medical profession care to know anything about the functions of the lungs, the properties of the atmosphere and the chemical changes which takes place in the blood through the interchange of carbonic acid and oxygen, and this we claim is a matter which every horseman should give more or less attention to, so as to be able to comprehend the absolute necessity of having a pure uncontaminated atmosphere circulating at all times through every part of stables where horses are kept—especially where large numbers are congregated together. The organs of respiration are the larynx, the trachea or wind-pipe and the bronchial tubes and their minute ramifications—the *air cells*. The air is displaced out of the lungs by the action of the muscles of respiration, and when these relax the lungs expand to a certain calibre by their elasticity. This may be exemplified by means of a sponge which may be compressed into a small bulk by the hand, but upon opening the same, the sponge returns to its natural size and all its cavities become filled with air. The function of respiration is the conversion of *venous* into *arterial* blood; this arterialization of the venous blood is a process highly essential to the well-being of all animals. More important is it than the assimilation of the food, for a horse may live several days without food, yet cannot exist many minutes if deprived of air. Food and air are the chief supporters of animal existence—the former furnishes the blood with its chief constituents and the latter gives it vitality. It is therefore to the food we eat and the air we breathe we must look for the maintenance of health, life, strength and endurance. Every muscular action, thought, act or deed performed by the living animal is attended with more or less waste of tissue, and this constant wear and tear of the system calls for a corresponding amount of repair. If this had not been wisely provided for, the living being would soon cease to exist. This great work of recuperating and building up the worn out tissues of the body is performed by the circulating fluid—the blood. At every pulsation of the heart and great blood-vessels the blood is forced through the arterioles and capillaries to every part of the animal fabric. This is known as the arterial circulation, and at the extreme end of the arterial capillaries the venous

circulation commences in capillaries, gradually becoming larger and finally diverging into two large blood vessels—namely, the anterior and posterior vena cava, which terminates by one common trunk in the right auricle of the heart. By the contraction of the walls of this important organ the blood is forced into the right ventricle, and from thence into the pulmonary artery. The latter is the main channel through which the venous blood is propelled to the lungs to become decarbonized. It divides and subdivides until its branches may be counted by thousands—the ramifications of which are found entwined around the innumerable air cells of the lungs. It is in this way the venous blood is brought in direct contact with the atmosphere through the attenuated walls of the delicate air cells (by a process termed *endosmosis*). The interchange which takes place in the air cells of lungs, between the carbon and oxygen, causes chemical combustion by which carbonic acid gas is liberated and oxygen is absorbed. This illustrates in a brief way how the blood becomes *decarbonized*—it is thus changed from venous into arterial blood. It is then carried back to the left auricle of the great fountain of life—the heart, to be distributed to all parts of the body. Chemical combustion from an interchange of carbon and oxygen takes place in all parts of the body as well as in the lungs. Were this not the fact it would not be an easy matter to explain how the heat of the body is kept up. As the blood circulated through the lungs the globules are impregnated with oxygen. These same globules are carried in the circulating fluid to all parts of the body, and wherever they come in contact with venous blood decarbonization takes place to a certain extent in the same way that it does in the lungs. The theory of the decarbonization of the blood, though very briefly described, illustrates the free access the atmosphere has to the lungs and how its chief component part oxygen enters the blood and is thus carried to all parts of the system. It not only calls to mind the great importance of having the air we breathe pure and sweet, but at the same time explains how *aerial poisons* find their way into the animal system. This accounts for malarial and typhoid fevers, fever and ague, and the various epidemics and epizootics which so often prove fatal to men as well as the lower animals. Scientific research has so far failed to discover the true nature of this aerial poison. All we pretend to know about it is that it enters the blood through the medium of the lungs—giving rise to a low typhoid condition which the medical profession find it difficult to overcome. We, however, know of other aerial poisons, the nature and causes of which are well understood. We also know that they are very injurious to the lower animals, and are solely to be attributed to ignorance and wilful neglect. We refer to the gaseous vapors which are constantly given off from the lungs, the skin, the kidneys and the bowels of horses which are kept in unventilated stables. Think for a moment of horses

that are compellen to breathe the same air over and over again, which is invariably the case in all stables that are crowded and badly ventilated. The failure of the lungs to perform their natural functions, viz.: that of the decarbonization of the blood, by the neglect of the individuals in charge to enforce one of our most important sanitary laws. This leaves the blood in a vitiated condition, the animal in a weak and debilitated state, and of course more susceptible to the prevailing diseases. Under such adverse circumstances—with the vital forces enfeebled—is it any wonder that the unfortunate animals, which are made victims of disease through ignorance and wilful neglect, die a premature death often in spite of the most skillful medical treatment known to modern veterinary science.

AN IMPORTANT RAILWAY CONTRACT.

MESSRS. Chadbourne, Hazelton & Co., general agents of the Wenstrom Consolidated Dynamo & Motor Co., of Baltimore, have just closed a contract with the Denver, Lakewood & Golden Railway Co., of Denver, Colorado, for an extensive electric railway. This road runs from the heart of Denver directly across the country to the city of Golden, a distance of fourteen miles, passing through several smaller towns on the way. The grading on this road is completed, and the work of laying the rails is about commenced. 60 lb. T rail will be used. This road is the only direct communication between these two cities, and Mr. Starkweather, vice president and general manager of the road, claims that the freight business alone on this line will pay a ten per cent. dividend on the investment.

The equipment at first will consist of two 100 H. P. motor cars, designed by Mr. Leonard Atwood, the mechanical expert employed by Messrs. Chadbourne, Hazelton & Co. These motor cars will be fitted with special Wenstrom slow speed direct geared motors, designed by Mr. H. F. Parshall, on the same general lines as the regular Wenstrom-Parshall slow speed street car motor. These are guaranteed to run 25 to 30 miles an hour, and haul loaded freight cars.

For the passenger traffic, long eight wheel cars with the pivotal trucks will be used. These cars will be handsomely fitted up and have a seating capacity of about forty people. The standard Wenstrom slow speed, direct geared motors, 30 H. P. each, will be put on these cars. They are calculated to run fifteen or twenty miles an hour, hauling two other trail cars.

The power plant will be divided in two sections: one station being in Golden, the other near Denver. Each one will be fitted up with four 80,000 Watt-Wenstrom street car generators, of the newest and most approved design, together with the necessary steam plant to operate them. No money will be spared to make this road complete in every detail.

Chadbourne, Hazelton & Co. have had their expert, Mr. Atwood, in Denver for some weeks, going over this work and laying out necessary plans for the successful equipment of the entire line. It is intended to have the road open for traffic near the first of May.

THE NEW GRIFFIN PLANT.

ON the first of December last, the Griffin Wheel and Foundry Co. began operating their new foundry located on Sacramento avenue between the C. & N. W. and C. M. & St. P. tracks. They have purchased thirty-two acres, erecting thereon a most complete plant, giving them a capacity of about 800 car wheels per day, or more than double the capacity of their old works.

The main foundry building is 200 x 488. Adjoining this building, are the engine and boiler houses, 50 x 80, containing the boilers and Corliss engine, which operate the machinery in the foundry and machine shop, the latter being 75 x 150 feet, containing all the latest machinery and tools for fitting car wheels for locomotives, cars, electric motors, etc., also the company's special appliances for grinding and balancing car wheels. All the buildings are constructed of brick and iron.

The yards are arranged with a system of standard and narrow gauge tracks, for the economical handling of material, and their switching facilities are of the best, enabling them to reach all roads entering Chicago.

The output is confined wholly to chilled iron car wheels, of which they make every kind and variety which can be used. This company makes a specialty of their "machined" wheels for electric roads. These wheels are first bored in the hub, and then ground on the tread with a true relation to the centre, being guaranteed true to 1-64 of an inch, thus insuring more perfect contact with the rails for the return current, thereby saving power and giving an easier riding car. The company also have adequate facilities for turning axles for electric motors.

ADDITIONAL STORAGE BATTERY CARS ORDERED FOR DUBUQUE.

THE Dubuque Street Railway Company is so well pleased with the operation of the experimental storage battery car operated on the Edco system, and which has been running in regular daily service since last August, that it has concluded to order from the Accumulator Company three additional cars of the same kind, work on which we are advised has already been started; delivery to be made in April.

This will make nine Edco cars in all which the Dubuque Company will have in operation: the first six of which are about ready for delivery, and will be installed in March.

We are informed also that the Accumulator Company has arranged with the Eckington & Soldiers Home Railway Company to rent them two Edco cars, which are about ready for delivery, and which are to be operated by the Eckington & Soldiers Home Railway Company upon the G Street Branch of that road between the Treasury Department and the Pension Office, thence to the corner of New York avenue and Fifth street, pending the delivery of the six new cars recently contracted for which will not be ready for delivery till about May or June.

THE AURORA STREET RAILWAY.

A PLANT ENTIRELY NEW FROM CROSS TIES TO CROSS WIRES.

AURORA, Illinois, is an enterprising little city of upwards of 20,000; has four lines of railway running into it, the principal one of which is the Chicago, Burlington & Quincy, which has its main car shops at this point and employs some 3,000 men. It is quite a manufacturing centre, including a large cotton mill, a corset factory, a watch factory, a number of large iron industries, manufactories of wind-mills, road carts and silver-plate, each of which employs all the way from 200 to 1,500 hands. Its street railway facilities until the present time have been of the most ordinary character, and consisted of six miles of single track, laid with a light T rail on which were operated some ten cars without conductors and drawn by not over speedy mules. The greater portion of the equipment throughout had been purchased second-hand, after having been discarded by some of the Chicago companies. In spite of these disadvantages the company had done fairly well, but the rapid increase in the growth of the place and the large number of new manufacturing industries which are now coming in have made it necessary that the street railway of Aurora should be changed to electricity to keep pace with the other improvements of the city. In July, 1890, the old company transferred all its rights and property to a New York syndicate, of which Mr. Dobson is the president, and after some delay, additional franchises were secured, and early in September the work of reconstruction was begun. The old tracks were torn up and replaced by new ties, chairs and a 67-lb. girder rail on all streets which were paved, and with a T rail of the same weight on the remaining lines. The rail was all furnished by the Illinois Steel Co., and is one of the heaviest rails they have yet furnished, for street railway purposes, to any but the largest cities.

The Johnson Company, of Johnstown, Pa., have furnished all the curves, of which there are a large number, some of 40ft. radius: but the cars glide around them as smoothly as on straight track, and have no difficulty whatever in starting with their heaviest loads from a dead stop in the centre of the curve.

As will be seen from the cut, the arrangement of the buildings, one of which contains the shops and car house, the other offices, engine and boiler rooms, is most convenient. To lessen the fire risk the two are separated, except at the rear, by a 11 ft. passage-way. The offices

and waiting-rooms for employes are finished in Georgia pine and present a most inviting appearance. Special accommodations have been provided for the men, including waiting-room, reading-room and toilet-room on the first floor and above that a large room containing good sized lockers, with individual keys for each employe, in which he may keep his citizen's clothes while on duty and such other personal effects as he may desire. A wide entrance leads from the hall between the Superintendent's



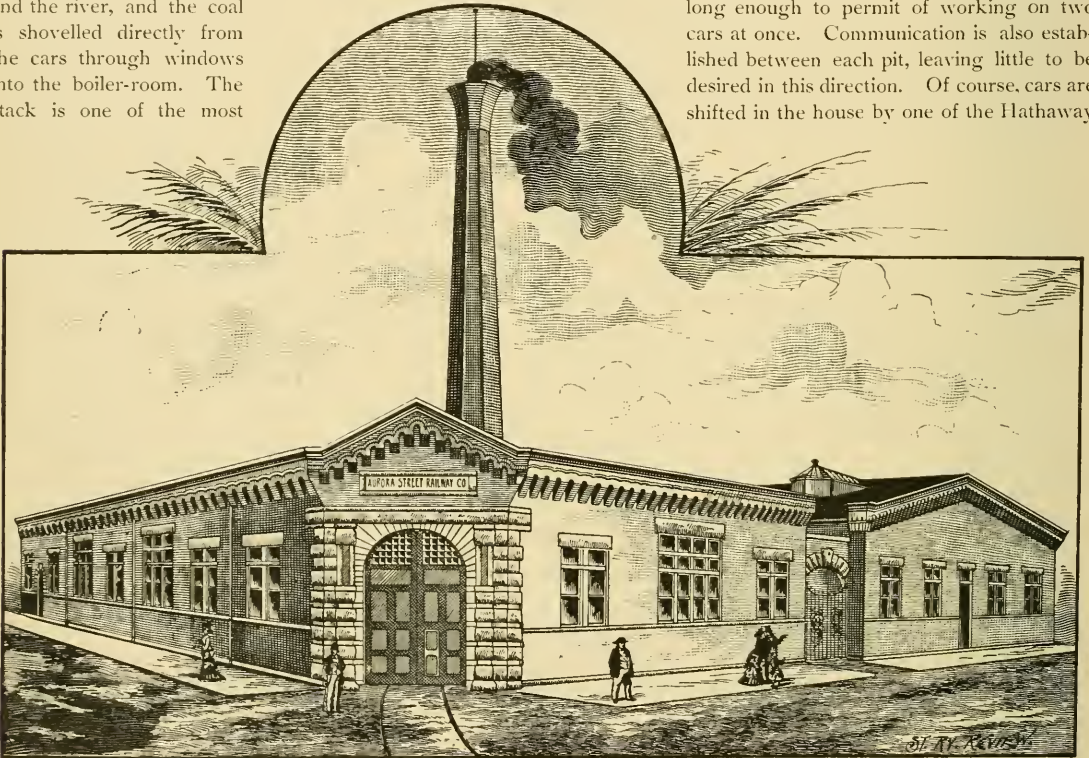
POWER HOUSE AS SEEN FROM OPPOSITE BANK OF FOX RIVER.

ent's room and the other offices, to the engine room, which is a large room 40 feet in height, well lighted by windows and sky-lights. Ample provision has been made for adding more than double the driving machinery which is at present in use, when that time shall come.

Between the Superintendent's office and engine room is a store room devoted exclusively to electrical supplies, which are conveniently placed upon divided shelves extending around the room. A small truck in one corner bears an armature ready for immediate use in case of accident. On the opposite side of the hall is a small repair shop devoted to repairs of driving machinery and boilers, while adjoining this are two commodious bed-rooms, nicely furnished, for the use of engineers and firemen.

The engines and dynamos rest on foundations 11 feet deep, which in turn rest upon a bed of solid rock which gently slopes toward the river. In the rear of the engine-room is the boiler-room, conveniently arranged, permitting the storage of 500 tons of coal. Provision has been also made for the placing of extra boilers when required. The water supply is drawn directly from the Fox river, on the banks of which and about 15 feet above the water line the building stands. The fuel is brought in on a private side-track, which extends the length of the building and between it and the river, and the coal is shovelled directly from the cars through windows into the boiler-room. The stack is one of the most

The car house has a street frontage of 190 ft., and extends to the river, a distance of 195 ft.; is one of the best lighted in the country, by windows on three sides and numerous sky-lights, and at night by 4 arc and 110 incandescent lights. Reference to the accompanying sketch will show division of room, which has been made with a view to convenience and economy of time in handling cars. Ten tracks each 125 ft. long extend from the transfer track to the end of the building. Each track is provided with a pit five feet deep, reached by easy steps, lighted by powerful incandescent lamps, and long enough to permit of working on two cars at once. Communication is also established between each pit, leaving little to be desired in this direction. Of course, cars are shifted in the house by one of the Hathaway



FRONT VIEW OF POWER AND CAR HOUSE.

shapely in the West: it is octagonal in shape, 155 feet in height, contains 358,000 brick, is lined with fire-brick for a distance of 60 feet. The flue is of a uniform diameter of 92 inches. The stack is surmounted by an iron cap weighing three tons, from which springs an iron flag-staff 25 feet high.

The power is derived from two 250-horse power straight line engines, built by Samuel L. Moore & Sons. One engine is more than sufficient at present to do the work, the other being held in reserve. The engine makes 200 strokes per minute and drives two 80,000 watt Edison dynamos which supply the current.

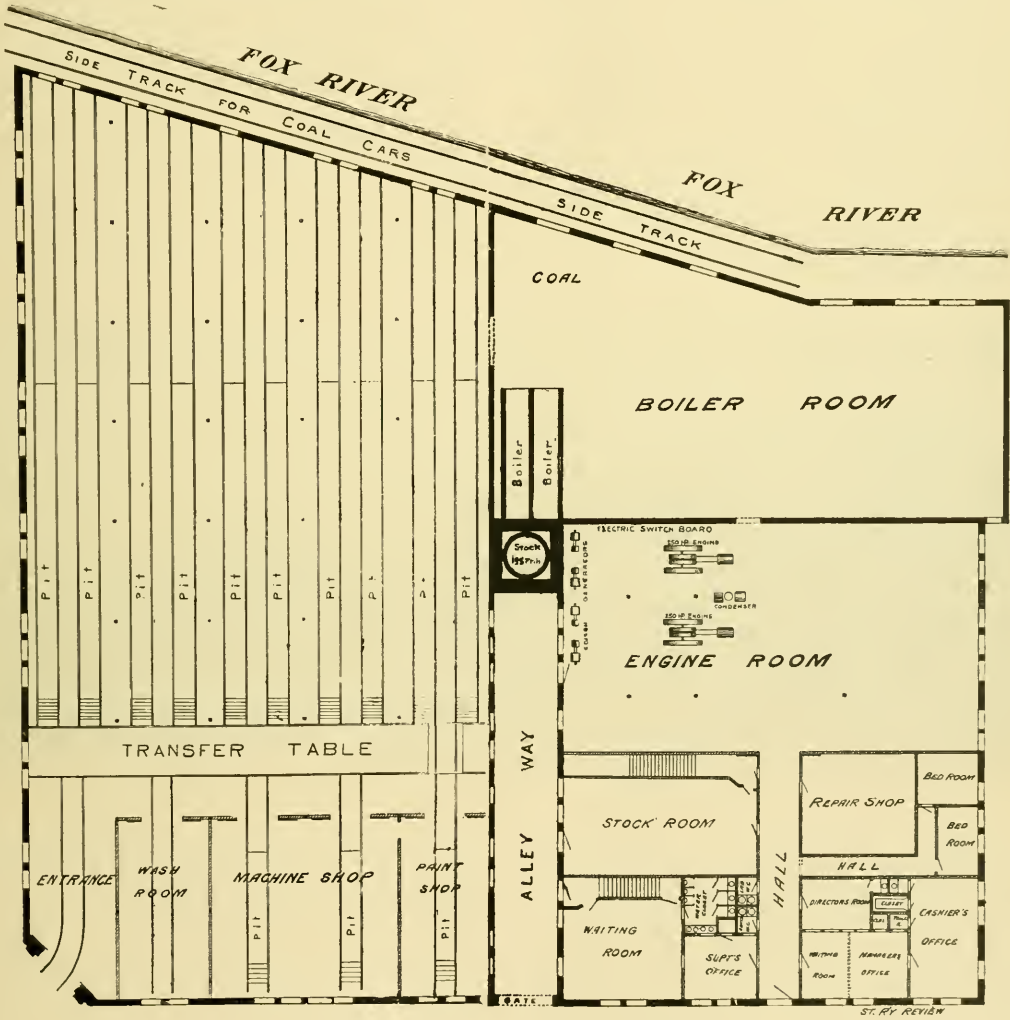
The boilers are the well-known Babcock & Wilcox tubular, two in number and of 250-horse power each. The steam water entering the boilers passes through a purifier furnished by Stilwell & Bayers, Dayton, O., and the steam fitting, which is very complete, by Crane Bros., Chicago.

transfer tables, which is operated by a 5-horse power Edison motor located in a pit at end of transfer track, and which carries a car at a speed of 100 feet in 23 seconds. It is operated by levers at convenient intervals, so that one man can easily and quickly handle all the cars, which is done entirely by electricity, the trolley wires extending the length of the room over each of the storage tracks. The car house will accommodate fifty cars. The paint room in one corner is separated by a brick partition from a good sized repair shop, capable of holding two cars and supplied with necessary machinery. Next to this is the wash-room, supplied with hot and cold water and steam pipes for drying purposes. Each of these rooms has large sliding doors extending to the ceiling, 23 feet 10 inches high. The roof is carried on wooden posts which rest on a bed-rock foundation. The buildings are of brick, and present a very attractive appearance from

without, and money has not been spared to make them as convenient as possible in every respect. It certainly is one of the model plants of the country.

The change from mules to electricity is scarcely less marked than the comparison of the old bob-tail cars with the new equipment, which has been furnished by the Gilbert Car Co. of Troy, N. Y. The new cars are fifteen in number, of the double vestibule style, and are models

wheels" from the New York Car Wheel Works of Buffalo. The truck is of the Gilbert make, and has a peculiar arrangement of the springs which secures an extremely easy riding car, entirely free from all rocking, although the wheel base is but seven feet. The motor frame suspends directly from the axles. A second frame rests on four half-elliptical springs. At each of the four corners of this frame is placed one elliptical spring, which in turn



GROUND PLAN AURORA CITY RAILWAY ELECTRIC PLANT.

of beauty and convenience; twenty-eight feet over all, weigh eight tons complete, and seat thirty passengers. The motors are the Rae type, from the Detroit Electrical Works, each car being driven by one 30-horse power motor placed between the car axles and securely boxed against dust and water. The motor makes 900 revolutions per minute to secure a speed of 12 miles per hour. The wheels are thirty inches in diameter, weighing 350 lbs. each, and are what are known as the "machined

carries the car box. The longitudinal distance between the centres of these last named springs is 11 feet 6 inches. The interior of the car is very elaborately finished in brass and hard woods. The windows, six on each side, are 30 inches square, furnished with spring roller curtains, while at night the car is brilliantly illuminated by two chandeliers, which contain two lamps each, made by Josephine D. Smith. They are fitted with glass shades and suspended by brass hangers, making a lighting fix-

ture handsome enough for any parlor. At one end of the car is a Standard Register, of which eighteen are in use by the Aurora Company, and midway is one of Lewis & Fowler's heaters, which insures comfort in cold weather. In summer the stove, which is a very attractive piece of furniture, can be removed and a section of seat substituted.

The outside lighting is by 12-inch headlights furnished by the Adams & Westlake Co. Each platform is vestibuled and entered by two side doors. The motor man can drive from either end, appliances for this purpose being so arranged that when in use he has the vestibule exclusively to himself, and the doors of the other platform swing back and hide the brake lever from view or interference by the passengers. There is one step from the ground to the platform, and a short step from platform to car floor, which avoids the use of the double step outside. An overhead sign by day and a colored bulls-eye light at night at each end of the car designates its route.

The contract for the entire construction work, including buildings, track, and overhead wires, was taken by Drake & Orton, of 45 Broadway, N. Y., the work being under the immediate supervision of Mr. Orton. Mr. Wm. MacQuesten has had charge of the electrical department of the work. Both these gentlemen are entitled to great credit for the painstaking care and thorough supervision with which they have directed the construction.

The city is built from the river banks along the valley and up over and upon the hills which rise on either side. There is quite a rivalry between the "East" and "West" sides, and nature evidently anticipating these harmless hostilities, thoughtfully formed a large island in the middle of the river. On this are built the postoffice, public reading room, and such other public offices as are of a general nature. The power house of the Electric Railway finds its home very prettily on the east bank of the river, and while something of a card for the sectionalists on that side, the rival half on the western banks has its full share of the railway tracks. The whole city, however, is very



AURORA CITY RAILWAY COMPANY—"THE NEW AND THE OLD."

There are twelve miles of track, several grades, one of which is 6.91, but at a recent trial a car loaded to its utmost capacity had no difficulty in mounting this grade at a speed of ten miles per hour, coming to a full stop when half way up and again starting and securing its speed in a distance of two car lengths. The work throughout is most perfect, and makes this one of the best as it is one of the latest plants in the country. Fifteen motor cars will go into service immediately, and a summer equipment is now building. The conductors will wear a blue uniform and motor men one of gray, cut double-breasted, with brass buttons bearing the words "Aurora City Railway."

Mr. T. C. Oakman is in charge as General Manager, and the future of the Company, equipped as it is with every possible convenience, is very bright. Extensions are already being considered and doubtless will be made within a few months.

much pleased with the new order of things, and have every reason to feel proud of their road and its equipment which has cost \$350,000, of which \$50,000 was spent on the power and car house.

A banquet was tendered the officers and contractors by the business men of Aurora and proved a suitable celebration of the completion of a work that is highly satisfactory.

Mr. McQuesten leaves in a few days to install the Consolidated Company's electric plant, at Syracuse, N. Y.

THE LYNN, Mass., *Bee* aptly says: "The cable and electric railways are playing havoc with the horse market. It is stated there has been a falling off of 50 per cent in the price of horses in New York since the introduction of these motive powers. The horse has been a faithful servant to man: it is time to give him a well merited rest."

STREET RAILWAY LAW.

EDITED BY MR. FRANK H. CLARK, ATTORNEY AT LAW, CHICAGO.

Liability for Assault by Conductor.

A street railroad company is responsible to a passenger for a battery by the conductor committed first on the car, and repeated shortly afterwards at the office of the company whither the passenger had gone to make complaint to the superintendent.

THE jury found for the plaintiff below, returning a verdict for two thousand dollars. The motion for a new trial complains of no error by the court, but attacks the verdict as contrary to law, to evidence, etc., and as excessive in amount. The motion was overruled, and upon appeal, in delivering the opinion, the court said:

Treating the testimony of the plaintiff and his witnesses as reliable, and as presenting the whole truth of the case, there can be no doubt that the verdict was warranted in all respects. The plaintiff, being a passenger on a street car, was called upon by the conductor for his fare. He had money in his pocket, and, telling the conductor to wait a minute, was feeling for a nickel, when he was seized by the conductor and ordered off the car. A struggle ensued, and the conductor kicked him off the platform, the car being in rapid motion. The plaintiff then repaired immediately to the office of the company for the purpose of making complaint to the superintendent. He reached the office in about 18 or 20 minutes. The conductor arrived at or about the same time. The conductor cursed him, kicked him again twice, bit him with his fist, and shoved him away. Others present took part with the conductor, and plaintiff was badly beaten. The conductor plunged a knife into him. His left arm was broken, and the cut with the knife was in the back of the head. He became unconscious, and was afterwards picked up by a policeman, some two blocks distant from the office. He could not say exactly where and at what time he was cut, but he saw the conductor, while on the platform of the office, draw a knife from his pocket and open it with his teeth. The evidence adduced by the company conflicted with this account in several material respects, but that conflict counts for nothing on this writ of error, the jury having found in favor of the plaintiff, and their finding having been approved by the presiding judge. The company is responsible for the unlawful violence and misbehavior of its employes, both on the cars and at the office. *Gasway v. Railroad Co.*, 58 Ga. 216; *Peebles v. Railroad Co.*, 60 Ga. 281; *Railroad Co. v. Turner*, 78 Ga. 292; *Railway Co. v. Brauss*, 70 Ga. 368; *Christian v. Railway Co.*, 79 Ga. 460. There was no error in denying the motion for a new trial.

(Sup. Ct. Ga.: *Savannah St. R. Co. v. Bryan*, 9 Ry. & Corp. L. Jour. 136.)

Electric Railroad—Frightening Horse—Contributory Negligence.

It is not negligence on the part of an electric railway company not immediately to stop the train on seeing a frightened horse with its driver at its head near a crossing 350 or 400 feet distant, where the speed of the train is

decreased and there is nothing to indicate to the employes that there is any particular danger.

One who deliberately drives his horse into a place of danger near a railroad track, with a full knowledge of the situation and danger, for the express purpose of testing the horse as to his disposition to become frightened, is guilty of such contributory negligence as will prevent a recovery, where the horse becomes frightened at a train and runs away.

(Sup. Ct. Mich.: *Cornell v. Detroit E. R. Co.*, 46 N. W. Rep. 791.

Riding on Front Platform of Car—Care Required of Conductor—Injury to Boy Alighting from Car—Liability of Company.

The front platform of a crowded street car is not a place of known danger so as to render it negligence *per se*, either upon the part of the company or an adult passenger or one reasonably competent to care for himself, to permit him to occupy the platform when the car is in motion.

A street car company is not liable for injuries to a boy eight years of age, sustained by his stepping off the front platform where he was standing while the car was in motion without the knowledge of the conductor, where the interior, as well as both platforms, was crowded.

A street car conductor is not required to exercise critical skill or judgment while in the performance of his ordinary duties in a crowded car, in observing closely the capacity or intelligence of a particular passenger, but is held only to that degree of discrimination which a reasonably prudent and observing man would exercise under the circumstances.

(Sup. Ct. Pa.: *Sandford v. Hestonville, M. & F. Pass. R. Co.*, 20 Atl. Rep. 799.)

Injury to Person Stepping into Depression Under Rail—Ordinance Requiring Maintenance of Drain—Liability of Company.

The plaintiff, while attempting to cross a street railway, stepped into a depression in the pavement over which the rail passed, and, her feet having caught, she fell forward and sustained the injuries complained of. It appeared that this condition of the street was the result of a regulation of the city which required a drain to be maintained at that place to carry off the surface water into the sewer, but there was no evidence that the railway company was in default, either as to the construction or the maintenance of the drain.

Held, that the company was not in any way liable, and that a verdict in its favor should have been directed.

(Sup. Ct. Pa.: *Campbell v. Frankford and Southwark R. W. Co.*, 48 Leg. Intel. 78.)

Open Cars—Passenger Struck by Passing Car—Duty of Conductor to Warn.

It is not negligence on the part of the conductor of an open street car not to warn a passenger standing on the platform of any possible danger of being struck by a

passing car. where the distance between the parallel tracks is such that no accident from that cause has occurred in the twenty years' use of open cars on such tracks.

A street railway company is not bound to so construct its track that it will be impossible for a passenger standing on the outside of an open car to reach or be struck by a car on a parallel track.

(Sup. Ct. N. Y.: *Craighead v. Brooklyn City R. Co.*, 25 N. E. Rep. 387.

Elevated Railway—Action to Enjoin Operation—Damages to Abutter—Offset of Benefits.

In an action by an abutting owner to enjoin the operation of an elevated railroad in the street in front of his premises, the amount to be awarded plaintiff as the value of his easements of light, air and access, and to be paid in avoidance of the injunction, should be offset by the increase in value of the plaintiff's property derived from the railroad, which is not participated in by the public generally, arising either from the proximity of its stations or the facility of access it affords.

Such increase in value is a special and peculiar benefit to the plaintiff's property with which the railroad company should be credited, no matter what the number of properties upon which such special and peculiar benefit is also bestowed.

Where the trial court, by its rulings on defendant's request to find, distinctly rejected its claims to credit for such special and peculiar benefits conferred by the railway upon plaintiff's property, it cannot be assumed in support of the award made that the court allowed them in the computation of the amount, especially where the contrary inference may be drawn from the record.

Although the error would be ineffectual to reverse the judgment, if it merely affected the amount to be paid in avoidance of the injunction, yet it is otherwise where the error goes to the foundation of the action, and involves the question whether the plaintiff would be entitled to injunctive relief, since it might be shown that the benefit preponderated over the injury.

(Ct. of Appls. N. Y. Co.: *Gray v. Manhattan R. Co.*, 9 Ry. & Corp. L. Jour. 147.

Improper Conduct of Passenger—Expulsion from Car.

On the trial of an action against a street railway company for ejecting the plaintiff from its car, the company attempted to justify the expulsion on two grounds; the plaintiff's refusal to pay fare and his use of language calculated to disturb other passengers. The court instructed that even if the plaintiff did not pay his fare, or some one pay it for him, and the conductor in charge of the car did not undertake to remove him in a peaceable manner, using no more force than was necessary, but pushed or threw him off the car while in motion, etc., held, that the instruction could not have been understood as excluding from the jury the consideration of the testimony tending to show misconduct of the plaintiff calculated to disturb the other passengers, especially when the jury were told by other instructions that the conductor would be justified in putting plaintiff off the car for using vulgar and indecent language loud enough to disturb other passengers.

While a conductor of a street railway is justified in expelling a passenger for the use of vulgar and indecent language to the annoyance of other passengers, still the law does not justify unreasonable and excessive force, or permit the removal of such passenger from the car at a place or under circumstances dangerous to life or limb.

A street railway conductor has no right to put a passenger off his car for the use of vulgar and indecent language in a tone loud enough to attract the attention of other passengers and refusing to desist, unless such language is calculated to annoy and disturb them.

Railway companies are not conservators of the public or private morals. But they may and should adopt and enforce such reasonable rules as will protect their passengers from injury, insult, disturbance or annoyance. Their duty to prevent the use of offensive language on their cars is for the protection of their passengers and arises out of their duty to passengers.

(Sup. Ct. Ill.: *The Chicago City Ry. Co. vs. Pélletier*, 23 Chi. Leg. News 15.)

Consolidation of Street Railways.—Injunction.—Pennsylvania Constitution.

Although the term "railroad" and "railway" are generally synonymous and interchangeable, yet it is evident from the way in which these terms are used in Const. Pa. art. 17, that "railroads" is applied to steam railroads, and "railway" to street railways, and therefore section 4 thereof, which forbids the consolidation by purchase or lease of any "railroad, canal, or other transportation" companies owning, or having under their control, parallel or competing lines, does not apply to street railway companies owning, and the latter, though parallel, will not be enjoined from consolidating. Street railways, though parallel, cannot be "competing" in the sense of the mischief intended to be prevented and the prohibition does not apply to them.

(Sup. Ct. Pa.: *Appeal of Montgomery*, 8 Ry. & Corp. L. Jour. 462.)

Collision between Street Car and Railway Car.—Negligence.—Injury to Passenger.—Remote and Proximate Cause.—Damages.

A passenger on a street car having been injured by a collision with a railroad car through the concurrent negligence of the two companies, neither can recover against the other.

A railroad car had been left close to a street car track, but not so near as to interfere with passing street cars driven at the usual speed. The position of the railroad car being known to the driver of the street car, he attempted to pass it at a rapid and unusual speed. A collision resulted, and a passenger on the street car was injured. Held, that the negligence of the railroad company was only the remote cause of the accident, and it was not liable to the passenger.

The only injury received by the passenger was a cut on his lip, for treating which his physician charged \$5. He lost a part of one day, and suffered no other loss of time or money. Held, that a verdict of \$200 was excessive.

(Ct. of Appls., Tex.: *Texas & Pac. R. Co. v. Doherty*, 15 S. W. Rep. 44.

THE PROVIDENCE CONVENTION.

THE thirteenth convention of the National Electric Light Association was held in Providence, commencing Tuesday morning, February 17. The attendance was very large, and the exercises and papers read were intensely interesting. Its deliberations were governed by President Perry and the sessions were held in the large room of the fine Masonic Temple. The President, in his opening address, established a new epoch, based on Franklin's kite of 1752, and dates the great electrical discoveries which have since been made as so many years "A. F." (after Franklin). The first paper was by W. H. Markland, of the Pennsylvania Railroad Co., who fully discussed the question of lighting in railway depots, and predicted the coming of the day when all trunk lines will light their tracks between stations. For out-door lighting he much preferred the arc light on account of the constant deposit of soot and smoke by locomotives. At the second session the report of the committee on underground conduits and conductors was somewhat meagre, owing to the failure to receive replies to questions which had been sent out. E. R. Weeks, of Kansas City, followed with a report on the "Relations between Manufacturing Companies and Central Stations." A paper by F. H. Prentiss was read by Judge Armstrong in the absence of the writer, on "The Distribution of Steam from the Central Station," and included a detailed report of the New York Steam Co. In the discussion which followed, Dr. R. S. Bishop, Mr. A. L. Ide, Mr. Porter and Mr. Weeks took part.

The third session opened Wednesday morning and was set apart as Pioneer's Day. President Perry shared the honors of the platform with Prof. Elihu Thompson, Mr. Thos. D. Lockwood, Mr. J. H. Herrick and Prof. J. Elfreth Watkins, Secretary of the United States Museum. Letters of regret were read from Dr. Norvin Green, the venerable president of the Western Union Telegraph Co., Cyrus W. Field, Mr. G. D. Ward, manager of the Commercial Cable Co., Alexander Graham Bell, Gen. Francis A. Walker, president Minnesota Institute of Technology, and Benjamin F. Butterworth.

Dr. Green was to have spoken on Overland Construction, but in his absence Mr. T. D. Lockwood discussed "The Telephone."

Upon the subject of Electrical Traction, General Manager Monks, of the West End, Boston, was the first speaker, and in the course of his remarks said: The business of electric railroading is yet in its infancy. The first electric car was started in Boston on Jan. 1, 1889, at first with the Sprague system and later on with the Thomson-Houston. There has been a continued and renewed expression of confidence on the part of the people in the use of electrically propelled street cars. At present we have sixty miles operated by electricity, on which are run three hundred cars, making a daily mileage of eighteen thousand miles, and carrying on an average of 125,000 passengers a day. This entirely by electricity. During the week in which the Grand Army was in session in Boston

we carried on the electric lines one million passengers, without the loss of a single trip or the inconvenience of any delays. What was formerly called "the experiment" has passed to a stage where the people not only consent, but insist upon it. In fact, the demand comes from so many quarters we find it impossible to meet them all at once.

I am of the opinion that the motor of the electric system of the future will be placed elsewhere than under the car, for I do not believe in that location the motor can have the life and durability which the extremely hard and constant wear of street railway work requires.

Prof. Watkins read a paper entitled "The place of Electrical Industries in History," which was replete with interesting data in condensed form.

A resolution was adopted recommending the proposed action of Congress to recompense the friends of Joseph Henry for the discoveries made by him.

The "Organization of the National Electric Light Association" was assigned to C. W. Price, who presented the subject in an attractive manner, and was followed by J. H. Herrick, of the Edison General Electric Company, and E. Wilbur Rice, of the Thompson-Houston Company.

Mr. G. M. Phelps introduced a resolution conveying the sympathy of the Association to Mr. Geo. Worthington, who through serious illness was unable to be present. Mr. Frank Sprague, whose name is so familiar to street railway men, was called for and following the line of reminiscences as the subject had been presented he cited some in his own experience. In 1878 and 1889 while in Japan and Asia in the service of the United States Navy, he was even then working on an electric motor. A little later he was fortunately ordered home, and visiting the works of Wallace & Sons in Ansonia, Conn., saw there a crude attempt at transmission of electrical power. In 1880 Mr. Sprague set up a machine and made his first actual experiments in building a dynamo. He also gave a racy account of his labors at Richmond, Va., whose electric railway being one of the first, necessarily had many very trying experimental experiences, in the working out of which the cause and the company suffered to a considerable extent. But that has always been the history of inventions. On the occasion of their first trip up a ten per cent. grade, with motors altogether too light for such work, and with which it would not be attempted in these days: the motor became overheated, and of the incident Mr. Sprague humorously says: "As we approached the grade I said to the superintendent, 'We cannot mount it.'" "Well," he said, "it will go up, and I will bet you \$5 I will take you up." We started and we mounted the hill. When we had got to the top it had settled the question of traction on a ten per cent. grade: it had also settled the fact that the motors we had were altogether too small and too light, because they were hotter than perhaps the furnace in an electric welding apparatus. Getting to the top, we thought the best thing we could do was to stand still a little while,

One of my assistants, Mr. Green, was with me. I said to him. "Green, I think we had better send for some instruments; I think a little accident has happened to one of the machines." So we laid down in the bottom of the car until he got those instruments, which were four strong mules, for it was necessary to get that car back into the car-shed that night."

The fourth session was held Wednesday afternoon and was marked by a paper on "The Electric Arc and its uses in Lighting" by Prof. Elihu Thomson, and illustrated by numerous diagrams. Dr. Lewis Bell reported for committee on "Proper Classification of the Lighting Power of Incandescent Lamps."

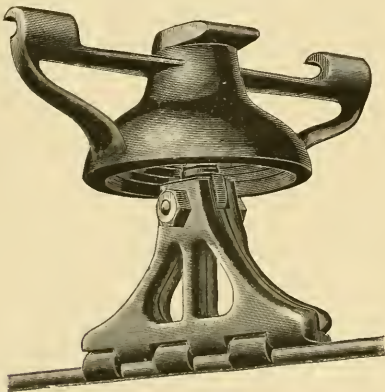
Thursday morning the fifth session listened to a paper by Caryl D. Haskins, entitled "The Terranti System, which was followed by Distribution and care of Alternating Currents," by T. Carpenter Smith. The next paper was "Mutual Insurance of Accounts," by Frederick A. C. Perrine, and the report of the committee on data.

Election of officers resulted in C. R. Huntley, Buffalo, President; J. I. Ayer, St. Louis, First Vice-president.

Montreal was designated as the place of the next meeting, date to be hereafter named by Executive Committee.

Latest Trolley Hanger.

THE Electrical Supply Co., of Chicago, have just brought out a new hanger from which to suspend trolley wires. The hanger is composed of two jaws which are held in place by a clamp bolt and securely grasps the wire. This form of hanger is very easy to apply, its hold upon the wire is positive, and admits of easy removal when desired. As seen in the cut, the wire is not entirely covered, its under surface being exposed



and admitting of perfect contact with the trolley wheel. The insulating material is of hard rubber, and the whole is covered by a metal canopy. The hanger is very simple in construction, is made of the best materials, and is very strong, and it is impossible for the wire to become released from the clamp. The attachment of the span wire to the hanger is a form generally adopted, and one which experience has proved to be very satisfactory. The hanger is so arranged as to fully clear the trolley wheel in passing and is very durable.

A PROMINENT EUROPEAN MANAGER.

THE subject of this sketch, Mr. Wm. Anderson, is a native of Dublin. At the age of thirteen he entered as a junior office assistant in an omnibus establishment which was being run by a relative of his, a Mr. Anderson.

A few months later the concern was purchased by a Mr. Wilson, one of the well-known London omnibus proprietors, to whom "Wm. Anderson" was transferred, and is indebted for the early business training which extended over many years, and fitted him for the important positions he afterwards filled.

After the introduction of tramways, in 1872, the omnibus system ceased to exist. It was bought by the Dublin Tramways Co., who retained Wm. Anderson's services and appointed him Manager in 1873, a position he filled until 1881, when an amalgamation of the then existing tramways took place and the present Dublin United Tramways Co. was established with a capital of £600,000 and Wm. Anderson as Secretary and Manager.

The manner in which he discharged his duties is best described in the resolutions passed by the Directors prior to their joining the Board of the new company:

"Resolved, That Wm. Anderson, having been appointed Secretary and Manager of the Dublin United Tramways Company, the Directors hereof desire to place on record their high appreciation of his services since the formation of the Company in 1872. To his upright conduct and able management they attribute much of the success which the Company has attained, while his courteous demeanor made it a pleasure to be associated with him in conducting its affairs."

Since 1881 Wm. Anderson has managed the Dublin United Tramways Co. with much credit, and how he has helped to bring it to its present useful position is shown in the chairman's acknowledgment of his services at the recent stockholders' meeting, and which was so cordially endorsed by the proprietors. In pursuance of tramway knowledge, and in the belief that there is always something to be learned, he takes advantage of his annual holiday to visit tramway centres.

In this way he has been to the chief tramways in Great Britain and to many on the continent, to keep himself in touch with what is going on all around.

In furtherance of this object we would be glad if Mr. Anderson came westward and took a holiday run across the Atlantic to the States, where, with a couple of weeks at his disposal he would see much to interest and to invite his thoughtful investigation in electrical and cable railways, while in the way of horse traction he would find the managers of such roads here would gratefully listen to his views, the careful result of a long service as manager of one of the largest, and certainly one of the best conducted, horse car systems in the world.

THE receipts of the St. Paul Street Railway Co. for 1890 were \$590,802.57, which will be very largely increased the present year as the company is operating entirely without the use of horses.



W.M. ANDERSON,

Secretary and General Manager

UNITED TRAMWAYS COMPANY, DUBLIN.

THE CENTENNIAL OF THE AMERICAN PATENT SYSTEM.

THE following call has been issued to the inventors and manufacturers of America, to join in a proper celebration of the completion of the first century of our patent system, and to further commemorate the event by the formation of a national association of inventors:

To the Inventors and Manufacturers of America:

“The completion of the first century of the American Patent System marks so important an epoch in the history of the nation, that it is eminently proper that the beginning of the second shall not pass unnoticed.

The centennial anniversaries of other important national events have been celebrated in a manner worthy of a people proud of their country and its growth. Surely the system that has aided the agriculturist in the field, the mechanic in the shop, and the toiler in the mine: that has stimulated invention and helped every branch of modern industry has played no small part in a history so full of the triumphs of human achievement.

Believing that the American inventor and manufacturer of inventions will regard it a privilege as well as a duty to co-operate in making due recognition of these facts, it is proposed to hold a celebration at the National Capital, in April, 1891, which shall, in a fitting manner, commemorate the important event, and place on record the Nation's appreciation of the labors of those whose ingenuity, patience and tireless efforts have exercised such a potent influence in accelerating the prosperous growth of the nation, and in aiding the progress of our civilization.

The necessity for a national association of inventors, organized for mutual benefit, has been frequently discussed in the technical and other journals. No time could be more opportune for the formation of such an association than when men from every part of the country meet to celebrate so important an anniversary. Surely the occasion is most inspiring.”

This announcement by the secretary, Mr. J. Elfreth Watkins, of the central committee, is a clear index of what is to be expected on this occasion.

The central committee is composed of Messrs. John W. Babson, Robt. W. Fenwick, B. H. Warner, Prof. Otis T. Mason, M. M. Parker, Hon. John Lynch, M. C. Stone and J. Elfreth Watkins, of Washington, and has the earnest co-operation of Senators Platt and Teller, Representative Butterworth and other members of the congressional patent committee, and Hon. C. E. Mitchell, Commissioner of Patents, Dr. G. Brown Goode, Curator at the National Museum, Hon. A. R. Spofford, Congressional Librarian, and many other officials of the governmental departments.

Commodious rooms for the meetings of the various committees, with telephone service, have been provided, and clerks are busily engaged sending out communications to inventors, manufacturers and members of congress, with a view of obtaining information as to the most suitable men to be appointed from the different States of the Union as delegates or representatives to the Centennial celebration.

The responses are indicative of great interest being manifested by leading inventors of the country, as well as manufacturers of patented articles. Among the many letters of approval received by the committee is one from Mr. Thomas A. Edison, the great electrical inventor, saying: “I am in hearty sympathy with the movement.” Prof. Alex. Graham Bell, inventor and patentee of the telephone, has signified his willingness to preside at one of the meetings of the centennial celebration. The President of the United States will preside at the opening exercises; Hon. John W. Noble, Secretary of the Interior; Hon. Frederick Fraley, LL. D., and Prof. S. P. Langley, LL. D., will also preside at different meetings.

The committee on literature, consisting of Dr. G. Brown Goode, chairman, Hon. A. R. Spofford, and L. Deane, Esq., have arranged the following order of exercises, which would be very difficult to excel, and which will prove one of the greatest literary treats of the nineteenth century.

FIRST PUBLIC MEETING, AFTERNOON, APRIL 8TH, 1891,
To be presided over by the President of the United States.

SECOND PUBLIC MEETING, APRIL 8, 7 TO 8:30 P. M.
To be presided over by the Hon. J. W. Noble, Secretary of the Interior.

SPECIAL RECEPTION TO INVENTORS AND MANUFACTURERS, and the ladies who accompany them, at the patent office, April 8th, 9 TO 11:30 P. M., by the Honorable John W. Noble, Secretary of the Interior, and the Hon. C. E. Mitchell, Commissioner of Patents.

THIRD PUBLIC MEETING, AFTERNOON APRIL 9, 1891.
To be presided over by the Hon. Frederic Fraley, LL. D., president of the National Board of Trade and the American Philosophical Society, and charter member of the Franklin Institute.

FOURTH PUBLIC MEETING, EVENING APRIL 9TH, 1891,
To be presided over by Prof. S. B. Langley, LL. D., secretary of the Smithsonian Institution.

ANNIVERSARY DAY, APRIL 10, 1891.
Anniversary of the signing of the first American Patent Law—“An act to Promote the Progress of the Useful Arts”—by George Washington.

Excursion to Mt. Vernon, at 10 A. M., where an address will be delivered by J. M. Toner, M. D., of Washington, upon “Washington as an Inventor and Promoter of Improvements.”

FIFTH PUBLIC MEETING, APRIL 10, 1891,
To be presided over by Prof. A. Graham Bell.
Addresses upon the following subjects are promised at the public meetings.

Edward Atkinson, Ph. D., LL. D., of Mass.—Invention in its Effects upon Household Economy.

Dr. John S. Billings, Curator U. S. Army Medical Museum.—American Inventions and Discoveries in Medical Surgery and Practical Sanitation.

Hon. Samuel Blatchford, Justice of the Supreme Court of the United States.—A Century of Patent Law.

Cyrus F. Brackett, M. D., LL. D., of New Jersey, Henry Professor of Physics, College of New Jersey, Princeton—The Effect of Invention Upon the Progress of Electrical Science.

Hon. Benj. Butterworth, Ohio, U. S. House of Representatives.—The Effect of Our Patent System on the material Development of the United States.

Octave Chanute, of Illinois, President of the American Society of Civil Engineers.—The Effect of Inventions upon the Railroad and other means of inter-communication.

Prof F. W. Clarke, S. B., of Ohio, Chief Chemist, Geological Survey, —The Relation of Abstract Scientific Research to Practical Invention, with special reference to chemistry and physics.

Hon. John W. Daniel, of Virginia, U. S. Senator.—The New South as an Outgrowth of Invention and the American Patent Law.

Maj. C. E. Dutton, Ordnance Dept. U. S. A.—The Influence of Invention upon the Implements and Munitions of Modern Warfare.

Thomas Gray, C. E. B., Sec. F. R. S. E., of Indiana, Professor of Dynamic Engineering, Rose Polytechnic Institution, Terre Haute.—The Inventors of the Telegraph and Telephone.

Prof. Otis T. Mason, Ph. D., of Virginia, Curator U. S. National Museum.—The Birth of Invention.

Hon. C. E. Mitchell, of Connecticut, Commissioner of Patents.—The Birth and Growth of the American Patent System.

Hon. O. H. Platt, of Connecticut, U. S. Senator—Invention and Advancement.

Col. F. A. Seely, of Pennsylvania, Principal Examiner U. S. Patent Office.—International Protection of Industrial Property.

Hon. A. R. Spofford, LL. D., Librarian U. S. Congress.—The Copyright System of the United States; its Origin and Growth.

Hon. Robert S. Taylor, of Indiana.—The Epoch Making Inventions of America.

Robt. H. Thurston, A. M. LL. D., Doc. Eng., of New York, Director and Professor of Mechanical Engineering, Sibley College, Cornell University—The Inventors of the Steam Engine.

W. P. Trowbridge, Ph. D., LL. D., of New York, Professor of Engineering, School of Mines, Columbia College.—The Effect of Technological Schools Upon the Progress of Inventions.

Hon. Edwin Willits, of Michigan, Assistant Secretary of Agriculture. —The Relation of Invention to Agriculture.

Hon. Carroll D. Wright, M. A., of Washington, Commissioner of Labor.—The Relation of Invention to Labor.

Committees on reception, public comfort, transportation and finances have been appointed and are actively engaged making reasonable terms with the hotels, private boarding houses and railroad companies, and arranging for a right royal reception to visitors, and in obtaining contributions from the citizens of Washington and the country at large to defray the expenses attending the renting of committee rooms, public halls and the printing and circulation of information throughout the United States, but more especially are these funds solicited for the publication of two or more handsomely printed volumes of 500 pages each, which shall contain the addresses delivered by the eminent statesmen, political economists and scientists, together with biographies of the greatest American inventors and manufacturers of their inventions. The treasurer of the finance committee is the Hon. A. T. Britton, president of the American Security and Trust Co. Chairman of the reception committee is W. Cranch McIntyre, Esq.; chairman committee on public comfort, W. C. Dodge, Esq., with sub-committees: on hotels, J. H. Whitaker, Esq., chairman; and on private boarding houses, E. T. Fenwick, Esq., chairman.

We are indebted to Mr. Edward T. Fenwick, Patent Attorney, of Washington, for the list of speakers and subjects.

PERSONALS.

J. E. GOODWIN has assumed management of the Moscow, Texas, Street Railway.

J. B. Low, President of the Low Adjustable Car Co., was in the city for a few days.

A. W. WRIGHT has returned from his California wedding trip, and will remain in Chicago for the present.

JACOB WAHL, of Louisville, will be succeeded by John Deloury as Superintendent of the Rochester Ry Co.

GEORGE P. LEVY, President of the Weatherford, Texas Lines, has sailed for Paris, and will be absent sixty days.

JOHN REYNOLDS, who is as well and favorably known as his excellent paper, *The National Car and Locomotive Builder*, favored us with a pleasant call a few days ago.

LEVI D. NELSON, Superintendent of the Fulton County Electric Street Railroad Co., has resigned, and on the first of March went into business for himself. Mr. Nelson has made a good record as railroad manager.

JAMES CHRISTY, who assisted in the construction of the electric road last summer, which the Cleveland Construction Co. put in at Newark, Ohio, was recently married at the latter city to Miss Effie Tresize, of that place.

H. A. EVERETT, Secretary of East Cleveland Ry., accompanied by his electrical engineer, C. W. Watson, called last week for the purpose of securing a picture of the editor, we presume, as he carried a big Kodak in one hand.

S. H. SHAW, Superintendent of the Parkersburg, W. Va., Street Railway called last week. He was chief engineer under Genl. Sheridan on the Upper Potomac, and also on Genl. Crook's staff for a long time. Mr. Shaw conducted a government survey across Nebraska in 1857.

LOUIS WAFIELD, recently connected with the mechanical department of the Pennsylvania R. R. Co., has accepted the position of General Manager and Treasurer of the Detroit Electrical Works. In Mr. Wafield they secure the services of one of the brightest engineers to be found in the country, and a gentleman accustomed to managing large interests.

JOHN C. N. GILBERT, the enterprising Secretary of the Richard Vose Car Spring Co., was in Chicago a few days ago in the interests of his well known springs and his Swinging Hose Rack, of which more than 8,000 are already in use. While here he was the guest of the Chicago agent, Wm. P. Williams, and made his headquarters at the Union League Club.

A NEW CABLE ROAD.

THE Atlanta Suspended Cable Railway Co. is the name of a company recently organized in Atlanta, Ga., with a paid up capital of \$300,000. for the purpose of building in that city and elsewhere suspended cable railways. Col. Samuel Goode, a wealthy gentleman of Atlanta, who is at the head of the new company. The inventor is Mr. Alexander P. Nelms, who is also the inventor of a number of railway appliances. An experimental track has been erected, which operates very satisfactorily. The plan is adapted not only to passenger traffic through the streets of cities and towns, but can be utilized in the transportation of freight as well. An ordinance has been granted and construction already begun in the suburbs of Atlanta for lines, one of which will be used in transporting brick and the other stone from a large quarry. One line is a mile and one-half and the other about two miles long. Mr. T. H. McDowell, of New York, when in Atlanta recently, spent a day in examining the plans and models, and not only pronounced the scheme practicable, but in his opinion the coming method of street car transit. The idea is by no means new, although the application of the overhead cable traction system to passenger traffic is.

The track upon which the wheels of the car run is a one and one-half inch stationary cable rope suspended from brackets or arms fastened to posts placed along or near the curb line, and at intervals of not less than sixty feet. Cars are suspended from this cable by two wheels, from which depend strong iron bands that encircle the body of the car. The cars are from six to eighteen inches above the ground, except at railway crossings, where the main cable is necessarily placed at a greater elevation to allow the steam cars to pass below. Above the main or track cable are two smaller wire ropes, moving in opposite directions and forming an endless cable propelled by drums and a stationary engine, in the same way that the conduit cable roads are operated. This is for single track. Where double track is required, there is only the main suspending cable from which the car hangs and the traction cable from which it gets its motive power, being grasped by a grip on precisely the same principle as the cable roads now in use.

Should it be desired to operate the cars along the center of the streets, the permanent or track cable may be suspended by posts or from cross cables stretched from posts on each side of the street, in the same manner that trolley wires are suspended by their cross wires.

To start the cars, the grip, which is specially designed for this purpose, is easily closed by a gentle movement of the lever, and its speed may be that of the traction cable or as much less as desired, in proportion to the force with which the grip clutches the rope. Curves and grades are easily traveled.

If desired to operate by electricity instead of by cable power, the trolley wire can be suspended in place of the traction rope, the main suspending cable or track remaining the same.

The advantages of this system are claimed to be economy of operation and the absence of expense that attends the maintenance of surface tracks.

The company have petitioned the City Council of Atlanta for extensive franchises, and great interest is being manifested in the enterprise by the people of that city. They are also contemplating a number of lines in adjoining places.

Mr. Goode states that Mr. McDowell's firm is willing to guarantee the success of the system, the development of which will be watched with interest.

A SEMI-CENTENNIAL.

JOHN HARRIS, Superintendent of the Cincinnati Street Railway was surprised on the occasion of his fiftieth birthday by a large company of neighbors, relatives and friends, who came in a body and quickly loaded a good sized table with their gifts. Before he could greet the first, a second party, consisting of the officers and office force of the company arrived. At the same instant the Glee Club, twenty strong, came around the corner. The finish of their serenade was the signal for the appearance of over two hundred conductors and drivers. The men brought with them a magnificent reclining chair, which somehow they forgot to take away with them when the festivities were over. Mr. Harris made a pleasant speech to his men, who responded with three cheers. But he was booked for still another speech, for the President of the Railway Men's Association thereupon produced a beautiful 32d degree masonic jewel set in diamonds, as a kindly reminder of friends in the Association.

Mr. Harris entered the employ of the Cincinnati Street Railway in March, 1866, and, as an instance of his grit, was married when on a salary of \$5.00 a week, although he did not have to work at that figure very long, for he was steadily promoted until he became the well known superintendent.

We hope Mr. Harris will live to enjoy a second semi-centennial characterized by the same success and popularity which so happily marked the first, which his railway friends would have supposed was still a good way off.

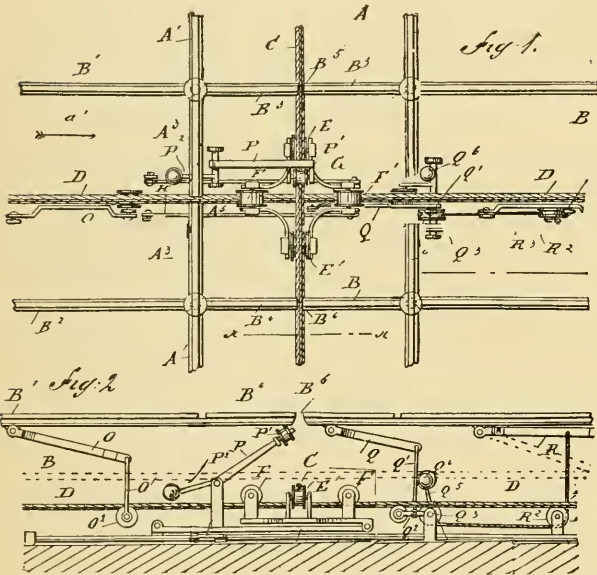
GOOD CAR MAT.

THE Brownell Car Co. make a car mat whose self-cleaning qualities are a sufficient guarantee of desirability. When in a neighboring town recently where the entire line had recently been equipped with these wooden carpets, in response to the question as to how he liked them the conductor replied: "Say, these mats are dandies. All you have to do is to raise them up, and give them a shake, and the dirt falls out of them, and then put them back and they are clean. Why, I have not had to sweep out my car yet." As the car had been on the road some time, probably three weeks, it gave every evidence that the party told the truth, and while it did not speak very well for the conductor certainly was a good send off for the mat.

CONSTRUCTION AND EQUIPMENT NOTES.

New Cable Crossing.

A NEW cable crossing has been patented by Dr. Jas. P. Orr, 638 Fifth Ave., Pittsburg, which is intended to reduce to a minimum the wear on ropes at such points. By the use of this device the cables are made to suffer only a slight deflection from natural lines, except at the moment when a grip is passing over the intersection, which it does by momentum after throwing out the cable from the grip jaws.

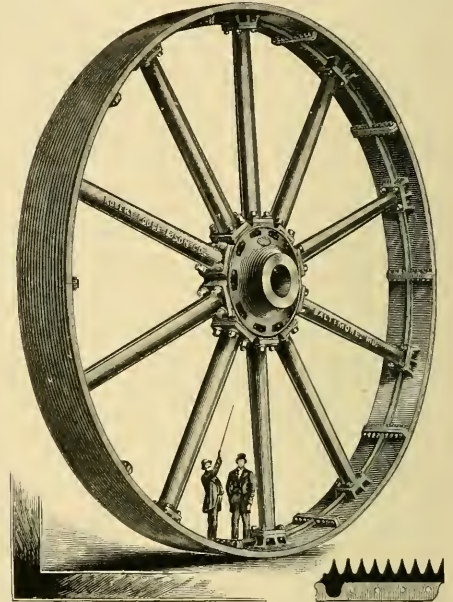


Having passed the crossing, the grip strikes a lever by which the cable is lifted to a point directly opposite the open grip-jaws, and a slight curve in the track and slot rail brings the grip where the cable can be grasped. The cables then resume their normal position. One of the greatest disadvantages at cable crossings has been the extreme wear on the ropes at such points by reason of the sharp depression which bends the wire in one direction, only to be followed a few feet distant by another equal but reverse bend, as it presses over the rising pulley. The inventor claims to overcome this unusual wear by his device, which is here illustrated.

T. P. BAILEY, the large sighted manager of the railway department of the Thomson-Houston Electric Co., has an office desk, built to order from his own design that for spacious compartments and elegance in material makes it a no small wonder. A few days ago a wealthy gentleman from Portland visited him and returning home wired—"I must have a desk like yours. Please have it built and forwarded as soon as possible." Friend Bailey better get a patent at once.

Rope Driving Wheel.

THE accompanying illustration gives a very good idea of the immense driving wheels which are made by Robt. Poole & Sons Co., of Baltimore. Four of these wheels were furnished for the new cable plant in Baltimore, and not only serve for the transmission of power by sixteen 2-inch ropes, but act as balance



wheels also. They are 25 feet in diameter and weigh 65,000 lbs. Two of these wheels are in service in the Los Angeles Cable Railway, and also one in a cable road at Providence. They are absolutely noiseless in operation, and will transmit any desired power.

A CLARKSVILLE, Tenn., paper called the *Tobacco Leaf*, branches out of its proper vocation long enough to remark: "The street car company produces nothing and lives off the people." It may not produce many free rides for the editor who was the author of the sentiment, but it produces more for five cents than any other institution, and as for living off the people its a little difficult to name the business that does not, certainly the aforesaid editor tries to.

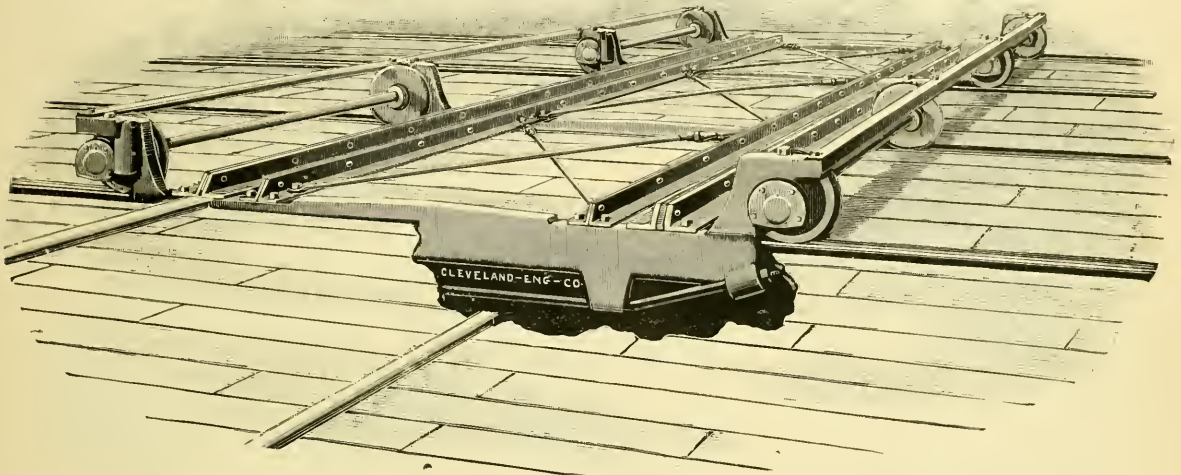
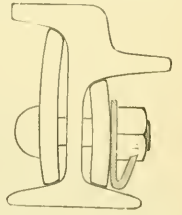
As a sample of the ridiculously large amounts sued for by people who claim to have been injured on street cars, is the recent case against the Second Avenue Street Railway Co., of New York city. The plaintiff, a woman, claimed \$50,000 damages by being knocked down by one of the company's horses attached to a car, while she was crossing the street. Her own witnesses admitted that the accident was almost wholly due to her own stupidity and the jury awarded her \$900.

The Hathaway Patent Transfer Table.

THIS table is in use all over the United States and Canada, and with the late improvements is quite a necessary thing for a modern car house. It is made wholly of iron and steel, and the Hathaway Improved Anti-Friction Gear will enable a man to transfer the heaviest cars. This table is equipped with 2½ inch steel axles, 12 inch chilled wheels, and its construction is so simple that the manufacturer guarantees it for four years.

The double tables are made 20, 24, 25 and 26 feet long, and the 25 foot table, which is used by most of the

satisfaction on electric and cable roads, and is most highly endorsed by their engineers. Its advantage is the broad washer back of the nut, and being made of one piece of metal, makes a washer and lock combined. It is a positive lock for the nut in any position. With the use of heavy cars and higher speed, which has followed the adoption of cable and electric power, street railway managers have been forced to meet a strain which was not so noticeable on horse lines, and the positive nut lock has

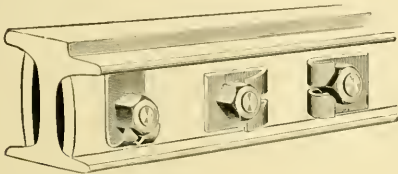


HATHAWAY STANDARD TRANSFER TABLE.

roads, is called the Standard. During the past year roads were equipped in the following places: Boston, Philadelphia, Baltimore, Pittsburgh, Toledo, Chicago and Denver. Several steam railroads have these tables in use, and they are also used by quite a few ore docks, and all are giving the best of satisfaction.

Jones' Positive Nut Locks.

THE extensive works of this successful company are now being removed from Syracuse to Chicago, where the manufacturing facilities will be very greatly extended to meet the demand already large and



rapidly increasing. The general offices are in commodious quarters in the Grand Pacific Hotel, Chicago.

This nut lock, which has stood the most severe tests on nearly every railroad in the country, is giving equal

now become a positive necessity. A spur lock is also made for the special use of car builders, and other varieties for every possible service where bolts are used. Thos. D. Jones is President and General Manager of the company.

San Jose Electric.

JACOB RICH, of San Jose, Cal., thinks his name expresses his feelings, as the owner of a whole electric railway which was opened for travel February 24th, and is one of the best in the far West. The Thomson-Houston system was adopted, and on the trial trip everything was found to be in perfect working order. The opening ceremonies were attended by the mayor, city council and invited guests.

The foundry and machine department of the Harrisburg car works has been purchased by capitalists of that city, and the works will resume operation shortly.

DURING the sixty years in which horse cars have been in operation in this country the capital invested amounted to \$58,000,000. The electric system has been in operation but five years and \$50,000,000 are already invested in electric railways.

The Westinghouse Slow Speed Motor.

THE Westinghouse Company has recently brought out a new four pole, slow speed railway motor which will be of interest to our readers. In form cylindrical it gives the shortest possible magnetic current,

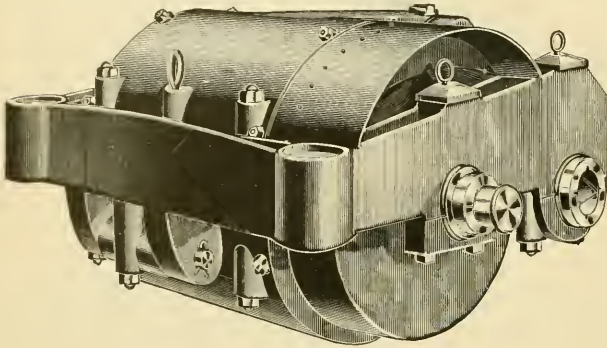


FIG. 1.

and achieves the greatest possible strength with a comparatively small expenditure of metal. The width of the motor is such that it can be used on a gauge of only 3 feet 6 inches. This motor is so designed that it can be completely shut in without heating, thus most effectually boxing and protecting it against rain and snow, or water dripping from the car floor. Fig. 1 shows the motor thus encased. The cast iron frame which carries the motor is not unlike that already adopted by this

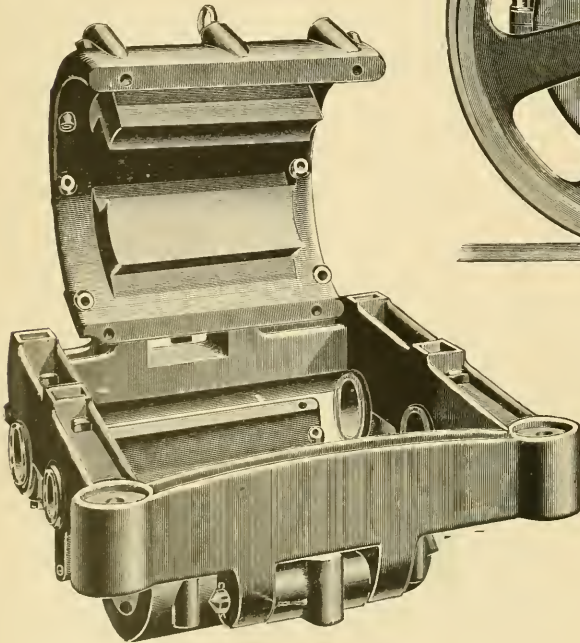


FIG. 3.

company, and is shown in Fig. 3. The frame is made in one piece; the holes are bushed and maintain the axle

and armature in perfect alignment. The gearing is closely mounted to the frame, thus preventing buckling. It is boxed as shown in fig. 6.

Easy access to the fields and armature is attained by the method of hinging the field castings as shown in fig. 3. From the interior of the cylindrical shell the poles protrude radially and over them are slipped the field coils protected and held in position by a brass cap. Any field may easily be removed without disturbing the others. The armature is of the drum type, specially adapted to railway work. The armature coil is of laminated grooved iron plates, with slots to receive the wires. In the finished armature the wires are completely imbedded in iron, and thus effectually protected against accident.

The armature shaft is tapered at the end to receive the pinion, the holes of which are also tapered to fit the shaft perfectly. This permits of ready removal.

The oil cups are protected by being sunk in the frame. The brush holder, Fig. 5, consists of a square oak holder attached to the side of the frame and carrying the brush

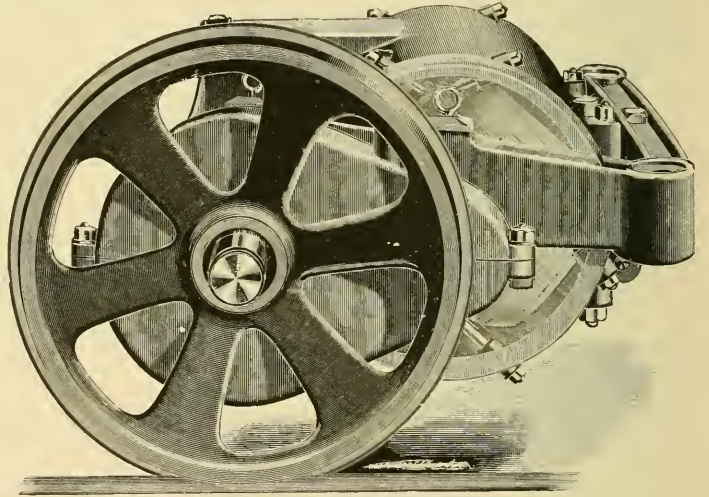


FIG. 2.

holders proper, which are clamped so as to allow ready adjustment. The carbon brushes are placed in a sliding frame and held against the commutator by two springs, easily released by a simple pressure of the finger when making renewals of carbons.

The special mechanical points in this motor and which commend it are its simplicity as to parts which are practically but two—the frame and the cylinder; its strength, every part being designed for a maximum strain, and so put together as to insure greatest possible durability; its high efficiency coupled with low speed; the absence of external magnetism; the thorough protection of all working parts; and the hinged cylinder giving easy access to all parts, especially the free removal of the armature.

The advantages of a slow speed motor drive, over high speed are evident to all. The periphery of the

armature in this motor moves at a speed of but one-fourth faster than the car wheel, and with but the one opinion is a very direct application of the power. The

The question of allowing street cars to run on Sunday, in the city of Toronto, Canada, has just been up for consideration again before their council, which has decided against it on the ground of morality. The "Toronto World" shows that Toronto, which has no Sunday cars, has a higher percentage of criminal convictions than five other Canadian cities in which there are Sunday cars. All of which goes to prove, what we shall always maintain, that street cars are a great factor for good, for most ministers would have very few sinners to preach to without them.

That the street railways are alive to the wants of the community, and this too without any commissioner to whip them into line, is nicely illustrated in what is said of the Boston West End road by the *Herald* of that city: "In all that relates to speed, comfort and efficiency the street car system of Boston has been improved to a far greater extent than the urban and suburban steam railway systems. Hardly a week passes, but that in answer to public demand, something is done to increase the facilities for transportation offered by the street car

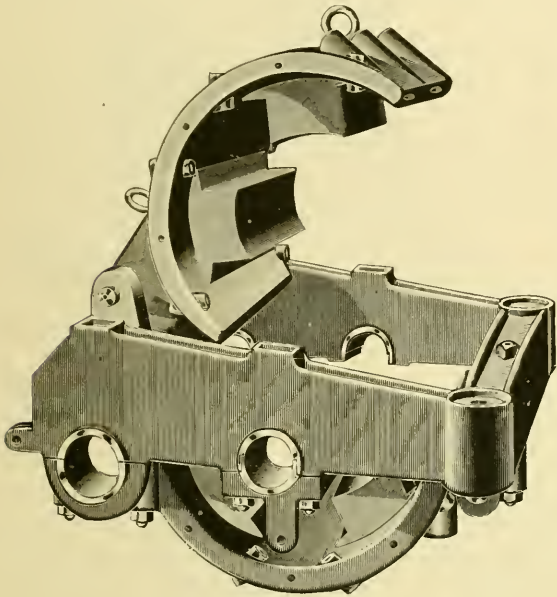


FIG. 4.

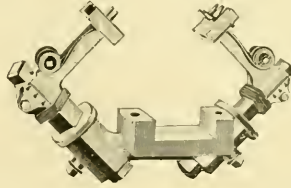


FIG. 5.

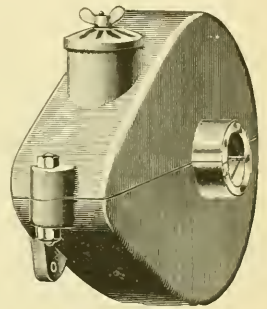


FIG. 6.

electrical efficiency is said to be 95 per cent and the commercial efficiency 75 per cent.

The workmanship throughout is careful and painstaking, and the relative materials selected with a view to best possible results.

The wire used on the armature is large, which reduces the number of turns, and therefore lessens the demagnetizing effect on the field. This operates also to prevent sparking at the brushes and controlling switch. The large wire likewise has less resistance and greater capacity and efficiency. Another most desirable advantage is the ability to remove the armature, which is always attended with more or less difficulty at the best, on account of the weight. The decreased wear on working parts is much less, as a high speed motion under the most favorable conditions of in-door service is admitted to be considerable, and is largely increased when subjected to the hardships attendant on exposed work in daily car service. The boxing of the gears, as shown in Fig. 6, effectually suppresses the noise.

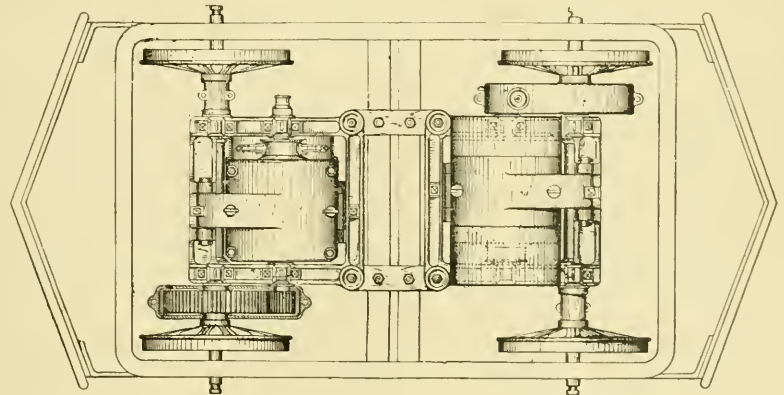
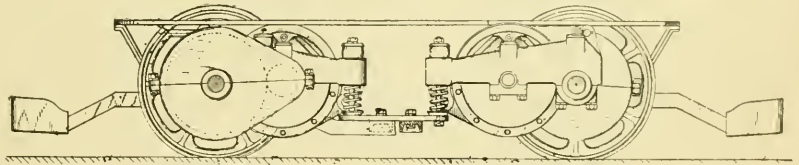


FIG. 7.

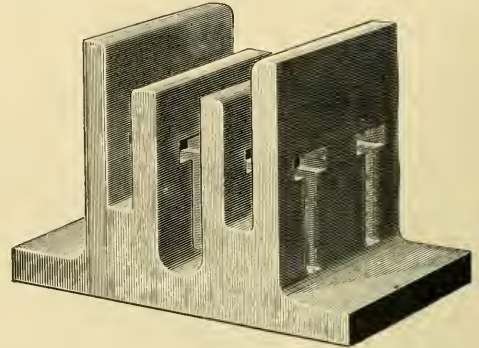
company; but the steam railway services to the suburbs are little, if any, better now than they were several years ago."

Gibbon Duplex Street Railway Tracks.

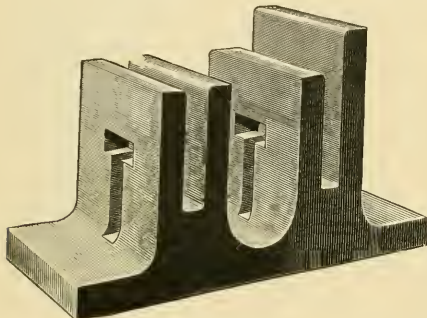
THE Gibbon Duplex Street Railway Track Co. have now completed arrangements with rolling mills in the East, West, South and on the Pacific Coast, which enables them to fill orders from the mill nearest the shipping point, with great saving in freight and without the delay incident to a long haul.

The Gibbon rail is not only a girder rail; it is two of them, rolled in sections, which combine to form a lap joint and resting on metal chairs. The two sections, the head and flange rail, are laid so as to break joints, in what is in use one rail. The system of laying as shown in the cut readily admits of perfect gauge; track is easily and cheaply laid, and a spring key not only makes the connection of the rails easy, but permits of expansion and contraction. It is especially well adapted for electrical lines on account of its perfect and continuous contact throughout, thus rendering the wire connection at joints unnecessary.

placed at intervals of fifteen feet, and intermediate chairs with tie-rods every five feet. Tie-rods are of steel, two inches wide by one-half inch thick. The wedge has



JOINT CHAIR.



SINGLE CHAIR.

The chairs constitute an important feature of this construction, and are of two forms. The joint chair is placed at each semi-joint of the rails.

The vertical slots in the chairs receive the web of the "head" and "flange" sections of the rails, and the tie bars and wedges pass through the T slots. The chairs have broad bases, square, oblong or saucer shaped, as desired. They admit of easy renewal should occasion require, and having served their term of usefulness, unlike wooden ties, still have a market value as scrap, quite an item.

barpoon points, and while binding the rail vertically permits free expansion.

This system is wholly of metal and follows the plan so generally adopted in England of discarding all wood in track construction. It likewise does away with spikes, bolts and nuts, and substitutes therefor the wedge key. Advantages claimed for this rail are

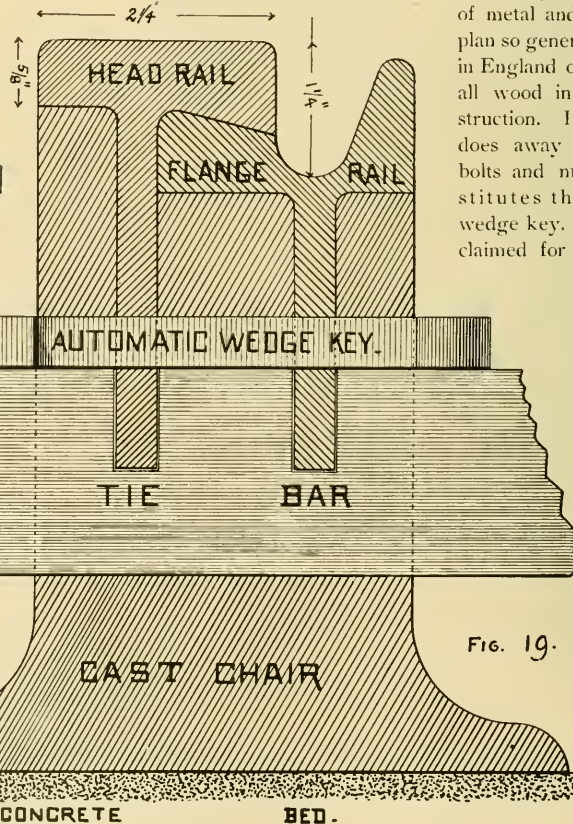


FIG. 19.

GIBBON DUPLEX TRACK.

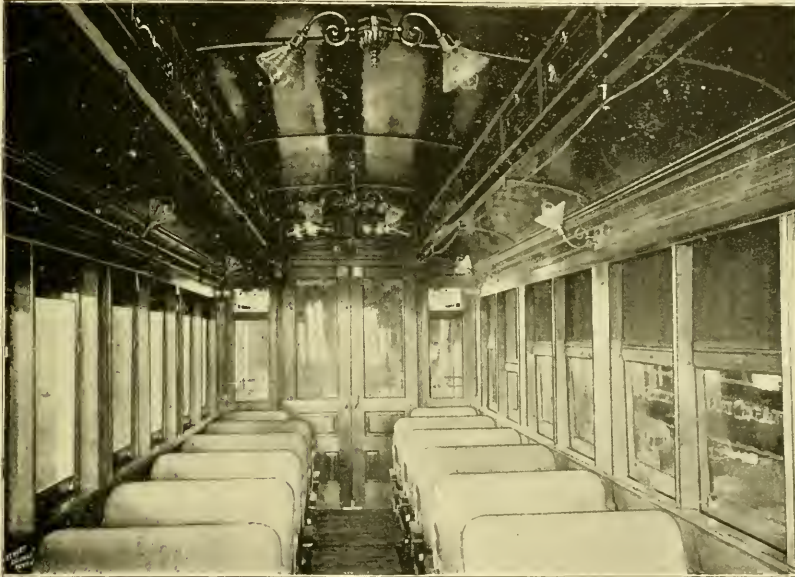
In track laying, only longitudinal trenches are necessary, except where lateral trenches are required for tie bars; and these are not large. Where the track is to be laid in a street already paved this is a great consideration. A pair of joint chairs connected by a tie-rod are

its increased vertical and lateral strength with no increase in metal; increased wearing capacity of head rail; in renewals discarding only the worn porportion; simplicity of construction, with least possible disturbance of the street, and all at a reasonable cost.

A HANDSOME CAR SEAT.

IN the early days of street railroading the passengers occupied a seat upholstered only with the soft side of some wooden slats: a little later some would-be aristocratic managers covered these seats with odd pieces of cheap carpet bought at job lot sales, and for a long time this was considered good enough. But to-day a car so furnished would be as incomplete as one without lamps, and the universal tendency is to surround the service with all possible conveniences. Perhaps no one feature more tends to the popularity of a line than that of attractive and comfortable seats, and to this end the Hale & Kilburn people have spared no expense to offer managers a line which in variety and appearance are all that any can desire.

The illustration is an interior of one of a large order of new electric cars which the Northern Car Co. of Min-

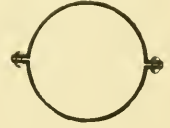


neapolis have just shipped to Tacoma. The interior finish is elaborate and really elegant, to which effect the seating equipment lends its full share. The center aisle with the reversible seats unite to make the car airy and spacious. These seats are made in special styles for electric and cable cars, though the Hale & Kilburn people make and carry a line of every possible desired style for any service.

In the seat here illustrated the back is 20 inches wide and the cushion 13½ inches. The distance from center to center of any two seats is 30 inches, and from floor to top of back 34 inches. Passengers can all face forward, or parties of four or less can directly face each other as desired. Seats may be made of rattan or upholstered in plush of any color and any quality, of which they carry a great variety.

THE LATEST POLE.

IF one of each of the poles that have been devised for carrying electric wires for railway and lighting purposes were spaced out, they would be found sufficient to equip a goodly sized road. Each have merits which the latest aims to improve upon. A new iron pole for railway work, and one which will strongly commend itself for strength, appearance, and simplicity, is now offered by Julius Lefman, Fagin Building, St. Louis. A cross section of the pole shown herewith will explain fully its construction, which could scarcely be more simple, and utilizes the cylindrical shape so potent for strength, with the use of the least possible material. Specially devised machinery is used in rolling the two parts which are similar in shape



and size, and made from tough steel plate. These parts have straight edges on opposite sides projecting sufficiently to secure strength, and fastened with rivets. The pole is slightly, cannot be broken, and will be placed on the market in a few days, and at a reasonable price.

Short Slow Speed Motor.

IT has been known for some time that the Short Electric Co. have been working on a slow speed motor and the results of their study and experiment are now to be made known. The conservatism which has always characterized this progressive company insures the abilities of their new departure when once they place it on the market, and the full particulars of this latest result of Prof. Short's study and investigation will be awaited with great interest.

THE SESSIONS SIDE SEAT CAR.

A FOURTEEN FOOT CAR, THAT WITHOUT INCREASE IN WEIGHT, AFFORDS A SEATING CAPACITY OF FORTY FOUR PASSENGERS.

THE phenomenal growth in the past few years in modern cities has led not only to the introduction of rapid transit, but also a car service largely increased with equipment in many cases fully double the size which was formerly employed. But the continued growth is fast and in many cases has already reached the limit of this extra accommodation, and especially at the terminals in large cities it has become an absolute impossibility to either increase the size of the cars or add to their number on account of the track space being already fully occupied. Additional turn-tables and loops would solve the problem and permit of an increased car service, but this is impossible in the heart of most cities where every available foot of street is now tracked. The underground and elevated roads are expensive and would hardly be attempted by surface lines, hence the only possible solution of the problem is in a car which without increase in length will afford additional seating capacity.

Mr. E. C. Sessions, a well known banker of California, has carefully considered this question in all its phases, and has patented and had constructed at the Pullman works several of his side-seat cars. In this he has carefully avoided every objectionable feature which has hitherto been raised against the use of what has been known in this country as the "double-deckers," and abroad as the "garden seat car." In fact, the Sessions car is in no sense a double deck car, as will be seen from the illustration and a further description.

With a car 14 ft. in length he secures a seating capacity for twenty passengers within and twenty-four more outside, making a total seating capacity of forty-four passengers. The construction is such that he has accomplished this without any increase whatever in weight, an objection which heretofore has been a most serious one against cars built on this principle.

The distance from the rail to the deck over all is only 9 ft. 7 in., which makes the highest point in the Sessions car 13 inches below that of the ordinary cars now in use

while the step, platform, floor and roof are each placed on a much lower level than the same relative points in the old style cars.

The distance from the ground to the top of a high hat worn by the tallest passenger seated on the outside is but 11 ft. 3 in., which is less than the height of most of the electric cars now in service.

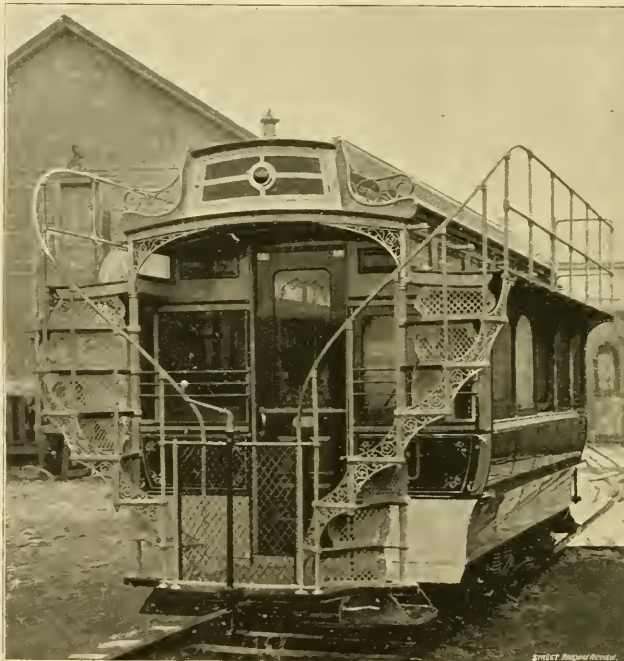
The car is entered by one easy step from the ground to the platform, and is so let into the platform that a passenger in boarding the car can by no possible means come in contact with the stairway, which winds around and over the rear platform. The interior of the car would not be

observed by the majority of passengers to be of any different construction from those now in use, and is of ample proportions both laterally and vertically. The distance from the car floor to the ceiling is the same as in other cars. The hood at the rear end of the car does not project quite as far as in the ordinary car, and permits of two iron stairways light and attractive in appearance yet very strong, which gently wind with one turn and lead to the seats above. Only six steps are required in making the ascent, which is neither steep nor more difficult than mounting any ordinary stairway.

Above, two rows of side seats, back to back, extend the entire length

of the car and are protected on the outside by an attractive iron railing, which is covered with a fine brass net, effectually shielding the occupants of the seats. These seats do not rest upon the top of the deck or lantern top, as in all cars heretofore built, but are placed upon the car roof, and the top of the back of the seat is on a level with the top of the deck, hence the name adopted by Mr. Sessions, of a "side seat car." It is by this means that the height of the car is so remarkably reduced, while comfort and room are in no way sacrificed. Suitable iron posts permit of the erection of a canopy of either light wood or canvas, should that be desired. This canopy can be removed or used at pleasure.

By the use of a wheel of 22 inches diameter, which is



THE SESSIONS CAR

as large as is used by many roads in their four wheel trucks, the car box is carried very low, and in this way the height of the car is kept within the limits stated, and oscillation is reduced to a minimum.

One would naturally suppose that there would be numerous points in the construction of a car of this kind from the dimensions given, against which the passenger would strike his head, but this question has been so carefully and scientifically considered, that it is impossible for the highest hat worn by a tall man to come in contact anywhere with either roof, door-frame or stairway. The stairway to the side seats may be placed at either or both ends of the car, as desired.

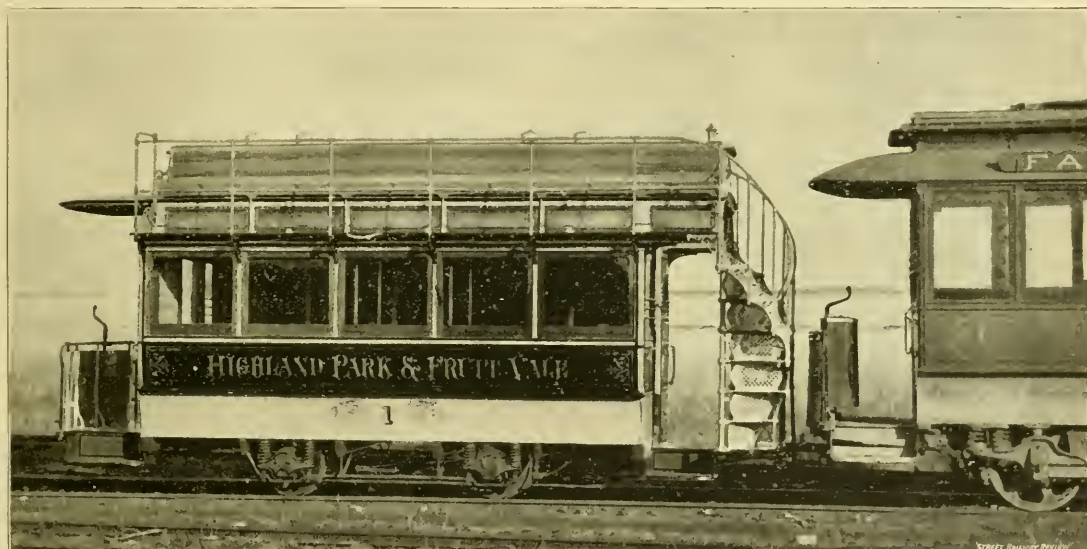
The cars are equally well adapted to horse, cable or electric roads, and their adoption will not require any change in car house, in order to get them through the door. They may be used as motors or trailers the same as any other cars.

which are being built for the Duquesne Traction Co. of Pittsburg, and gives a most striking illustration of the comparative heights of the two cars.

Mr. H. G. Bird, who is so well and pleasantly known to street railway men, having furnished supplies in their line for many years, has been secured as general agent for all territory east of the Rocky Mountains, and is already in receipt of a large number of inquiries regarding this car which is constructed on entirely new yet most scientific principles.

It is now planned to construct four miles of elevated road, which will wind around the grounds of the World's Fair, with stopping points at all the principal buildings and points of interest. The present plan contemplates a single track, resting on single columns. It will have a carrying capacity of 300,000 passengers per day.

The Detroit Electrical Works find it necessary to work



COMPARATIVE HEIGHT OF A 44 SEAT SESSIONS CAR WITH AN ORDINARY CAR.

The Pullman people have already completed part of a large contract for these cars for the Brooklyn & Fruitvale Railway, of Oakland, Cal., and the finishing of both the outside and interior is of the highest order, while the appearance and capacity of the car and its application of scientific principles whereby the double seating capacity is secured without increase in size or weight, is such as to commend it to all.

An important feature in connection with this car is that it can be constructed for an additional expense of about \$200 over that required for the old style car of equal length.

The interior is perfectly ventilated, and in such a way as to prevent the admission of dust and without disagreeable drafts.

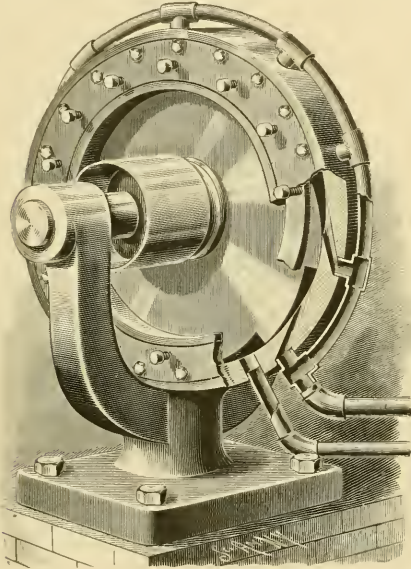
In the illustration herewith the Sessions car is shown as standing by the side of one of the new electric cars

three nights in the week, being so crowded with orders. This company has made very rapid development within a very short time. Among their latest orders for equipment and special design is a forty H.P. motor maintained upon a Three Rivers Truck for the Lake View & East Cleveland R'y of Cleveland, Ohio, which has been specially designed for drawing two trail cars heavily loaded. This also solves the problem of handling heavy traffic on excessive grades. They have also sent a thirty H.P. motor to be operated at Syracuse, with which the Syracuse management write they are much pleased, having given it a very severe test by loading both the motor and trail car and then running with the brakes fully set.

The *Electrical World* devotes twenty-three pages to the account of the Electric Light Convention, its report of which is wonderfully accurate and complete.

The Everest Rotary Engine.

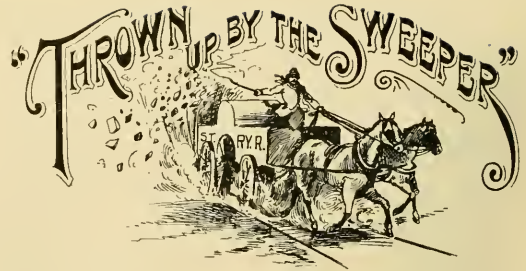
A NEW and improved rotary engine, which it is claimed is especially adapted for street railway purposes, has been patented by J. L. Everest, of Omaha, Neb. The accompanying cut will give a very correct idea of its construction. The piston is made in the shape of a wheel on a shaft turning in bearings in a "U" frame. This piston has recesses or buckets in its periphery against which the live steam is tangentially directed through open ports, which are placed at regular distances, all of which are fed from a supply pipe which extends entirely around the cylinder. A series of



exhaust ports are also arranged in a similar manner and empty into a main exhaust pipe. By this arrangement all but one of the buckets of the piston are kept constantly filled with live steam, which discharges as it reaches its exhaust port. The piston is made steam tight by the use of packing rings which are held in the cylinder and pressed against the piston by means of side screws, permitting easy adjustment from the outer side of the cylinder.

REED & SONS, proprietors of the Tramway Rail Co. of Pittsburg, who have been having their rails tested for some months, report themselves much pleased with their success. Mr. Reed has had many years experience in the rolling-mill business, and has succeeded in studying out the points that are required for a perfect girder rail. They are meeting with great success in their line, having received orders for the entire equipment of a number of roads.

ROBERT A. RAY, principal of the Hinsdale, N. H., high school, has, for the instruction of his pupils in electrical science, constructed and put in operation a miniature street railway, track, plant and all occupying one room in the building.



THE *Baltimore World* says: You probably couldn't induce one of the anti-progress Park-ave. street car associations to ride on an electric car if each one had a reserved seat—the first day. After that the company won't need to win 'em over with free tickets. Not much, they won't ride on any other line.

A SYRACUSE street car horse which got into the habit of kicking was tied in a stall and a bag arranged for him to practice on. He began at 7 in the morning and kicked until 11.35 without a let-up, and then, broken hearted, disgusted with man's ways, he fell on his side and yielded up his life. A good example for some people to follow.

A PHILADELPHIA car line in its route makes a sharp turn and runs alongside the Reading railroad for some distance. The other night the owl car was plodding along and contained among its motley load four young men asleep, who had taken more than a doctor would prescribe. As the car took the curve a train approached, and the glaring headlight a few feet distant shone directly across the car into the face of one of the sleepers. The whistle and bell also sounded at that instant. With a wild yell he rushed to the door, and, followed by the trio, cast themselves into the mud and darkness. When they again boarded the car their faces, hands and pretty clothes gave them the appearance of a gang of sewer cleaners, and the hilarity of the other passengers was by no means concealed or moderate.

THE Sweeper man was witnessing a trial the other day of a new motor. As it moved along, one after another of the horses standing by the roadside stood on their hind legs and pawed the air with their front feet after the most approved circus fashion. To our mild suggestion that some means might be found necessary to overcome the features of the propelling power which produced these interesting phenomena, the inventor replied: "Oh, these are all country horses, that have not become used to such things. Now, there is a horse that is city-bred, and I promise you won't mind it a bit." As the car approached the handsome animal, we watched with increasing interest the results, for he was hitched to a nice carriage and was standing untied; but the demonstrations of the motor had no effect whatever, and the enthusiastic promoter was in raptures. "Didn't I tell you?" said he; and then, as the car went by, the horse raised his eyelids and disclosed—a pair of sightless eyes.

FOUND ON THE RUSH TRIP.

American Street Railway Association.

HENRY M. WATSON, PRESIDENT, Buffalo, N. Y.
 W. A. SMITH, FIRST VICE-PRESIDENT, Omaha, Neb.
 CHARLES ODELL, SECOND VICE-PRESIDENT, Newburyport, Mass.
 A. D. RODGERS, THIRD VICE-PRESIDENT, Columbus, Ohio.
 WM. J. RICHARDSON, SECRETARY AND TREASURER, Brooklyn, N. Y.
 EXECUTIVE COMMITTEE—THE PRESIDENT, VICE PRESIDENTS, and THOMAS
 LOWRY, Minneapolis, Minn.; D. F. HENRY, Pittsburgh, Pa.; ALBERT E. THORNTON,
 Atlanta, Ga.; H. M. LITTELL, Cincinnati, O. and THOMAS C. KEEFER,
 Ottawa, Can
 Next meeting will be held in Pittsburgh, Pa., October 21st, 1891.

Massachusetts Street Railway Association.

President, CHAS. B. PRATT, Salem; Vice Presidents, H. M. WHITNEY, Boston,
 AMOS F. BREED, Lynn, FRANK S. STEVENS; Secretary and Treasurer, J. H. EATON,
 Lawrence.
 Meets first Wednesday of each month.

New York Street Railway Association.

President, DANIEL F. LEWIS, Brooklyn; Vice Presidents, JNO. N. BECKLEY,
 Rochester, JOHN S. FOSTER, New York; Secretary and Treasurer, WILLIAM N. RICH-
 ARDSON, Brooklyn; Executive Committee, JOHN N. PARTRIDGE, Brooklyn; CHARLES
 CLEMENSHAW, Troy; C. DENSMORE WYMAN, New York.
 Next meeting, Hotel Metropole, New York City, Sept. 15th, 1891.

Ohio State Tramway Association.

JOHN N. STEWART, Ashtabula, President; JOHN HARRIS, Cincinnati, Vice Presi-
 dent; J. B. HANNA, Cleveland, Secretary and Treasurer; E. K. STEWART, Columbus,
 Chairman Executive Committee.

The Street Railway Association of the State of New Jersey.

President, JOHN H. BONN, Hoboken; Vice President, TROS. C. BARR, Newark
 Secretary and Treasurer, CHARLES Y. BAMFORD, Trenton; Executive Committee,
 OFFICERS and C. B. THURSTON, Jersey City; H. ROMAINE, Paterson; LEWIS PER-
 RINE, Jr., Trenton.

ALABAMA.

EUFAULA.—The company which organized a year ago to build a street railway is again coming into life, and its prospects are fair for the construction of the road.

ARKANSAS.

LITTLE ROCK.—The erection of the power house and offices of the Electric Railway has greatly enhanced the value of property in that part of the city.

CALIFORNIA.

HAYWARD.—Has a street railway in operation for the first time in the history of this place.

SACRAMENTO.—The inauguration of the new trolley system here was witnessed by large crowds, and the test was in every way satisfactory. The cars were lighted by incandescent lamps, and attained a speed of twenty miles an hour. It is proposed to operate at twelve miles per hour.

SAN DIEGO.—The San Diego Cable Railway has issued a very neat souvenir, containing twelve pages of handsome illustrations of points of interest in that city.

SANTA CRUZ.—A capital stock of \$100,000 has been subscribed for the construction of an electric road from Garfield Park to Capitola. The road is estimated to cost \$60,000.

SANTA ROSA.—More than one half of the stock for the new street railway, in the northern part of the city, has been subscribed. The intention is to operate by the Hoskins' Motor.

SAN FRANCISCO.—The Metropolitan Railway Co., with a capital stock of \$1,000,000, has been organized to construct cable lines through a number of streets and into the suburbs. Among the directors are C. E. Mayne, H. A. Iddings, Nathan Crocker and J. I. Bailey.

CANADA.

QUEBEC.—J. W. Henry has been elected president of the Upper Town Street Railway Co.

WINDSOR.—The Windsor & Canada Street R'y has been sold to Detroit capitalists for \$25,000, the reason being the owners do not care to undertake the extensive improvements which are now necessary. The new line will be built to Brighton Bridge and the old track will be relaid. New cars will be added to be operated by electricity, and the entire plant put in first class shape. The purchasers are Willis C. Turner, Edward O. Gott, of Detroit, and H. Clark, of Toledo.

COLORADO.

DENVER.—The Suburban Electric Railway has secured its bonds by mortgage to the amount of \$1,000,000. Track laying has already commenced.

DENVER is becoming so well supplied with street railroads that some people here desire the Legislature to pass a bill prohibiting the granting of franchises to build a street railway within two blocks of any of the existing lines.

THE University Park Electric Line will be extended a mile and one-half, making its entire length five miles. The extension will cost \$15,000.

GRAND JUNCTION.—The Street Railway Company is considering plans for extension in the near future.

LEADVILLE.—The Leadville & Evergreen Lakes R'y having completed its survey, is now purchasing material, and will commence construction April 1st. Electricity will be generated by water power.

PUEBLO.—The Pueblo Street Railway has changed hands, the consideration being \$250,000. The new officers of the company are: President, J. E. Downey; vice-president, A. W. Chamberlin, of Denver; treasurer, Frank S. Pusey, of Denver; secretary and general manager, J. E. Downey.

DISTRICT OF COLUMBIA.

FRANK H. CLARK, of this city, is working up a company to establish a street railroad plant in Petersburg, Va

A BILL has been introduced incorporating the Mt. Pleasant & Rock Creek Park R'y Co., to construct double track lines, to be operated either by horse, electric or cable power. The capital stock is \$200,000.

THE President has signed an Act incorporating the Washington & Arlington road; also one granting a right of way to the Junction City & Fort Riley R'y Co.

FLORIDA.

CLEARWATER HARBOR.—The Arcadia Street R'y & Improvement Co. has been organized with a capital stock of \$50,000, with F. C. Peters, president; Anthony Peters, treasurer and manager, and Paul A. Peters, general superintendent.

JACKSONVILLE.—Interested property owners are holding meetings with a view to perfecting arrangements to build an electric line to Panama Park, a distance of three miles.

GEORGIA.

AUGUSTA.—It is proposed to make a boulevard of the center of Broad street and place the tracks of the Electric Railway immediately next to the grass plot in the center of the street.

SAVANNAH.—Contract has been closed with the Edison General Electric Co. for the construction and equipment of three miles of road for the Electric Railway of this city. It is intended to extend the lines as soon as the first plant is fairly in operation. This will give Savannah thirteen miles of electric railway, and the proposed line, which will without doubt be built, will include about twelve miles more.

IDAHO.

BOISE CITY.—An electric road will be built here under the name of Boise City Rapid Transit Co. The contract calls for two and one-half miles to be built June 1st, and has already been let.

ILLINOIS.

BLOOMINGTON.—Messrs. Bailey & Patterson have accepted the electric system installed by the Daft Co. without waiting for the expiration of the four months' trial. Six miles of track will soon be relaid with heavy rails.

CHAMPAIGN.—The Champaign and Urbana Electric Co. made its trial trip into Urbana March 12th. The mayor vetoed their ordinance, but the company purchased a right of way.

ELGIN.—The Elgin Street Railway Co. is seeking an ordinance for the extension of their line on Bluff City Boulevard. The road here has been very successful, and has met with great popularity.

EAST ST. LOUIS.—The East St. Louis Electric Railway has opened one of its lines and is already doing a large business. Everything is working very nicely.

GALESBURG.—The directors of the College City Street Car Co. are soon to take action on the question of changing their lines to electricity.

KANKAKEE.—Contract has been made with the Western Electric Illuminating Co. to construct a street railway which must be in operation by the 1st of July. The cars will be of the vestibule pattern.

LINCOLN.—An electric street railway has been incorporated by D. Blinn, A. Quissenberry and John F. Munday. The capital stock is \$65,000.

MONMOUTH.—The Monmouth Motor Street Railway Co. has been incorporated here, with a capital stock of \$30,000, for the transportation of passengers, baggage, freight, fuel and mails by means of electricity.

PEORIA.—The Central Railway Co. have recently secured authority for completing extensions on a number of streets.

ROCKFORD.—The Rockford Street Railway Co. has subscribed \$2,600 toward a base ball club in this city.

SPRINGFIELD.—The People's City Railway Co. have laid tracks to the State Fair Grounds, and will be able to land passengers at the gate.

INDIANA.

ANDERSON.—The City Railway of this place has been sold to a Buffalo syndicate for \$50,000, who intend to substitute electricity for mules. Possession was given March 9th.

BRAZIL.—Eastern capitalists have inspected the streets here, and express their willingness to advance \$100,000 toward the construction of an electric line.

INDIANAPOLIS.—The Indianapolis & Greenwood Suburban was incorporated for \$150,000.

KOKOMO.—The Kokomo Electric Street Railway Co. has concluded to erect its own power house and generate their own current, which has hitherto been supplied by the Electric Light Co.

MARION.—Edward Carey, of Chicago, representing the Johnson Company, has closed a contract for five and one-half miles of steel rail.

NEW ALBANY.—Negotiations are being made to operate the lines here with electric motors. May 1st is the date set for the completion of the system.

TERRE HAUTE.—The Street Railway Co. has accepted the electric railway plant which the Westinghouse Company have installed.

VINCENNES.—George W. Greater, proprietor of the Citizens' Street Railway, has sold the property, franchises and everything connected therewith, to a company composed of Capt. Allen Tindolph, B. G. Hudnutt and D. C. Greiner, of Terre Haute.

IOWA.

CLINTON.—A movement is on foot to induce the City Electric Co. of this city, to construct an electric line to Camanche, a distance of five miles.

COUNCIL BLUFFS.—The Interstate Company will ask the property owners of the two counties interested on each side of the river, to vote \$500,000 of long time bridge bonds towards the construction of their bridge, on which it is desired to spend \$1,300,000. If this should fail, the company will erect its own bridge, to cost \$500,000, for its exclusive use. In the meantime electric lines will be constructed in West Council Bluffs, to cost \$150,000, which amount has been paid in for that purpose.

DUBUQUE.—The Dubuque Street Railway Co. will issue \$250,000 of first mortgage bonds for the purpose of enlarging and improving its plant.

IOWA CITY.—An ordinance has been granted the Iowa City R'y Co. to construct an electric line, which it is intended to operate by water power. Among those interested are O. A. Byington, Dr. Hobby, Mr. Gooch and Mr. McGuan.

KEOKUK.—The company here are now operating five and one-quarter miles electrically, and will add two miles in the spring.

SIoux CITY.—The Sioux City & Highland Park R'y expect to have their new electric line in operation by May 15th.

WATERLOO.—There is some talk of connecting this city with Cedar Falls by an electric railway, to be ten and one-half miles in length.

KANSAS.

LEAVENWORTH.—The Leavenworth Suburban Street Railway Co. is to be sold at Sheriff's sale March 31st. The bondholders expect to secure its control and place it in first class condition with the electric system.

KENTUCKY.

COVINGTON.—The Street Railway Co. has let the contract for a new car stable to cost \$25,000.

LOUISIANA.

ALEXANDRIA.—The street car line is now in operation and equipped with cars which were made by the Crescent City R'y Co. of New Orleans.

NEW ORLEANS.—The Electric Traction Co. are equipping the Coliseum line with storage battery cars, several of which are already in operation and have proved very satisfactory. The contract calls for the equipment of 22 cars.

The city has advertised for the sale of a franchise for a period of twenty-five years, covering a large number of streets. The successful bidder may use either animal power or the storage battery system.

MAINE.

DEERING.—Authority has been given the Portland R'y Co. to run a line between the two cities. It is proposed to put on cars seating 65 passengers.

GARDINER.—The electric line here has commenced operations and is doing a good business.

LEWISTON.—The Lewiston & Auburn Horse R'y Co. have let a contract for a suspension bridge to cost \$5,000, connecting an island just above the falls with the main land, and will run their cars over it as soon as completed.

THOMASTON.—An electric railway company has been organized here under very favorable concessions from the town, and it is quite likely construction work will be commenced soon.

WESTBROOK.—The Portland & Westbrook Street Railway Co. has been organized with a capital of \$300,000, and is preparing to construct electric or horse lines from the village of Saccarappa, in the town of Westbrook, and through the village of Cumberland Mills, Deering and into the city of Portland. The incorporators are Lemuel S. Lane, Frank Haskell, Charles B. Woodman, Nathan Cleaves, Stephen R. Small, Prentiss Loring, George E. Macomber, J. Manchester Haynes, Orville D. Baker, Horace H. Shaw, James P. Baxter and John H. Fogg.

MASSACHUSETTS.

ESSEX.—The Essex Electric Street Railway Co. has issued \$100,000 of bonds, secured by first mortgage on its entire plant, for the purpose of making desired improvements.

LYNN.—The Belt Line Company have ordered six of the Robinson radial open cars. They have six wheels and two motors, and a larger seating capacity than the ordinary car. The Rae motor will also be given a trial.

LOWELL.—It has been voted to consolidate the lines in this city with the Lowell & Dracut roads, with a view to rebuilding the same and equipping them with electricity.

WORCESTER.—Property owners of Chandler street have pledged \$6,000 bonus toward the extension of the railway line, and it undoubtedly will be made, together with several miles which the company expect to build in other directions.

MICHIGAN.

ANN ARBOR.—The attempted injunction against the Ann Arbor Street Railway has been denied, and the company is now proceeding with its extension.

BAY CITY.—The electric railway companies of Bay City and West Bay City are contemplating a consolidation of the two companies.

GRAND RAPIDS.—Mr. Chapman, the new superintendent of the consolidated lines states that some of the roads will be abandoned on account of paralleling other lines and being unprofitable. The cable system, which has been the single track system, with turnouts, will be abandoned, and electric power with overhead wires adopted on all lines. The reconstruction work was begun March 1st, and is to be completed by June 1st, at an estimated cost of \$500,000. A transfer system will be adopted, by which a patron can ride from any point on the line to any other portion of the city for one fare.

JACKSON.—An electric railway has been incorporated here, with a capital stock of \$150,000, divided into six hundred shares.

KALAMAZOO.—An electric street railway has been started here for the purpose of operating with a new storage battery, the invention of Mr. White, of this city.

MANISTEE.—The council has passed over the Mayor's veto the ordinance for electric road. The franchise is granted Gen. Geo. A. Hart and others, for thirty years.

MAPLE RAPIDS.—There is strong talk of building an electric line to St. Johns.

MINNESOTA.

DULUTH.—The Street Railway has decided to extend their line to Lester Park, the residents of which are very anxious for the line.

MINNEAPOLIS.—The old depot at Minnehaha Falls used by the Motor Line has been destroyed by fire.

ST. PAUL.—The extension of the electric lines which are planned for the present season are very extensive, and cannot be all completed before the first of November. Tracks will be extended to Fort Snelling, which has hitherto been reached only by steam road.

The cashier of the University Ave. Cable was surprised recently at two o'clock in the morning by being confronted by a man who pointed a revolver at him with a view to taking the day's receipts. The cashier fired at him, whereupon the robber fled.

MISSISSIPPI.

GREENVILLE.—At the recent election of officers of the Street Railway Co., J. M. Jayne was elected president,

James E. Negus, secretary and treasurer, and John Gunn, of Memphis, general manager. The new organization will operate four miles and will give first-class service.

NATCHEZ.—The street railway has been disposed of at trustee's sale to satisfy a mortgage of \$3,708.65. It was bid in by Messrs. A. & M. Moses and is considered a good purchase. It has a valuable franchise, no competition, but has not been a profitable undertaking hitherto.

MISSOURI.

ARGENTINE.—Messrs. Enright & Thayer have been granted a franchise for an electric street railway line connecting with Kansas City, Mo., and Kansas City, Kas. The right extends for twenty years, but in order to be valid must be complied with within a limited time.

JOPLIN.—The Joplin Electric Railway has begun its extension to Blendville, a distance of one and one-half miles. This line will also be extended to Webb City and Findlay to Grand Falls, for which purpose the company has increased its capital stock to \$100,000.

The Joplin & Grand Falls Electric Railway has also been organized, with a capital of \$100,000, for the purpose of building an electric line between those places.

KANSAS CITY.—Work has commenced on the West Side Electric Line, and it is hoped to have the road in operation by May 1st.

The Metropolitan Company will extend its cable line from Tenth street and Minnesota avenue to the city limits. Material for that purpose having been already secured.

ST. LOUIS.—Application has been made to change the motor of the Cass Ave. and Fair Ground Line to electricity, and extend the tracks.

BENJ. VOXPHUL and associates have petitioned for a franchise to construct a double track electric line through a number of streets.

MONTANA.

HELENA.—The first mortgage of the Helena Electric Railroad Co. to the Old Colony & Trust Co. of Massachusetts, for \$50,000 has been filed.

NEBRASKA.

LINCOLN.—A special election will be held April 7th, on the question of granting the Lincoln Park Association a franchise to construct street railway lines.

The Lincoln Street Railway Company will assume control of the Standard line on April 1st.

S. W. BURNHAM was elected president and William Olier secretary and treasurer of the South Lincoln Street Railway Co.

OMAHA.—The Street Railway Co. has just purchased two new dynamos of 107 H. P. each.

THE Benson & Halcyon Heights Co. has been organized with a capital of \$25,000, to construct an electric line in these suburbs. They expect to get their power from the Omaha Street Railway.

NEW JERSEY.

NEWARK.—The South Orange Company has let a contract for the equipping of its line with the Sprague system. The old cars will be rebuilt, and the entire change will involve an expense of \$300,000.

PLAINFIELD.—A company has been incorporated with a capital of \$50,000, to construct five miles of track in this place. It will be owned by Essex county capitalists.

QUINTON.—The Building Syndicate has arranged for right of way and will construct an electric line to Salem.

NEW HAMPSHIRE.

MANCHESTER.—The line here has received two new cars from the Ellis Car Co., of Amesburg, Mass. They are beauties, finished handsomely with beveled glass.

ALL but four of the street railway conductors have been dismissed to reduce expense, and the fare box system has been substituted in their stead.

NEW YORK.

BUFFALO.—J. H. Prescott, of the firm of E. N. Cook & Co., is largely interested in the electric railway in Meadville, Pa., which is now an assured fact.

THE Buffalo City Railway Co. is securing consent for the trolley system on Main street. Property owners along the street are becoming very anxious for the change.

GLOVERVILLE.—The council has granted permission for an electric belt railroad which will be built this spring.

NEWBURG.—John E. Adams and M. H. Huschberg, of this place, and John A. Mason of Harlem, have secured a controlling interest in the Newburg Street Railway Co., and operations have been resumed.

ROCHESTER.—Jacob Wahl, of Louisville, has been made superintendent of the horse car service of the city railway.

UTICA.—The troubles which have hovered over the Utica Belt Line Railway for so long have finally drawn to a close, and its affairs have been brought to a settlement. The road has changed hands and its charter has been secured by the Thomson-Houston Company, who assume the floating debt of \$70,000, first mortgage bond of \$500,000, and second mortgage bonds of \$60,000. It is believed that under the management of the T-H. people the operation will be what it should, and that it will soon become a valuable property.

NORTH CAROLINA.

WINSTON.—Manager Cooper, of the City Railway, is negotiating with the manufacturers of Waughtown with a view to extending his line to that place.

WILMINGTON.—J. H. Burnard, of Asheville, and H. J. Croby, of Atlanta, Ga., propose to purchase the street railway here, and change it to an electric line.

OHIO.

HAMILTON.—The Hamilton Street Railway Co. has closed the contract for the construction of its new electric road.

NORTH BALTIMORE.—Dr. Henry and others have been secured a franchise for an electric line in this place and Welker, a mile and one-half distant.

SANDUSKY.—Thomas Wood, Geo. H. DeWitt, A. J. Stoll and others, are interested with capitalists of Norwalk in the construction of an electric line to cost \$40,000.

ST. BERNARD.—The Council has voted to donate a site valued at \$3,000 for a new power house for the Mt. Auburn Electric Road, and the company contemplates the erection of a building to cost \$50,000.

TOLEDO.—Wm. R. Haines, employed in the power house of the Consolidated Street R'y Co., took poison, and the physician was unable to save his life. He was for a long time a veterinary surgeon.

MAUMEE.—Right of way has been granted for an electric line here, which must be built by 1892.

NEWARK.—A new power house will be erected for the Electric Road, to be of brick, 50 x 150 feet.

WARREN.—Two different companies are seeking a franchise for an electric line here.

CLEVELAND.—The Cleveland City Cable Railway Co. has asked permission to extend its lines on Woolsey street. The cable system is in great favor, and the receipts are increasing every day.

THE East Cleveland Co., which ordered some motor cars 36 feet in length, from the East, has been delayed in their receipt of same on account of the inability of the railroad company to get the cars through the Hoosac Tunnel.

THE officers of the East Cleveland road propose to make a test case of the fine imposed by the city for neglecting the car-heating ordinance.

EAST LIVERPOOL.—Local capital has organized here to build a street railway.

FINDLAY.—The Findlay Street Railway Co. has increased its capital stock from \$150,000 to \$200,000, for the purpose of changing the Main Street line to electricity. Contracts have been let, and the work must be completed within sixty days.

OREGON.

SALEM.—The Capital Street Railway is preparing to change its motive power from steam to water, by which a great saving will be effected.

PENNSYLVANIA.

ALLENTOWN.—Our citizens are working with the Independent Improvement Co., of Boston, with a view to building an electric line.

CHESTER.—The Union Railway Co. desires to build a line on West Seventh street.

MURRY VERNER, Gen. Supt. of the Birmingham Traction Co. is in the city, superintending the construction of the 18th Street Electric Line.

NORRISTOWN.—The Norristown Traction Co. has been organized, with a capital of \$100,000.

PITTSBURG.—The Birmingham Co. has ordered motors from the Short, Edison, Thomson-Houston and Westinghouse companies, and will try them all.

THE power house of the Duquesne Traction Co., at Ben Ave. Station, was destroyed by fire on the night of February 17th, and the machinery, including both engines and dynamos was ruined. The fire was caused by the explosion of a gasoline lamp. The loss amounts to \$100,000.

THE Central Traction Co. held their first meeting since the operation of their cable road, and elected a new board of Directors. Since the line has been changed to cable power the business has trebled. President Hardin desires to make further extensions, but the stock holders object. However, it is probable an extension will be made during the summer.

RHODE ISLAND.

NEWPORT.—At the annual meeting of the Newport Street Railway Co. the President reported a daily business of 2,000 passengers, which has been carried at an average cost of .043 cts. per passenger and that the receipts averaged .048 cts. per passenger. The company uses eight motor and seven trail cars, and has 4.17 miles of track. There had not been a single accident during the year. A. C. Titus was re-elected president and J. D. Bundick secretary and treasurer.

SOUTH CAROLINA.

CHARLESTON.—Capt. J. A. Steinmeyer is president of a company which intends to build a line exclusively for freight business. It will in no way interfere with the West End Electric Railway.

THE new West End Railroad Co. has elected its officers as follows: Geo. B. Edwards, president; Michael Kelley, vice president; Kirby S. Tupper, secretary and treasurer. The company will apply at once for right of way.

COLUMBIA.—The Columbia Street Railway has been transferred to the Electric Company of this city, and is now in charge of Col. J. Q. Marshall. Electricity will be the motive power and the work commenced at once.

TENNESSEE.

CHATTANOOGA.—The electric system is rapidly enlarging here and within four months the Electric Street Railway Co's. lines have increased to thirty-five miles, and with the other companies electric lines will make an aggregate of fifty miles. Additional franchises are being sought which may increase the lines still more.

THE Electric Street Railway will abandon two of its old lines and construct new ones in their places on more desirable streets.

MEMPHIS.—\$100,000 has been deposited as a part of the contract between the city and the Street Railway Co. for the completion of the electric lines within a certain time. Work is to commence April 1st. The Thomson-Houston system has been adopted.

NASHVILLE.—The Maplewood Electric Railway Co. has been incorporated by Wm. Duncan, Jere Baxter, T. W. Crutcher, G. W. Ehle, Peter Tamble, L. K. Hart and Sam Wene. Their plan is to construct a large amount of road.

TEXAS.

AUSTIN.—The trial trip of the new electric railway was in every way successful, and the line is already doing a large business.

ARANSAS PASS.—Three street railways have been incorporated here, all of which have received franchises from the city, and have given bonds to complete four miles of track by June 1st. One will be a belt line.

HOUSTON.—The City Street Railway Co. are connecting their rails with ground wires, so as to be ready for erection of overhead wires when that time shall come.

TAYLOR.—The street railway will be completed and ready for use April 1st.

UVALDE.—G. E. Hardwick, of Sherman, is contemplating putting in a street car line in this place.

VERNON.—R. B. Grant has been granted a franchise for an electric railroad on Cumberland and Wilbarger streets.

WACO.—The Council has granted a liberal franchise, extending for fifty years, and including twenty-five miles of streets upon which the Waco Electric Railway & Light Co. may construct lines. Capital, \$250,000. Incorporators, W. J. Hobson, Bart Moore, John Sleeper and others.

UTAH.

OGDEN.—The Ogden Street Railway has been sold at trustees sale for \$85,000, and purchased by the bond holders, the Jarvin, Conklin Mortgage & Trust Co., of Kansas City. Improvements are contemplated at once, including a large power house.

VIRGINIA.

DANVILLE.—Capt. H. Robertson and Messrs. Hoffman & Lee, of Baltimore, who are the largest stockholders in the street railway here, are making plans for putting the lines in operation again, and also making several extensions, and will add a new car equipment.

LYNCHBURG.—It is expected that the electric line here will be in operation within sixty days.

WASHINGTON.

SEATTLE.—The Seattle Electric Railway proposes to extend the Fremont Line to Ballard, a distance of one mile.

SPOKANE FALLS.—The Spokane University Heights Street Ry has been incorporated for \$100,000 by the following persons: Allen Garrett, Robert Abernethy and Leonard B. Cornell.

VANCOUVER.—The Vancouver Street Railway Co. have begun work on their new line leading from the railroad depots.

WISCONSIN.

APPLETON.—The City Railway has been transferred to the Edison Co., and the plant will be equipped with the Edison-Sprague system, and Pullman cars by May 1st, at an expense of \$40,000.

MILWAUKEE.—THE Hinsey Line has a quarrel between its two principal stockholders, and between them a receiver has been asked for.

THE Villard syndicate has obtained permission from the Government to extend its proposed line through the Park to the South Gate of the Soldiers' Home. The line will be completed July 1st.

THE plans of the Villard Syndicate for the consolidation of the Cream City and the Milwaukee City railroads have now been fully consummated, and the contract let to the Edison Co. for the entire electric equipment. Bids have been invited for furnishing six thousand tons of rails. As the railway company will be unable to build all its car equipment in its own shops, car builders will have an opportunity to bid on a large number of new cars.

STREET CAR PATENTS.

GRANTED DURING FEBRUARY 1891, IN THE UNITED STATES OF AMERICA.

The following list of street car patents is prepared for THE STREET RAILWAY REVIEW, at the Patent Law Offices of Haupt Bros., 606 Rialto Building, Chicago. We refer our readers to them on all matters relating to patents and patent law.

	NUMBER.
Separating Cross-Head Tie Wires. Geo. B. Baer, Cloverdale, Cal.	445,828
Electrode for Storage Battery... S. H. Barrett, Springfield, Mass.	445,872
Contact Device for Electric Railway... Ed. M. Bentley, New York, N. Y.	445,634
Secondary Battery... Henry T. Cheswright, Carcassonne, France	445,542
Electric Motor Support... Chas. Foster & W. H. Bevis, Cincinnati, O.	445,594
Electric Wire Connector... John W. Hoffman, Pullman, Ill.	445,751
Electric Switch... John W. Hoffman, Pullman, Ill.	445,752
Electric Railway... Rudolph M. Hunter, Philadelphia, Pa.	445,674
Electric Railway... Rudolph M. Hunter, Philadelphia, Pa.	445,952
Electric Car Lighting... Linwood F. Jordon, Somerville, Mass.	545,954
Fare-Register... Thomas B. Lee, Toronto, Can.	445,669
Street Car... Geo. Moore, Boston, & J. E. Perfler, Everett, Mass.	445,661
Electric Motor... Francis J. Patten, New York, N. Y.	445,623
Electric Motor... Francis J. Patten, New York, N. Y.	445,624
Motor for Street Cars... Thomas Roberts, Baltimore, Md.	445,756
Street Car... John G. Schneider, Chicago, Ill.	445,941
Starting Device for Electric Motor. Ed. P. Sharp, Boston, Mass.	445,907
Trolley Wire Holder... Edward P. Sharp, Boston, Mass.	445,908
Regulator for Electrically-Propelled Vehicles... Sidney H. Short, Cleveland, O.	445,656
Coupling for the Trolley Wires of Electric Railway... Sidney H. Short, Cleveland, O.	445,841
Electric Motor Switch... Franklin A. Weller, Boston, Mass.	445,741
Rolling Stock for Tramways or Railways... Chas. Zipenousky, Buda Pesth, Austria-Hungary	445,583
FEBRUARY 10, 1891.	
Electric Locomotive... Geo. R. Baldwin, Montreal, Can.	446,245
Electric Railway and Contact Device Therefor... Ed. M. Bentley, New York, N. Y.	446,376
Insulating Coupling Block and Cut Out... Sigmund Bergmann & C. J. Klein, New York, N. Y.	446,180
Electric Insulator... James R. Branch, Richmond, Va.	445,969
Rail Joint Fastener... James R. Burgess, Port Huron, Mich.	445,971
Combined Support and Fastening for Railway Joints... Thomas J. Bush, Lexington, Ky.	446,282
Oscillating Car Track Cleaner... Jos. E. Chambers, St. Louis, Mo.	446,326
Railway Track... Lebbens Chilsen, Worcester, Mass.	446,161
Cable Street Railway... Lewis M. Clement, Oakland, Cal.	446,212
Safety-Platform for Railway Cars... Spencer L. Davis, Chicago, Ill.	446,129
Automatic Potential Regulator for Electric Currents... A. L. Ellis, Kansas City, Mo.	446,284
Automatic Cable-Lifter... John B. French, St. Louis, Mo.	446,337
Combined Street Car Fender and Brake... Geo. T. Hall, Moravia, Cal.	446,227
Dust-Guard for Car Axles... Wm. McKenzie, Boston, Mass.	446,003
Electrode for Secondary Battery... Marmaduke M. M. Slattery, Fort Wayne, Ind.	446,104
Elevated Railway... John N. Valley, Jersey City, N. J.	446,272
Elevated Railway... John N. Valley, Jersey City, N. J.	446,273
Brake for Cable Car... James F. Waitts	446,305
FEBRUARY 17, 1891.	
Electric Conductor Connection... Heinrich Arld, Nuremberg, Germany,	446,655
Electric Line Switch... Edward M. Bentley, Boston, Mass.	446,418
Electric Railway Conduit... Edward M. Bentley, Boston, Mass.	446,419
Contact Device for Electric Railway... Ed. M. Bentley, Boston,	446,420
Conduit Electric Railway... Ed. M. Bentley, New York, N. Y.	446,417
Electric Locomotive... Eben M. Boynton, West Newbury, Mass.	446,821
Contact Trolley for Electric Railway... James B. Cahoon & I. F. Baker, Lynn, Mass.	446,428
Street Car Service... Thos. H. J. Cruise, Toronto, Can.	446,731
Locomotive for Electric Railway... Thomas A. Edison, New York	446,667
Gate for Car Platforms... Samuel B. Fuller, Pawtucket, R. I.	446,514

Street Railway Track.....	Thos. G. Gribble, Yonkers, N. Y.	446,446
Electrically Propelled Car.....	Rudolph M. Hunter, Philadelphia, Pa.	446,817
Electric Railway.....	Rudolph M. Hunter, Philadelphia, Pa.	446,833
Electric Railway.....	Rudolph M. Hunter, Philadelphia, Pa.	446,834
Secondary Battery.....	A. M. F. Laurent, City Paris, France, & I.	
.....	A. Timmis, London, England,	446,527
Car Wheel.....	John Player, Topeka, Kan.	446,571
Controlling Switch for Electric Railway.....	F. B. Rae, Detroit,	446,613
Electric Railway.....	Nicholas Seibert, Malden, Mass.	446,475
Electric Railway Conductor.....	Elihu Thomson, Lynn, Mass.	446,485
Car Starter.....	August Wilke, Brunswick, Germany,	446,725
Rail for Street Railway Service and Chair for the Same.....	Win.	
.....	H. Wright, Buffalo, N. Y.	446,589
FEBRUARY 24, 1891.		
Street Car.....	Fred. Baier & D. R. Hart	447,240
Current Controlling Device for Electric Railway Cars.....	Jacob	
.....	C. Chamberlain, New York, N. Y.	447,230
Secondary Battery.....	Stanley C. C. Currie	447,279
Regulator for Electric Circuits.....	Thomas M. Edwards, New	
.....	London, Conn.	447,177
Railway Axle Box.....	Louis Ellert, New York, N. Y.	447,148
Cut Out.....	Stephen D. Field, Stockbridge, Mass.	447,966
Underground Railway Conduit.....	Chas. C. Gilman, Eldora, Ia.	447,861
Electric Motor.....	Ludwig Gutmann, Pittsburg, Pa.	446,864
Apparatus for Cleaning Railway Conduits.....	Wm. Heckert,	
.....	Yonkers, N. Y.	447,181
Driving Device for Car Trucks.....	Chas. W. Hunt, West New	
.....	Brighton, N. Y.	447,114
Electric Railway.....	Randolph M. Hunter, Philadelphia, Pa.	447,283
Trolley-Wire Hanger.....	Chas. H. Macloskie & W. E. Baker,	
.....	Boston, Mass.	446,985
Electric Motor Mechanism.....	Sam'l E. Mower, New Haven, Conn.	447,255
Trolley for Electric Railway.....	Sidney H. Short, Cleveland, O.	447,268
Automatic Cut Out.....	Jacob B. Tirrell, Boston, Mass.	446,902
Electric Railway System.....	Chas. J. Van Depole, Lynn, Mass.	447,215
Cable Railway.....	Geo. O. Watris & C. J. Kaighin, San	
.....	Francisco, Cal.	446,905
Elevated Railway.....	David B. Weaver, Hopewell, Pa.	447,172
Railway Chair Spike.....	Wm. O. Wood, Brooklyn, N. Y.	447,268

At the Walker Manufacturing Co.

THE Walker Manufacturing Co., of Cleveland, will get their magnificent new works completed none too soon to take care of the orders for heavy work for which contracts are being closed.

Their Differential Drum is being more and more recognized. Two sets have recently been placed in the Elm St. power house of the North Chicago Street Ry., and the four sets for the Chicago City Ry. have been in operation several weeks, but have already demonstrated their value and advantages. The Cleveland City Cable Ry. have taken off two 12 foot drums and substituted in their stead two 14 foot Walker Differentials. This entire change was made in only five and one-half hours, commencing at midnight, when the machinery stopped, and completed thirty minutes before starting time in the morning. As the individual rings had all to be removed before the drums were taken off and the new drums placed and keyed and their rings adjusted, it was a remarkable accomplishment, only made possible by accurate shop work.

Among new orders are two differential drums for the Madison St. Cable Ry., Seattle, also the entire plant, including "U" frames and sheaves, for the Montague Construction Co.'s line in Brooklyn. Differential drums will be placed there, and as the transmission is by rope drive those wheels will be differential also. The Walker Co. will furnish engines, boilers, piping and in fact the

power house plant complete. In other lines this company is making twelve 16-foot diameter wood-filled sheaves for the Calumet & Hecla Mining Co., and a large amount of heavy work for the Standard Oil Co., to be used in their new method of vaporizing, recently adopted. The department for making hydraulic machines, presses, pumps, etc., of which they make a specialty, is also crowded.

The new works nearing completion will be among the finest and largest in the country. The machine shop is 165 feet wide, divided into three bays by iron columns, spaced 24 feet centers longitudinally; two bays being 288 feet long and the third bay 430 feet long, with provision for extending all three bays to 500 feet each. Each bay will be provided with an improved 30-ton rope drive power traveling crane, and the shop will be equipped with the most modern tools and facilities for handling the heavy class of work they are making.

The new foundry building is 118 feet wide by 300 feet long, equipped with two 30-ton, two 12-ton and two 6-ton improved rope drive power traveling cranes and all the latest improvements in foundry equipment. The present foundry is 56 feet wide by 200 feet long, equipped with several lighter capacity cranes, and will be used for the lighter class of work.

The cranes alone will require two and one-quarter miles of rope to drive same. The buildings are all of brick, iron and glass, and equipped with all modern facilities. Ample provision has been provided for light by continuous skylights in the roofs, the glass alone costing in the neighborhood of \$15,000. The new office, which is now being finished in quarter-sawn oak, will be equipped, both in drawing office and in general offices, with the most modern improvements and conveniences, where they will be pleased to see their many friends.

CAR HOUSE BURNED.

THE electric road in Sioux City has just experienced two disasters which probably would not occur again in a generation. About three weeks ago both cylinder heads were blown out of their engine, and disabled their plant for several days while new ones were cast and shipped by express. Supt. Peavy, however, scoured the town and hired all the teams he could and had all his lines running by horses in less than sixty minutes. In a week the new heads arrived, but that night, or rather at 3:30 in the morning, fire was discovered in the car house which is separated from the engine room by a fire wall. The city fire department, though at work elsewhere, quickly responded, but so rapid did the fire spread only two motor cars entirely escaped. All the rest of the winter equipment was burned or disabled. By great exertions ten cars were pressed into service the first day, including several summer cars, and by working night and day repairs were made which enabled the company to operate seventeen, though presenting a sorry appearance.

The loss on cars is \$30,000, fully insured, but that of course does not represent the daily loss which lack of car service must entail while others can be built.

ECHOES FROM THE TRADE.

J. G. BRILL & Co. are building ten cars for use on the electric line at Millersville, Pa. Two of them will be combination cars.

THE AMERICAN PERMANENT WAY Co., of New York, has been organized to promote the rapid transit system of which T. Graham Gribble is the inventor.

THE THOMSON-HOUSTON Co. have delivered three large sweepers, the brushes of which are each run by a separate electric motor, to the Duquesne Co., at Pittsburg.

THE ELECTRICAL SUPPLY Co., of Chicago, have just put upon the market a new trolley wire hanger, a description of which we give more fully in another part of this issue.

THE PULLMAN COMPANY have just furnished twenty-four new open electric cars for the Tacoma Railway and Motor Co., which are marvels of beauty and thorough construction.

THE HAINES BROS. are negotiating with parties in Brazil, with a view to constructing a street railroad in that country. They are the parties who built the Rutland, Vt., road.

EDISON GENERAL ELECTRIC Co. has secured the contract for the Boise City electric railway, two and a half miles, and an order for a 400 horse power electric mining plant in the Cœur d'Alene camp.

S. T. BRUSH, of No. 21 East 52d St., has organized the Robertson Electric Railway Construction Co., in which several New York and Brooklyn gentlemen are interested: capital stock, \$500,000.

THE ELECTRIC RAILWAY SUPPLY Co., 50 Broadway, New York, have taken the selling agency for the United States for the complete line of gearing and other supplies for R. D. Nuttall & Co. of Alleghany.

THE JOHN STEPHENSON Co., Limited, have just delivered a large order of new cars to the South Covington and Cincinnati Street Ry., which are the pride of the company operating them and the admiration of the public.

THE GILBERT WORKS at Troy have delivered the first five of its order for new vestibule street cars for Buffalo. They are vestibuled at each end, contain heaters, are of dark cherry for interiors, and will seat forty passengers.

THE Connelly gas motor has taken a southern trip and is very highly spoken of by the papers and citizens of Jacksonville, Florida, where its merits are being demonstrated. The car was built for them by the Lewis & Fowler Co. and is decidedly attractive.

RUSSELL CARETTE Co.—A company has been organized in Newark, N. J., to operate a line of carettes on several streets. They will run at 12 minute headway, with a five-cent fare, and a transfer from one line to the other.

MR. DUTTON, of the Dorner & Dutton Co., Cleveland, has just completed an extended southern trip, in which he closed a large number of contracts. Their gears and pinions are making an excellent record, and their sales in this line are rapidly increasing.

THE STANDARD INDEX AND REGISTER Co., of New York, report a very satisfactory business, having received a number of orders for that popular system during the past month, one of the large ones being for eighteen for the new electrical line at Aurora.

ALFRED G. HATHAWAY, of Cleveland, manufacturer of Hathaway's Transfer Table, is busy shipping that popular car mover to all parts of the country, receiving many orders for his new double truck table especially designed for eight wheel cable and electric cars.

THE ST. LOUIS CAR Co. have been filling the order to equip the new electric line at Springfield, Ill., and have done so in a manner which reflects much credit on their work. President Schuck, of the electric road, says: "These cars are veritable palaces on wheels and will be the finest cars in service in this State."

THE HALE-KILBURN MANUFACTURING Co. are sending a neat catalogue to the street railway men, showing their many styles of side and cross seats for electric, cable, suburban and all kinds of steam and street cars. It also contains a cut of their immense six-story factory, and attractive views of their various styles of seats.

THE NORTHERN CAR Co. made a shipment of combination cars to Sioux City this month, and instead of placing them on flat cars, they were hauled to their destination over the steam road track attached to the end of a freight train. They reached their destination safely, and were greatly admired, as well as the new method of shipment.

GEO. W. WELLS, General Manager of the Duplex Railway Chair Co., of Worcester, Mass., called on us on his way home from a western trip, in which he sold 40,000 of his duplex chairs. He reports the prospects never better for a large trade in all kinds of street railway material throughout the entire country the coming summer.

THE PRICE RAILWAY APPLIANCE Co., of Philadelphia, have just issued a neat circular, setting forth the advantages of their rail and chairs. It is neatly gotten up, and clearly describes the many valuable points. President Garrett and Treasurer F. C. Hartshorne of that company have recently made a very successful trip through the southwest.

THE EICHEMEYER FIELD Co. has been incorporated with a capital of \$1,000,000 to manufacture electric railway complements. Their principal place of business is Yonkers, N. Y., and the trustees are Samuel Shethan, of New Castle; S. D. Field, Stockbridge, Mass.; H. S. Teinel, E. A. Nichols and Prentice Shethan, New York City.

THE ELECTRIC MERCHANDISE Co. is spreading out like the branches of a green bay tree. Recently Manager Mason received orders for electrical street railway supplies from Amsterdam, Switzerland, and another from Borneo, from some one who, if the order is delayed on the way, will without question be one of the wild men of that country.



SUPT.—“Begone! Go, take your time and let me never see your face again.”

THE WESTERN SAND BLAST Co., of Chicago, whose extensive works at the corner of Jackson and Clinton streets, are among the most interesting industries in the city, have furnished ornamental and lettered colored glass to a large number of street railways. For this work they have every facility, and are constantly bringing out new and appropriate designs.

THE STAR HEADLIGHT COMPANY. The office of this company at Rochester has been moved to 13 Allen st., where they are better prepared to care for their extensive trade. They have also established special agencies in the principal cities, and Mr. Glazier, their President, reports for January and February the largest trade they have ever experienced.

THE MCGUIRE MANUFACTURING Co., of Chicago, are very much pleased with the business of February. That being the best business the company has ever done in one month. Vice President Cook reports sales for 256 trucks made on his recent trip to Providence and other eastern cities. “Surely a record breaker.” It speaks much for the popularity of this western truck.

THE SHULTZ BELTING Co., of St. Louis, are as usual full of orders, especially for their new link-belts. Those being shown by Mr. Shultz at the Electric Light Convention recently held at Providence received the attention of everyone interested in belting, and the general expression was “I don’t see how it can ever wear out.” A letter herewith published will show the uses of these belts.

THE AMERICAN RAILWAY REGISTER Co., of New York, are nicely settled once more after the fire in the Broadway Theatre some days ago. Luckily they were only damaged by water, and are now proud of their appearance, everything being re-placed by new. Luckily the factory adjoining the office was not harmed, causing them no delays, and they report to be full of orders for spring delivery.

C. E. Loss & Co., electric railway contractors, at 113 Monroe street, Chicago, have so improved their facilities for work in this line that they are prepared to negotiate for bonds and do the entire equipment work for new roads. Among the electric street railways recently built by them are those at Adrian, Mich., the Calumet Electric Street R’y at Chicago, and the Pullman Electric Street Railway, at Pullman, Ill.



HE GOES—And changes his appearance.

THE WESTINGHOUSE ELECTRIC MANUFACTURING Co. report the demand already very large for their new motor, a description of which we make in this issue. This new motor, it is said, is becoming very popular, and is receiving the hearty endorsement of all who see it. They are now sending them to many cities in which their old systems are in use, and are soon to commence equipping some new lines from which they have recently received orders.

THE BABCOCK & WILCOX Co., of New York have just finished equipping several large street railway companies with their tubular boilers, among which were 2,000 H. P. for the Minneapolis Street Railway Co.; 600 H. P. for the Duluth Street Railway Co.; 12 H. P. for the St. Paul Street Railway Co.; 1,600 H. P. for the Consolidated Street Railway Co., of Cincinnati. This company anticipates a very large business for street railway work in the coming spring.

THE ELECTRIC MERCHANDISE CO., of Chicago, have now added another important department to their already complete lines of railway supplies. They are now the western selling agents of the Tramway Rail Co., of Pittsburg, and have already forwarded several good orders. With Manager W. R. Mason to push this rail, the railway men of the west will not be long in learning of its good qualities.

THE ELLIS CAR CO., at Amesburg, Mass., are unusually full of orders, a number of orders having been received from Western cities, besides large orders from the New England States, among the largest of which were from the West End Road in Boston; and they also have under way a large number of open cars for stock, a plan which has proved itself very advantageous. Oftentimes, when a company are in need of summer cars upon short notice, this company by so building in advance are able to deliver in less than a week's time.

AMONG the many recent orders received for cars by the Pullman Car Company are those for Helena Electric Railway Co., of Helena, Mont.; twenty-four double truck open and close cars combined, for the Tacoma Street Railway Co., Tacoma, Wash.; five double-deck cars for E. C. Sessions, of Oakland, Cal.; forty double truck electric cars for the Pitsburg, Alleghany, Manchester Traction Co., of Pittsburg, Pa.; twenty-five closed motor cars for the West End Street Railway of Boston, and a number of small orders in all parts of the country.

AS USUAL, the St. Louis Car Co. are crowded with orders, having orders at present for over 300 cars on the books. Among their recent orders are those for 11 cars for the Og-



SUPT.—“I rather like your looks; report to the foreman for duty, we happen to need a man this morning.”

den City R'y of Ogden, Utah; 26 for Dallas, Texas; 28 for Little Rock; 6 for the Rapid Transit Co., Salt Lake City; 25 for San Antonio, Texas; 12 for Houston, Texas; 6 for Richmond, Ind., and a number for Victoria, B. C., this being the second order from that place within a short time, which speaks well for the quality of their work.

THE FULTON FOUNDRY of Cleveland report the sale of their new steel tire car wheel very large and gaining in popularity each day, having been adopted by many of the largest roads in the country. This company is also making a full line of cast wheels besides gear and pinions of all sizes for the electric systems, of which they report a very large sale. It is stated that the East Cleveland R'y Co. in their city have recently adopted their new patent draw bar, and it is being used by other roads in the country.

THE BALL ENGINE CO. have greatly increased their facilities and are now better prepared to handle their large and increasing business than ever. Among the many orders received lately are those for five 60 H. P. engines to drive electric welding machines for the Johnson Co., at Johnstown, Pa.; two 150 H. P. tandem compound engines for the Southern Car Co., at St. Louis, Mo., making the second order received from that company recently; four 150 H. P. engines for the Central Passenger Co., of Louisville, Ky., besides many for electric roads and other purposes.

LAMOKIN CAR WORKS.—Through the courtesy of Mr. G. E. Pratt, Contracting Agent, we were escorted from Philadelphia to Chester, where are located the shops of the Lamokin Car Works, and were surprised to find there such an example of what energy and push will accomplish. This new company, although only two years old, has made such advancement that it has become necessary to build large shops in addition to their already extensive works, and it seems quite probable that they will soon be ranked in size among the largest, and the duplicate orders they are receiving speaks well for the quality of their work. J. B. M. Hirons, manager, and C. H. Cochran, superintendent, are both experienced car builders of many years, while Mr. Pratt, formerly with the Pullman Co., is no novice at the business, and we predict for this company a prosperous future.

THE CALORIFIC VENTILATING AND HEATER CO., of Chicago, are full of work at their factory, having received orders for a large number of their heaters, several of which have been given with a view to having their heaters placed while the winter cars are being shopped during the summer. This heater has been adopted by the North Chicago and West Chicago Railway Co.'s, and is being placed as fast as can be made. President Myers having had many years experience in the manufacturing of stoves gives his personal attention in looking after a large force of men whose work it is to place the heaters in the cars. The record of this heater has been equally satisfactory to both patrons of the line and the company. The well-known President writes as follows:

COLUMBUS CONSOLIDATED STREET RAILWAY CO.

COLUMBUS, OHIO, Jan. 29, 1891.

Calorific Ventilating and Heater Co., 79 Kinzie St., Chicago.

GENTLEMEN: Replying to yours of the 20th inst. I take pleasure in saying that the heater has continued to give entire satisfaction. The winter so far has been very mild, but from the test we have made I believe they will heat the car sufficiently during the coldest weather.

Yours truly,

A. D. ROGERS, Pres.

PERSONALS.

C. L. BOWLER, manager uniform cloth department of Sawyer, Manning & Co., New York, made a pleasant call the past week.

COL. BEECHER, of Beecher, Schenck & Benedict, general managers of the American Casualty Insurance and Security Co. is in the city for a few days.

C. G. GOODRICH, general manager of the Minneapolis City Railway Co. has purchased the well known Kasota Block, in this city, for \$168,000. The trade was closed in three days.

A. G. WELLINGTON, secretary of the Griffin Wheel and Foundry Co., has returned from an extended and successful business trip through the South, in the interests of his company.

FREDERICK SARGENT has been appointed consulting electrician to the chief of construction of the World's Columbian Exposition, a position for which he is eminently qualified from long experience as an electrical engineer of high standing. Mr. Sargent has been prominently connected with large enterprises, and for the past few months has been established here as an independent electrical and mechanical engineer. His appointment gives general satisfaction, and we join with others in congratulations.

MR. S. T. POPE, the new superintendent of the Chicago City Railway, is a Bostonian and was educated as a mechanical engineer at the Massachusetts Institute of Technology. He came to Chicago in July, 1879, in the employ of the C. B. & Q. R. R., with which corporation he remained ten years, filling various positions in the engineer's mechanical and operating departments. When he left the road he occupied the position of Train Master at Chicago. He then became General Superintendent of the Duluth & Iron Range R. R. In January, 1890, he was appointed Assistant Manager of the Minnesota Iron Co., who operate the third largest of the Lake Superior iron mines. He resigned this last named position to accept the superintendency of the City Railway, a field which will give abundant opportunity for the display of the fine executive ability with which his former connections complimented him.

Koch's Lymph.

DR. KOCH'S lymph will doubtless prove a great boon to suffering humanity, but it is yet in the experimental stage. The remedial value of the waters at Hot Springs, Ark., has been demonstrated. This great health and pleasure resort is reached directly via the Wabash road. Compartment sleepers, Chicago to St. Louis, where direct connection is made with a double daily line of sleepers for Hot Springs. Berths reserved through,

MOBERLY, Mo., expects to have ten miles of electric railway before the close of this year.

Health vs. Fashion.

TO be fashionable, one must frequently violate the laws of health. It is both fashionable and healthful to go to Hot Springs, Ark. The Wabash road is the favorite line to that great winter resort. Compartment sleepers Chicago to St. Louis, where direct connection is made morning and evening with a double daily line of sleepers to Hot Springs. Berths reserved through from Chicago.

FOR SALE.

ONE TWO HORSE SWEEPER—Almost new, but found to be a trifle short for our gauge, which is 5 ft. 2½ inches. Address, B. F. OWEN, Pres., Reading City Passenger Ry Co., Reading, Pa.

HYDRAULIC WHEEL PRESS.—As good as new, and in perfect order. For sale at a bargain. DORNER & DUTTON, Cleveland, Ohio.

STREET RAILWAY FOR SALE.—In a live western manufacturing city of 25,000 people. Dividend paid in 1890, six thousand dollars. The right to use electricity. Charter has 88 years to run. Price \$75,000. Address H, care Street Railway Review Office.

Electric Railways.

C. E. LOSS & CO.,
113 Monroe Street,
CHICAGO.

Contract for the Building and Complete Equipment of Electric Railways.

Correspondence Solicited.

References Furnished.

THE HALE & KILBUN MFG. CO.

PHILADELPHIA,

EXTENSIVE MAKERS OF

PATENTED

STREET CAR SEATS,

Made with or without Springs. Covered in CARPET, PLUSH or RATAN.

OUR NEW ELASTIC SLAT SPRING SEAT IS THE CHEAPEST AND MOST COMFORTABLE WOODEN SEAT EVER MADE.

Our Celebrated Steel Top Spring Sections used in Upholstering

THE BEST FOR COMFORT,
FOR DURABILITY,
FOR APPEARANCE.

Hundreds of References. Thousands in Use. Estimates and Particulars cheerfully furnished.



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F. L. KENFIELD,
Business Manager.

CORRESPONDENCE.

We cordially invite correspondence on all subjects of interest to those engaged in any branch of Street Railway work, and will gratefully appreciate any marked copies of papers or news items our street railway friends may send us, pertaining either to companies or officers. Address:

THE STREET RAILWAY REVIEW,

334 Dearborn Street, Chicago.

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VOL. I. APRIL NO. 4

We will pay \$15.00 for the best article by any person engaged in Street Railway Work, on

"The Best Method by which a Street Railway may conduct a Parcel Delivery Service."

Article must not be less than 1,000 nor more than 2,500 words in length, and decision will be rendered in favor of the most practical and complete plan, rather than for literary qualities.

Manuscript must reach this office on or before June 15th.

NOWHERE has rapid transit had greater obstacles to contend against than in Baltimore, but some few people are experiencing a change of ideas, for the values of property have advanced from 30 to 50 per cent along the line of the new cable road there.

PRESIDENT JOHN W. McNAMARA, of the Albany, N. Y., lines, has had considerable experience with snow-flakes this winter and after a careful analysis has come to the conclusion that snow-flakes contain a dividend reduction as well as water—and not the kind of water that gilt edge stock is watered with, either.

PITTSBURG may very properly be said to have been "all torn up" the past year, for the report of the superintendent of highways states that at one time there were eighty-seven streets undergoing a change by construction work of the various street railways of that city.

THE electric car has added years to the life of the people of Hannibal, Mo., for the new system makes a trip in just eight minutes which one year ago mule power required thirty to accomplish. Moreover, the cars are lighted and heated by the same force, while the business is as far in excess of what it was as the accommodations are better than the old.

THE newsboy no longer is one of the institutions of the Boston street cars. For a long time a news company had the exclusive sale of papers on the cars there,

and some three hundred boys were employed for that purpose. One of the conditions was that the news company should protect the railway company against all damage suits, that might be brought for accident to any one riding on the badge with which the boys are furnished. This arrangement it seems suited the news company well enough until the other day, when they were called upon to respond to the claims made by a boy injured through his own carelessness while wearing their badge. Now the deal is off, and General Monks has petitioned the Board of Aldermen to pass an order prohibiting boys boarding the cars for the sale of papers.

THE coin receipts of the New York Broadway line last year amounted to 700 bushels. This is a very fair acreage, and had it not been for the late rains and the appearance of that pest known as the dead-head the yield would certainly have been larger. The prospects, however, for a big passenger crop this year are now very promising, and if the legislators will only keep away the chances are even that some of the mortgage on the old farm may be wiped out in time for Thanksgiving.

THE Philistines are abroad in the land. Our proud State of Illinois, deferentially termed the "Sucker State," now joins California, Massachusetts and Minnesota in street railway legislation. By some strange paradox our Philistine is named David. At the last election, one named David Hunter, was torn by a relentless constituency from the pastoral scenes of his peaceful flocks and carrot plantation and sent up to the capital to make laws. Now when David arrived at the town where the governor resides, he found so many laws that needed making he was somewhat at a loss to know which crop to tackle first.

One morning David left the tavern and indulged in the extravagance of a street car ride to the State house. On the way he saw a gentleman rise and give his seat to a lady. He saw the man seize a strap and pull vigorously thereon. His loyal soul welled up within him with great big welds. He knew not that the man was consumptive and that the doctor had prescribed just such exercise. David remembered, however, that the very cows in his barn kicked at him when they stood, and he could not call to mind an instance where his cows had kicked except when standing. This grand conception of humanity and nature kicking only when they stood, sent a big tap-root deep into his heart. David called to mind also the time when as a boy, his father had taken him to the city, and how he was obliged to stand while an old fat woman occupied the seat where he wanted to look out of the window and see the big houses go by. This, then, was that dreadful microbe that gnawed and was getting in its work on the digestive organs of the body politic. Are not street cars iniquitous institutions any way? Should they be tolerated at all in this once free country? thought David, and every time the clock struck he fancied he could hear the ring of the conductor's register as he extorted fares from the helpless victims, and then he remembered the vicious ends to which the

street railway people in Chicago had resorted to trap the public. There the passengers could ride nine miles for one base five cent fare, and even get a free transfer to a cross line extending two miles more.

The cars have been made attractive within and without. They were comfortably warmed in winter, and nicely lighted, and in summer an entirely different set of equipments was furnished; they were propelled by new mechanical powers costing millions of somebody's money, and hurried the people home at ten and fifteen miles an hour, thus forcing them into the bosom of their families a full half hour earlier than in the old time days. Many, too, had been on this account beguiled into going out where there was grass and generous yards and where they were compelled to breathe fresh air. For all these sins a day of reckoning should now be set. The thistles should be burned and the burdocks grubbed out. The only way to prevent people riding in the cars was to make it impossible for the companies to operate. How should he do this?

The Hunter street car bill may be considered as including one big ring and five acts. The first act provides a maximum fare of five cents for one ride between termini of all surface and elevated roads. This is specially intended as a premium for extending present lines. The second provides a fine of from \$200 to \$500 recoverable in the courts, for the collection of more than a three cent fare from any passenger not provided with a seat. The third great act provides a \$10 fine collectible from conductors for violation of item second. Section four allows the passenger the \$500 noted above if he can prove his case against the company.

But it is reserved for act five to tassel out the silken threads that are intended to strangle. It provides that when a company has been convicted a fourth time of collecting more than three cents without furnishing the passenger a seat, that such company shall be deemed to have forfeited all its rights, franchises and privileges which it may have acquired from the city where it exists.

Were any such provision constitutional, and could be enforced, it were an easy matter to close out every street railway in the state in a few hours. Men can be found in plenty who would enter the employ of the company only to betray it, and intentionally violate the law, nor could it be proved against them. To furnish a seat to all who desire to leave the center of Chicago for only one hour following the close of business would require five thousand 28 foot cars, seating thirty passengers each. These if placed end to end would make an unbroken line 26½ miles long, and would cost \$7,500,000.

In our February issue we showed the actual impossibility of providing seats for all in large cities during the rush, and to carry at three cents, would, in Chicago, with its immensely long hauls end in speedy bankruptcy. The measure would engender endless strife between passenger and conductor, and it would seem as though the author of the measure never could have left his calves and hens before. Instead of assisting the public it would have a positive effect in the opposite direction.

The generally mild weather which has characterized the past winter has resulted, as was feared, in a large amount of sickness chiefly bordering on the "grip" and tending to pneumonia. It seems to have been more severe in the cities bordering on the lakes than on the seaboard, but has been all too widespread and fatal. Street railway employes, by reason of their necessarily exposed work, have suffered in large numbers, but with a very much less per cent of fatalities than in almost any other occupation. In Chicago there have been the past month as many as five hundred street car men sick at one time. Clear, bright weather seems to be the only radical relief from the prevailing trouble.

In this issue are described and illustrated two improved forms of street railway motors. The most cursory examination will show the great advance over what was the best available only a few months since, and is another fulfillment of confident expectations so firmly maintained by leading students. When we consider the years of railroading which were allowed to pass before the air-brake, the safety platform and the sleeping car were worked out, words almost fail to express the achievements and practical advance made in electrical railway lines. Even discounting the facilities existing now which were wanting then, the comparison reveals an amount of earnest, intelligent effort unequaled in any other branch of modern science.

THE Massachusetts legislature was recently requested to appoint a committee to report on a fixed schedule by which the various railway companies should be governed in their car service; the object in view being to secure more cars at periods of heavy riding. A law could not be framed which would have elasticity enough to better either the public or companies in this respect. Of course all managers anticipate the morning and evening "rush" and as far as possible provide for it—but even this varies in volume with different days in the week, and it also occurs earlier or later certain days in the week. For instance, in some cities there is heavy homeward riding on Saturday at one o'clock, in others at three, in others at four, five or six. Some cities experience heavy matinee riding, but the day for such attractions is not the same in all cities. The above are suggestions of a list that could be mentioned, of causes that go to make any attempted legislation of this character thoroughly impracticable. The public or the few who are always demanding the impossible, little know the difficulties surrounding the desire to give a good service. Best results will only and ever come from the constant watch of the manager himself, who, to accomplish best results must watch the travel as an engineer watches a steam gauge, and check the number of cars here and increase there as necessity requires. An iron clad law would require a given number of cars on a certain street at a certain time, which if complied with would prevent the distribution of cars to meet daily requirements. There are many local conditions that general legislation cannot improve, and this is one of them.

THE WORLD'S FAIR will be of great value to street railway enterprises all through this western country, for it will draw people from the East who have never before visited this section. They will then see for the first time its wonderful resources and phenomenal growth, and realize, as is impossible save from personal inspection, the present and future possibilities of this great section. The western manager who goes East to place his securities finds a most disheartening, and to him almost incomprehensible lack of appreciation of what the West has and is. The many wildcat schemes that eastern investors have followed to their sorrow have worked an undesired hardship on many really legitimate and profitable enterprises, and this lack of confidence can never be fully overcome until capitalists shall have visited the West, and by so doing realize what it is.

CAPITAL which formerly sought investment in railroad securities is more and more being diverted into street railway bonds. There is comparatively little speculation in street railway stocks, and the money which goes into them does so as a permanent investment. The reduced profits that have attended the operation of most steam roads, and their enormous indebtedness when compared to the property which a street road has to show for its securities, coupled with the fact that the business of the latter is much more uniform and certain, has attracted capital as never before. The abnormal growth of cities, which has been greatly accelerated by modern rapid transit, has also been a prominent factor in bringing about this favorable opinion which has stimulated investment.

CREATED TRAVEL.

THE traffic managers of all steam roads freely admit the profit accruing to their lines from what is termed created travel, and are ever on the alert to devise schemes and avail themselves of every opportunity to foster it. To this end they spend largely, advertising the attraction of every new feature of interest reached by their road. Winter excursions to the south and summer trips north, special rates on certain days to lakes and picnic grounds and other rates to special parties. They go farther and lay out attractive grounds on river bank or charming lake and the revenue derived in return is very largely a profitable one.

Already many street railroads have seen the possibilities in this branch of their service; others are content with the natural Saturday and Sunday riding to parks. But almost every road can greatly further enlarge this class of travel by a very small outlay if intelligently and judiciously expended. If there are band concerts on certain days in the public parks, print small dodgers or "diamond" cards and hang them in all the cars, for a day or two previous, giving the hour at which the concert begins; publish the programme to be rendered on the occasion, and in every possible way set forth the attractions. Many people would be glad to go if they are thus reminded of the event, who would otherwise have forgotten all about it. If there are no such musical attractions furnished

by the city, canvass the question with the confectionery and ice cream men in the neighborhood adjoining the place of resort and join them in a subscription which will defray the expense of the attraction. It is very easy to raise a surprisingly large amount in this manner for such purposes, and musical organizations are glad to make favorable terms for a season's contract. If there is no local band available help to get one organized.* Local attractions are always strong ones, and will often draw a crowd where outsiders fail. Vary the performances occasionally. For a few dollars a stereopticon exhibition can be secured and the views cast upon a large screen in a park afford a delightful summer evening entertainment. The views can embrace as wide a range as may be desired: travels abroad and at home, and the entire expense be brought within fifteen dollars an evening. In connection with this secure a few advertisements to be thrown in occasionally between other views and the revenue from these will often be sufficient to defray the entire expense. If desired, a lecture descriptive of the scenes may accompany them although the public does not as a rule care much for lectures in an outdoor entertainment, preferring to enjoy refreshments or engage in conversation than listen attentively. There are in all good sized cities parties who can be secured to give such views, and when their own are exhausted can readily rent new and fresh ones from supply houses who carry an unlimited variety in stock for that purpose. The suggestion in this is not to invite the public to a worthless, cheap and uninteresting entertainment, for that would be fatal to the accomplishment of what is aimed at. But let the attraction be in every sense good and each succeeding one will draw more and more. A good idea would be to occasionally vary the band concerts and views with a chorus of as many voices as can be secured, to render popular airs, selections from the latest operas, and if possible secure one or more pieces of a local nature that will tend to further increase public interest. In some places it will be found difficult to secure necessary consent from park commissioners for the use of the grounds. But this is only in a few of the largest cities, for in most places it will be found that the officials will not only welcome such offers, but co-operate in promoting and making the plan successful. Where no park is available some suitable ground located at the end of a line, may be rented and fitted with board seats at slight expense. The returns from the sale of privileges sold to refreshment stands should offset this item; and the ride over the line in a warm summer afternoon or evening is in itself pleasing, particularly if the motive power be other than animal. The entertainment comes at a time of the day when cars can be drawn from other lines and made to do extra service.

We know of a few railway companies who have already found it very profitable to lease or purchase grounds at the end of some line, and have there laid out walks, seats, refreshment stands, swings, and where water of sufficient size is available furnish boats which are rented at so small a charge as to place them within the reach of the poorest.

In an enterprise of this kind one important feature must not be lost sight of; and that is on no account to allow the prices charged for refreshments and such other accommodations as must be charged for, to be such that they will act as a practical prohibition. Make just as much as possible free and for what a charge must be made fix it as near a self sustaining price as can be safely done. In this way will a large travel be built up, and look for the main returns from this alone.

We have but touched on this question, and as the foregoing is merely suggestive, every energetic manager can better work out the details to suit his own city and public; but a very little careful investigation of the subject will prove both interesting and surprising, and its possibilities much wider than at first thought would be expected.

Another feature of summer car service that can profitably be encouraged is that of chartered cars for Sunday schools, Public schools and special parties. Make a rate on the basis of so much a mile for the round trip for the car, and a sliding scale where a larger number of cars are required. It can easily be arranged to move such parties at an hour which will utilize the extra cars as they turn in from the morning extra runs, and thus secure their use at a time when they usually go into the barn. A good plan is to take picnic parties out in a body, and as it is difficult to furnish the same number of extra cars all at once for the return in the evening, sell a sufficient number of tickets to the managers with which to supply the members of the party. This will be found very advantageous to all; as the company can perform the service necessary to return the party with a small number of extra cars, and also does not compel all to return at a set hour. There are always many who desire an early return, and others who prefer to remain out until nine or ten in the evening. By this ticket arrangement all are allowed their own choice in the matter and the regular car service is made to take care of a large proportion of the crowd.

EVEN the staid old city of Washington, D. C., has experienced quite a boom in real estate from the construction of the new street railways in that city. A single instance of this may be cited in the case of the corner of F. and Thirteenth streets, which a few days ago was sold at an advance of \$125,000 over the purchase price of six months ago, and still some people there want to reduce the price of the street car fare.

A BALTIMORE paper bewails the fact that on certain lines in that city standing room on the cars is at a premium, and not always available at that. And yet Baltimore has made a long and vigorous struggle against rapid transit, and made it almost impossible for the companies there to move hand or foot towards better service. A change of sentiment is working and the cable road there will quicken matters wonderfully, and if anything is left of the electric ordinance as it struggles through the city council it may even be that in the future there will not only be standing room, but seats and plenty of them on their cars.

PERSONALS.

W. H. SHAFER, general manager of the City Railway, Richmond, Ind., favored us with a call. He has been increasing his rolling stock to meet the increasing travel.

A. H. ALLEN, formerly district engineer of the southern office of the Westinghouse Electric & Manufacturing Co., has accepted the position of superintendent of the Charlotte, (S. C.) Electric Street Railway.

W. P. RAYLAND, who has been superintendent of the Rome, New York City R'y for the last four years, has been appointed superintendent of the Newburgh Street R'y and will have charge of both lines.

THOS. H. GIBBON, president of the Gibbon Compound Rail Co., when in Chicago made our office his headquarters. He appointed Avery & West of this city western agents, and reports a very successful trip.

EDWARD E. HIGGINS, of Buffalo, N. Y., formerly of the Thomson-Houston Co., and G. W. Atterbury of Litchfield, Ill., recently of the Westinghouse Co., are now with the Short Electric Co., and will prove valuable acquisitions to that enterprising institution.

H. C. WHITNEY, the well known and able journalist, and recently engaged in electric lines, has joined the *Electrical Age*, and will represent that paper between New York and the Rocky Mountains. His headquarters will be at 1,001 Opera House Block, Chicago.

MENARD K. BOWEN, who has been superintendent of the Kansas City Cable R'y, for four years, has resigned, to take effect April 15th. He has been connected with the road for six years, and during his superintendency the mileage has been increased from five to twenty miles, and the road takes a place among the best known cable lines in the country. Close application to his office has resulted in poor health, and for the present he will rest and travel through the south. He has an offer from a large company in the east, but will probably decline it and shortly engage in manufacturing. Mr. Bowen is counted among the most capable cable men in the country, and has not had a vacation in seventeen years.

FRANK X. CICOTT, who has had many years experience as general agent for electric railway supplies on the Pacific coast, and who has been largely interested in street railway matters for a long time, has assumed the management of the rail department for the Electric Merchandise Co., of Chicago. Mr. Cicott brings to his work a long and practical experience with the wants of street railway men, supplemented by a recent and thorough inspection of the tramway systems of Europe. His articles in the STREET RAILWAY REVIEW on foreign tramways have been read with much interest, and our readers will find Mr. Cicott a very delightful gentleman to meet, and the Tramway Rail Co., of Pittsburg cannot but become well known to the western trade through the efforts of their active western agent.

REPORTING ACCIDENTS.

ONE. Howe, of Cambridge, has an order now in the hands of a Massachusetts legislative committee for a report on a bill which, should it become a law, would require a street railway company to promptly report in writing every accident that may occur in connection with the operation of its cars. Just why this bill does not go further and in the interest of reciprocity require the citizen to report in writing to the Health Department every time he may indulge in unripe fruit and by so doing perchance get a colic; or stub h's toe on a protruding nail and accidentally embrace the sidewalk, is not stated. Certain however, is it, this Howe is no true friend of either the public or the corporation. If his measure be born through ignorance a very little exertion on his part to enlighten it could not fail to declare to him the error of his ways yet would this not make him a true friend but rather a well meaning though misguided one.

The *Boston Post* admits its lack of enterprise, by stating that only a small portion of the accidents that occur ever get into the papers, and lays great stress on the better protection the public would receive by the passage of the bill. In just what way a column article describing in detail the fact that Mrs. So and So insanely jumped off backwards in the middle of the block from a car moving at full speed; and without giving any signal to any one on the car; and that the result was attended with the usual disturbance of garments and perturbation of mind which all females experience when endeavoring to point at the sun with both feet;—we say in just what way the public is thereby benefitted and protected is not entirely self-evident. Such accidents, and there are dozens of them daily in every large city, might for a while prove interesting reading, but as to having any restraining effect on the other sisters when a similar fit seized them is absurd. Even the publication of accidents of more serious nature could scarcely be seen to afford additional safety to any one.

* * *

That accidents occur in the operation of street railways, whether by horse, cable or electricity, none will dispute. That more or less painful experiences to certain persons will always attend the operation of vehicles of any kind is likewise not to be denied. In fact some people cannot travel alone in a forty acre lot without coming to grief, and to get hurt seems to be the chief end of some men. Frequently the agents of the railway grossly violate orders and the company becomes criminally negligent thereby, though wholly blameless morally as to any such intent. That managers court such undesirable circumstances as a part of their administration is not true, even though some people feign to believe it. Neither is he a cold-blooded and untamed individual whose greatest ambition is to show a greater damage account than his competitor on the next street. He does not revel in gore although the idiotic actions of some law-makers make him want to. He is not "at home" to every person who claims to have

barked their shins on one of his car steps, simply because such persons are always the most desirable and agreeable ornaments of society. His faith in man, and woman too, is seldom strengthened as the claims of nine out of every ten cases are found on investigation to be honey-combed through and through with evidences of the most deliberate fraud.

* * *

The bill as proposed could be of service to but one person, and that one is the shyster lawyer, an individual in man's clothing, but inwardly a ravening shark, devoid of either conscience or manhood. The Judas of his profession, despised by none more than by judges and reputable members of the bar. His is the one class which would be benefitted by such a law. As it is now he arises early in the morning, scans the paper for reports of every kind of accident and is at the bedside of the unfortunate often before the surgeon has finished dressing the wounds. Here his fine work appears, posing as one who witnessed the accident and has come to see justice done. His indignation against the company knows no bounds, and his arguments are freely supported by accounts of cases won, and large damages secured to his clients. The patient though honest is perhaps weak and half unconscious and signs the papers bringing suit before he knows it; or if dishonest gladly seizes the opportunity. In other cases, the shyster poses as a dear friend of the deceased and invades the sanctity of death itself and the frightened and helpless widow is dragged into bringing suit with scarcely any knowledge of having done so. In Chicago, one of these knaves goes so far as to carry with him a scrap book showing cases he has had. They also take such cases on shares, themselves advancing, where necessary, the usual court fees. By these means, the client where he has an equitable case, is at the outset kept away from any fair offer which the company may desire to make.

* * *

The impression, so widely accepted, that street railways are not disposed to act in an honorable manner towards those injured on their cars has long prevailed and been fostered by a careless press. The actual facts are, that where a company is plainly liable or where they are partially so, they are always ready and glad to do the right thing and much prefer that the claimant in such case should receive the entire amount rather than have it wasted in court costs or divided with some rascally lawyer. The records of every large railway corporation shows that fully 90 per cent of suits brought have no foundation whatever, either being cases where the company is in no possible particular liable, or not unfrequently never existed at all.

* * *

As a sample of these infamous schemes to bleed the company, the following, known to the writer, may answer to illustrate others little better, that could be named by the score. When the cable road was opened in Chicago and the speed changed from four to ten miles an hour those

at that time opposed to the system said it would be highly dangerous. Taking advantage of this, a tailor sent his attorney to the company's claim agent, stating he had been struck by a grip car and dangerously injured. The claim agent called and found the sufferer groaning in bed from bruises which had completely covered his entire side with black and blue marks. He could scarcely speak, and largely excited the agent's sympathy. The offer to send the company's doctor was vigorously declined, nor could the patient tell the name of his physician, but was able to suggest a sum for which settlement could be made. As it amounted to several thousand dollars, however, the agent not having that amount loose in his pocket was unable to close the trade. The man would take no less and should enter suit as soon as he could get about again, though he never expected to be a well man. The agent left, promising to call the next day. He then hastened to the company's surgeon and directed him to go at once and if possible make an examination, stating the case was a very serious one. When the doctor unexpectedly arrived and inquired for the patient, a vigorous bustle in the next room was heard, and after a few moment's delay the doctor's suspicions were aroused. He forced his way into the bedroom. The patient was breathing hard and moaning in evident pain, but would not allow the doctor to touch him. Glancing on the floor, one shoe only was to be seen with the patient's clothes, and with one sweep the doctor stripped the clothes from the bed. The other shoe was on the injured man's foot, but the collection of discolorations which covered his side astonished the doctor and for a moment phased him. Whenever the patient was touched he fairly howled with pain, while his good wife talked in a threatening manner about cruelty and sending for somebody to cast somebody else out. Nothing daunted the doctor proceeded to bathe the zebra-looking object with a sponge dipped in alcohol, whereupon a sort of grand transformation scene ensued, during which the doctor succeeded by active work in removing fully one-half the results of the alleged battle with the grip, and would have made a clean sweep and permanent cure had the patient not jumped to his feet and burst into a fit of rage. The doctor suggested a year or two in an institution supported by the state, where the inmates wear striped clothes, and the tables turned and the rascal was on his knees begging for mercy and pleading not to be exposed.

* * *

Another and still more desperate case was that of apparently a very nice married lady, who sent to the stock yards and secured a quart of beef-blood, with which she covered her body and the bed-clothes and having done so sent a messenger in great haste to the company, claiming a hemorrhage resulting from being thrown from a car. It required several day's active detective work to ferret out the whole plot, which was eventually laid bare, whereupon the party suddenly left town.

* * *

These cases from actual record are given merely to show to what extreme people will go who have no case at all.

Some, who receive injuries other than from the cars, make claims for injuries which do exist but have not the remotest connection with the company. Others are insignificant until fanned into flame by some designing lawyer. Suit was recently brought in a Chicago court for \$10,000 damages for the loss of a leg which had been already twice paid for by two steam roads, and in which a doctor, a lawyer and the owner of this amputated limb were in league to defraud. Strange as it may seem, it was only after long and indefatigable search that the plot was discovered, and then after the company had offered to settle for a sum, which though large was less than the amount sued for. From experience the writer knows that this fraudulent litigation is attempted to an extent almost beyond belief, and now, to add to it and stimulate the same by requiring companies to report every accident, which means publish it broadcast, is unjust, as it simply encourages and makes easy a nefarious and infamous practice which has assumed alarming proportions.

If a person has been injured on a car it is a matter between him and the company alone.

No institution in a city is as well known as the street railway, and it is the easiest of matters to get in communication with the proper officers and enter claim in a proper method; but to make people unfamiliar with such operations, the victim of the merciless schemes of these legal pirates is not "for the better protection" of the public but rather "for the better robbery" of both the public and the corporation.

In striking contrast to the statements of those people who not only do not know what they are talking about but wilfully misrepresent the facts when they do know, as regards the safety of the electric system, comes the report from the Albany (N. Y.) Electric Railway. President Pruyn recently stated that of the three million people who had been carried since that road started, they had yet to have a single accident to any passenger. The daily press of Philadelphia have worked unmeasured mischief by their columns of untruths which have set the pace for a large following of papers in the smaller towns of that State, who seem to get the most of their ideas from the Quaker city. The result has been that in several such places the citizens are to-day plodding along the same old gait that has been the rule for years, while the street railway companies have been prevented from making improvements so greatly to be desired. In not a few instances has there been altogether too likely a probability that the only arguments lacking to convince some people of the real truth as to the merits of the electric rapid transit have been arguments the chief points of which very much resemble a dollar sign. There was a time when many an objection now raised was an honest one, but the experience of operation has made such objections pointless, and some people seem to have gained their advice on electrical matters on the famous Josh Billings plan. Josh said, "When a man comes to me for advice I first find out what kind of advice he wants—and then I give it to him."

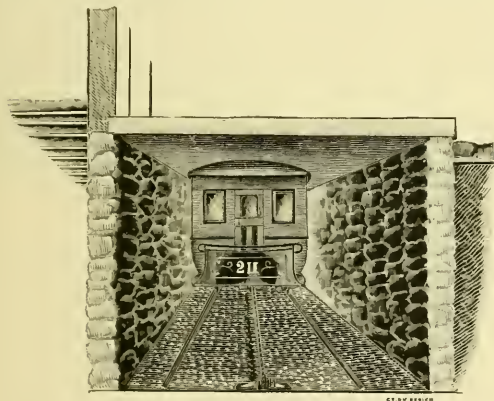
PROPOSED SIDEWALK CABLE RAILWAY.

IN these days every large city in the country has from one to a dozen new schemes for transit ranging all the way from two or three stories underground to more than as many overhead. While many of them are intensely impracticable, others are both interesting and meritorious.

One of the latest in Chicago is a company whose object is to secure a right of way for a cable road to extend under the sidewalk and on either side of the street. In this city the streets are so regularly laid out and so wide, and the sidewalks of sufficient width to make the plan much more easy of accomplishment than in many older cities.

Plenty of capital is said to back the scheme, and a survey has already been made for a line to start north, west and south from the business centre. An ordinance has been drafted, but probably will not be presented until the new council is elected.

The subway will have a roof of girders and stone, or iron gratings filled with glass, and will have a depth of 8 feet from sidewalk to floor. The subway will be 12



feet wide, and as the cars are only to occupy 8 feet, a passage-way of four feet will be left along one side. It will not be necessary to incur the usual heavy expense for conduit work, as the carrying pulleys can rest upon the floor and the cable remain exposed at all points. T rails would be used, and paving repairs, snow cleaning and obstructions on the track would be all absent, the three greatest disadvantages probably that surface roads experience in their track department. It is intended to make the cars from floor to ceiling 6 ft. 2 in., and of ordinary length.

There is no occasion to make the exterior of the cars other than very plain, but the interiors should be the best that can be secured and lighted with incandescent lamps, while the sub-way itself would be brilliantly lighted throughout its entire length. In summer the ride would be much cooler and in winter warmer than on the surface.

It is proposed to have cars stop at every street intersection as desired, same as surface lines, and a comfortable waiting room is to occupy space under the sidewalk of the cross street. Passengers enter the cars at the end on platforms as on other cable cars.

There are a great many very commendable features attending the scheme, the only really serious objection being, providing for water, gas pipes and electrical conduits which cross the proposed route at a less depth than the 8 feet. It is claimed, however, that these can all be depressed at the meeting points and while involving some considerable expense the entire construction would have all the advantages of a tunnel and could be constructed at one-fourth the cost. This plan would have one feature which a tunnel road could not have, and that is the basements at station corners would become almost as valuable for business purposes as those on the surface, and in time it would be an easy matter to protect the four foot walk with an iron lattice railing and thus afford a second sidewalk which though narrow would accommodate a large number.

Cars would pass upon one side of the street and return on the other, and could easily be brought to the surface when well out from business, if desired.

STREET CAR EXPRESS LINES.

MANAGERS whose lines are already or soon to be operated by electricity, especially those which reach the outskirts of cities, or tap suburbs, will do well to consider the problem of introducing a light freight service. We have referred to this question in a former issue and particularly of its successful and profitable working in Dublin, where the system has been in vogue several years. Many of our American companies would have to secure a change in their charter: others only the necessary permit from municipal authorities, and some already have the opportunity open to their reach. The expense would be by no means large to give the plan at least a trial, as an old passenger car could easily be converted into an express car, or one better suited to the purpose built at slight outlay. We have great expectations for the future of this branch of railway service and believe that when it is once fully appreciated, it will become general in a short time: and when that time comes, stockholders will regret having been so long blind to a profitable revenue that has been lost to them through the press of other matters. The express car can certainly be hauled at less expense than an express wagon, and as surely in one-half to one-fourth the time. There are no serious difficulties in the way and the system once established would doubtless grow rapidly. A central receiving station down town and distributing ones midway and at terminals of lines, would completely cover the city. For the purpose of bringing out the advantages and objections incident to this problem, we offer this month a prize of fifteen dollars for the article by anyone in street railway employ which will enumerate the best and most complete system of managing this traffic in large towns and cities. See offer elsewhere.

BURGLARS broke into the cable car house of the Haight street line, San Francisco. The vigilance of the watchman prevented the probable loss of the \$4,000 which were in the safe. Fifteen bullet holes were found in the building.

CHICAGO'S FIRST ELEVATED RAILROAD.

A MAGNIFICENT STRUCTURE—UNQUESTIONABLY THE FINEST IN THE COUNTRY.

CHICAGO has been so laid out with wide streets that cross each other at right angles, and its topographical divisions are such that as the city spread out and increased in size it did so on all sides save only that touching the lake. Street railway lines lead out in every direction, and increased travel was at first provided for with additional lines and cars from time to time. Later, cable roads starting from the business center formed trunk lines south, west, and north which drew trains of cars of the horse lines that branched from the cable line at intervals, and thoroughly distributed the people. The many steam roads put in a suburban service in all directions and thus good accommodations were afforded. But since the borders of the city were extended until there is now rapidly filling with population a district twenty-four miles long and fifteen in width, all embraced within its limits, the necessity arises for elevated transit which can furnish the long haul riders coming from points far out, a quick service and fewer stops than is forced on the surface lines.

The Chicago & South Side Rapid Transit R'y Co., has been at work on its plans since 1888, and pushing active construction work during the past few months. Its plan was radically different from other roads, for it incorporated under the general railroad act of the state and proceeded to secure a right of way by purchase where possible, and condemnation where necessary, of a strip twenty-five feet wide extending from Congress street, to the old city limits at Thirty-ninth street, a distance of a little less than four miles. This strip is on the rear of lots and next the alley

settlements by the company. This occupation of the premises on which the road is built furnishes a perpetual right of way, and what is fully as important, removes the cause for damage suits attendant on the erection and operation of an elevated road along a thoroughfare.



CLEARING THE RIGHT OF WAY.

Several large buildings of four and five stories were across the path, but these were cut through, and the line so far as completed presents a most attractive appearance, and its opening is awaited with impatience. Property abutting this alley has largely increased in value, and eventually a street forty feet wide will take the place of what would have otherwise remained a comparatively unused passageway.

FOUNDATIONS.

The foundations generally are about ten feet in depth and rest on a clay bank. The bed is of concrete and seven feet square and one foot thick, on which rest two stones $2\frac{1}{2} \times 5\frac{1}{2}$ feet, which hold the anchor bolts and distribute the weight over the concrete. From these stones a brick pier rises, five feet square at the base, four feet at the top, and three and one-half feet high. A blue-stone cap $3\frac{1}{2}$ feet square and one foot thick completes the foundation work and supports a cast iron base weighing 1,800 pounds,



THE COMPLETE STRUCTURE.

which extends the whole distance in a straight line. In connection with the condemnations, which have occupied nearly two years, it is interesting to note that the awards by juries have averaged less than the price offered for

in which the columns stand and are held in place by the anchor bolts, which are one and one-fourth inches in diameter and five feet long. There are two sockets twenty-one and one-half inches deep in this iron bed plate which

receive the two channels that compose the sides of the column, and all remaining space is filled with a mixture of iron filings and sal-ammoniac. The lateral distance from center to center of columns is twelve feet, except at stations, where they are spread to 19 feet 9 inches, to allow the longitudinal girders to rest on transverse girders and to make room for the station building. The longitudinal space between columns varies from thirty-five to sixty feet, but in most cases is forty-five feet. The girders are plate girders and the chords are made of angle iron $4 \times 6 \frac{7}{8}$ in., and the chords of the long span

more in depth than those on the Eastern roads. The foundations are so constructed that there will not be more than 1,800 to 2,000 lbs. per square foot on the soil under the concrete, and the clay bed, which has been found at a depth of only ten feet, is excellent and hard.

The bottom of the girders is not less than 16 ft. and the rails are 20 ft. above the alley grade. At Sixteenth street the road crosses a steam line, and here the bottom of the girders is 20 ft. above the street. A viaduct is also crossed at Twelfth street, and to accomplish this a grade commences at a point one thousand feet distant on



VIEW SHOWING GIRDERS AND LATERAL BRACING.

girders are $6 \times 6 \times 1 \frac{1}{4}$ in. The web plate is $\frac{3}{8}$ in. to $\frac{7}{8}$ in. thick and united to the chord angles by $\frac{7}{8}$ in. rivets placed from four to six inches apart.

GIRDERS.

The girders are strong enough to sustain a moving or live load of 1,000 lbs. per lineal foot per girder and a dead load of 270 lbs., which gives a sustaining ability of about 1,300 lbs. per lineal foot per girder, with a large factor of safety. The chords will not be strained more than 10,000 lbs. per square inch by the equipment to be used, but all the material has been actually tested to upwards of 30,000 lbs. per square inch as the elastic limit before being accepted, while the tests show an ultimate or breaking strength of fully 50,000 lbs. per square inch. This leaves the very large margin of 40,000 lbs. surplus strength per square inch. The girders are six inches

either side, by an ascent of twenty-six feet to the mile.

The girders vary from thirty-five to sixty feet in length, according to the spacing of the posts. A thirty-five foot girder is forty-two inches deep and weighs 7,000 pounds. A fifty foot girder is forty-eight inches deep. A sixty foot girder is fifty-four inches deep and will weigh about 9,000 pounds. Girders are secured to the top of the posts by bolts and rivets of $\frac{7}{8}$ inch diameter, and at every other span there are slotted holes in the lower chord of the longitudinal girder which permits of free expansion and contraction. The girders are braced by a system of laterals riveted to the chords, both at the top and bottom of girders, and connecting the two chords themselves in order to resist any swaying motion from the engine. Angle irons 4×4 in., at intervals of five feet, also stiffen the girders vertically and prevent buckling. A proper

quality of iron, when not strained beyond a certain limit, is practically enduring for all time if protected against rust.

COLUMNS.

The columns are composed of 15 in. channel bars, 150 lbs. to the yard, braced by a system of $4 \times \frac{1}{2}$ in. flat iron braces, the same as in use on Third avenue in New York, only heavier. The columns are 15 in. square, until within 3 feet of the top, at which point they gradually broaden out and form the spread top column, sustaining the ends of the longitudinal girders.

TRACK.

On the top of the longitudinal girder rests the track superstructure, which consists of hardwood ties 6x8 in. placed twenty inches from center to center, and are held to the girders by hook bolts, instead of being rigidly bolted to the girder, so as to permit the expansion of the girders independent of the track system. On these ties rest the steel rails, which weigh ninety pounds to the yard, and were made by the Illinois Steel Co. The rail joints are what is known as the Fisher bridge joint, which trusses the base of the rail and gives a uniformly even surface to the tread of the wheel as the joint is passed. Both rail ends deflect the same distance at the same time,

On each side of the steel rail is a guard timber six inches wide and eight inches high bolted to the ties, and which would effectually prevent derailment should wheel



THE PERSPECTIVE—FROM ABOVE.



THE PERSPECTIVE—FROM BELOW.

which prevents pounding. Joints are broken and the ends of the rails rest on an arched beam between ties. It is therefore a supported joint: the load comes upon the two shoulder ties, and they act together as one, directly under the rail ends. Rails are spiked to the ties with $\frac{1}{2} \times \frac{3}{8}$ in. spike.

or axle break by any chance. It also assists in bracing the structure longitudinally, and takes up all the thrusting force which comes upon the rails by the application of the brakes, and distributes this force over a long series of spans, and is the ideal method of stiffening a road of this character, as it is not practical to have any bracing under the girders as in ordinary trestle work.

Between the tracks are placed ties six inches square and forty inches apart, on which are laid four 2 in. planks 6 in. wide, and which forms a foot-walk for the passage of employes and to permit engineers to make examination of machinery between stations should occasion require. This walk extends the entire length of the road, and in case of possible delay or blockade passengers could easily reach the nearest station without difficulty.

The structural iron received one coat of metallic paint when it left the mills, and two coats of white lead and linseed oil when finally placed in position. This not only preserves the iron, but adds to the appearance of the structure.

STATIONS.

The stations depart from the well known plan of other roads in several particulars. They are built on the ground and are convenient and at the same time attractive in appearance. They are on the company's own property, have a base of stone, and rise with terra-cotta ornaments and walls of Roman and pressed brick; making a structure in cost and appearance the finest in the country. Each station has one entrance and one exit. Passengers enter the waiting room and procure their tickets, and when the train is within 500 feet an electric bell sounds automatically, indicating in which direction it is going.

The passenger first deposits his ticket at the foot of the stairway, which leads by easy steps to the platform above. One stairway leads to north-bound trains, the other to the south-bound. The platforms are on the outside of both tracks, are 200 feet long and eight feet wide, and will accommodate a five or six car train. Arc lights will illuminate the platform at night.

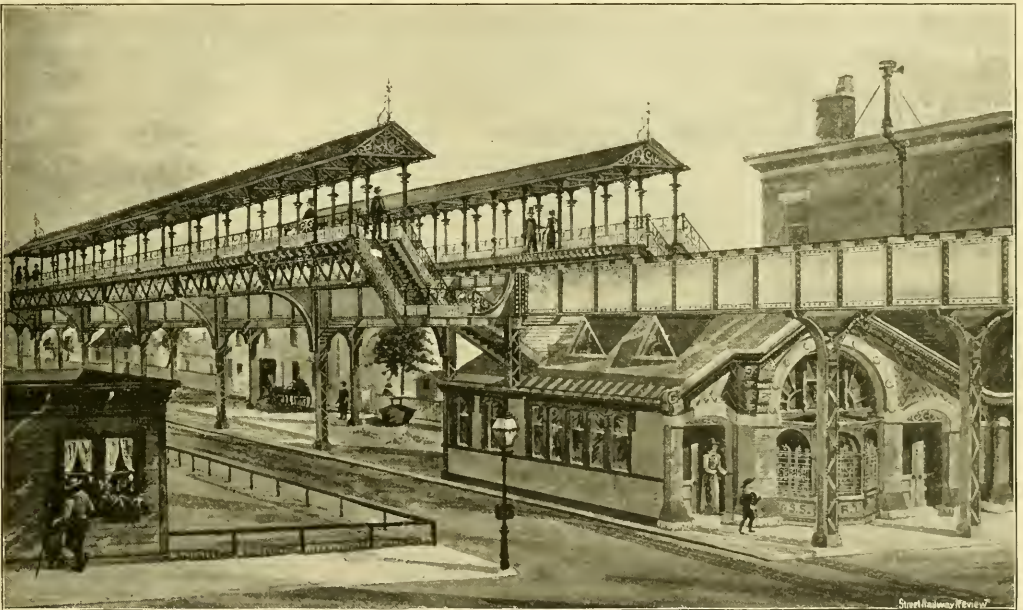
The waiting room is provided with a toilet room for gentlemen and one for ladies, is finished in light wood, heated by furnaces and lighted with electricity. Newspapers may be had from the station news room, but will not be sold on the train.

The platforms are covered with a corrugated iron canopy, and the girders which carry the platform are made stiff and strong, to overcome the unpleasant vibration felt while a train is starting or coming to a stop, as on the New York roads.

assisted by Mr. R. I. Sloan as chief engineer, who is also a veteran in all that pertains to elevated roads, and who left the Manhattan road, where he had been chief engineer for eight years, and with which company he has been connected for fifteen years, to take up this work here.

The road will soon be open for travel, and has already had a marked effect on values of realty along the entire line. The extension will soon be commenced, extending four miles further south, and branching to the World's Fair and the populous district of Englewood. Trains will be run on short headway and fare will be five cents.

The structural work was all furnished under contract with the Keystone Bridge Co. of Pittsburgh, and the foundation masonry by Michael McDormott, a well known Chicago contractor, and competent engineers who have examined the finished work pronounce it in every res-



35TH STREET STATION—CHICAGO AND SOUTH SIDE RAPID TRANSIT AND ELEVATED R. R. CO.

Stations are now completed or building at Congress street, Twelfth street, Eighteenth street, Twenty-second street, Twenty-sixth street, Twenty-ninth street, Thirty-first street, Thirty-third street, Thirty-fifth street and Thirty-ninth street.

The road has scarcely a deflection from a straight line throughout its entire length, and no more handsome and substantial structure can be found anywhere. With the surveys, constant care has had to be exercised, as the street and alley lines used by the city were frequently found to be erroneous. The entire management and direction of the work has rested on Col. C. Goddard, whose reputation as engineer and builder of elevated roads is second to none, and who has abundantly deserved the compliments which every engineer who has inspected the structure has expressed. In his work he has been

pect superior to any thus far constructed, both in accuracy and tensile strength.

EQUIPMENT

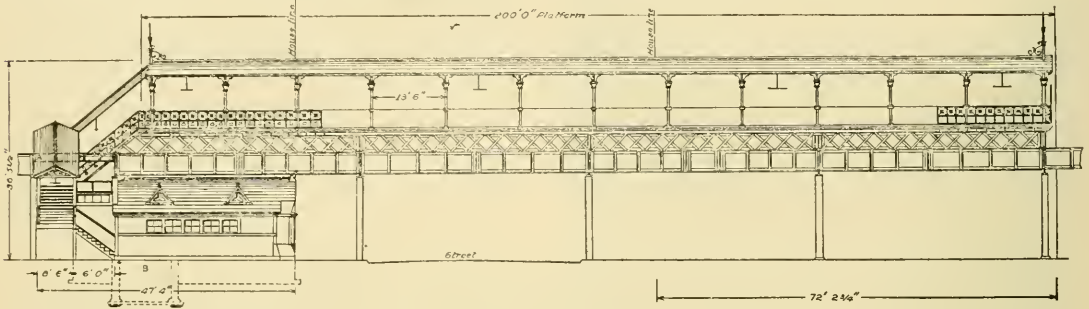
will be similar in general design to that on the New York and Brooklyn roads, with many improvements suggested by their experience, and will be constructed and finished in the best possible manner to avoid unnecessary noise and secure the greatest possible comfort and convenience of passengers.

It is not expected that the operation of this road will have any disastrous effect on the earnings of the surface lines, as the "L" will take the bulk of the long-haul travel in which, by reason of the endless stops, there is practically no profit for a surface road. It is already building up a large and heretofore unoccupied territory, which will yield a good business of short riders for cross-

town surface lines. It enables residents to go further out and still reach and leave their offices the same as before, and the road will at once enter on a business almost unparalleled in the history of new lines. The streets and alleys of Chicago are so long and wide, and laid out with such uniformity, that elevated roads can be built by the dozen, and it is hardly to be expected that the occasion

The street railways of the United Kingdom have an aggregate of 948 miles, with 27,719 horses, 515 locomotives, and 3,801 cars.

The electric railroad between St. Paul and Minneapolis ought to be a great success, as the two cities are negative and positive poles.

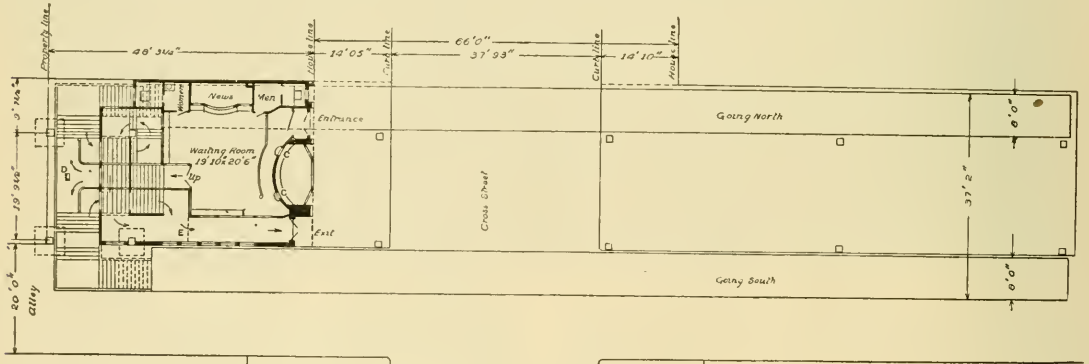


SIDE VIEW OF ELEVATED RAILROAD STATION.

will ever require the building of under-ground lines, involving such enormous expense and difficult of access: not to say less desirable than riding in free air and natural light.

F. J. PEARSON, general manager of the Trans-Missouri Electrical Construction Co., has duplicated, on a somewhat smaller scale, the famous wind-mill storage battery system of lighting, at his residence in Lincoln, Nebraska. In that State there is always a good breeze summer and

It is required of street car lines in Chicago to pave the sixteen feet occupied by their tracks at the time the city paves the balance of the street. Recently President Yerkes desired an extension, which was granted, and the order passed in which the city agreed to pave eighteen feet of the street. Now the laugh is on the city, for the street is only wide enough for two tracks, and when the city has paved its eighteen feet there won't be any left for the company to improve, but they do not seem to be greatly cast down at the prospect.



PLAN VIEW OF ELEVATED RAILROAD STATION.

winter, and Mr. Pearson has a dynamo driven by a large wind-mill in his back yard, which stores in a series of storage batteries, and which affords an inexhaustible supply for lighting his entire residence and running fans, sewing machines and other like conveniences.

When the Milwaukee Electric Railway Co. secured its franchises the residents along the street where the line is to pass were anxious to have the poles along the side of the street, but they have now changed their minds, and have petitioned that they be placed in the centre of the roadway.

A New Steam Motor.

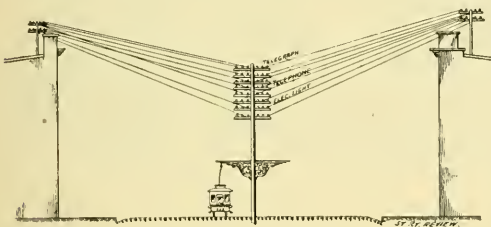
C. E. Healey has constructed a steam motor, which is now being experimentally operated in Detroit. At a trial a day or two ago, two loaded trailers were stopped in a sharp curve on a heavy grade, and although the rails were very slippery, the motor started and drew the train, and without the use of sand. Mr. Healey claims to have entirely suppressed both the visible and audible exhaust steam. The engine is said to weigh only 190 pounds, and with all gearing is placed below the car floor. The upright boiler rests upon the floor at one end of the car, and is not at all unsightly.

A SALT LAKE CITY PLAN.

THE ideal method of placing telegraph and telephone wires in large cities is underground, but the enormous expense incident to the accomplishment of this greatly to be desired result is such that it will be a long time before it can be generally attained.

Hence it is obvious that while the wires must be stretched along or over public streets, any method that will tend to lessen the objections to their presence will be considered with interest.

Mr. W. A. Stanton, Chief of the Fire Department of Salt Lake City, is urging adoption of a plan for his city which would certainly lessen the unsightly appearance of a set of poles along both sides of a thoroughfare, and would reduce to a minimum the difficulties under which the fire department have so often labored in their efforts



to raise ladders and gain entrance to the upper stories of those buildings in front of which a net work of wires of various kinds are stretched. It is equally suggestive that the loss suffered by companies to whom the wires belong would be far less from fire if their lines were in the centre of the street, than when occupying the more exposed position only a few feet from a burning building.

While the line of poles along the middle of the street may not be claimed to be in themselves any special ornament, and it is conceded would be somewhat of an obstruction, still it is claimed in such position they would be much less objectionable than along the curb.

Chief Stanton has presented his plan to his city council, who are considering it with great favor, and other city officials speak in the highest terms of the scheme. In exceptionally narrow streets it would perhaps be impracticable, but certainly in wide streets where two car tracks are laid, the poles could be placed between the tracks, where their uniformity of size and location would form a not unpleasant picture in perspective. The lowest cross arms extend one over each track and carry the trolley wires.

In the cross section of street shown herewith, the entire height of pole is 55 ft., and the distance from rail to trolley wire arm is 20 ft. Above are a series of cross arms for the use of lighting, telephone, and telegraph wires respectively. The latter class to include fire and police alarm wires also.

There can be no doubt that a uniform system of poles, either owned by the city and rented to users, or erected and maintained jointly by the several companies in interest, allowing the city the free use of a reasonable number of

its wires would in very many cities prove a most satisfactory arrangement. And in many places the distance from the trolley wires to the telephone wires above would by this arrangement actually exceed the distance from centre of track to location of telephone wires along the curb.

By this plan no wires would cross the street below the top of any building, as the various wires needed in it would be carried direct to the roof and thence distributed in the usual manner, and in no way hinder the free access of the fire department, while the damage from falling poles during a storm would be very slight.

The decision of the Salt Lake City fathers will be watched with interest.

THE STREET CAR AS AN ARK.

THERE are two ladies and three children in San Antonio, Texas, who enjoy the distinction of having explored the murky depths of the San Antonio river, and gazed through a car window at the clams and eels which grace the bed of that stream. A bob-tailed car, drawn by a mule, while coming down the grade, was derailed by a stone upon the track, and the motor becoming frisky undertook to make a short circuit around the bridge and across the somewhat trackless bosom of the river, fifteen feet below. The accident was so sudden and unexpected, that the occupants of the car had no warning, and the driver barely managed to save himself as the car crashed through the railing and went down. In its fall it turned completely over and struck the water on its roof, and sunk with the trucks partly out of water. It then turned slowly over, the cause of all the mischief managing to get beneath the car, where his demise took place. Meanwhile the passengers were not suffering from any dust. One Wm. Nixon, who was fortunately passing, took in the situation at a glance, and plunging into the river swam to the car and diving through the car door, one by one rescued the occupants, one of whom was a small babe. Some fishermen in a boat near by came to their assistance, and as the brave rescuer brought them out, more dead than alive, they were siezed by the men in the boat and so towed ashore, where prompt medical assistance saved their lives. The line is one but little used, only one car being operated thereon, and the escape was as remarkable as the accident is unusual, and the bravery of the rescuer commendable.

THE New York *Dispatch* is somewhat of an oasis to an electric railway man among the vast desert of New York and Philadelphia dailies who profess an encyclopedical knowledge of street railway matters, for it says:

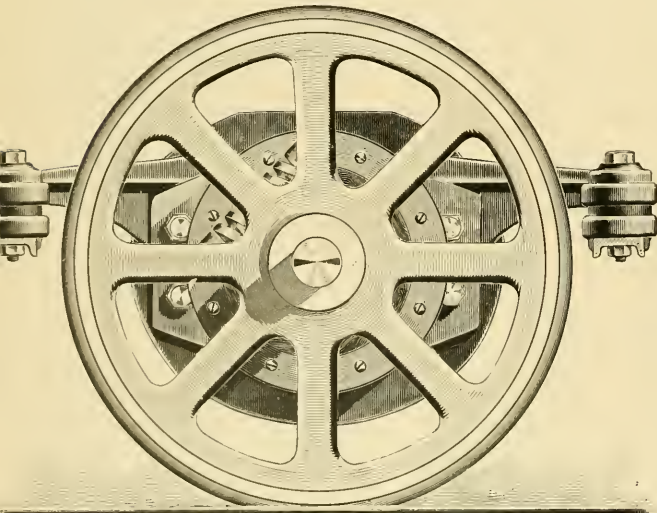
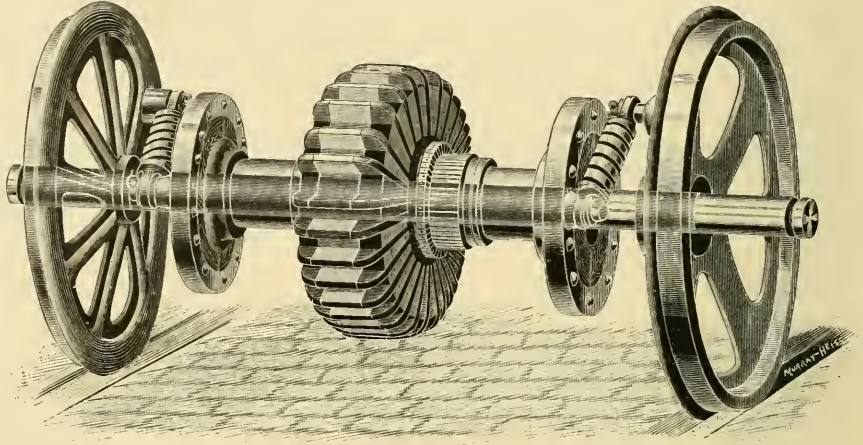
"Thus far no system of running street cars has been devised that is as practical, as safe, as satisfactory and as desirable from a public point of view as that of overhead electric wires. The storage idea may be perfected some time in the future to answer the requirements, but at present it is a decided failure, having been tried in a score of cases and found wanting.

The overhead wires are not placed in such a position as to be either dangerous or in the way in case of fire. The objections to the system have been in all cases fictitious and inspired either by rival companies who have different systems to introduce if possible, or by that conservatism which like Joshua would have the sun stand still if possible."

Short Gearless Slow Speed Railway Motor.

IN our last issue reference was made to a new gearless motor which the "Short Electrical Co." were perfecting, and which has now been fully developed, and of the construction of which our readers can obtain an excellent idea from the accompanying cuts. This motor combines not only the advantage of doing away with the expensive and noisy gears which have characterized the operation of electric railways heretofore, but has secured also a number of valuable improvements, any one of which would strongly commend it to an intelligent railway man.

This motor is the direct fulfillment of all promises made by the electrical companies at the time when electrical motors were first adopted for railway work, namely, reducing the expenses for repairs, which until now, as has been conceded by all, have been very considerable. Not only are the gears with their consequent wear and noise done away with, but the motor is enabled to do its work with three shafts less than heretofore. The frame which carries the motor is made of two specially shaped castings of steel, with arms which project for an equal distance on



either side of the car axle, and which support the motor on rubber cushions. The entire weight of motor and frame is carried by channel bars placed outside the wheels and resting on the ends of the car axles. This not only relieves the motor proper from any serious jar, but prevents crystallization of motor frame.

A remarkable feature of its operation lies in the fact that a speed of thirty miles per hour can be obtained for the car, with no greater speed for the motor than was formerly possible when the car was moving at the rate of only ten miles per hour.

The armature shaft is hollow, made of steel, six inches in

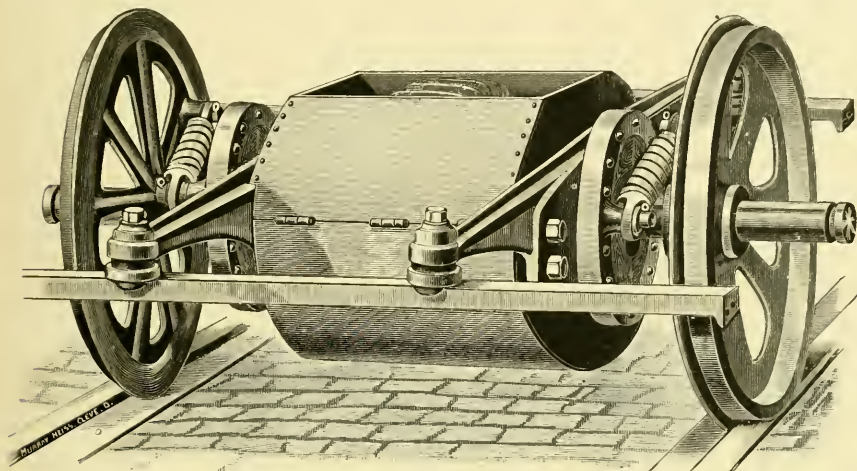
diameter on the outside, with an opening of fully five inches on the inside. This permits of an air space of one inch between the car axle and the inside of the hollow shaft. The armature and commutator are placed midway between the wheels, and together with their boxing are scarcely noticeable from the street.

The armature is of the well known "Short type" with separate bobbins and laminated ring. On each end of the armature shaft is keyed a heavy crank disc made with iron hub and rim and wooden web, which thoroughly insulates the armature shaft from the rim of the crank wheel. The crank wheel rim has a crank pin on one side, and the car wheel has a crank pin also, the two being connected by a heavy coil spring capable of pulling under slight tension 2,500 pounds.

The power of the motor in the turning wheel is transmitted through these springs, and the car wheel turned readily in which ever direction the armature is made to rotate. This arrangement will be readily understood by reference to the illustration.

The sheet iron casing which covers the entire machine thoroughly protects it from mud and water, and being hinged, an opening from the underside permits of ready access to the motor by running the car over a pit. The casing has an opening on the upper side for the purpose of ventilation. When it is desired to make repairs to the motor the car body can be jacked up, when the armature field magnet and the wheels can be easily rolled out. This obviates the necessity of taking the motor to pieces and can all be done by one man. The noise caused by the contact of the brushes with the commutator is greatly lessened by the slow speed, and as both commutator and brushes are securely cased they cannot be injured or their efficiency

impaired by water or mud. The weight of the motor is somewhat less than 2,000 pounds. Every possible part which could be eliminated has been done away with, resulting not only in an increased efficiency, especially under normal loads, but in a lessened cost of maintenance.



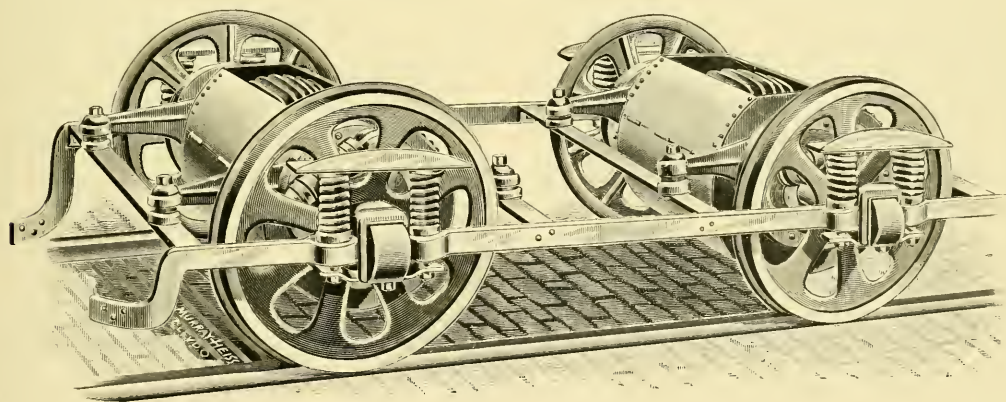
The car starts without jerk and moves off easily and quietly. The casing is hung so as to clear high crossings and ordinary obstructions on the street, and the new Short Gearless may fairly be said to have already entered upon a long and useful future.

are in Lincoln, Nebraska, and is officered with G. W. Enslow, president; G. W. Hartman, secretary and treasurer, and F. J. Pearson as general manager and electrician.

The company have the contract for furnishing all the equipment, and building the power car houses, and furnishing and installing the entire plant for the electric road at Beatrice, Nebraska.

They are also western agents for the Baxter Motor Co., of Baltimore, and will use that motor in equipping the Beatrice road, in which no expense will be spared in any respect to make it first class in every way.

Contracts for this road are now being let, and the work will be crowded to the utmost, and will, when finished, be a source of great pride to the enterprising citizens of that energetic young city of the west. There is a splendid field throughout the west for construction work, and one which will continue to expand rapidly for a long time.



SHORT TRUCK WITH DOUBLE GEARLESS MOTORS.

Trans-Missouri Electrical Construction and Heating Company.

THE live construction companies are by no means all confined to the territory east of the Mississippi river, and no small amount of the new work is being taken and installed by western corporations.

A new but decidedly progressive institution of this kind is the Trans-Missouri Electrical Construction and Heating Company, which is incorporated under the laws of the State of Nebraska, for the purpose of contracting for the entire equipment and construction of railway, lighting, heating, and power plants. The company's headquarters

are in Newark, N. J., very generously donated to the hospitals of that city the entire receipts of all its lines on Easter Sunday. Announcement had been made in the papers of its intention to do so, and the cars were crowded throughout the day, and many passengers paid their fare with coins which were a great deal larger than a nickel.

DETROIT, Mich., has seventy-eight miles of its streets laid with single or double track street car lines. Of this, the City Railway fifty-six miles, the Grand River twelve miles, and the Fort Wayne & Elmwood twelve miles.

HYGIENE AND VETERINARY.

BY JOSEPH D. TUTHILL, M. D., V. S.

The Food of Street Car Horses.

EVER since horses were first used to propel street cars through the public thoroughfares of our large cities up to the present time, we believe that no change has been made in the food fed to them, or in the method of feeding the same. It consists of a mixture of ground Indian corn, ground oats, bran and cut prairie hay—in the proportion of one part of the oat to three parts of corn. This mixed with a sufficient quantity of water and seasoned with salt constitutes the food of all street car horses. It no doubt must be considered the most economical kind of food for this class of horses or it is to be presumed it would not have been so universally adopted and so strictly adhered to by the many different railway corporations of this great country. However, it has always been a question with the writer whether this peculiar method of feeding is consistent with the best interests of said corporations and it is for the purpose of calling the attention of the readers of THE STREET RAILWAY REVIEW to this fact, that we have made it a special subject for this issue.

It has been demonstrated over and over again by the wonderful feats of endurance and speed which have been performed time and again on our public race tracks, that horses can be brought to the highest state of physical development by prudent training and the proper selection of food; and perhaps it may be as well to stop long enough to inquire what the latter consists of? Simply—good sound oats and timothy hay. And we would like to ask right here, what class of horses are more over taxed than the unfortunate railroad slave? The constant stopping and starting of our overloaded street cars to let on and off passengers. The exhaustive pull to reach the top of some up grade. The number of miles traveled day in and day out, Sundays not excepted, is an over tax on the nervous system of these unfortunates that calls for a more substantial diet, and the question arises will it pay to feed it! In discussing this part of our subject we will not take up valuable space and time by entering into any argument in regard to the relative value of the different articles of food which constitutes the diet of horses. Everyone is supposed to know that oats so far as the actual cost is concerned always command a higher price than any of the other cereals used for horse food. This probably explains why it is so sparingly fed to street car horses. As Indian corn is the cheapest horse food we have that can be used as a substitute for oats, it constitutes the greater part of the food of this class of horses. It is, however, very inferior in the essential elements of nutrition to that of oats, and this is one of the reasons why it is not the proper food for street car horses. So far as the actual cost is concerned it is extremely doubtful if any improvement can be made in the present system of feeding. However considered from a scientific standpoint the question

at issue presents quite a different aspect, but whether it will pay to experimentalize or not, we must leave our readers to decide. It should not be a question with the owner as to the comparative value of the food fed so much as the advantages to be derived from feeding a more substantial diet.

The following pertinent questions may be of interest to some of our readers just now:

1st. Will a radical change in the feeding of street car horses prolong their lives and render them more active and efficient for service and better able to endure the trials and hardships of railroad life?

2d. Will more highly developed nervous and muscular systems, brought about by a more judicious system of feeding, enable them to resist to a certain extent the prevailing diseases?

3d. Will the contemplated change of diet render horses less susceptible to diseases which under the present system of feeding are very fatal?

One of the great disadvantages of feeding cut feed is the great tendency it has to produce "Tympanitic colic" and "Laminities." The former too often proves fatal, and the latter, as a rule, leaves the patient a useless cripple for life. We contend that water taken with the food always retards digestion. Not only this, but when dry food highly charged with water enters the stomach the temperature of that organ causes the food to swell, increase in bulk, and distends that organ, and lays the foundation for an attack of "acute indigestion" and its too often fatal consequences. Another great objection to feeding "ground feed" is the chance given unscrupulous dealers to mix in spurious articles of grain, and it will be well to bear in mind that there is nothing so injurious to the health of horses as *damaged food*.

We will now call the attention of our readers to the relative proportion of nutritive matter contained in "oats" and "Indian corn." The former contains comparatively larger quantities of the nitrogenous elements known as albuminoids. Of these, albumen and gluten, flesh forming principles, are the chief elements of nutrition found in oats, which at once explains why it constitutes such an excellent article of diet for all horses used for speed and endurance: it gives them *bone, muscle* and *nerve*. On the other hand, Indian corn belongs to the class of foods known as non-nitrogenous compounds—carbo-hydrates. They are called carbo-hydrates because they are composed simply of *carbon* and the elements of water. Indian corn contains about 70 or 80 per cent. of *starch, gum* and *sugar*, and comparatively but little albumen. It is therefore used in the chemical laboratory of the animal body chiefly in storing up fat and the support of respiration and animal heat. It is, however, devoid of the elements of nutrition so essential for the development of muscular and nervous power. Horses fed on corn meal are soon

overburdened from the rapid accumulation of adipose tissue (fat). The muscles of the body of the corn fed horse have a flabby feel. Contrast them if you will with the firm, hard, fully developed muscles of the oat fed horse, what does it mean? It simply illustrates the superiority of the oat over corn for physical development.

Let each interested reader of the STREET RAILWAY REVIEW ask himself the question which of these subjects—the horse fed according to the present system—or one fed on two feeds of oats and one of cut feed per day is best able to endure the hardships and trials of propelling over crowded street cars through our public thoroughfares.

Which of the two are constitutionally predisposed to all prevailing diseases; which of the two are best able to perform work with less evidence of fatigue. Finally, will not the extra cost of feeding a greater quantity of oats and less corn be more than compensated for by the superior condition of the horses thus fed and their comparative freedom from disease.

In conclusion, we will offer some suggestions as to what in our opinion the food of street car horses should consist. Oats morning and evening and cut feed at night. However, instead of cut prairie hay, we advise that wheat, oat or barley straw be substituted, and we will explain why. No article of fodder known in the family of grasses contains such a large quantity of phosphorus; it is not strictly speaking nutritious, yet it is actually necessary for the support of life. It is an element of both vegetable and animal organization; the former absorbs it from the soil and in turn yields it to animals for the promotion of their health and longevity. It serves to develop bone, muscle and nerve. Animals require phosphorus just as much as they do meat or oats; the latter we admit are highly nutritious, yet deficient in the former very important requisite.

We would not be doing justice to the many subscribers of the STREET RAILWAY REVIEW if we allowed this subject to go to press without calling attention to the danger to be apprehended from a sudden change of diet. Horses fed on one kind of food for any great length of time and suddenly changed to some other kind of food are very liable to become dangerously sick from acute indigestion and its fatal consequences. *The change should be made gradually and with all due precautions.* The writer of this article remembers very well the great mortality which occurred a number of years ago among the horses of a New York City street railroad line from a sudden change of food. It happened in this way: A large fire occurred, which destroyed a large portion of the company's buildings; also the machinery for cutting the hay. In consequence of this disaster they were obliged to go to feeding oats, and the sudden change from "wet cut feed" to "dry oats" was attended, as might well be expected, with great mortality among the horses from acute indigestion, fermentation of the food and the liberation of gasses. We hope, however, that the very important action of our New York friends which ended so disastrously to their horses will not prevent the readers of this article from giving

our system of feeding street car horses a fair and impartial trial. We are very sanguine as to its success, and can assure all that there is no danger whatever, providing due care is exercised in making the change. We will be glad to hear from any one who has enterprise enough to give the experiment a fair test. Any report made on the results we will be pleased to notice in our columns.

THE following from the *Electrical Engineer*, London, we print not so much on account of its kind mention of this paper as indicating the interest with which electrical progress in this country is watched by our neighbors across the water:

"While we are pottering along with one or two street electric railways—we reserve credit for the subways—the Americans are still forging ahead with unexampled rapidity. One of the best indications of this is the appearance of another new journal hailing from Chicago—334 Dearborn street—entitled the STREET RAILWAY REVIEW, the first number of which is before us, a large thick journal of 100 pages, beautifully printed and got up generally as is their wont, and containing articles on noiseless motors, Wenstrom's electric works, large electric cars, electricity in snow storms, electric railways of North America, besides a description entitled 'In Deepest London,' of our own success in electric traction—the Southwark Subway."

SHALL a man surrender his seat to a woman in street cars or elevated and suburban trains is a question that has been as often asked as it has been unsatisfactorily answered. The fact that a man finds the necessity for asking himself the question would seem to be somewhat of an admission that he is not entirely convinced that he should not do so.

Considered only from a purely abstract standpoint, it may be argued that first come, first served, and that a man having paid his fare and selected the best available seat in the car at the time, is under no more moral and legal obligations to yield his seat to another, simply because that other passenger may be a woman, than he is obliged to give up to her his ticket to a theatre when the house is filled and no more seats are for sale. That there is less inclination on the part of the men to relinquish a comfortable seat than existed a few years ago is unquestionably true. This may be considered one of the concomitants that attend the doing of man's work by woman. When she enters the office and store to compete with him, he naturally feels that it is no more than just that sharing its privileges she should also expect to share its chances in other respects. Then, too, when a man has politely offered his seat and it has been accepted without any sign of acknowledgment, it has its influence with him when the opportunity next occurs. We have seen with indignation strong women allow feeble old men to stand while they did not; and strong, able-bodied men buried behind their paper while sick and tired women stood. And yet it would be equally unfair to expect men never to sit while one woman remained standing in the car. The individual circumstances must furnish the basis of action in these matters, but it should not, *per se* be accounted either ungentle or discourteous in a man who for reasons known only to himself, perhaps refrains from jumping to his feet every time a lady enters the car.

STREET RAILWAY LAW.

EDITED BY MR. FRANK H. CLARK, ATTORNEY AT LAW, CHICAGO.

Right of Street Railway Company to Condemn Property.

The statute of Oregon which provides that "a corporation organized for the construction of any railway" may appropriate land for a right of way, has little or no reference to corporations operated as street railways propelled by electricity or horse-power for local convenience and the transportation of passengers, and does not authorize such a company to condemn private property for a right of way.

Lord J., in delivering the opinion of the Court, said: This is an action to condemn a right of way for a street and suburban railway operated for the carrying of passengers. A demurrer was filed to the complaint, which was sustained by the Court below, and the plaintiff refusing to proceed, judgment was rendered therein from which this appeal is taken. The contention of the plaintiff is that our statute authorizing the condemnation of land for a right of way, contemplates the exercise of such power as much by street and suburban railways propelled by horse power or electricity as railroads where cars are propelled by steam.

While it is true that the word "railway," may include railroads operated by steam as well as those whose cars are propelled by some other power, yet it is common knowledge that such corporations as belong to the latter class, are usually operated as street railways for local convenience. The plaintiff is an electric company and as such we know belongs to the class of corporations operated as street railways for the benefit of the local public. It was so understood at the argument, and the action is described as one to condemn "a right of way for a street and suburban railway for the carrying of passengers." I take it, then, that we are to consider the plaintiff as belonging to this class in determining whether it is such a corporation for the construction of a railway as is intended by the statute to be invested with the power to exercise the right of eminent domain. The statute provides (section 3239) that "a corporation organized for the construction of any railway," etc., (Id. sec. 3240), "may appropriate so much of said land as may be necessary for the line of such road, not exceeding sixty feet in width, besides a sufficient quantity for work-shops," etc., and in case of a railway a sufficient quantity of such land in addition to that before specified in this section for necessary side tracks, depots, water-stations, cuttings, embankments," etc., "and any such railway company shall have the right to cut down any standing timber in danger of falling upon its road," "may cross, intersect, join and unite with any other railway," etc., "and may make the necessary turnouts, sidings and switches and other conveniences," etc., (Id. sec. 3246) "and all streams and other waters on the line of such road shall be safely and securely bridged except," etc., and (Id. sec. 3251) "every corporation formed under this act for the construction of a railroad as to such road shall be deemed a common carrier," etc.

Few, if any, of these provisions have any reference to the class of corporations to which the plaintiff belongs,

and were scarcely intended to apply to them. They contemplate and authorize a railway to be constructed where none was built before through the country, requiring bridges, cuttings, fillings and embankments, and sometimes tunnels through hills and mountains, and also the building of depots and stations for the accommodation of freight and passengers, or engine-houses, repair-shops, switches and turnouts to enable the corporation to properly conduct its business. It is plain that the provisions of such a law can have little or no reference to corporations organized and operated as street railways, propelled by electricity or horse-power, and intended to accommodate local convenience for the transportation of passengers. They contemplate a track laid upon an established street or highway, and are usually restricted to the bounds of the city, its vicinity or adjacent towns, and generally derive their authority to lay their tracks upon such street or highways, from the municipality or county, and their construction is regarded by many adjudications as a legitimate use of such streets and highways, and an exercise of the right of public travel. It is not enough that a railway is for a public use to authorize the taking of private property, but the taking must be for a public use within the scope of its undertaking and the object which it is to subserve. To authorize railroads operated for such purposes to take the private property of the citizen, and appropriate it to its use without his consent, the statutory authority for it must be plainly given; otherwise the right does not exist. In view of these considerations, we do not think the provisions of the statute for the condemnation of a right of way apply to the plaintiff, so as to authorize it to take the private property without the consent of the owner for its own use as a right of way.

(Sup. Ct. Ore. Thompson-Houston Electric Co., v. Simon, 10 L. R. A., 251.)

Care Required of Driver of Street Car—Injury to Person Attempting to Cross Track—Contributory Negligence.

It is not negligence for the driver of a street car when there is no one on the track in front of him and no one apparently about to cross it, to look up and down a street which intersects the one upon which his railroad is laid, if he does not withdraw his attention from his car an undue length of time.

A person who attempts to drive across a street railway track directly in front of an approaching car, is guilty of contributory negligence even though it appears that by the exercise of extraordinary effort the car might have been stopped in time. The company cannot be held to a higher degree of care or diligence by reason of the carelessness of another.

(Sup. Ct., Pa. Citizens' Passenger R. Co. v. Thomas, 20 Pitts. Leg. Jour. 437.)

Master and Servant—Wages—Extra Time—Michigan Statute.

Act Mich. 1885, No. 137, makes ten hours a legal day's work in factories, workshops, etc. Plaintiff, after working nine months as a night watchman in defendant's stable, under a contract for \$1.35 per night, and after having been paid each half month at that rate, sued for pay for extra time over ten hours per day. Prior to this service he had worked for defendant under a written contract by which he waived all claim for extra time. The second contract was verbal, was made with the barn foreman to whom plaintiff had been directed by defendant's superintendent, and no mention of extra hours had been made in connection with it. But plaintiff, the superintendent and the foreman knew that it was the absolute custom and invariable rule that defendant's employes should work as many hours as the business demanded for the pay agreed on as a day's pay. Every time plaintiff was paid he signed a receipt acknowledging the amount received "in full of all demands for work done during the regular and irregular working hours in the service of said company (defendant) up to and including the date of this pay roll." This part was read over to him before he signed his last receipt, and he said he understood it. *Held*, that even if the act covered such an employment, plaintiff having contracted with knowledge of the custom and rule and of the limited authority of the superintendent and foreman, and having made no claim for extra time, but acknowledged full satisfaction therefor, could not recover.

(Sup. Ct. Mich. *Bartlett v. Grand Rapids Street R. Co.*, 46 N. W. Rep. 1034.)

Street Railway—Consent of City Authorities to Construction of Road—Contesting Rights of Subsequently Incorporated Company.

The consent of the city is a condition precedent to the exercise of rights under a charter to a street railway company.

If a municipal ordinance is obnoxious to the prohibition against local or special legislation, it is simply void; it cannot merely, in order to give it validity, be held to have a general operation upon the whole class to which the subject specifically mentioned belongs, or any other or more extensive effect than was intended by the body which enacted it.

Although the unauthorized occupation of a public street by a railway track may be regarded as a nuisance *per se* which will be enjoined, Chancery will not restrain such an act which affects the whole community, at the suit of a private citizen or a corporation, unless the plaintiff can make out a case of special damage.

A passenger railway corporation which has failed to obtain the consent of the local authorities to the construction of its road cannot be said to be injured in contemplation of law by a subsequent ordinance which authorizes another company to build on the same route, and therefore has no standing in a court of equity to complain of the illegality of the ordinance.

(Sup. Ct. Pa. *Larimer and L. Street R. Co.'s Appeal*, 20 Atl. Rep. 570.)

Personal Injury—Contributory Negligence by Minor—Liability of Company.

A lad, aged ten, attempted to cross defendant's horse railroad track by running in front of a car which was approaching at the rate of about six miles an hour. He fell on the track, not more than twenty feet in front of the horses. There was a conflict of evidence as to whether or not the driver made diligent effort to stop after the lad's fall. *Held*, that under the facts shown by plaintiff's witnesses it would have been physically impossible to stop the car in time to avert the accident, and that the intestate had, as matter of law, been guilty of contributory negligence, which would bar a recovery by his personal representatives.

(N. Y. Ct. Appls. *Fenton v. Second Ave. R. Co.*, 4 N. Y. L. Jour. 509.)

Master and Servant—Discharge of Employee—What a Sufficient Cause.

The employer has the right to terminate the contract of employment for any disobedience of orders, neglect of duty or disrespectful conduct on the part of the employe, or for quarreling with other employes, regardless of the merits of the quarrel.

Where a servant is discharged and there exists cause for discharge, such cause will justify the discharge, even though other motives than the legal cause induced the employer's act.

Excuse for discharge of servant need not be specially pleaded, but may be given in evidence under the general issue.

(Appellate Ct. First Dist. Ill. *Sterling Emery Wheel Co. v. Magee*, 23 Chi. Leg. News 247.)

Street Railways—Construction—Rights of Abutters—Franchise.

A street railway company may use a street for its track without compensating the owners of the fee.

In Civil Code Cal. s. 498, requiring street railway tracks to be placed as "nearly as possible" in the middle of the street, the words "as nearly as possible" are equivalent to "as nearly as practicable."

Where the only evidence that it is impracticable to place the track in the middle of the street is the testimony of two witnesses that to so place it would interfere with traffic somewhat, because the street being only forty feet wide, there would not be room for teams to pass on either side of the track, but who do not state that there is an extensive traffic on the street, nor that it would not be practicable to put the track in the middle, it is insufficient to support a finding that it was not "practicable" to locate the track in the middle of the street.

Where a member of the board of city trustees is a subscriber to the stock of a corporation obtaining the franchise for a street railway, and is himself one of the committee to whom the application for the franchise is referred, which committee reports favorably, the franchise is void, notwithstanding that no corporation was formed at the time the stock was subscribed for, and that the franchise was granted to individuals, a committee of the subscribers, who conveyed it to the company.

(Sup. Ct. Cal. *Finch v. Riverside & A. R. Co.*, 9 Ry. and Corp. L. Jour. 250.)

Paving Ordinance—Validity—Constitutional Law—Obligation of Contract—Franchise.

The fact that a street railway company constructed its track under a franchise granted by a city does not exempt the company from the power reserved to the general assembly by Code Iowa, s. 1090, of imposing any conditions on the franchise of a corporation which it deems necessary for the public good; and hence, though the original franchise granted by the city required the company to pave only the space inside the rails, the obligation of the contract is not impaired within the meaning of the federal constitution, by a subsequent ordinance passed by the city in pursuance of the Act Iowa, March 15, 1884, requiring the company to pave, in addition, one foot outside of each of the rails.

(U. S. Sup. Ct. *Sioux City St. R. Co. v. City of Sioux City*, 9 Ry. and Corp. L. Jour. 251.)

A BUSY PRESIDENT.

THE well known features on the opposite page are those of one of the brightest men in the street railway world, and needs introduction to but very few of our readers of the fraternity, while the name accompanying could scarcely be more widely known within our own domain and extends across the waters to the farthest end of the most distant tramway.

The history of Mr. Daniel F. Lewis, from the time he first entered the service of the Brooklyn City Railway as ticket agent, until he reached its highest office and occupied the president's chair, is not only interesting but full of inspiration to every young man entering life with its open future yet unwritten.

Mr. Lewis was born in Brooklyn, March 28, 1849, and although yet a young man may properly be said to be one of the "old settlers." His early education was received at the public schools of his city, where he made rapid progress; but so strong an inclination did he have for business pursuits that his father yielded to his requests, and at the age of only thirteen he entered the office of his father, who was Treasurer of State under Governor Horatio Seymour. His father had fully intended that young Lewis should return to school after a year or two of business experience, but his progress was so earnest and gratifying that the plan was finally abandoned. At the end of one year he left Albany and returned home and entered a wholesale drug establishment in New York, where he remained four years. During all this time he carefully devoted his spare minutes to study and acquired a far more practical education than many a young man who had entire days for study and attendance on lectures.

The confinement of the drug establishment proved too much for his health, and when he left, it was to enter the service of the Brooklyn City Railroad as ticket agent. At the end of one year he entered the office of the secretary of the road and in 1880 was made assistant secretary, and two years later was elected treasurer.

In 1883 Mr. Lewis was still further honored by election to the directory, and in 1884 had added to his duties that of secretary. In 1886, when Mr. Hazard resigned the presidency, Mr. Lewis was gladly chosen to fill that office, and then became the head of the largest unconsolidated street railway in the world.

A strike occurred on the day following his election, and his executive abilities were put to a sudden test, but were fully equal to the trying demands and the troubles were all harmoniously and satisfactorily settled within twenty-four hours following their inception, and so thoroughly settled that while every railway in both Brooklyn and New York has been "tied up" once or more since 1886, the lines of the Brooklyn City R'y Co. have remained open without interruption. On more than one occasion the employes of the company were urged to "tie up" to strengthen the situation elsewhere, but in every instance they proved loyal to the company; a condition of affairs appreciated by no one more than their president.

Since Mr. Lewis assumed the presidency, the road has made rapid strides and more than doubled its mileage, which has increased from 80 to 175 miles of track. But the exacting duties of the Brooklyn City Road are only a part of the varied interests in which he is a moving power. He is president of the Brooklyn Heights Railroad Co. and one of the trustees and a member of the executive committee of the Peoples' Trust Co. He is also director and member of the executive committee in the Long Island Bank, and trustee and treasurer of the Lewis & Fowler Manufacturing Co., whose fame has spread wherever street cars run; trustee of the Brooklyn Savings Bank; president of the Knickerbocker Steam Boat Co., which is the famous Rockaway Line; president of the Bay Ridge Park Improvement Co.; also the treasurer of the United States Projectile Co., of Brooklyn.

He is a member of the Hamilton, Carleton, Marine and Field Clubs of the city of Brooklyn, and Engineers' Club of New York City, and since the death of Mrs. Lewis has resided at the St. George hotel. He is the president of the Street Railway Association of the State of New York, of which the Brooklyn City R. R. Co. has been a member since the organization of the association.

At the convention of the American Street Railway Association none is more welcome than he, and his views on railway interests and policy ever receive the attention and consideration that attach to the words of one whose experience and success has been so marked.

A MISCHIEVOUS boy was the cause of the stopping of cars on the Broadway and Newberg Street Railway for nearly an hour the other day. He threw a thin wire over the trolley wire in the power-house and then "grounded" it by laying it on one of the rails and holding it there with a short piece of a two-inch plank. When the electric current was suddenly destroyed a force of men were sent along the line to find the supposed break. The power-house was not thought of, and it was only when the men found that the wires along the line were all connected the trick was discovered.—*Cleveland Leader.*



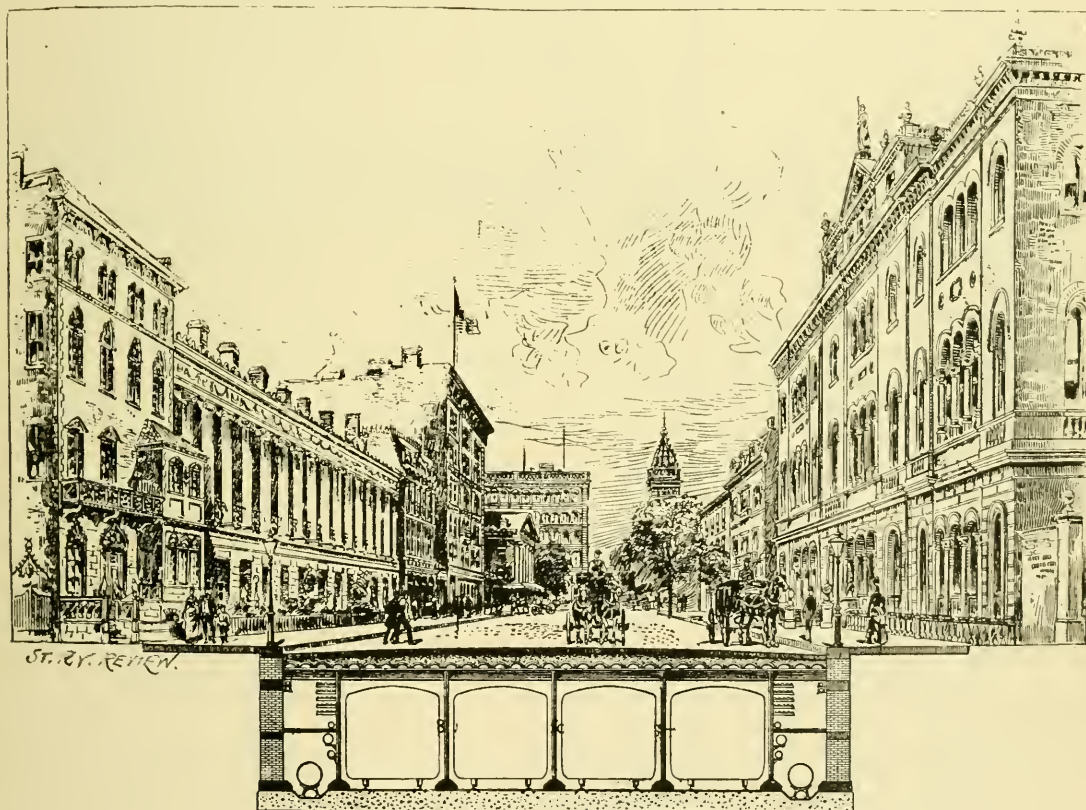
DANIEL F. LEWIS,
President Brooklyn City Railway Co., Brooklyn.

RAPID TRANSIT IN NEW YORK CITY.

BY T. G. GRIBBLE, CONSULTING ENGINEER TO THE AMERICAN PERMANENT WAY COMPANY, AND AUTHOR OF
"PRELIMINARY SURVEY AND ESTIMATES."

THE public sessions of the Commission have come to an end and the deliberations of that most important quintette of citizens are continued in the seclusion of their office in the Farmers' Loan and Trust Building, aided by the experienced advice of their engineer, Mr. William E. Worthen, past president of the Society of Civil Engineers. They have extended the utmost courtesy to all the promoters who have laid their schemes before them and they have had no lack of schemes to choose from. One of the leading New York papers has already blossomed into prophecy as to the

spanning it with his steamers until the time comes for the great cantilever bridge to be thrown across the estuary, and it will probably be a long while before he goes out of business on that account. Mr. Samuel Spencer is an engineer and practical railroad man, well known on Engineering Commissions as one of the first experts; he was, before joining the commission, a director of the Suburban Rapid Transit Co., which was acquired by the Wall Street Napoleon, during the first stage of the discussion, to form henceforth an integral part of the elevated system. He is a member of the firm of Drexel,



NEW YORK UNDERGROUND RAILWAY CAR SYSTEM.

decision, and has been roundly rated for it by its contemporaries. We shall probably hear from the only reliable source within the next two or three weeks.

The commissioners are men of such wide reputation, that it is hardly necessary to make more than a passing reference to their personality.

Mr. William Steinway's name vibrates a chord throughout this continent, but he is more than musical, for he is a railroad man with very large interests in Long Island City. Mr. Starin is the admiral of the North river.

Morgan & Co. Mr. Eugene Burke, the well-known lawyer, and Mr. John H. Inman, president of the Richmond and Danville, complete the board.

The duty of the commission is, in few words, to select one or more routes and determine the class of construction. If their line runs through private property or otherwise affects it, they must obtain the consent of one-half the owners, failing which they must be heard before a commission of three; nominated by the general term of the supreme court and the representatives of the property

owners to be heard likewise. Interference with pipe-lines is not considered in the same category as with real estate, but all such alterations or deviations must be subject to the supervision and reasonable regulations of the commissioner of public works.

The plans are then to be submitted to the common council and approved by vote.

Finally the franchise is to be sold at public auction, the usual precautions being taken to ensure the reliability of the purchasing corporation and the immediate commencement of the work.

The act forms a tract of twenty-seven pages and contains some provisions for the organization of the company, which are generally left to by-laws.

There are several points of reference to the existing elevated railway system, which have been jealously watched by the New York citizens. One very important clause prohibits any level crossings of elevated roads.

If they had been empowered to take retrospective action with regard to such crossings as that at Chatham Square, it would have been still more to the point. Crossings of

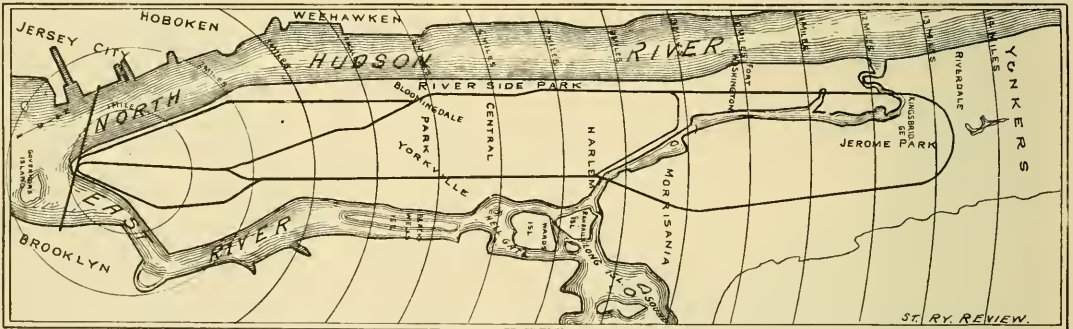
worse cases of disregard of public safety in crossings of crowded thoroughfare by steam railways on the level, and one of the worst on this continent is in the city of Oakland, California, where the train traverses the whole of one of the main avenues at high speed, without the least protection to pedestrians or carriages.

The clause providing for the sale of the rapid transit franchise has occasioned much controversy, many seeing in it a surrender of the city to the Manhattan Railway Company, who hold the golden key. They do not ask for more avenues, but it is in the power of the commission to indicate as much of the rest of the city as they choose, with a few small exceptions, for that or any other type of construction they may approve.

The following is an approximate summary of the various schemes submitted to the Commissioners:

DAYLIGHT SYSTEMS.

1. Extensions of the Manhattan railway.
2. The Boynton bicycle railway.
3. Chittenden's four track high viaduct.



MAP OF MANHATTAN ISLAND, SHOWING ROUTE AND CONNECTION WITH BROOKLYN AND JERSEY CITY OF THE DEEP UNDERGROUND SYSTEM.

that kind with several facing points and long fouling distances are immeasurably more dangerous than square crossings on the level.

The last clause but two reads: "No railroad shall be constructed or operated upon the surface of any street, avenue or highway, under the provisions or authority of this act." This is an evident prohibition to fast speed on the surface. When the first proposals were made for cabling Broadway and Third avenue, it was suggested that here was a means of supplying rapid transit, because in Chicago the suburban traffic was carried at fifteen miles an hour, but New York has set the speed limit for the cable car at six miles per hour, and will have to get her rapid transit by some other means.

There is a growing feeling in the larger cities of this continent for protection to the citizens against the selfishness of railroad corporations. The recent accident in the Fourth avenue tunnel, although occurring under the arrangements and regulations, which have handled an enormous traffic safely for many years, and involving, as the accident did, only the death of employees of the company, has nevertheless produced the indictment of the chief officials, including the president. There are still rising much

4. Thorpe's six track embanked railway on land reclaimed from the North and East rivers.

5. Wegman & Bates six track, three decker metallic viaduct.

6. Speer's endless train.

7. Collett's suspended railway.

8. Wenigmann's archway tunnel schemes.

9. Austin Corbin's deep tunnel.

10. Louis Sterne's Greathead system of metallic tunnel.

11. Jesse W. Reed's four track subway with columns.

12. Knut Forsburg's four track underground railway with ventilators in the form of flower gardens in the street.

13. Dr. Sheffield's elevated tunnel through the blocks.

14. Major Henning's gravity system.

15. J. Coleman Drayton and Col. Hazard's city railway.

16. R. W. Gibbon's two track and four track underground railway.

17. Frank Sprague's four track tubular system.

18. William Walter's underground railway.

19. The Writer's combination surface and subway railway.

It would be manifestly impossible to explain and criticise all these schemes and we shall therefore confine

ourselves to a few of those which have been brought more prominently before the public than others and we will begin with the Manhattan railway extensions.

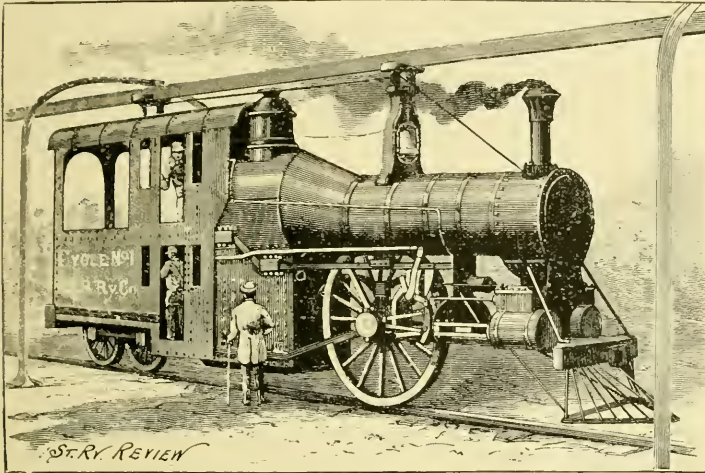
It has already been remarked that this company are not asking power for occupying another avenue. The Suburban Rapid Transit Co.'s line which they have just acquired will carry them across the river to the new district of Morrisania.

clearly shown from the Brooklyn bridge that cable traction can be performed more cheaply than the steam traction, but the installation of a cable system upon a structure not originally intended for it would involve considerable difficulty, especially on the curves. Experiments have also been made with electric traction on the Daft system, but the result showed a largely increased cost. It would appear, therefore, that the Manhattan railway has reached the limit of its capacity, and although it will be sure to get power to make its improvements, it can afford to endure one or two competitors. There is, however, one very novel method which has been proposed for extending its usefulness to which a brief allusion will be made.

THE BOYNTON BICYCLE RAILWAY,

One of the most original and ingeniously simple schemes brought before the commissioners, is the Bicycle railway patented by Mr. E. M. Boynton, and first exhibited at Gravesend, L. I., in September, 1888. Since then it has been operated on Coney Island in the summer time, transporting large numbers of people at great speed and with very small consumption of fuel. The cars are

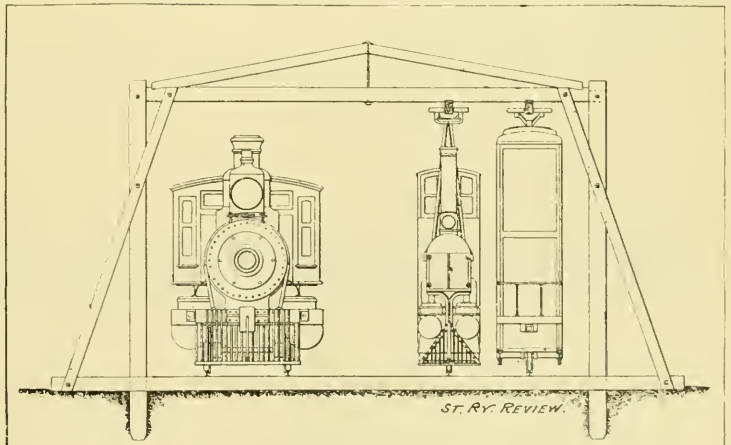
very narrow in order to keep the center of gravity as near the axis of the cars as possible, consequently without altering the gauge, a Boynton train could be run on each rail of an ordinary standard gauge track. The inventor claims that by using double-decked cars on his plan he could



BOYNTON BICYCLE LOCOMOTIVE.

They ask further for powers to build a road along the south bank of Harlem river between Third and Eighth Avenues, and a continuation of the Eighth Avenue line from Sixty-fifth Street along the boulevard to Washington Heights and King's Bridge. These extensions if sanctioned will form the Manhattan into a complete belt line having two spurs, one into Morrisania and the other to Washington Heights. The latter will be a stiff climb but as a whole the improvement to the system will be a very decided one and will bring an extended area within reach of the railway. The thorn in the side of this great and useful undertaking is that the structure is not adapted for heavy trains and could not safely be burdened with extra tracks. Some attempts have been made to increase its carrying power. One very costly piece of work was carried out upon the Third Avenue line, in altering the original Warren girders to lattice girders by introducing fresh web members during the running of the trains. It is very doubtful whether

this operation has increased the supporting power of the structure. The locomotives have been much increased in weight, so much so as to produce unpleasant, not to say, injurious vibration upon the stations, but still the trains are not long enough to carry the people. It has been proposed to operate the road by cable and it has been



STANDARD GAUGE COMPARED WITH BOYNTON BICYCLE SYSTEM.

more than double the capacity of the Manhattan railway. His theory is sound enough, and there may be a wide field for his invention. Tractive force, especially on short curves, should be very much reduced, but the drawback remains that as his locomotive weighs twenty tons, a double track elevated road would by his system

be liable to come under a simultaneous load of eighty tons, which would be likely to knock the frame work to pieces.

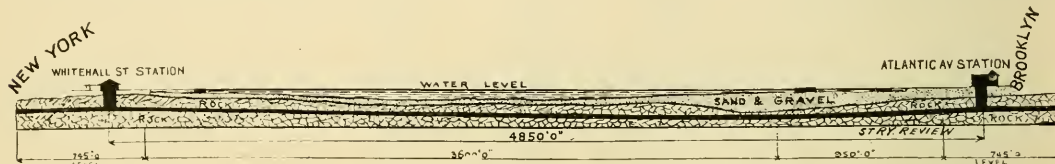
THE AUSTIN CORBIN TUNNEL SCHEME.

There are three classes of travel for which present facilities are needed, and the development of the city is proceeding at so rapid a rate that it will tax both the ingenuity and the financial resources at her command to keep pace with the requirements of the traveling public. The deep tunnel scheme of Mr. Austin Corbin is in the first place a means of external communication between Manhattan Island, Long Island and New Jersey, and as such will doubtless, if sanctioned and carried out, become

first and the other two classes of travel, and the aim should be to separate them as much as possible; not a separation of distance, but a distinction by means of which people traveling with baggage and requiring to spend time at depots in making their arrangements should not come in the way of those who are traveling to and fro regularly and without baggage.

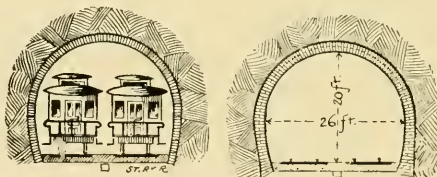
Mr. Corbin's tunnel would be more than a hundred feet underground, and access would be obtained by elevators of very large size.

As regards the furnishing of facilities for external communication Mr. Corbin's scheme is only one of several proposals for effecting the same thing. Bridges and tunnels for each of the rivers are before the Legislature



AUSTIN CORBIN'S DEEP TUNNEL SCHEME, NEW YORK TO BROOKLYN.

a great boon to the community. If a spare track is added to the Grand Central station it will make a valuable and effectual connection between the various trunk lines for the transportation of passengers and their baggage to any part of the country. The rapid elevator connection between the surface and underground depots would enable passengers from the Hudson villages to get down town much more quickly than by the present shuttle train on Forty-second street and the Third avenue elevated. A resident in Tarrytown would then get to Wall street in less than an hour, and the effect would be to build up all the Hudson districts. The tunnel across the East river would be altogether in rock, that across the North river would be partly in silt. A large sum of money is said to have been spent in trial

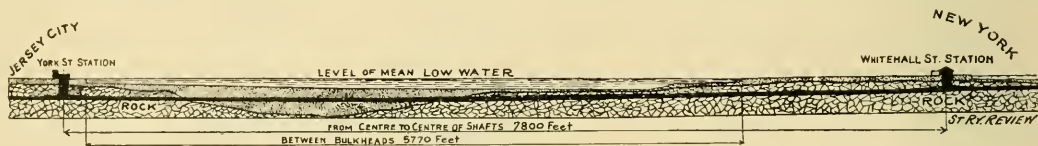


CROSS SECTION OF TUNNEL.

involving the expenditure of vast sums of money, but they are not within the scope of the Rapid Transit Commission.

It is to the point, however, to allude to them as having in all probability a striking effect upon the internal travel. The Brooklyn Bridge has practically made its own travel, and is now unable to carry the crowds who flock to it. Jersey City and Newark are to-day more cut off from New York than Brooklyn was before the bridge was built. Good facilities will make them like one city, and there will be an enormous rush of population into New York City either for business or amusement.

The present congestion of traffic on the elevated roads is all between South Ferry and 125th street. The longer haul to Morrisania, King's Bridge and Yonkers is handled



AUSTIN CORBIN'S DEEP TUNNEL SCHEME, NEW YORK TO JERSEY CITY.

borings both on the island and in the estuaries, and a complete plan has been formed not merely to make the aforesaid tunnels, but also to carry the same class of construction entirely round the island and far out into the suburbs. The complete scheme would involve about thirty miles of tunnel: truly a gigantic enterprise, beside which the Mont Cenis and St. Gotthard tunnels shrink into insignificance. The object of the extension of the system round the island is to handle the other two classes of travel which are the long and short haul of the internal city traffic. There is a natural distinction between the

very comfortably by the New York Central and New York and Northern, but the effect of all increase of external facilities with Brooklyn and Jersey City will tend to increase the congestion on the elevated road and horse cars, so that the crying want of the hour is for the best, most rapid and financially most eligible scheme for relieving the elevated road.

The deep tunnel is more applicable to long than to short haul, principally on account of the inaccessibility of the way stations. The tunnel of the New York and Harlem on Fourth avenue is an illustration of this. The

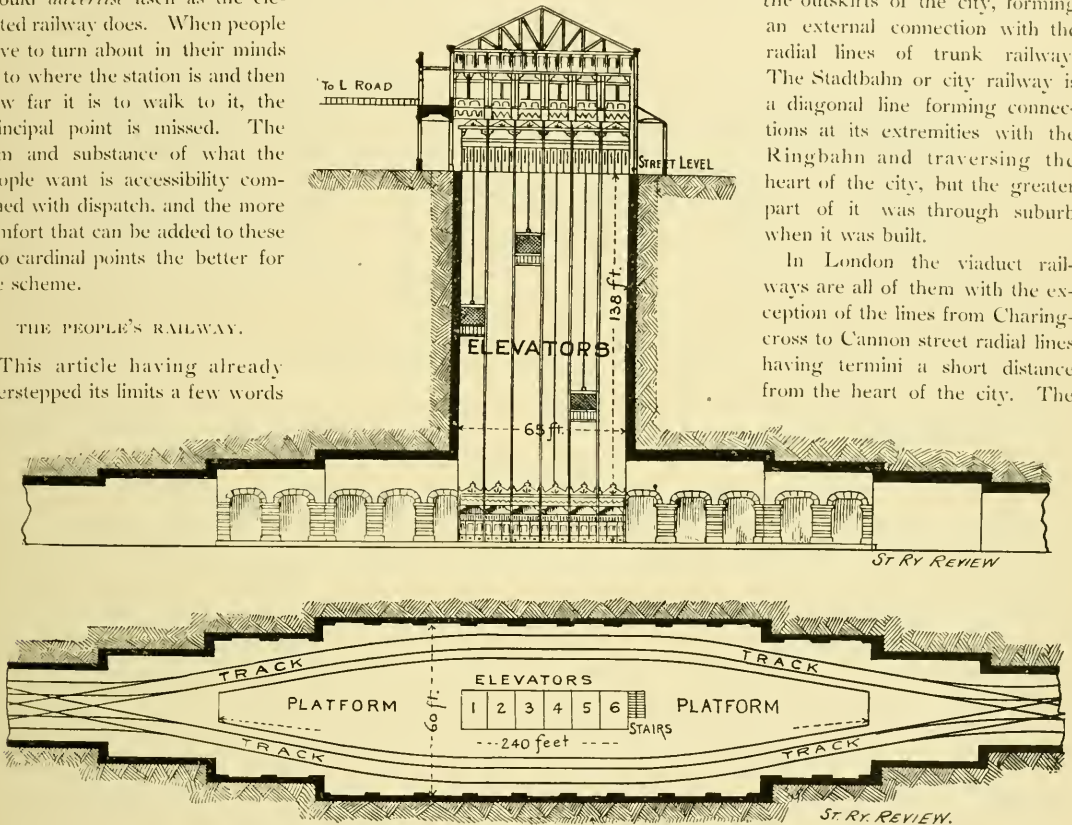
traffic naturally goes to the elevated road in preference. When in addition to the distance between stations an elevator trip has to be made people will prefer the horse or cable car even though they may be a minute or two longer on the journey. One of the first requisites of a rapid transit scheme to supply internal transit is that it should *advertise* itself as the elevated railway does. When people have to turn about in their minds as to where the station is and then how far it is to walk to it, the principal point is missed. The sum and substance of what the people want is accessibility combined with dispatch, and the more comfort that can be added to these two cardinal points the better for the scheme.

THE PEOPLE'S RAILWAY.

This article having already overstepped its limits a few words

cities such as Berlin and London the result of viaduct railways has been to increase the value of adjacent property, and therefore that lots under or contiguous to the railway would have a rise in value. There should be some qualification to the statement as regards Berlin and London. In Berlin the Ringbahn or Belt line girdles the outskirts of the city, forming an external connection with the radial lines of trunk railway. The Stadtbahn or city railway is a diagonal line forming connections at its extremities with the Ringbahn and traversing the heart of the city, but the greater part of it was through suburb when it was built.

In London the viaduct railways are all of them with the exception of the lines from Charingcross to Cannon street radial lines having termini a short distance from the heart of the city. The



AUSTIN CORBIN'S SCHEME - SECTIONAL VIEW OF ELEVATORS AND GROUND PLAN OF WHITEHALL STREET UNDERGROUND STATION.

must suffice to mention a scheme of very great importance, and one which until lately appeared the only one likely to satisfy the requirements of the city. It is a proposal to purchase a right of way through the middle of the blocks from end to end of the island and to construct upon the cleared space a high viaduct, at the top of which four tracks of railway should run; under which should be warehouses and stores and possibly dwelling houses, and in the basement of which there should be pipe lines supplying the city. The promoters expect a revenue of \$500,000 per annum from the pipe lines alone.

This scheme possesses some advantageous features. It does not disfigure the streets like the elevated road; it would give very rapid transit from end to end of the island, and it affords an asylum to the troublesome pipe-lines. It is more; much more of a real estate speculation than a railway scheme. Those who are posted in valuations of property are best qualified to judge of its financial prospects. It is claimed that as in European

rise in the value of property has been due in all cases to the development of the district by inducing builders to lay out new estates into terrace and street property. In contrast to this the city of New York is already built over, almost to the end of the island, with expensive property. To plan a railway to run through the blocks in London would not enter the wildest dreams of a railway promoter. He could no more obtain a financial backing for such a scheme than if he laid out his line through Buckingham Palace.

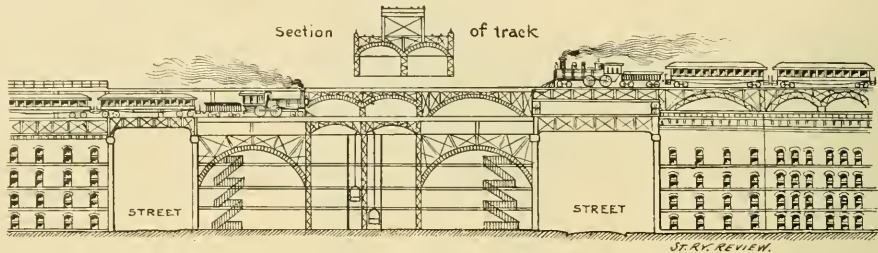
It is hardly correct to say that people prefer to be contiguous to the railway. Clerks and that class of people who cannot afford expensive residences and desire to be close to a station will sometimes live adjacent to the railway. They get used to the noise which is certainly objectionable to those who can afford to live elsewhere.

It is claimed further that such a scheme might be constructed very rapidly, and so it might, because every

block might be handled simultaneously. That is to say if there were no litigation and no injunctions. It is found, however, that in many cases even an act of the Legislature is not sufficient to prevent organized obstruction with a view to blackmail, and the railroad company often meets with its greatest delays from the smallest of the property owners so that it has to choose between

a serious extension on the appraisers estimates or a more serious extension on the contract time of completion, together with the "glorious uncertainty of law."

(Continuation in our next will contain descriptions of Greathead system of underground railway and Gribbles' combination system.)



THE "PEOPLES RAPID TRANSIT COMPANY'S" VIADUCT SYSTEM.

THE ASHTABULA HORROR.

THE readers of the STREET RAILWAY REVIEW are perhaps all familiar with the extraordinary proceedings indulged in at Ashtabula in July, 1890, on the part of the municipal authorities, authorized by act of city council, in dispossessing Captain John N. Stewart of his street railroad tracks, franchises, and all, without any adjudication at the hands of a court. Simply the whim of the city council, with whom Stewart had not been in accord for some time—a council said to be susceptible of what is known as "boodle," and whose members have accused each other in open meeting, one of having received more money than the other for their votes on pending ordinances and resolutions—a council who, for some years, were permitted to enjoy the benefits of complimentary tickets on the street railroad, but who, after constant and increasing abuses of the privileges, had been refused the same, and on account of an "anti and malignant feeling" sought to make and encourage a sentiment of discord and discontent in the community, and while none of the patrons of the road ever made any objection to its operation for the past seven years, this august body themselves resolved and re-resolved several times to tear up and remove the tracks from the streets for what they termed to be a violation of franchise. This sentiment seemed to be increasing among the members of the council to such an extent that at the instigation of friends Captain Stewart obtained an injunction from one of the judges of the court and the city was kept thereunder for some months; but on July 19, 1890, one Judge Sherman, the father of the city solicitor, appears upon the scene in the dual capacity of judge and party at interest, and, at the request of his son, hears a motion to dismiss or vacate the injunction, and against Mr. Stewart's protests to his hearing the case as an interested party, he forces on the hearing and dismisses the case. This being late Saturday afternoon, July 19, Mr. Stewart protested again against such "high handed" proceedings and the

very audacity of the thing induced the judge to retract and continue the case until Monday, July 21, 1890, and then adjourned his court but again, bending to the demands of the conspirators, Judge Sherman returns half an hour after and, without any knowledge or information to the plaintiffs or their attorneys, pre-emptorily dismisses them from the court by subscribing to an entry of dissolution or vacation of injunction, and with this in their possession the council are privately convened, and at 8 o'clock that night they pass an ordinance declaring the franchise under which Captain Stewart built his railroad in 1883, and given for the term of twenty-five years, to be null and void—forefeited—and ordering the mayor and street commissioner to remove the tracks from the streets, which they proceeded to do within an hour thereafter, and at 9 o'clock that Saturday night, with from six to seven hundred men, and under cover of the darkness, they proceeded to tear up and remove the street railroad tracks, and the work of destruction continued through Sunday and Sunday night, and not until daylight on Monday morning did these vandals complete their work, done under the guise of law. There is no law justifying any such action; it was simply superior force, and induced by preconcerted conspiracy, and Judge Sherman was made intentionally, or otherwise, to co-operate in the scheme. The very audacity of the thing seems appalling.

That there could be any number of men gotten together as councilmen who would rush into such a bare-faced attempt of confiscation seems almost beyond comprehension, but such is really the case at Ashtabula—and on account of the consort of action and unanimity of purpose and by this fiendish act, Captain Stewart is temporarily deprived of any tracks upon which to operate his cars, and a street railroad plant that he had been offered seventy-five thousand dollars for made completely valueless; and that is now the condition of the street railroad of Ashtabula. The former patrons of the street railroad are

compelled now to either walk through the muddiest streets man ever saw in any unpaved town, or patronize some of the meanest, broken-down old stage coaches anyone was ever compelled to climb into, and such means of transit is very apt to be the only means of reaching the "Harbor" for some time to come, for the reason that the city appears to court all kinds of dilatory methods at the hands of the old judge who helped them into the scrape. While Capt. Stewart and his able attorneys are endeavoring to push matters along in the courts as fast as possible the attorneys for the city, who seem to control the actions of the judge on the bench, are alert to all methods for delay. Meantime Capt. Stewart who knows and feels his deep wrongs and grievances has "memoralized" the Ohio State Legislature to hear Judge Sherman's excuses for such "high handed" interference and treachery, violating his official oath and obligation by such unheard of conduct, and asks the legislature to impeach him and cause his removal from the bench. The Judiciary Committee of the House are now considering the matter and unless the judge's lieutenants succeed in the artistic application of the whitewash brush as they are all attempting to do, the old fellow will probably hear his dismissal read to him before very long. The charges are of such a serious character as to give him and his "faithful pals," a great deal of uneasiness and at the last meeting of the committee at Columbus, the judge felt it necessary to be represented by three able practitioners from his court who were expected to settle Capt. Stewart in the most approved manner, and although the Captain is doing all his own attorney work in the impeachment matter, it is conceded by all familiar with the facts and acquainted with the Captain that in a case of this kind he is a fearless and aggressive fighter, and having right, justice, and honor upon his side, there can be no question as to the finale.

Meantime public opinion is divided upon the Council's actions, but unanimous that there should be a street railroad reconstructed over the former streets occupied by Captain Stewart, and he has made several attempts to do so, but is prevented by the police force, and his men arrested and the reconstructed parts again torn up: and the Council appreciating the demands of the people and fearing the pressure of public sentiment have granted a "Hazardous" adventurer an ordinance to construct a road conditioned on his paying into the public treasury a percentage of the gross receipts of his road. Thinking perhaps such concessions may appease the wrath of the people at the delay made consequent upon such litigation and expense as will eventually fall flat upon their heads, Captain Stewart has been urged strongly to prepare a complete statement of his seven years' of street railroad experience at Ashtabula, as in all probability no other half dozen promotors of street railroads or any other roads ever met with any such opposition and conspiracy on the part of the malcontents as has fallen to the lot of Captain Stewart. Such a publication would afford interesting reading, but when the Captain was asked about such a work he aptly replied that the success of all literary works depended upon the proper christen-

ing, and in the absence of any fitting name for such a book as would describe his persecutions for the past seven years in Ashtabula, he thought his friends would have to be content for the present with what they read in the STREET RAILWAY REVIEW.

The Captain is as full of fight as a gatling gun, and somebody is liable to get hurt before the war is over.

The opening of the Twin City Electric Line and its consequent reduction in fare between Minneapolis and St. Paul, has had an effect upon the steam roads, who until now, have had everything their own way, so much so that a conference of railroad officials was held here recently with a view to improve the railroad crossings by raising or lowering the tracks so as to reduce their running time.

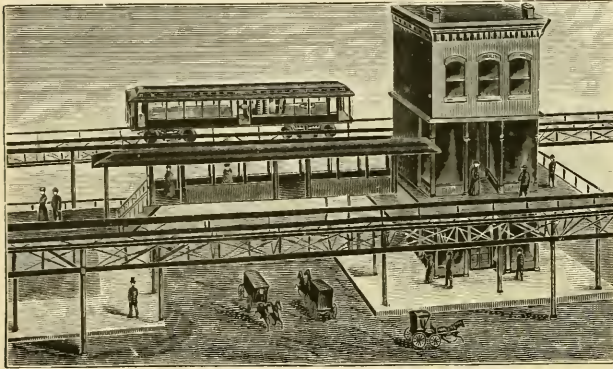
A PARTY of street railway men who were making a tour of inspection among the large cities finally brought up at Cleveland, when one of the party said to a reporter: Cleveland owes a debt of gratitude to Mr. Frank De H. Robison for the splendid cable line which he has done so much towards introducing in Cleveland. Different members of our party have seen all of the principal cable lines in the United States and we are unanimous in our opinion that Cleveland has the best cable service of any city in America.

In the car heating case which the West Chicago Street R. R. appealed from a justice court, the company's attorney, Judge Jamieson, closed his argument with: "You can require us to number our cars for convenience of identification in case of accident, and you can compel us to grade in conformity with the street grade, but you can't compel us to put curtains in our cars, or cushioned seats, or to peddle ice water, or put in stoves. You might as well compel us to put fans in the cars in summer as stoves in winter." The case is not yet decided, and it is believed the ordinance is invalid, because it does not include cassettes, omnibuses, etc. Meanwhile we have balmy summer weather, and stoves are at a discount.

CHAUNCEY M. DEPEW in an interview a few days since said, in speaking of the future of electricity in its relation to steam roads: "While it would not surprise me to see electricity rushing our railroad trains along at the rate of fifty or sixty miles an hour, I recognize there must be more great secrets of the mystic power revealed before we accept it. When we can get electricity so cheap that we can produce it as we go at the same cost as we now generate steam, we can talk about electricity as a motive power. Many railroad men are of the opinion that the steam locomotive, as a means of propelling cars, is doomed. They say its use involves too great a waste, and that electricity is already successfully employed for the propulsion of street and suburban cars. That is all well enough and I glory in the inventiveness of our Americans, but electricity will need to be juggled a great deal more before we can run a through express train to Chicago with it."

THE TRICYCLE ELEVATED RAILWAY.

THE inventors of elevated railways have of late been very numerous, and each new inventor has endeavored to obviate the objections which have been brought against those which have preceded it and embody such improvements as would make the construction at once strong, slightly, and if possible, less expensive.



The latest candidate for favor in this direction is J. G. Chandler, an architect of Racine, Wisconsin. His is called the "Tricycle Road." It runs on a single rail, with two guide rails two feet above and parallel with the main rail. This with the diverging trusses make a "V" shaped trough for the truck to run in. The structure is made entirely of iron and has comparatively little weight. It is supported on a single line of posts, which it is intended should be placed along the curb line on business streets, and in the centre of the roadway in residence districts: by reason of the fact that no heavy girders are used, it does not obstruct the light to any great extent.

The truck consists of two main bearing wheels of equal size, which are grooved, and placed one behind the other the same as the Safety bicycle. Two guide wheels on either side run flat-wise against and under a flange rail, by which arrangement it is impossible for the car to jump the track. Strong springs allow the guide wheel a lateral motion, and at the same time insure perfect contact with the flange rail.

Each car is carried on two of the trucks, each having a frame in which is placed a 30-horse power motor, and the arrangement is such that one or both of these motors can be used as may be desired.

The cars are 45 feet in length, of a standard width and height, and rest upon the trucks with a double swivel.

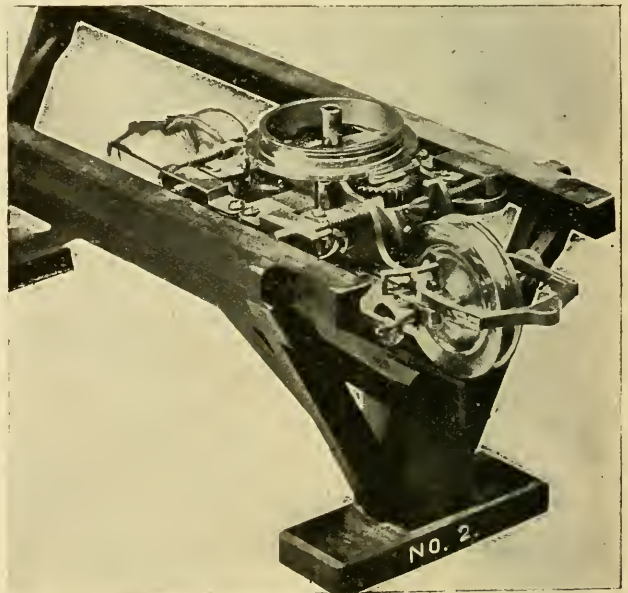
The most interesting and striking feature of this constructive system is its ability to move a 45 ft. car around a curve of 20 ft. radius. It not only does this, but at full speed, without any jerk whatever, and the adaption of the truck to the rails is such that a minimum of power is required to move the car on a curve, whether at full speed or from a dead stop. Instead of a conductor wire a conductor rail is used, which is placed conveniently on one

side, and a little above the main centre rail, and from which the current is easily taken.

In connection with this system the inventor has designed a supplemental method for an elevated sidewalk, by which it is intended to make the second stories of stores equally as valuable for business purposes as those upon the first floor. To do this he would take out the front of the buildings on the second floor and make an entrance recessed back six or eight feet, while the glass of the show windows below extends two feet above the elevated sidewalk, with a slanting top also of glass. In this way people on the elevated walk can view not only the show windows of the second story, but those of the floor below with equal ease.

The inventor also proposes to secure a very high speed for his truck and rail system, and to displace the steam locomotive and cars by the same three rail construction placed upon the ground. It is practically the same as his elevated road minus the posts, and will be readily understood by the accompanying illustration.

The weight of the trucks are no greater than the car box with passengers, making the center of gravity low.

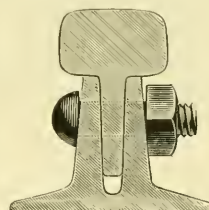


A DARING thief in New York in broad daylight the other day grabbed a valuable watch from a gentleman walking down Broadway, and dashed across the street. But retributive justice was near at hand, for in his rude haste he tried to run over a car horse, which promptly resented the insult, and, knocking down the thief, stepped on his ear, and so he was held until the surprised police arrested the bleeding offender. That horse deserves to draw the feed-box in the largest barn the company has, and should promptly receive the promotion.

EQUIPMENT NOTES.

Bargion Compound Rail.

OUR illustrations show the new form of rail introduced on the Pacific coast by the Bargion Compound Rail Company. For the last 12 months, the Southern Pacific Railroad Company have had the Bargion Compound Rail under test on their steam road in Oakland, Cal., on both curves and straight track. Forty-five passenger trains, consisting of a forty-four ton locomotive and ten heavy suburban cars, well filled, have passed over it daily. The test has shown some remarkable results, and the Bargion Compound Rail Co. claim that the joint problem has finally been solved. The entire absence of low joints has prevented hammering with the



attendant noise, and breaking up of the road-bed. During nine months not a bolt was touched or a moment's work done on the track, greatly surprising the railroad men and others cognizant of the fact, that with the ordinary T rail the section men were compelled to tamp up all the joints every two weeks, and screw fish-plates and bolts very frequently.

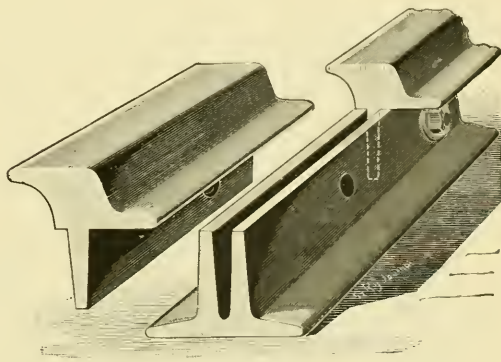
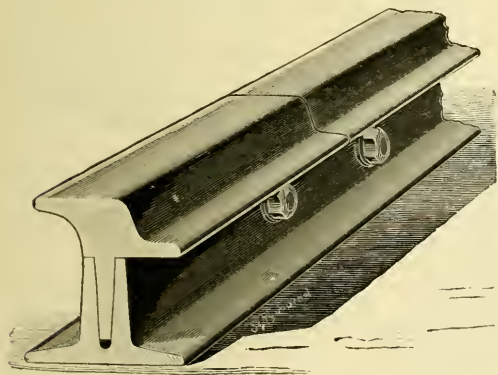
The question of joints has been under discussion in railway journals for years, but up to the present, no device has been invented which secures a uniform rail surface, and prevents low or high joints. The California invention

on the two upright webs, the tongue of the upper part lacking a quarter of an inch or more of touching the bottom of the groove. The two parts are made of steel, but the head can be carbonized to a very high percentage, increasing its life without endangering the safety of the rail. The lower half is made of soft steel, and is a part of the permanent road-bed when laid. In case of renewing or repairing the rail it is only necessary to remove a block from the ends of the rail. A ratchet wrench is used for removing blocks. Then the head can be taken out and a new head inserted without delaying traffic or disturbing the street. While the first cost of the rail is the same as ordinary girder rails, the saving on renewals

is one-half, and the cost of maintenance is reduced to the minimum.

Rapidity of construction; perfect alignment; uniform elasticity and smoothness; no hammering or noise; no raising or lowering of joints, are among the many claims made for this rail.

The Chicago & Northwestern Railway Company have now laid about 800 feet of the Bargion rail designed for steam roads and the test will be watched with interest by eastern railroad men and will go far toward the introduction of the rail on steam and street roads if satisfactory.



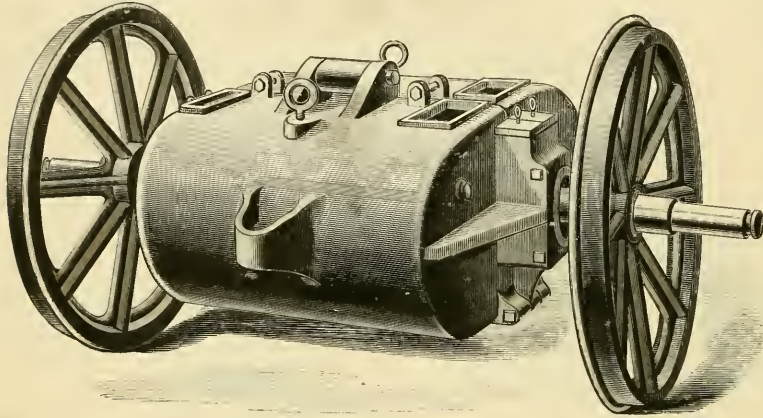
would seem to meet the issue by making the rail in two sections, the upper section breaking joints in the center of the lower, thus forming a solid support the entire length of the rail and making to all practical purposes a continuous rail. Its simplicity causes one to wonder why it was not thought of before.

Any of the prevailing shapes of head can be rolled to fit the lower section. The full weight of a load is carried

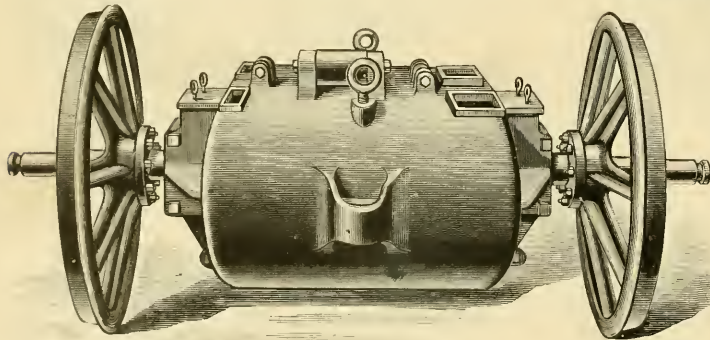
The officers of the rail company have every confidence that the rail will prove all they have claimed for it, and are looking forward for large orders in the near future. The company is backed up by men of capital and they intend to push the rail until its merits are recognized by all railroads. The offices of the Bargion Compound Rail Company are at 19 Montgomery street, San Francisco.

The Westinghouse "Ironclad Gearless" Railway Motor.

THE Single Reduction Motor lately put on the market by the Westinghouse Electric and Manufacturing Company has given such excellent results that this company has decided to go a step further and build a direct acting gearless railway motor. Two of



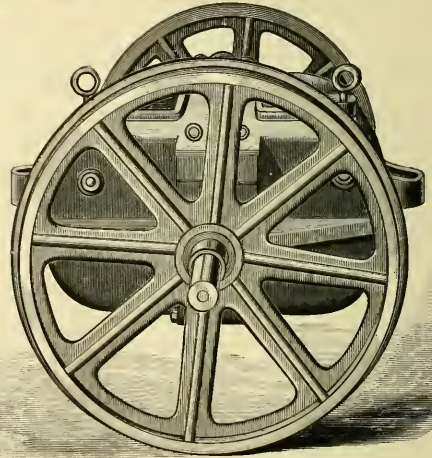
these motors have been built in their Pittsburg factory and after careful tests, have been found to exceed the most sanguine expectations. In the accompanying cuts, Fig. 1 shows a diagonal view of the motor mounted on the wheels. Fig. 2 is a side view of the same and Fig. 3 is a view from the front. Fig. 4 shows a completely equipped car with two motors, and in Fig. 5 we have represented the car body raised at one end in order to remove or replace the motor. Fig. 6 shows the method of opening the fields to exchange the armature or field coils. This motor the Westinghouse Company has termed the "Ironclad Gearless," for, as will be seen in the accompanying cut, it is completely surrounded and protected by the field frame, which forms a natural casing of sufficient strength to withstand all shocks and obstructions of the roadbed. The field consists of two symmetrical castings of special iron sleeved upon the armature shaft



or axle, hinged on top and secured together by bolts. The joints are made watertight and the bearings are provided with leather cups for the same purpose, which

makes it dust-proof and possible to operate the motor on inundated tracks. The armature, which is of the drum type, is built upon the car axle. The sheet iron discs being solid and keyed to the axle, give the axle an additional strength which precludes any possibility of its bending. This arrangement of course, eliminates all gearing. The car wheels are fastened to the shaft by a

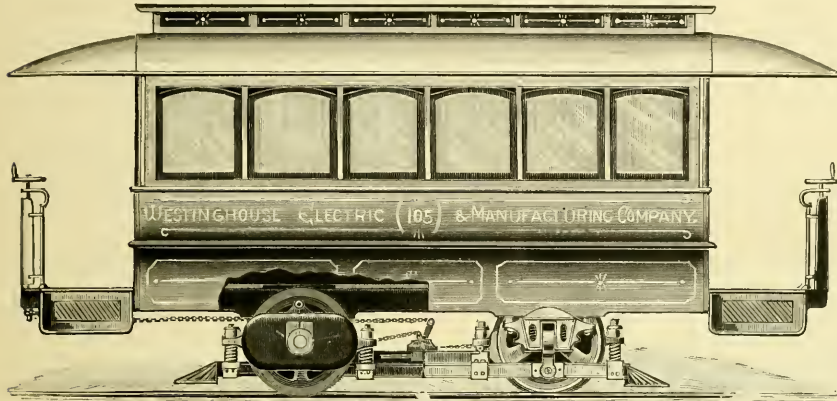
new and novel arrangement, which makes it possible to quickly and easily replace them without any special tools or skilled labor. The armature is but 16 inches in diameter with a grooved periphery for the wires, which not only increases the efficiency, but holds the wires absolutely rigid. This construction has been found to be of great value for railway work, as the severe strain upon the armature in starting the car, has a tendency to displace the wires. The drum type armature was selected by the Westinghouse Company for this



motor, as it is more efficient electrically, and mechanically much superior to the gramme or disc armatures. No extra care being required to prevent lateral motion, which, in a disc armature, is a constant source of danger. The sudden stops and reversals of the cars have a tendency also to loosen the spiders which are essential to the construction of both the gramme and disc types. Special attention has been given to the design of a commutator of great solidity and durability. It is securely fastened to the shaft, and

connections with the armature are made by short, heavy wires which will overcome the trouble which has been experienced from broken connections. The

brush-holder, which is rigidly fastened to the magnet frame is of very simple design, well insulated and easily accessible by openings provided with water-tight lids. It will be seen from the cuts that the weight of the magnet frame is counterbalanced and cushioned upon two powerful spiral springs which rest upon the cross bars of the truck. These springs prevent the field from rotating and give the motor the necessary flexibility for easy starting. The total depth of the "Ironclad Gearless"

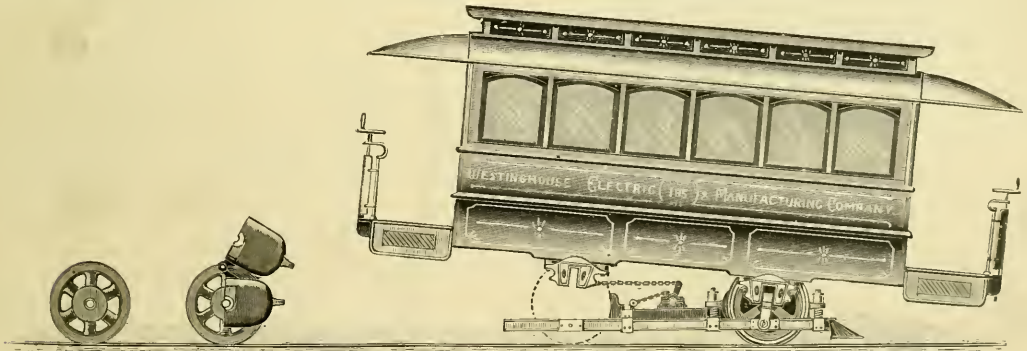


motor is but 20 inches, giving 5 inches clearance between the bottom of the motor and the rail, with a 30-inch wheel. One point of great importance is the ease and rapidity with which these motors can be changed. In case of accident, one end of the car body may be raised by means of jacks and by simply unscrewing two nuts, the motor can be rolled out on its wheels, and a complete motor, which may be kept tested in the car-house for that purpose, can be rolled into its place. The fields of the motor

working efficiency of over 90 per cent. It is also proven by the fact that, after two hours' run with a load of over 20 H. P. the rise in the temperature of the armature and field coils was only 30 degrees centigrade above the surrounding air. All sparking is avoided by the excellent Electrical design. This form of motor is naturally entirely free from leakage and external magnetism. On account of the absent of gears, it may safely be stated that at least 5 H. P. per car is saved over the double reduction

motors, thereby diminishing coal bills, or allowing more cars to be operated by the same generating capacity; or in other words, requiring less generating capacity for a given number of cars. The wear and tear and maintenance on cars equipped with these motors will be enormously reduced on account of the low speed of the wearing parts, small inertia of the armature and the low peripheral speed of commutator.

The comparatively light weight of the equipment, dispensing with the weight of an elaborate truck, is a point that should be carefully considered. The "Ironclad Gearless" can be adopted for any and every gauge from 3 ft. 6 in. up. This practically, is the limit of improvement in electric motors for street car work, and the railway presidents who have been waiting for this point to be reached before equipping their roads, should hesitate no longer.



can then be opened by one man, as shown in the engraving, which will at once liberate the armature. For all this no pit is required and the work can be done intelligently and conveniently. This point we are sure, will be appreciated by every railway man who has experienced the inconvenience and delay of making repairs on the high speed motors. The Westinghouse Company claim that their "Ironclad Gearless" is the most efficient railway motor now on the market, actual tests having shown a

EVEN base-ball cannot flourish without street railways, for when the Terre Haute Street Railway Co. declined to subscribe a great big lump to a base-ball fund the Terre Hauters decided not to join the inter-State ball league.

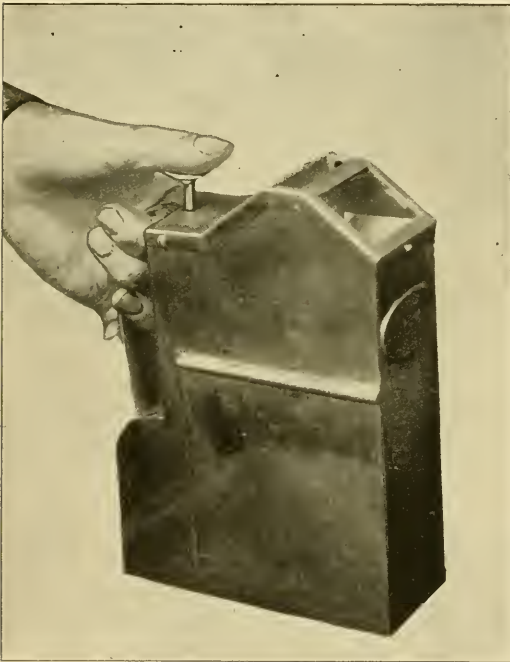
RESIDENTS of Third street, Kansas City, who had signed the petition for an electric line to use side poles, have changed their request and now desire that the poles be placed in the centre of the street.

Lee's Registering Fare Box.

IT is not to be expected that a conductor will turn in more fares than his register calls for, even if the same have been collected and the registration of them omitted either accidentally or intentionally.

Thomas B. Lee, of Toronto, Canada, has invented a combination portable register and fare box, by the use of which companies receive all the money collected whether the same has been registered or not. Lee's fare box is illustrated herewith, but may be made of any desired size or pattern or used as a fixture on bob-tail cars.

The box is operated with the thumb of the hand by which it is held, the other hand remaining free to make change. When not in use the box may be suspended by a strap leaving both hands free.



When the fare is put into the mouth of the box it falls on a platform or leaf of a revolving disc, so that when the conductor presses the button, it causes the disc to turn and drop the fare into the inner receptacle or bottom portion of the box, at the same time it rings a bell inside to signify that the button has been pressed, and also causes a paper ribbon inside to be marked or punctured, making the record of the transaction complete in every way.

It has put the fare out of the reach of the conductor, it has registered it for his employer, and it has informed the passenger that this has been done.

If ten cents is paid for two fares, the conductor presses the button twice, which consequently rings and registers twice.

Now, when the box is handed in by the conductor the amount in same must correspond with the number of fares registered, unless the conductor has failed to do his duty

in not pressing the button for every fare he took. But here the company get the benefit, as they have the money, while with other registers the money remains in the conductor's pocket.

The slip or paper ribbon is not more than a quarter of an inch wide and is marked in such a way that there is a clear space at both the beginning and end of each when same is taken out of the box, which prevents the possibility of cutting off of any of the fares, supposing the receiver wished to be dishonest; and the marking being at regular distances can be counted instantly by a rule or scale.

The conductor's name, date, etc., are entered on the slip which may be pasted in a book, preserving for reference the record of the trip or day. This system is also a positive check on the receiver, as his failure to report any excess of fares registered, permits of easy detection. Neither conductor or receiver can tamper with the printed slip, and when a fare is deposited in the box it is impossible to extract the same until opened at the office. The boxes cannot possibly get out of order and are light, strong, and handsomely nickel plated.

Double Curve Bracket.

THE Electric Merchandise Company, Chicago, who have just placed on the market the double curve bracket, illustrated, have had such a long experience in equipping electric roads that they are continually figuring on material which will simplify the work to be done as well as secure the best results when in use.

This bracket is to be used on outside wire in double curve construction. It is made with malleable iron yoke.



insulated at either end with a specially prepared hard rubber composition. The clamp holding the wire is the new Brewster clamp, which has met with such phenomenal success, and which can be attached to the wire without solder and which can be adjusted in a moment's time to meet the varying conditions of the trolley wire. It can also be adjusted to any angle to fit the curve of the trolley wire. The advantages of this bracket will be readily understood by practical men.

THE FALLS RIVER MANUFACTURING Co., who have for some time past been located at 46 South Canal street, are now nicely settled in their new double store, at 8 and 10 South Canal street. This gives them one of the finest show rooms on the street, and more ample accommodations for caring for their large and increasing business. This company is making a specialty of electric light and street car plants, and are having very large sales for their popular clutches.

THE CAMPBELL & ZELL Co., of Baltimore, have opened an office in the Rookery building, this city, under the management of Mr. Ross, who will look after the very rapidly increasing business of this company.

The Westinghouse Automatic Circuit Breaker.

THE railway men who have operated street cars and have used in their station the ordinary fusible block, and the make-and-break switch, know how difficult it is to keep their switch-board looking well, especially when they have had a number of short circuits on the line. Not only are the safety-fuse blocks burned and discolored, but also the portion of the switch-board near the safety fuse is injured, and in addition to the above, the jaws of the switch are partly melted or fused, and the whole presents anything but a neat appearance. In order to prevent this, the Westinghouse Electric and Mfg. Co. have an automatic circuit breaker, which breaks the current automatically whenever there is a short circuit on the line, without burning or in any way disfiguring the breaker itself. It has been tested on as high a current as 900 amperes and 500 volts, or a total of 450,000 watts, without in any way affecting or burning the breaker. There should be one of these automatic breakers upon each feeder, and a trial will readily prove its numerous advantages.

In the accompanying cuts, Fig. 1 is a view of the breaker when open, and Fig. 2 represents it closed.

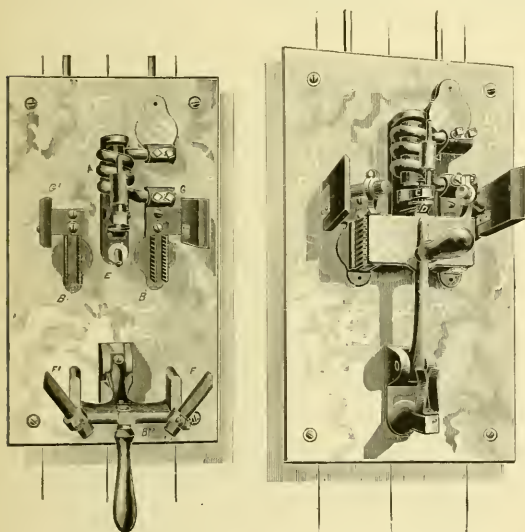


FIG. 1.

FIG. 2.

In the following description the letters refer to the corresponding parts in these cuts:

The Automatic Circuit Breaker consists of an electro-magnet, A, in series with a double break switch, B, B₁ and B₂.

If a short circuit occurs on the line, the electro-magnet will attract its armature, C, and with it the trigger, D, which holds its switch closed, and thereby allows the spring, E, to throw the lever arm out of the contacts. This, however, does not yet open the circuit as the carbon contacts, F and F₁, carried by the lever arm still touch the carbon plates, G and G₁, at the sides of the switch, and at these carbon points the circuit is finally

broken without injuring in the least the metal parts of the switch. The feeder switch should always be opened before the circuit breaker is closed again.

The point at which these circuit breakers will cut out, can be regulated by changing the weight, H, attached to armature. The Westinghouse Electric & Manufacturing Co. make two styles of circuit breakers, viz.: one to work on feeders up to 400 ampere capacity (type A), and one to work on feeders from 400 ampere to 800 ampere capacity (type B). These can be used in connection with any street railway system.

Ryan's Convertible Car.

THE Ryan Convertible Car Co. have just brought out a new style car, the first order of which has been manufactured at the works of the St. Louis Car Co. Its object is to enable a single equipment of cars to do the double service for summer and winter work, and they have succeeded in overcoming a number of serious objections which have existed in former attempts to accomplish this result.

This car has stationary ends, as in an ordinary closed car. The space between the posts is filled by a removable section, the outer edge of which overlaps half way on each post, and is supplied with neatly fitting rubber tubing, so that when the section is firmly pressed in position, the rubber flattens against the outer edge of the post. This makes a joint at once wind and dust proof, and prevents any rattling. Each section is provided with sash and sun curtains and neatly shaped panels within and without. The windows may be let down as in the regulation winter car. For the winter car the passenger enters from either end and passes through a single aisle to seats which are placed on either side, which accommodate two passengers, and for a car 16 ft. 6 in. in length, a seating capacity is thus afforded for twenty-eight persons. To remove the sections and transform the box into an open car requires the work of but two men for five minutes, and a reverse change from summer to winter car may be made in the same time, as there are no bolts or screws required. The seats are reversible, except those at the end. This permits of a space in the center of the car, 24 inches wide and as long as the width of the car, to allow of the armature being lifted out or replaced on electric lines. A running board on both sides of the car, when it is used as an open car is securely held by neat iron braces, which are easily removed when the car is closed.

The inventor claims for his new style a car that is entirely water proof, that will not rattle, and which combining all the advantages of an open and closed car can be built for but from 10 to 15 per cent. more than the ordinary closed car. By this means a great saving can be made in equipment and in the storage room required, and shop work, such as varnishing and re-painting, may be done on the sections while the car is on the street, and to that extent reducing the time which otherwise the car would lose when being shopped.

Wooden Tooth Gear.

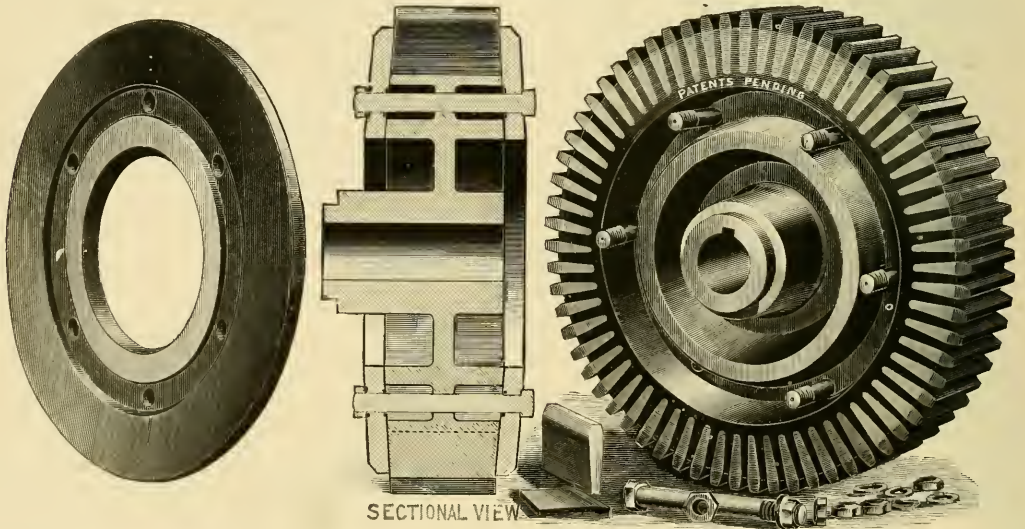
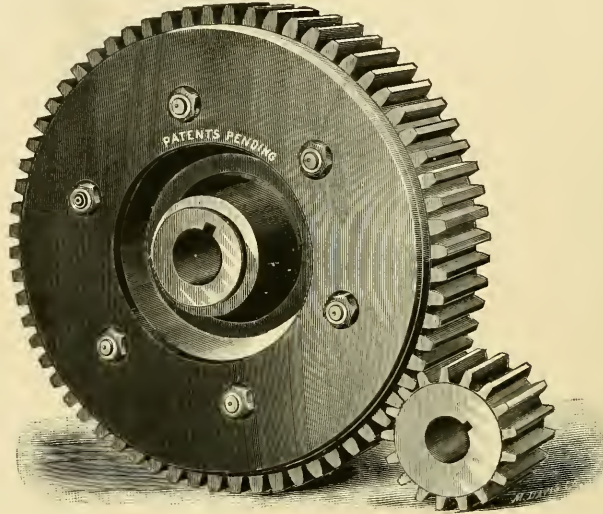
FOR many years the desirable qualities of wood in a gear wheel has been fully established, both as regards wearing qualities and noiseless operation: and the greatest objection to its use in street car service has been the enormous price at which gearing of this description has been held.

To devise a plan which should place a wooden tooth gear for electric motor service within the reach of all, has been the aim of R. D. Nuttall & Co., of Allegheny, Pa., and in doing this they have considered maintenance as well as first cost.

The body of the wheel is composed of a special grade of cast iron with the receptacles for teeth milled accurately in its periphery in the form of a wedge, thus accomplishing a two fold purpose. It enables the production of a wooden tooth exactly correct, with equal amounts of wood on each side of receptacle, thus avoiding the splitting of teeth to be met with in other forms of wooden toothed wheels, and it almost enables any ordinary carpenter to insert the teeth without any special tools, other than

years. They use in connection with the wooden toothed wheel a hardened steel pinion, hardened by a new process, which makes the life of the pinion very much longer than the forms of pinions now in use. The wooden tooth, however, will wear longer than the pinion. The teeth can be removed and placed without removing the wheel from the motor, a very great saving over the old way. These wheels are guaranteed to be first-class in every particular, making very little noise and on account of their elasticity they have proved to be specially adapted to street car service. These wheels are in use on several prominent roads, among which are the Erie Electric Motor Co., of Erie, Penn., the Atlantic City Railway, Atlantic City, N. J., and the Federal Street & Pleasant Valley Line, Pittsburg, Pa.

The manufacturers will send one set of wheels on 30 days trial to any responsible parties ordering same, and if not what is claimed for them they can be returned without expense. The cuts on this page convey an excellent idea of the construction of the wooden-toothed gear.

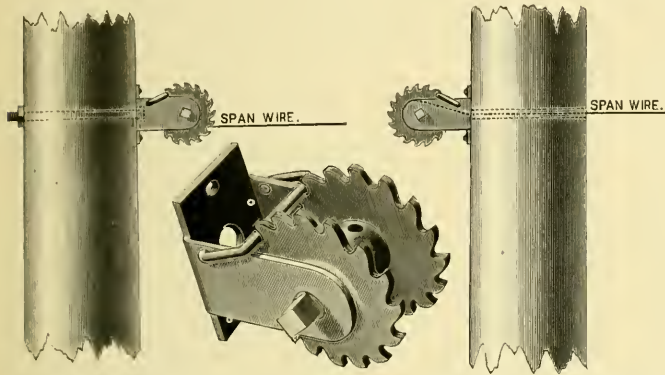


usually used on ordinary work, thus reducing the cost of maintenance to a minimum. The main body of the wheel with ordinary care will wear indefinitely, the teeth have known to wear six to eight months in severe street car service, and in mills, etc., have been known to last for

The authorities of San Antonio, Texas, are sensible in naming speeds for its street car companies, and allows ten miles an hour for the district within one mile of business centre, fifteen miles an hour from one to two miles radius, and twenty miles per hour beyond the three-mile radius.

Electrical Supply Co.'s Pole Ratchet.

THE Electrical Supply Co., of Chicago, have a new pole ratchet, which though simplicity itself, as will be seen from the illustration herewith, is highly effective in results. The ratchet itself is not particularly new in general characteristics, but is unusually well made, and though light does not sacrifice strength. The ratchet admits of two methods of application, as shown in the cut; the old method, with the use of a bolt passing through the pole, and the improved method suggested by



the Electrical Supply Co., by which the span wire is passed through the pole and is wound on the ratchet on the farther side. This, it will be seen, entirely obviates the use of the bolt, for the greater the strain from the span wire the tighter the ratchet hugs the pole. There are several advantages in this ratchet, which a casual examination will readily discern.

Memphis Matters.

After many weary months of discussion, objection and uncertainty, contracts are being let with the various supply houses for the equipment of the electric road here. Every effort will be made to have the Main street line in operation by Sept. 1st, and the others to follow as fast as possible. Scarcity of brick has delayed the letting of the contract for the power house, but it is hoped to have the building completed within four months. This station, with its steam and electric equipment, will cost \$175,000, and contains 1,500 horse power. A part of the old car equipment will be rebuilt to be used as trailers behind the motor cars. The mules, of which the company have about three hundred, will be sold.

The contract for power plant and motors was let on Saturday, April 11th, and was secured by the Edison Company. Sixty motor cars will be equipped at the start and additions made as necessary. This is a large order and has been the object of strong competition from all sides.

THE GREAT WESTERN ELECTRIC SUPPLY CO. has received the western agency for W. S. Hill's switches, cut-outs, etc. They are to be congratulated on securing this agency, as these switches are known from the Atlantic to the Pacific as first class in every particular.

An Improved Casing for Steam Pipes.

THE Wyckoff patent steam pipe casing shown in the accompanying illustrations is made of double thickness of eight thoroughly seasoned one inch white pine staves to each section. The staves of the inner course are jointed together and wound with galvanized steel wire, then wrapped with two thicknesses of heavy corrugated paper, after which another casing of staves is put on the outside and wound with galvanized steel wire. The outer casing is then coated with asphaltum. Fig. 1 represents a section of such casing complete, there being two staves removed from the casing as shown in Fig. 2, to disclose the

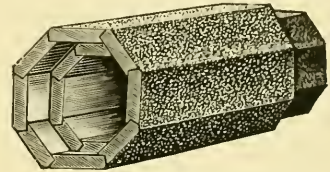


FIG. 1.

lining between the inner and outer courses. To cut the casing lengthwise, where this is necessary in putting it around the pipes in position, the binding wires are cut by a file or otherwise, and their ends fastened down by a common blind staple. This allows the outside casing to be laid open, as shown in Fig. 3, a similar process being

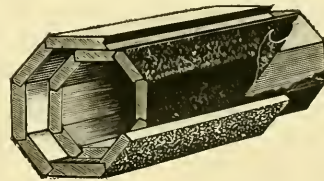


FIG. 2.

followed in opening the inner casing. In calculating the size of casing required proper allowance should be made for the pipe couplings.

It is said in comparative tests of this casing with one of solid wood, both round and square, in the same line, the sectional casing has proved greatly superior. The solid wood casing rapidly became checked, and so heated

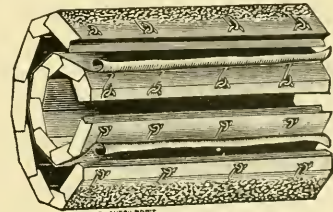


FIG. 3.

throughout as to cause material loss of heat, while the sectional casing, owing to the interposed non-conducting layers, remained perfectly cool on the outside.

This improved steam pipe casing is made by Messrs. A. Wyckoff & Son, Elmira, N. Y.

The Edco Company.

THE storage battery cars equipped by the Accumulator Company, and installed according to the "Edco" system, invented by Mr. W. W. Griscom, have been in continuous operation upon the tracks of the Dubuque Street Railway Company in Dubuque, Iowa, and of the Eckington & Soldiers Home Railway Company in Washington, D. C., and this fact has, we are informed, given such an impetus to the street car business of the Accumulator Co. and the Electro Dynamic Co., of Philadelphia, (the latter company making the motors, gearing switches and other apparatus, except accumulators embraced in the Edco system), as to make it necessary to consolidate in Philadelphia the general offices of the two companies named, so that the officers and heads of departments of both companies shall be in constant communication with each other.

New and commodious offices have been secured, fronting on Chestnut street, Philadelphia, Nos. 224 and 226, and extending back to Carter street, upon which the six story factory of the Electro Dynamic Company is located. These offices will be fitted up so as to accommodate the executive officers, the superintendent and the technical departments of both companies, and the same time enabling the factory facilities to be increased to the extent now covered by the Electro Dynamic Company's offices.

The Eckington & Soldiers Home Railway Company, in addition to its contract for a full equipment of Edco storage battery cars for its "G" street and Fifth street branches, has recently ordered from the Electro Dynamic Company two 40 H. P. Edco slow speed dynamos, with self-oiling bronze bearings and tempered copper commutators, work on which is being pushed forward as rapidly as possible. The factory of the company is being worked to its full capacity, including three nights service a week.

Mr. D. H. Bates, vice-president and general manager of the two companies, has resigned these positions to date from May 1st, in order to take a general selling agency for street car equipments upon the Edco system, with headquarters in New York, in the same offices which the two companies named have occupied for the past five years.

The electrical fraternity and the street railway officials and public have now an opportunity of satisfying themselves whether the storage battery system of street car propulsion is economical, in view of the fact that the system is in practical every day operation in Dubuque and Washington, on the roads above named.

Messrs. Truex & Vail, also located at 44 Broadway, New York City, are the general selling agents for New York and New Jersey for accumulators and Edco apparatus for other than street car work.

THE St. LOUIS CAR CO. are finishing ten open cars for the Salt Lake Rapid Transit Co., in which the seats extend across the car with aisle reaching the full length of the car. The cars are of the latest pattern and very handsome.

STREET CAR PATENTS.

The following list of street car patents is prepared for THE STREET RAILWAY REVIEW, at the Patent Law Office of Haup Brothers, 606 Rialto building, Chicago. We refer our readers to them on all matters relating to patents and patent law.

MARCH 3, 1891.

Trolley for Electric Railway.....	Wm J. Calvert, Albany, and W. P. Nishall, West Troy, N. Y.	447,632
Axle Bearing.....	D. W. Copeland, Syracuse, N. Y.	447,298
Step for Cars.....	Elias E. Fashion, Emporia, Kan.	447,304
Electric Subway.....	John C. Reilly, Brooklyn, N. Y.	447,350
Electric Heater.....	Chas. C. Rich, Mt. Vernon, N. Y.	447,353
Turnout and Crossing for Line Conductors.....	Sidney H. Short, Cleveland, O.	447,495
Safety Brake Apparatus.....	John H. Hoechstatten, Vienna, Austria,	447,710
Electric Motor.....	Robt. W. Taylor, Richmond, Va.	447,704

MARCH 10, 1891.

Street Railway Tie.....	Chas. A. Beach, Albany, N. Y.	448,005
Registering Apparatus for Street Cars.....	Horace G. Canfield, Akron, O.	447,806
Cable Grip.....	Clement Hagard, San Francisco, Cal.	448,035
Car Brake and Starter.....	Chas. J. Luce, Niantic, Conn.	447,780
Trolley Carriage and Conductor.....	Chas. J. Luce, Niantic, Conn.	447,885
Overhead Railway.....	Jonah W. Moyer & G. F. Jackson, Philadelphia, Pa.	448,157
Trolley for Electric Railways.....	Merle J. Wightman, Scranton, Pa.	448,172
Trolley for Electric Railways.....	Merle J. Wightman, Scranton, Pa.	448,173

MARCH 17, 1891.

Electric Motor Truck.....	Francis O. Blackwell, New York, N. Y.	448,199
Trolley Support for Electric Cars.....	Benj. F. Crow, St. Louis, Mo.	448,505
Electric Railway.....	Justus B. Entz, New York, N. Y.	448,328
Electric Railway.....	Rudolph M. Hunter, Philadelphia, Pa.	448,653
Elevated Railway.....	Patents 448,523, 448,618 and Marion Jacobs, Chicago, Ill.	448,571
Brake for Street Cars.....	John H. King, Cincinnati, O.	448,438
Underground Conduit for Electric Railways.....	Robert A. Stewart, Alleghany, Pa.	448,461
Electric Railway Motor.....	Chas. J. Van Depoele, Lynn, Mass.	448,561
Electric Railway System.....	Chas. J. Van Depoele, Lynn, Mass.	448,563
Gripping Machine for Cable Roads.....	Fred W. Wood & J. Fowler, Los Angeles, Cal.	448,287

MARCH 24, 1891.

Electric Street Car Driving Gear.....	Conrad M. Conradsen, Madison, Wis.	448,910
Electric Railway.....	Thos. A. Edison, Menlo Park, N. J.	448,778
Trolley for Electric Railways.....	Rudolph Eickemeyer, Yonkers, N. Y.	448,831
Overhead Crossing Appliance for Electric Railways.....	Isaiah H. Farnham, Wellesley, Mass.	448,711
Link for Cable Grips.....	Vernon T. Lynch, Chicago, Ill.	448,973
Speed Regulators for Electric Motors.....	Sidney H. Short, Cleveland, O.	448,681
Protecting Motor Mechanism of Electric Cars.....	Sidney H. Short, Cleveland, O.	448,840
Lamp for Electric Railway Cars.....	Chas. G. Smith, Brooklyn, N. Y., and L. Pfingst, Boston, Mass.	448,865

MARCH 31, 1891.

Street Railway Crossing.....	Victor Angerer, Philadelphia, Pa.	449,433
Electric Railway Conduit.....	Francis O. Blackwell, New York, N. Y.	449,196
Electric Motor Truck.....	Francis O. Blackwell, New York, N. Y.	449,197
System for Cable Railways.....	Leonard Cutshaw, Denver, Colo.	449,466
Car Starter and Brake.....	Wm. Giffard, Salford, England,	449,285
Constructing Street Railway Tracks.....	Theo. G. Gribble, London, England,	449,117
Guard for Electric Railway Trolleys.....	A. W. Mitchell, Boston, Mass., Patents 449,226 and	449,490
Hand-Support for Cars.....	Fred'k A. Morley, Brooklyn, N. Y.	449,262
Electric Railway System.....	Sam'l F. B. Morse, Brooklyn, N. Y.	449,569
Automatic Trolley-catcher for Electric Railways.....	Byron J. Parsons, Omaha, Neb.	449,569
Method and Apparatus for Propelling Street Cars.....	Wm. E. Prall and W. E. Jr., Washington, D. C.	449,588
Cable Grip.....	Emil Schalk, Piermont, N. Y.	449,139
Pneumatic Railway.....	Eliel L. Sharpneck and J. W. Baily, Denver, Colo.	449,594
Reversible Sign for Horse Cars.....	Fred. E. Webb, Boston, Mass.	449,506

FOUND ON THE RUSH TRIP.

American Street Railway Association.

HENRY M. WATSON, PRESIDENT, Buffalo, N. Y.
 W. A. SMITH, FIRST VICE-PRESIDENT, Omaha, Neb.
 CHARLES ODELL, SECOND VICE-PRESIDENT, Newburyport, Mass.
 A. D. RODGERS, THIRD VICE-PRESIDENT, Columbus, Ohio.
 WM. J. RICHARDSON, SECRETARY AND TREASURER, Brooklyn, N. Y.
 EXECUTIVE COMMITTEE—THE PRESIDENT, VICE PRESIDENTS, and THOMAS
 LOWRY, Minneapolis, Minn.; D. F. HENRY, Pittsburgh, Pa.; ALBERT E. THORNTON,
 Atlanta, Ga.; H. M. LITTELL, Cincinnati, O. and THOMAS C. KEEFER,
 Ottawa, Can.
 Next meeting will be held in Pittsburgh, Pa., October 21st, 1891.

Massachusetts Street Railway Association.

PRESIDENT, CRAS, B. PRATT, Salem; VICE PRESIDENTS, H. M. WHITNEY, Boston,
 AMOS F. BREED, Lynn, FRANK S. STEVENS; SECRETARY AND TREASURER, J. H. EATON,
 Lawrence.
 Meets first Wednesday of each month.

New York Street Railway Association.

PRESIDENT, DANIEL F. LEWIS, Brooklyn; VICE PRESIDENTS, JNO. N. BECKLEY,
 Rochester, JOHN S. FOSTER, New York; SECRETARY AND TREASURER, WILLIAM J. RICH-
 ARDSON, Brooklyn; EXECUTIVE COMMITTEE, JOHN N. PARTRIDGE, Brooklyn; CHARLES
 CLEMENSRAW, Troy; C. DENSMORE WYMAN, New York.
 Next meeting, Hotel Metropole, New York City, Sept. 15th, 1891.

Ohio State Tramway Association.

JOHN N. STEWART, Ashabula, President; JOHN HARRIS, Cincinnati, Vice President;
 J. B. HANNA, Cleveland, Secretary and Treasurer; E. K. STEWART, Columbus,
 Chairman Executive Committee.

The Street Railway Association of the State of New Jersey.

PRESIDENT, JOHN H. BONN, Hoboken; VICE PRESIDENT, THOS. C. BARR, Newark;
 SECRETARY AND TREASURER, CHARLES Y. BAMFORD, Trenton; EXECUTIVE COMMITTEE,
 OFFICERS and C. B. THURSTON, Jersey City; H. ROMAINE, Patterson; LEWIS PER-
 RINE, JR., Trenton.

ALABAMA.

SELMA.—The street car line here is to be converted into an electric line. Arrangements are being made now to put in the plant.

CALIFORNIA.

LOS ANGELES.—Grading is well under way and a considerable of the material on the ground for the construction of the Los Angeles Electric Belt Railway. The projected system will consist of thirty miles, of which it is expected no less than twelve miles will be completed this year.

OAKLAND.—E. M. Green, T. D. Hoskins, and others, have petitioned for a franchise on several streets. It is proposed to operate the same by the Hoskins motor.

THE Oakland and Berkely Rapid Transit Co. has petitioned for a franchise for an electric road, it will undoubtedly be built. The following officers were elected: Geo. W. McNear, president; J. E. McElrath, vice-president; H. S. Hunt, secretary.

MESSRS. MEEK, LANDERS & PALMER have secured a franchise for an electric road extending from the city limits to Thirteenth avenue. It will enter the city through the Eighth street bridge. It does not in any way interfere with the proposed line which E. C. Sessions and E. B. Vandercook intend to build.

THE Central Avenue Railway Co. has incorporated for \$1,000,000, for the purpose of operating a cross-town

electric road on various streets. Walter F. Beck, of Oakland, and John F. English, of San Francisco, are among the promoters.

SACRAMENTO.—Traffic on the electric road has so rapidly increased that it has been found necessary to order additional equipment. Cars will be built by California parties.

SAN FRANCISCO.—The California Street Cable Co. now operates from the new power station on California and Ide streets. The transfer was made from one station to the other with a loss of but a few hours in the operation of the cars. The old cable which was taken out of service at the time had been in use for sixteen months.

COLORADO.

DENVER.—The Denver City Cable Co. will build a new car house 125x300 feet, to cost not less than \$20,000. The company have other improvements in contemplation, notably the conversion of their horse car lines into electric roads.

THE entire road-bed of the Lakewood & Golden electric R'y. has been graded, and it is now hoped to have the line in operation by May 1st. There will be three power houses: one at each terminus, and the third midway. The entire cost of the road will amount to \$600,000.

FRANKLYN, MOREY & Co. report they have \$50,000 subscribed to build an extension electric road through their property at Sherwood place.

THE Suburban, City Cable, and the Tramway Co. have each sought to lay tracks on the same street, and the attempt at the same time of all three to do so, recently lasted all day, and entertained a crowd of more than three thousand people. As fast as one company would complete any portion of track work the others would tear it up. This lasted all day, when finally a truce was declared, and matters are at a standstill for the present.

GREELY.—The proposed electric street car line has not yet been fully organized, but steps are being taken to do so at once.

TRINIDAD.—There is a disposition on the part of local capitalists to take the franchise granted to Mr. Frank A. Miller, of Denver, for an electric street railway, as Mr. Miller decided to let it drop after securing the franchise from the city. A company is being formed by Captain John Conkie and indications are good for raising the necessary amount of money.

CONNECTICUT.

BRIDGEPORT.—The East End Railway has decided to adopt electricity when their tracks shall have been extended to Stratford, work on which has already been commenced. The new cars have been ordered built in such a way that they can be operated either by horse power, storage battery, or trolley system.

NORWICH.—The Norwich Street Railway Company is extending its tracks on the West Side; also in Taftville, and is to rebuild all of its tracks and furnish them with new equipment.

DELAWARE.

WILMINGTON.—The Front and Union Street Railway Co. will begin work the first of May on an extension of its tracks to Silver Brook.

DISTRICT OF COLUMBIA.

WASHINGTON.—The power plant of the Metropolitan Street Railway Co. will be built adjoining their present stable on P street. It will be 122x250 ft. and two stories in height.

EVERYTHING is in readiness to commence work on the extension of the cable track of the Washington & Georgetown System. When it is completed it will give the city of Washington twenty-two miles of cable railway. One of the best in the country.

FLORIDA.

JACKSONVILLE.—C. B. Rogers and others are talking of an electric line from Riverside, to extend a considerable distance north.

GEORGIA.

ATLANTA.—The Atlanta West End & McPherson Barracks Co. have already completed five miles of track, and a large portion of the equipment is in place or on hand. As soon as this is finished other extensions are planned, which it is hoped will be finished this year.

At the election of the officers of the Atlantic Street Railway, Alfred Glazier, of New York, was elected secretary and treasurer, and L. Bloodworth, Jr., of this city, assistant secretary and treasurer.

The Capital City R'y Co. are receiving bids for the construction of about five miles of single track, electric system.

MACON.—The Macon City R'y affairs are in a somewhat tangled shape, owing to the difficulty which the owner, Geo. F. Work, has gotten into by re-hypothecating securities, and the road will undoubtedly be sold, probably under a foreclosure.

IDAHO.

BOISE CITY.—Hon. Ben. Wilson, one of the directors of the Boise City Electric road, states that the proposed line has not been abandoned, but that the road will be completed by the first of June. It will be two and one-half miles in length.

ILLINOIS.

AURORA.—The Evans-Winslow syndicate are securing bids on an electric line to their new sub-division and are strongly inclined to the storage battery system.

BLOOMINGTON.—A large portion of the tracks of the Bloomington Street Railway will be relaid this spring with new iron.

CENTRALIA.—The laying of the first rails of the city railway here, on April 6th, was witnessed by a large and interested concourse of citizens. The line will be pushed as fast as possible.

KANKAKEE.—Work has begun on the electric road here, for which all contracts have been let. It will be finished in sixty days, and for the present, power will be furnished by the Electric Light Co.

PEORIA.—Capt. John Hall is still fighting for an ordinance under which to construct another railway. It has not yet been granted.

ROCKFORD.—The West End Street Railway has closed a contract for additional construction, which must be completed within thirty days.

WAUKEGAN.—The Waukegan Street Railway Co. is preparing to make extensive additions to its line, one of which will extend to the site of the new Washburn-Moen works.

INDIANA.

COLUMBUS.—Another company is being organized here to build a street railway on a route which will be east and west through the city. It is said sufficient capital has already been subscribed.

ELKHART.—The Citizens' Railway and the Elkhart Electric Co. have been purchased by the Elkhart and Electric Railway Co.

FT. WAYNE.—T. R. McDonald has completed the survey for his proposed electric line to the Catholic cemetery.

INDIANAPOLIS.—The board of public works have just made a contract with the Indianapolis and Broad Ripple Rapid Transit (electric) Company, by which the latter, in consideration of a twenty years' franchise, agrees to pay one-fourth of one cent for each passenger—that is, five per cent of the gross receipts—to pave the tracks; to keep the same in repair; to charge but five cents fare; to keep cars warm in winter, and lighted with electric lamps all the year round.

MARION.—George L. Mason, of this city, and W. T. Adams, of Buffalo, have fully decided to push the construction of the electric line to completion at the earliest possible moment. When finished they intend to build a belt line twelve miles in length, reaching entirely round the city.

The Halberman, McHimney Electric Street Railway Co. has commenced work, and it will be a race as to whether this company or the Mason Electric Co. will complete their line first.

NEW ALBANY.—Work has been resumed on the street railway, and the indications are that we shall have one of the best street car systems of any city of this size in the State.

SEYMOUR.—The Seymour Street R'y with a cash capital of \$30,000, contributed by home business men, has been organized and incorporated, with A. M. Batey, president, and B. F. Price, secretary and treasurer. Work will be commenced at once.

IOWA.

BURLINGTON.—The Burlington Electric Street Railway has filed a mortgage with the American Loan & Trust Co. of Boston, in the amount of \$120,000, to be used in the construction of their line here.

COUNCIL BLUFFS.—At the election of officers of the Lake Manawa Motor Co., the following were elected: president, Col. F. C. Reed; vice-president, S. P. MacConnell; secretary, W. F. Sapp; treasurer, C. R. Hannan.

IOWA CITY.—The organization of the electric street railway has been finally perfected, and everything is favorable now to an early completion of the road. The franchise has not yet been granted for an electric road here, but the prospects are good that it will be very soon.

MASON CITY.—There is every prospect that a franchise will be granted for the construction of an electric street railway. The electric light and gas companies are asking for the permit.

SIOUX CITY.—The Riverside Electric Railway Co. has begun the erection of its power house. Most of the poles have been set, and track laying will be commenced soon.

KANSAS.

SALINA.—There is a good prospect of an electric road being built here, and the intention is to have it in operation by July 4th next.

WANETHA.—A freight and passenger line is projected from this place to St. Joseph. It is thought it can be made very profitable.

KENTUCKY.

COVINGTON.—The Highland Lot Company are getting figures for the construction of a Dummy line to their suburban property.

LOUISVILLE.—The Fall City Real Estate Co., which is the name of the new street railway company here, is pushing vigorously for an ordinance for an electric road. It is proposed to use center poles, which will carry electric light, and the equipment will be of the vestibule pattern. Contracts have not yet been closed. John H. Sutcliff is the president.

NEWPORT.—It is understood that a new electric street railway will apply to the city council for franchises along Columbia street, Park avenue and Fourth street,

LOUISIANA.

NEW ORLEANS.—The Electric Traction & Manufacturing Co. of this city has shut down, and two hundred men have been thrown out of employment. The company had been operating a line of storage battery cars over the tracks of the Crescent City Road, and it is

claimed the shut-down was partly the result of a disagreement between the two companies. As the overhead system has been prohibited thus far in this city there are at present no electric cars in operation.

MAINE.

BELFAST.—The Belfast Street R'y Co. has been chartered for the purpose of building an electric road three and one-half miles in length. Among the incorporators are: R. F. Price, C. H. Field, W. R. Marshall, Joseph Williamson.

BIDDEFORD.—The Biddeford & Saco Horse R'y Co. are making a strong fight for the necessary permit to change its system to electricity, and the prospect is a little more favorable, although the matter is not yet settled.

PORTLAND.—The Portland Horse R'y Co. is erecting a stable and car house which will cost \$23,000.

MARYLAND.

BALTIMORE.—On April 6th the first cable was drawn into the channel of the new cable road, and it is hoped to have the line in operation within a day or two.

AFTER many weary weeks of discussion and one of the longest and hardest fights which has been made in the City Council here, an ordinance has been passed which will enable the North Avenue Electric R'y to construct electric lines, and it is now probable that this victory will be followed by others of a similar nature.

MASSACHUSETTS.

ATTLEBORO.—The street railway here has been sold. It is six miles in length and extends to Wentham. It is said to be very valuable property.

BOSTON.—The West End Co. have decided on the erection of a new car house, the dimensions of which will be 285x350. Their car house for the storage of electric cars at Eggleston Square will be increased by an addition of 96x220 ft.

THE project to connect Boston and Lynn with an electric line passing through East Boston, Crescent Beach, and Oak Island is working favorably and has every indication of success.

FALL RIVER.—New York City men have bought the Globe Street R'y for \$600,000, and it is now proposed to put in electricity.

KINGSTON.—The Plymouth and Kingston Street R'y. have been petitioned for a line to this place. There is every indication that the line will be built.

PITTSFIELD.—Contracts have been let for equipping the lines here with electricity, and it is hoped to have the system in running order by June 1st. Power will be furnished for the present by the Edison Electric Co.

PLYMOUTH.—The Plymouth & Kingston Street Railway Co. has acquired a route to the shore. The well-

known Clifford house has been purchased by the directors of the railway company and they will open it as a first-class house about June 1st.

ROCKLAND.—A franchise for this place has been granted to the Hatherly Street Railway Co., and as the company has already received charters from all the other towns, work will be commenced shortly.

MICHIGAN.

BAY CITY.—The Union Street Railway, of this city, has arranged to exchange passengers with the City Electric Co., of West Bay City, which will be a great accommodation to both places. Construction of the West Bay City Electric line will be commenced immediately.

DETROIT.—The Fort Wayne & Elmwood Street Railway Co. are seriously considering a change to electricity, and have about decided to abandon the proposed method of operating by compressed air.

THE Detroit City Railway Co. has notified its men that hereafter its employes will be paid by the hour, at the rate of 15 cents for conductors, and 14 cents for drivers.

FENTON.—Strong efforts are being made to work up a company to build a line to Long Lake, a popular summer resort, which is attracting a great many people.

FLINT.—A street railway with a capital of \$50,000 has been organized here.

ISHPEMING.—There is every indication that the proposed electric railway to connect this place with Menominee will be built this spring.

MANISTEE.—Gen. Geo. A. Hart, of this city, is engineering the proposed electric line here, and states that he will build eight miles this season, connecting Filer City, Eastlock and Stumack with this place.

MENOMINEE.—Of the \$90,000 capital required to build the electric railway here, \$75,000 has already been subscribed. Mr. Carpenter, of the Kirby, Carpenter Co., is one of the prime movers, and the road will undoubtedly be built, as it is greatly needed, and the city is growing very fast.

MINNESOTA.

DULUTH.—The extension of the electric line to West Duluth will be commenced in a few days, and if no delays occur, will be opened for travel June 1st.

THE City Railway Co. have just put in an extra engine of 250-horse power, and will soon purchase another of 800-horse power. The Power House is to be enlarged to three times its present size and other improvements made. New cars will be added shortly. The company has filed a trust deed for \$2,000,000 to cover an issue of bonds to that amount.

MINNEAPOLIS.—The through electric service between this city and Minnehaha Falls has been established.

THE Minneapolis City Railway have won their suit in which it was sought to enjoin the construction of an electric railway on Hennepin boulevard. This will enable the company to proceed with its construction work.

THE coming summer will be another active one in the construction of electric lines here. Contracts have been already let for twenty miles of steel rails, which will be furnished by the Illinois Steel Co. One thousand centre poles will be furnished by the Brownell Co., of Detroit; and one hundred and twenty new cars, of which the Northern Car Co. of this city furnish twenty; Jones & Co. of Troy, sixty, and John Stephenson Co. of New York, forty.

THE second 1,000-horse power triple expansion engine has been placed in the main power house, and is working beautifully. It was built by the Allis Works at Milwaukee.

ST. PAUL.—The operation of the electric line between St. Paul and Minneapolis is working very successfully, and new cars have been ordered which will have a speed of twenty-five miles per hour.

MISSOURI.

KANSAS CITY.—One of the post office officials in this city has been instrumental in securing the passage of a bill in the State Legislature, providing for the carrying of mails by the street railways run in the large cities of the State. The electric and cable cars can make so much better time than the government mail wagons between post office and depot that it is believed the arrangement will prove a very satisfactory one.

ST. JOSEPH.—The Bell City R'y at its recent annual meeting decided to issue monthly commutation tickets of 120 fares, to be sold for \$40.00 per year. Books of 100 tickets will be sold for \$4.00; \$15,000 was voted for new cars and motors. Officers elected were: James W. Heddens, president; W. T. Van Brunt, vice-president and general manager; A. J. Moulton, secretary and treasurer.

ST. LOUIS.—The brake system as applied to cars run in trains is not entirely satisfactory to some of the companies here on account of the noise it makes. Two of the electric lines, the Lindell and the Union Depot, are now trying experiments with the pneumatic brake. These are worked by storage tanks of air, which are pumped full by automatic mechanism applied on down grades. In conjunction with the brake they are also using an air whistle instead of the gong.

SOME difficulty has been experienced at the Broadway and Olive streets crossing by the two cable roads. At that point the Olive street cable runs at its normal level, but the Broadway cable goes under; when an Olive street car has hold of the cable it is raised several inches off the pulleys, so that when an Olive street train is within a few feet of the Broadway crossing it raises the rope high enough for the jaws of the Broadway grip to strike it in passing.

THE Clayton & Forest Park Railway Co.'s railway project is being vigorously pushed. Nearly all of the \$100,000 of capital stock has been subscribed.

MONTANA.

BUTTE.—Gen. Manager Woolston has announced that his company will make an extension of lines to the Parrot Addition. The line will be built this summer.

THE Metropolitan Railway Co. has been sold to the Butte Consolidated Street Railway Co. This gives to the Consolidated Company control of all the street car lines in this city.

IT is now proposed to build a new line, independent of the Consolidated Company, to be operated by electricity. The road is to be on Plain St., Park St., and Montana St., extending to South Butte. It does not parallel the existing lines, except in the centre of the city for a short distance. It is now understood that Regan & Vaughn of Omaha have also asked for another franchise.

PROMINENT citizens have petitioned for franchises for a new street railway here, which will probably be operated by electricity. Among the promoters are Mantle & Warren and R. M. Cobban.

GREAT FALLS.—The electric line has been opened here, and is working splendidly.

BOZEMAN.—E. M. Ferris, who is at the head of the electric street car project here is now east, perfecting arrangements for the completion of the line.

NEBRASKA.

BEATRICE.—Contract has been let the Trans Missouri Construction Co. of Lincoln, for the entire equipment of the new line here.

LINCOLN.—The Lincoln Street Railway Co. has leased a ten acre tract of land for a term of years, on which they will locate a mammoth base ball park, to which they are now laying track. For the present the extension will be a horse car service, but will be converted into an electric line as soon as possible.

OMAHA.—The Metropolitan Street Railway has been granted a charter to build from the business portion of South Omaha to the corner of Farnam and Eighteenth Sts.

THE Omaha Street Railway will spend \$300,000 this year in improvements and extensions. The work of extending the Farnam Street Motor line to Dundee Place will be commenced at once. The company suffered a most annoying accident a few days by the breaking of the cylinder head in one of their 400-horse power engines.

PROPERTY owners are desirous that the City Railway extend its Eleventh Street Motor line so as to connect with the south Omaha line. It will probably be done.

NEW HAMPSHIRE.

NASSAU.—The action of the city council the past winter in compelling the street railway here to operate its

cars on runners simply that those who desired to ride in sleighs might be pleased, has resulted in the railroad company canceling its orders for rails, and for the present deferring the extensions which they intended to make.

NEW JERSEY.

CAMDEN.—The differences between the Horse Railway Co. and the Daft Motor Co. have been settled, and electric cars on Market St. have resumed operations.

KEYPORT.—The Keyport & Mattawan Street Railway has passed into new hands, and Thomas S. R. Brown has been elected President and Arthur L. Brown, Sec'y, and Treas. Capital stock is \$50,000.

JERSEY CITY.—The Jersey City & Bergen Railway has secured consent for the extension of its over-head wires to Cortlandt Ferry. It is a very much needed improvement.

TRENTON.—The Trenton Horse Railway Co. has been granted an extension of time to April 1st, 1893, in which to build their electric railway, which they have not been able to do thus far owing to injunctions.

THE Trenton Street Railway has been purchased by Boston and New York capitalists, on the basis of \$125 per share. The old company has been in existence for fifteen years and has never yet paid a dividend. The same syndicate will probably secure control of the Trenton Horse Railway Co., and the intention is to place electricity upon the consolidated lines.

NEW MEXICO.

ALBUQUERQUE.—A company was organized here, April 8th, for the construction of an electric railway.

NEW YORK.

CORTLAND.—A belt line four miles in length, to be operated by horses, is being discussed.

JAMESTOWN.—Work on power house, car station and office building for the Jamestown Street Railway has progressed nicely, and it is now hoped to have the line started by the first of May.

LOCKPORT.—The scheme to connect Niagara Falls and Rochester with this city has more merit and backing than is generally supposed. The consent of farmers owning land along the road is being secured and already a very large proportion has been obtained. The road will do both freight and passenger business.

MT. VERNON.—The board of trustees have granted a franchise to the Yonkers, Mt. Vernon, Pelham & New Rochelle Electric Railway.

NIAGARA FALLS.—The Falls Surface Railway Co., of Niagara Falls and Suspension Bridge, has been incorporated for \$60,000. The road will be six miles long and connect the two towns. Among the directors are: John Mackay, James F. Murphey and Peter Porter, of Niagara Falls; O. E. Dunlay, Konrad Fink and Wm. A. Frazer, of Suspension Bridge; and James F. Gluck, of Buffalo.

OLEAN.—The Street Railway Co. here has decided to change to electricity.

SYRACUSE.—The Consolidated Street Railway has made application for a franchise to extend its Fifth Ward line, which is greatly desired by the citizens residing in that district.

SYRACUSE.—The People's Railway Co. of this city have made application for a permit to use electricity as its motive power.

TROY.—Track work is progressing nicely on the line to Albia. It has now been fully determined to make the line an electric one.

RANSOMVILLE.—It has been decided to have the electric railway from Rochester to Lewiston run along the ridge road to Wright's Corners, thence to this place, to Youngstown and Lewiston. Work on the Lewiston and Youngstown branch will begin immediately.

WEST CHESTER.—The Harlem Bridge, Morrisiana & Fordham Railway Co., have been granted consent to substitute electricity for horses. It is considered a great victory, and no time will be lost pushing the work, and it is hoped to have the cars in operation within ninety days.

NORTH CAROLINA.

WILMINGTON.—The City Railway Co. have resumed the construction of their new line on Monroe street, and the prospect is that this city will be very thoroughly covered within a year by the various lines which are now planned.

OHIO.

CANTON.—The Electric Street R'y Syndicate of Toledo will undoubtedly purchase the lines in this city. The company here has been very successful, and since last May have paid \$13,000 interest and \$6,000 in dividends.

A SCHEME is on foot to connect this place with Massilon by an electric railway.

CINCINNATI.—George Horgung, consulting engineer of the Mt. Auburn Electric R'y., is preparing plans for an extensive power plant to be erected at St. Bernard.

THE Mt. Adams & Eden Park Inclined R'y. will relay a large amount of track this summer and also construct several new lines.

DAYTON.—The City Council have granted an extension of twenty-five years to the franchise of the Oakwood Street R'y.

EAST LIVERPOOL.—The construction of an electric street railway here is an assured fact. It cannot fail to prove a very profitable investment.

SANDUSKY.—The Citizens' Street Railway Co. has increased its capital stock to \$150,000.

TOLEDO.—The Toledo Electric Railway has been petitioned to extend its Bancroft line to Auburn avenue.

THE Consolidated Co. has in contemplation a number of lines with double track. The electric line on the east side will be extended to Ironville, and the Oak Street line to the works of the Smith Bridge Co.

THE Toledo Electric Street Railway has increased its capital stock from \$600,000 to \$800,000.

YOUNGSTOWN.—The Electric line here is nearly completed, and will be opened about the first of May. Construction work will then commence on the line to Haselton, material for which is already contracted. It is now intended to build a line to the fair grounds this summer.

OREGON.

PORTLAND.—A company has been formed to build an electric line to connect this city with Oregon City, which is fifteen miles distant.

WAVERLY.—J. W. Campbell and others have filled articles of incorporation for the Waverly, Woodstock Electric Railway Co.

PENNSYLVANIA.

ALLENTOWN.—An ordinance giving the street railway permission to dispense with horses and substitute electricity passed the City Council unanimously. The road now passes into the hands of Boston parties, and contracts are being let. This road will be connected with the proposed line to Bethlehem.

ASHLAND.—All the right of way has been obtained for an electric line, which is unanimously endorsed by the citizens. It has not yet been fully decided that the line will be built.

BETHLEHEM.—Contracts for an electric road to Allentown have been let, and most of the material is already on the ground. There will be a power plant in Bethlehem and another in Allentown. Cars will be run at the rate of twenty miles per hour.

BRADDOCK.—The Braddock Electric Railway Co. are erecting a handsome power house for their new line from North Braddock to Copeland Station.

Du Bois.—The Council has granted an ordinance for the proposed electric railway, which has every indication of success.

GREENBURG.—THE Electric Line is being extended to Hoff Station and later on will go still farther.

EAST HARRISBURG.—The East Harrisburg Passenger Railway Co. is now letting contracts for the conversion of its tracks into an electric one.

HARRISBURG.—The East Harrisburg Railway Co. by a vote of 1,697 out of the 2,500 shares has been leased to the Harrisburg Street Passenger Co. As soon as the consolidation has been completed the question of extension and equipping of both lines with electricity will be taken up.

LANCASTER.—The West End Street Railway Co. has just filed a mortgage for \$225,000 with the Atlantic Trust Co. of New York, for the purpose of raising money to make extensions.

MEDIA.—Work on the electric line to connect this city with Chester will be commenced in a few days. Most of the bids have now been placed.

MEADVILLE.—The organization of the Meadville Electric Street Railway has been perfected with the election of the following officers: F. P. Ray, president; Cyrus Kitchen, vice-president; T. A. McFarland, secretary; J. S. Hotchkiss, treasurer. The outlook for the plant seems very hopeful.

NORRISTOWN.—The company formed to operate the Citizens' Passenger Railway Co. by electricity, have secured control of the same.

PITTSBURG.—The Citizens' Traction Co. recently suffered the loss by fire of their East Liberty power house, including also a dozen cable cars. Loss \$50,000.

THE Duquesne Traction Co. have moved their offices from the Freehold bank to the car house on Neville street. It is now believed the road will not be in operation until July 1st.

READING.—The Street Passenger Railway has obtained permission to extend its tracks on Sixth street and on Bern street.

REYNOLDTON.—The power house will be placed here between the river and the railroad by the McKeesport Street Railway Co.

WILKESBARRE.—Morgan B. Williams has been elected president of the Suburban road, to fill the vacancy caused by the resignation of Mr. Hollenbeck.

WESTCHESTER.—The Electric Street Railway will shortly commence the erection of a nice depot building. Its car house is nearly completed.

YORK.—The York Street Railway Co. has moved their office to 27 East Market street, in the Trust Company's building.

RHODE ISLAND.

PROVIDENCE.—The railroad committee of the city council have approved the trolley system of street car service, and the Union Railroad Co. will undoubtedly secure their franchise for the construction of four miles. The fight has been a long and bitter one, and the company are to be congratulated on their victory.

WATCH HILL.—The Ocean View Railway will be built some time this summer. Electricity is proposed. The road will be idle winters.

SOUTH CAROLINA.

CHARLESTON.—The West End R'y which is chartered to operate both freight and passenger cars by almost any kind of a motor, has petitioned the city council for franchise covering a large number of streets.

TENNESSEE.

CHATTANOOGA.—A petition which was circulated a part of one day, was signed by more than two-thirds of all the business men on Market street, asking the Chattanooga Electric Railway Co to build a line on that street.

BUSINESS has increased so rapidly with the Chattanooga Street Railway Co. that it has been obliged to order engines and boilers of 250-horse power, and a generator. They are expected to be delivered in sixty days.

NASHVILLE.—The differences between the United Electric Co. and the Maplewood Electric Co. have been adjusted, and the last named company will proceed in the construction of an electric line to Maplewood.

THE Nashville Electric Railway & Power Co. have petitioned for additional franchises on a number of streets which they desire to build as extensions to their present system.

TEXAS.

AUSTIN.—At a mass meeting in South Austin it was decided to construct an electric line to connect the two places.

GALVESTON.—Col. Sinclair has granted the request of a large number of his patrons and has abolished the system of street car tickets.

HOUSTON.—Work has been commenced on the new power house of the Houston City Street Railway, and it is promised to be a very fine structure.

THERE is every indication that the electric line here, which includes 15 miles, will be in operation by May 10th.

VICTORIA.—The street car line in the northern part of the city will be extended to Evergreen cemetery, a distance of a little less than one mile.

UTAH.

ENDERSON.—It is expected that work will commence in a few days on the electric railway.

OGDEN.—The Ogden Street Railway Co. has been incorporated with a capital stock of \$250,000, divided into 2,500 shares, of which H. M. Beardsley owns 2,496.

SALT LAKE CITY.—The Rapid Transit Railway Co. are now making an extension of their line of two and one-quarter miles. When it is finished it is claimed it will be the longest straight electric car line in the country.

THE Salt Lake City Railway Co. has now invested in its power house, tracks, cars, etc., \$800,000, and now propose adding improvements which will cost \$600,000.

VIRGINIA.

BRISTOL.—The directors of the horse railroad here are strongly inclined to change to electricity.

WASHINGTON.

CENTRALIA.—Mr. Nivens has given a bond for \$10,000 for the faithful performance of the requirements of an ordinance under which he is to build a street railway.

MILTON.—The motor line between this place and Walla Walla is apparently an assured fact; \$25,000 of local capital will join with New York parties to construct a line.

OLYMPIA.—A dummy or electric line is proposed to run to West Olympia.

W. L. RUSSELL, of Seattle, has petitioned for a franchise for a motor line for the West Side. Their intention is to put in a plant which will give a five minute service on three miles of road, and cost \$250,000.

THE West Olympia Railway has been incorporated for the purpose of constructing an electric line to Butlers' Cove.

SPOKANE FALLS.—The Spokane & University Heights Railway Co., of which Allen B. Garrett is president and general manager, will proceed to the construction of their lines immediately. They will use the over-head system. Mr. Garrett is a practical electrical engineer, one of the best known in the country, and, it is needless to say, will have a first-class line in all respects.

SEATTLE.—The James Street Cable line, which was put in operation a few days ago, was completed in just seven months. An electric wire is stretched in the conduit and is used to light the cable cars. From the same power house power is also secured to operate the electric lines of the same company. Cable is used on the hill and electric lines beyond. It is intended to make further extensions soon.

TACOMA.—The Tacoma Railway & Motor Co. expect to have their new cable line in operation about June 1st. It will require a rope 10,000 feet long. J. H. Cummings, general manager of this company, has been in receipt of a number of letters threatening him with assassination. He was commander of a company of militia in Chicago at the time of the anarchists' riots. The letters are supposed to be the work of some crank.

FRANK C. ROSS of this city has secured what all others have hitherto failed to get, a right of way through the Puyallup reservation. From this city to Puyallup a space 200 feet wide has been leased of the Indians, upon which an electric line will be built. This will be a strong competitor of the steam roads.

ARRANGEMENTS have been made to lay one mile of the Wheelless Underground Electric Track in this city for the purpose of exhibiting the merits of the system.

AN ordinance has been passed granting the Belt Line Electric Street Railway Company three months more time in which to complete its road. Tacoma capi-

talists are now negotiating with the Belt Line people for this road, and it is likely the deal will be effected.

WILATCOM.—The electric street cars are now in successful operation, running the entire length of the line through the city, on Elk, Holly and Thirteenth streets. The system is owned by Cornwall, Stenger & Co.

WISCONSIN.

RACINE.—The Belle City Railway Co. has petitioned the council for thirty days extension of time in which to accept its franchise.

MILWAUKEE.—Henry Villard who is now en route to Europe will place a loan of \$10,000,000 on his Milwaukee Street Railway property.

WASHINGTON BECKER promises to push his electric lines to the present city limits and Athletic Park, and may also extend his line into the heart of Williamsburg. His Washington avenue line will be extended to North avenue.

ON May 1st the offices of the Milwaukee City and Cream City Railway companies will be transferred to the general offices of the Villard syndicate in the Colby and Abbott building.

GEORGE KUECHLE, cashier of the Cream City Railway Co. for a number years, has resigned.

THE West Side Railroad Co., which is known as the Becker Lines, has filed a trust deed securing one million dollars of bonds, one-half of which it is proposed to use in the construction work in the near future.

IN the fight for the possession of the Milwaukee Electric Railway Co., the court has issued a temporary injunction restraining Messrs. Vogel & Pfister from disposing of their stock.

"Laugh and Grow Fat"

IS a wise old saw; yet the close confinement of winter tells even on the merriest. For an agreeable change go to Hot Springs, Ark. The Wabash is the Hot Springs Line. Compartment sleepers Chicago to St. Louis, where direct connection is made morning and evening with through sleepers to Hot Springs. Sleeping car berths through from Chicago reserved in advance.

"THE Broomstick System" may be an intensely humorous term in the ears of some people, but it's a sort of sweeper that seems to have made a pretty clean and thorough job of it wherever it has gone.

THE question of placing electric poles in the centre of the street is receiving considerable attention in a number of large cities throughout the country. There are many advantages in favor of the change.

ECHOES FROM THE TRADE.

PULLMAN Co. have received the order for cars to equip the new electric line at Kankakee, Ill.

THE ILLINOIS STEEL Co. has secured a large contract for 54-pound rails for the Milwaukee Street Railway, of Milwaukee, Wisconsin.

THE UNION DEBENTURE Co. of Trenton, N. J., has been incorporated, with a capital stock of \$100,000, for the purpose of constructing a street railway.

WESTINGHOUSE ELECTRIC MFG. Co. have secured the order for the motors and generators for the Kankakee, Ill., electric line, and the equipment of sixty cars on the Memphis line.

C. E. SARGENT, general selling agent for the Ide engines, with office at 89 Lake street, Chicago, reports a very large demand for their engines, especially in Chicago, in which city alone they have now seventy-six engines in operation.

WM. B. WILLIAMS, western agent of the Vose Company, has remembered us with a handsome nickel plated paper weight, which is a miniature spring complete. In fact it has such a good spring we have hard work to keep it on our desk when visitors call.

THE ILLINOIS ELECTRIC MATERIAL Co. are now nicely located at their new store, 158 Fifth avenue. They have very elegant quarters on the ground floor. They have equipped with an unusually large stock and are giving special attention to street railway work.

THE TRIUMPH COMPOUND ENGINE Co., of Cincinnati, report business for electric work increasing with them. This engine has just been specified for the new electric line at Beatrice, Neb., and is being carefully examined by a great many street railway men wanting high speed engines.

THE ELLIS CAR Co. of Amesbury, Mass., are very full of orders, having recently received orders from Grand Rapids, Mich., Newton, Holyoke, Salem, Mass., and West End R'y Co. of Boston. This being the second order received from the last named company within a short time.

C. E. LOSS & Co., contractors for construction and equipment of electric roads, at 113 Monroe street, Chicago, have closed a contract with the Kankakee Electric R'y Co., for the construction and furnishing of all material for their new track. Work will begin April 25th, and be pushed as fast as possible.

THE GREAT WESTERN ELECTRIC SUPPLY Co., 190 Fifth avenue, Chicago, have just issued catalogue No. 4, devoted exclusively to their electric and combination fixtures and shades, of which they have an exhaustless and endless variety, suited to every purpose from a car house to general office or mansion.

THE STANWOOD MANUFACTURING Co., of Chicago, is mailing to its friends among the street railway men a very handsome catalogue, printed on heavy enameled paper and containing abundant illustrations of the many styles of car steps and devices for fastening the same to platforms, which they manufacture.

THE HAZARD MANUFACTURING Co., of Wilkes Barre, Pa., have just furnished a cable for the Metropolitan Street Railway, of Kansas City, of 1 $\frac{1}{8}$ inches in diameter and 32,300 feet in length. This is the longest cable ever made in this country, of that diameter, for cable service, and will be put in use on the Eighteenth Street line.

THE MILLIKEN PATENT POLE, manufactured by the Milliken Bros., 59 Dearborn street, Chicago, and 55 Liberty street, New York, is handsomely illustrated in a very attractive thirty-two page catalogue, which shows the various applications of their poles, both at the side and in the centre of the street. It makes a pretty souvenir for office desk or table.

TRANS-MISSOURI ELECTRICAL CONSTRUCTION AND HEATING COMPANY, of Lincoln, Neb., are stirring in the West in the interest of the Baxter Motor Co., for which they are agents, in addition to contracting for the entire construction and equipment of electric roads. They are now building a road in Beatrice, that State, which will be a model road in every respect.

THE MCGUIRE MFG. Co. are as full of orders as ever, having received orders for their trucks from two lines at Lincoln, Neb.; two lines at Rockford, Ill.; for those at Sandusky, Ohio, Hamilton, Ohio, Denver & Suburban R'y, Denver, Colo., Kankakee, Ill., and also equipped the New Thompson & Houston line at Springfield, Ill., besides numerous other orders from different parts of the country.

THE ELECTRICAL SUPPLY Co., of Chicago, is handling the "Anderson" devices for electric railway overhead construction. These goods are substantially made and their insulating qualities are of a high order. In the "trolley wire hanger" and the "curve pull off" contact with the trolley wire is made by mechanical means, and the use of solder is avoided. These goods are worth investigation by those contemplating railroad construction, or who already have lines in operation.

THE GOULD & WATSON Co., who have recently opened a salesroom at 170 Washington street, Chicago, under the management of Mr. R. B. Pierpont, have found this a very important field for them, and find their quarters entirely too small to properly display their very large line of goods manufactured for electric street railways; so have leased new offices in the Northern Building, at the corner of La Salle and Lake streets, where they will be glad to receive all western street railway men when in this city.

THE BALL ENGINE CO., at Erie, Pa., report business as active as usual, having had inquiries from street railway companies from all parts of the country, for their high speed engines, and the outlook is that this will be the largest year for business that they have yet had. They have shipped a 300 H. P. triple expansion engine to the Rochester Street R'y, at Rochester, N. Y., and a 200 H. P. compound condensing engine to the Buffalo Street R'y Co., and have many orders under way.

THE MEAKER MANUFACTURING CO. whose registers are so well known, have decided to move their extensive manufacturing plant to Chicago. They have secured two entire floors in the large building at the corner of Union and Washington streets, where they will have ample facilities. They will bring their workmen with them and will find this city a more central distributing point, especially for their far west business. The general office of the company will on May 1st occupy commodious rooms in the new factory and the work of removing the machinery from the East will be commence about June 1.

BURTON HEATER CO.—This company at its annual meeting at Richmond, Va., a few days since, made a splendid showing for the year, and reported a large number of orders already received for next winter. It also made a most wise selection in electing as president, Mr. W. R. Mason, the well-known general manager of the Electric Merchandise Co. of this city, and under his direction the street railway men may expect to become fully informed of the merits of this excellent heater. The other officers are: W. J. Johnson, who is president of a Cincinnati bank, as vice-president; C. E. Wings, treasurer; A. Pizzini, secretary, and W. Leigh Burton, superintendent, Richmond.

R. T. WHITE, of Boston, of "Daisy Chair" fame, reports trade very good with his chair as well as the rails. He has recently made preparations whereby he may give his extensive trade throughout the country more care, by appointing agents in a number of different cities. Those who have already taken the general selling agency of these chairs are, W. D. Thomas, 141 Byran street, Savannah, Ga., southern agents; D. E. Garrison, Laclede building, St. Louis, southwestern agent; Great Western Supply Co. of Chicago, northwestern agents. With a force of representatives so well known to the street railway people as these men are, Mr. White may look for a very large and increasing business.

THE LAMOKIN CAR WORKS, Chester, Pa., are busier than ever, and, among recent shipments made, report the following: To the Derby, Birmingham & Ansonia Electric Railway, two handsome 278-a-278 open car bodies for motors; to the Chester Street Railway, Chester, Pa., two elegant, closed, 16-foot horse cars; to the City Passenger Railway, Trenton, N. J., six vestibule car bodies. Among orders received during the past week are: Two open trail cars for the Salem (Ohio) Electric Street Railway, being a supplemental order; also six 26-foot electric cars to be

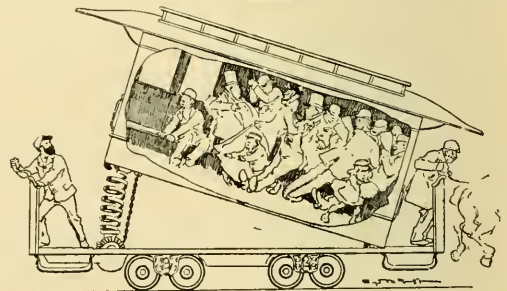
mounted on Robinson Radial Trucks; six 16-foot closed cars and six open motor cars for the Rock Creek Railway Co., of Washington, D. C. They are also building thirty 16-foot closed cars for the Lincoln Electric Street Railway, Lincoln, Neb.; twenty cars for the Denver Suburban Electric Railway, Denver, Colo.; six vestibule cars for the Wilmington Electric Railway, Wilmington.

A Possibility in Street Cars.



CONDUCTOR.—"Move forward."

THE ELECTRICAL SUPPLY CO. of this city have, on account of the large increase in their business, found it necessary to move to more commodious quarters. Therefore have leased a large double building on Randolph street, at the corner of Michigan avenue, where they will fit up a very fine line of offices and have more room for their large and increasing trade. At their present quarters their street car department, which has become a large part of their business, has been partially sidetracked for want of more office and show room. At the new headquarters this department will have a prominent part, and make one of the finest displays seen in this country. They expect to be located in their new quarters by July 1st.



"Please."—Puck.

THE SHORT ELECTRIC CO., have recently closed a contract with the Lincoln Street Railway Co., Lincoln, Nebraska, for twenty car equipments and forty standard motors, and this order will be followed by an installment of a large number of the new gearless motors. They have also closed a contract with the West End Street Railway, of Rockford, Ill., for three car equipments, six standard motors, and one 80-horse-power generator, and for the overhead construction work for four and one-half miles. A third order from the South Covington & Cincinnati Street Railway is for eight car equipments, sixteen standard motors and two 125-horse-power generators, and is a strong illustration of the satisfaction the Short equipment is giving there.

THE WOODBRIDGE & TURNER ENGINEERING CO. is the name of the new organization to succeed Woodbridge and Turner, well-known engineers and contractors of New York. The officers of the new company will be: Wm. S. Turner, president, Geo. A. Bell, vice-president, G. L.



HAD Grip, eh? Well they say it does nip folks mighty sudden. But I know how to take care of myself,—never yet had an attack—

Woodbridge, secretary and treasurer. The company are now nicely located in the Times building, and are prepared to do all kinds of construction and equipping of electric railways. This company has long been in the electric contracting business, and are well known among



—But he had one then, and the symptoms all appeared at once.

the electric street railways of the East. They have also opened another office in the Rookery building at Chicago, under the management of F. D. Turner, who will look after their increasing business throughout the West.

ELMER MORTON has been elected superintendent of the Gloucester (Mass.) Street Railway.

Good Enough for Street Railway Magnates.

When a street railway man travels the best is none too good for him. Among the many desirable advantages which the Chicago, Milwaukee & St. Paul R'y offer, are the following:

Electric Lighted and Steam Heated Vestibuled Trains, with Westinghouse Air Signals, between Chicago, St. Paul and Minneapolis, daily. Through Parlor Cars on day trains between Chicago, St. Paul and Minneapolis. Electric Lighted and Steam Heated Vestibuled Trains between Chicago, Council Bluffs and Omaha, daily.

Through Vestibuled Sleeping Cars, Daily, between Chicago, Butte, Tacoma, Seattle, and Portland, Ore.

Solid Trains between Chicago and principal points in Northern Wisconsin and the Peninsula of Michigan.

Daily trains between St. Paul, Minneapolis and Kansas City via the Hedrick Route. Through Sleeping Cars daily between St. Louis, St. Paul and Minneapolis.

The finest Dining Cars in the World. The Best Sleeping Cars, Electric Reading Lamps in Berths.

6,100 miles of road in Illinois, Wisconsin, Northern Michigan, Iowa, Minnesota, Missouri, South Dakota and North Dakota.

Everything First-Class. First-Class People patronize First-Class Lines.

Tickets Agents everywhere sell Tickets over the Chicago, Milwaukee and St. Paul Railway.

PERSONALS.

R. T. GARTH has been appointed purchasing agent and A. J. Hough, auditor of the Chicago City R'y. Co.

J. E. MORRIS, secretary of the Bargion Rail Co. of San Francisco, is in the city and has favored us with several calls.

EDWARD SHEPARD has been elected general manager of the Madison Street and Front Street cable railways, Seattle.

F. H. SODEN, the electrical engineer of this city, is recovering from a four week's attack of la grippe and pneumonia that was almost fatal.

C. A. HOAGLAND, general agent of John H. Graham & Co., New York, was a caller at our office. He is here in the interests of their new departure bell.

CHAS. NAGL, Superintendent West Chicago Street R'y has been dangerously ill with the grippe, and has barely succeeded in pulling through though still quite weak.

PAUL W. BOSSART, recently of Kansas City has accepted the western agency of the Short Electric Company, and will make his headquarters at Denver.

JOHN C. BRIDGEMAN, of the Hazard Manufacturing Co., whose wire ropes for cable roads are so generally used, was a welcome visitor at our office while on his western trip.

JAMES F. PEAVY, president, and James E. Bogg, director of the Sioux City Railway Co., are in the city. Yesterday they ordered twenty new cars from the Pullmans, and steel girder rails from the Johnson Co., for twelve miles of track. They are accompanied by J. X. Brands, a well-known newspaper man of that city, who completes a trio most agreeable to meet.

OBITUARY.

CHARLES MUNSON.

ON March 21st, at his residence, No. 46 Park avenue, in this city, occurred the death of Charles Munson who, as the head and founder of the Munson Belting Company was known throughout the country. He had been unwell several weeks, and though confined to his house was thought to be in no great danger, until heart trouble suddenly set in with fatal results. He leaves two sons, and one daughter, Miss Clara Munson, who has been studying music in Berlin for two years past, and who was called home during her father's illness.



Mr. Munson came here in 1860 and had lived to see the city grow from 150,000 inhabitants to almost ten times that number. In 1864 he established in a small beginning the belting company which is now second to none in the country. Two years ago he formed a stock company, and though president, did not endeavor to devote any considerable amount of time to it, traveling considerably, a portion of which was abroad.

His associates in the conduct of the business were E. A. Groetzinger, secretary, and B. F. Horsting, treasurer. He was a member of the Illinois Club, an attendant on the Methodist church in Evanston, where he resided for many years, a far sighted business man of the most unquestioned integrity, and a man possessing an unusually large circle of friends. He leaves an estate of \$500,000.

JAMES B. WRIGHT.

ON April 5th, in Chicago, James B. Wright, who for five years has been the master mechanic of the Chicago City Railway Co., died from the prevailing la grippe, which has been so fatal of late. He was a superior car builder, and during his connection with the company

had devised a number of improvements in car building. His parents were both dead, his father having been for many years a Presbyterian clergyman in Scotland. He had no relatives on this side of the water, and it is not known whether his only brother is living. Mr. Wright was fifty years of age, and the burial was at Rose Hill cemetery.

WANTED. A position as Superintendent or General Manager, by a man thoroughly experienced in the running and management of Electric roads. Can furnish satisfactory references. Address, C. J. W., care Street Railway Review.

STREET RAILWAY FOR SALE.—In a live western manufacturing city of 25,000 people. Dividend paid in 1890, six thousand dollars. The right to use electricity. Charter has 88 years to run. Price \$75,000.

Address H, care Street Railway Review Office.

FOR SALE. On account of having adopted Electricity, we offer for sale, 80 tons, 16 lb. to the yard Rail, 6 Cars, 30 Horses. Will sell cheap.

Charlotte Consolidated Street Railway,
Charlotte, N. C.

WANTED. An Electric Street R'y Co., who are newly equipped or extending their lines, can secure the services of a gentleman with several years experience with horse and cable companies; experienced in outside as well as office work. Best of references. Address, Engineer, care this office.

Electric Railways.

C. E. LOSS & CO.,

113 Monroe Street,

CHICAGO.

Contract for the Building and Complete Equipment of Electric Railways.

Correspondence Solicited.

References Furnished.

THE HALE & KILBURN MFG. CO.

PHILADELPHIA.

EXTENSIVE MAKERS OF

PATENTED

STREET CAR SEATS,

Made with or without Springs. Covered in CARPET, PLUSH or
BATTAN.

OUR NEW ELASTIC SLAT SPRING SEAT IS THE CHEAPEST AND
MOST COMFORTABLE WOODEN SEAT EVER MADE.

Our Celebrated Steel Top Spring Sections used in Upholstering

THE BEST

FOR COMFORT,
FOR DURABILITY,
FOR APPEARANCE.

Hundreds of References, Thousands in Use. Estimates and
Particulars cheerfully furnished.

PENNSYLVANIA shows good progress in street railway construction during the last two years. At the present time there are 160 companies with a total mileage of over 600 miles. On the horse lines 10,712 horses are employed, which is practically the same number which were in use a year ago. This taken in connection with the fact that there has been a large increase in track building shows that horses, as a motive power are being rapidly superceded by electric and cable systems. During the year 225,000,000 passengers were carried, an increase of 29,000,000 over the year previous.

WITH the view, probably, of removing all doubts as to the power of the provincial government to authorize the Ottawa Electric Street Railway Company to lay tracks across the lines of the existing company, Mr. Robillard has introduced in the Ontario assembly an act providing that the tracks of any street railway company incorporated before February 1883 may be crossed by the line of railway of any other street railway company, if authority therefore is given by order of the lieutenant-governor-in-council; such order to fix and determine the terms and conditions upon which the railway may be so crossed.

A VERY disastrous explosion occurred recently in St. Paul by which the fuel oil tanks of the Street Railway Company were destroyed. The accident was due to the carelessness of a steam fitter who was repairing a leak, and contrary to orders carried a lighted candle to aid him in discovering it. The burning oil shot into the air to a height of 150 feet, carrying with it several tons of brick and iron platings. The fire burned for several hours consuming some 15,000 gallons of oil. The unfortunate workman whose carelessness was the cause of the disaster was killed by the explosion and his body burned in the flames. Travel on the electric lines was suspended for several hours.

THE electric road in San Francisco has traveled on a stony road ever since it started, and recently its construction along a certain street was stopped by injunction. The legal battle lasted several hours and toward night the decision was in favor of the company. Profiting by past experiences, they waited not for another sun to shine, but putting on a force of several hundred men, worked all night and by daylight "the rapids were above them," and a well built road over which was suspended the trolley wire inviting the tired pedestrian to ride. The workmen were divided into thirty gangs and an army of boys held lanterns, and the way the pavement came up and the rails went down was a great object lesson in "hustling" to the rising generation.

WHILE comparatively little is doing in construction work among steam roads, the activity continues with scarcely any abatement in street railway work. There are perhaps a less number of extraordinary large contracts on account of so many large companies having already been equipped, but the aggregated mileage of smaller cities is very large, and an even greater amount is pending the action of city councils. Added to this are

the orders placed by companies which installed electricity last year who are now sorely in need of additional rolling stock by reason of increased business; and the more than usual amount of track to be relaid will unite to make the coming summer an intensely busy one for manufacturers and dealers in street railway supplies.

FROM time to time there arises in one city and another the question of allowing street railways the right to lay tracks into city parks, and almost universally the matter is settled by the companies being allowed to remain outside. It is just and proper to throw around public property all reasonable precautions against the occupation of public lands and buildings by persons or corporations who would use the same for private gain. But in very many cases the refusal to allow car tracks to enter the borders of a city park, seems to be actuated more by a strict and sometimes a strained construction of the law than sound judgment that the policy of the greatest good to the greatest number would dictate. The parks are for the people and the street railways more than all means combined makes possible the use of these oases in the dreary dust and noise of our modern city life. It is not as though the railway company was a great personal gainer financially by the granting of the privilege asked, for it is not. It can and will bring the people to the edge of Jordan where they must cross over for themselves, when they might just as well, and with great additional comfort, be landed a short distance within the grounds. In the case of the aged and infirm many are absolutely prevented from going at all because they are unable to endure the walk from the terminus of a car line to the easy seat beneath the trees, and we believe that greater liberality in this respect from the Park Commissioners, or those in whose hands the power is vested, toward the railway companies would not be an abuse of public trust and would prove a blessing to the people.

The companies do not ask permission to girdle the park, although it is a question open to discussion whether that even might not in many places be desirable, but it does seem as though the point might be strained a little, or the governing rules if necessary revised so the street railway might be allowed to fully complete its good service in this direction, and take its patrons, the public, not only to the park, but into it.

THE New York *Tribune* mourns that at a recent session of the State Railroad Commissioners to consider the trolley system—"the opposition to this method of propelling street cars was not as strong and vigorous as was to be hoped,"—and then truthfully confesses "It is hard to arouse public feeling in such a matter." It does seem a pity that the people should be so generally pleased with new methods and improved appliances, when such a gray headed old paper as the *Tribune* does not see fit for some reasons best known to itself to approve of such things. It is sad that the great indignant populace should have been conspicuous in masses by their absence at such a time. It is hard too, to have such a pronounced and unmistakable approval of its readers set upon the policy of a paper which has opposed this modern enterprise. It

shows the power of the press as a great moral factor to lead the people as a victorious general leads his armies. Of course it cannot be that the *Tribune* has counted its own pulse beat in mistake for that of the public. No, it must have been that elevated trains were full, and the horse cars slow, and therefore the populace did not arrive in time to lift up its voice and weep according to the *Tribune* formula.

THE *New York Call* thus reads the riot act to the young man who opened a window in a street car, and thereby caused the wind to blow through the dignified whiskers of its editor; and dubs the object of its wrath, "The window fiend." He says: "This is the time of the year when the fool-killer should be sent out upon his rounds. The fool goes into the horse car, and raises the windows, letting the draft blow upon passengers who may be recovering from a severe cold. It never enters the head of this sort of an ass, that the death rate is just now remarkably high from colds and pulmonary diseases, and that extreme care is necessary to those who may be recovering. Swine and cattle are not subject to illness from drafts, and consequently the window fiend is in no danger. But human beings are not draft proof and suffer in consequence of the hoggishness of these foolish ones. The horse railroad officials also, with brains dominated by the idea of large dividends, put out in service the open cars about three weeks before they should. Then the suffering public is compelled to sit in them, shiver and become ill, and all because the managers will not use common sense."

THE argument of President Whitney of Boston, before the legislative committee on cities, which appears elsewhere in this issue, is worthy the careful perusal of all interested in street railway enterprises: and not only such, but those as well who through a misunderstanding of the elements which are necessary to the best welfare of a city, believe they are serving its interests in their opposition to corporate privileges. Mr. Whitney takes his text from a few short words which, however, express a policy on which all true success of every kind must rest: "If you take away from individual enterprise the just rewards of its labor, you will discourage enterprise." And he makes a personal application of the doctrine when he says: "There would be nothing so unfortunate for this commonwealth as to discourage the spirit of enterprise to which the state of Massachusetts is indebted in the past; and it is this upon which she must hereafter rely to sustain herself in competition with industries in more favored localities and climates." We have in mind a bright little city in the West, to which eastern capitalists recently made overtures to equip it with a first class electric street railway system. It was greatly needed, though generally conceded the investors could hope for no adequate returns for several years at least. But a few influential citizens who, though they could not furnish their city with rapid transit from their own resources, raised a great cry and created a public sentiment which

resulted in the franchise, when finally granted, being so loaded with burdens that it sunk the ship, and the men who would have invested \$100,000 in the place, left in disgust and placed their investment in another town. The citizens now see their fatal mistake, but too late, and having rejected overtures which were only fair and equitable, they will wait a long time before others can be interested in a place which works along such selfish, narrow lines. Combined capital can bring to successful achievement that which unorganized money and effort cannot even undertake. That man in the community who talks the loudest about what the company should be required to give the town for the privilege of investing its money there, is the very one of all in that same place who will do the least for others, unless he is paid for it. He is like the doctor who refused to move his hand to stay the flow of blood for a patient who was bleeding to death, until his fee was guaranteed; or the man who cut off all the branches of a fruit tree on the side next his neighbor's fence, for fear some limb might overhang the line and be plucked by other hands than his. The world is full of narrow-minded, selfish men, and the manager of a railway often feels as though they existed in an overwhelming majority. Such men are usually self appointed leaders, and fair minded people are too apt to be led into their path of error and injustice more through want of thought than through any real intention.

HAD A BROTHER-IN-LAW.

SEVERAL months ago the Metropolitan road in Kansas City, was obliged to discharge a number of conductors for "nickling," and at the same time an assistant superintendent named Patrick Kellum, who went to Denver. There he succeeded in securing fourteen registers for the "Denver Quick Transit Co." The company never had an existence outside the vivid imagination of Kellum, and the "quick transit" part of the performance was Kellum's speedy conviction and sentence for two years in the penitentiary, where he now resides.

A number of the "brothers" found their way to Kansas City and were recovered. Recently Supt. McCarthy suspected that the same scheme was again being worked, and put on a detective, who soon located the troublesome relative on conductor George O. Journey, who claimed to have received it from one Curtis, (supposed to be James H. Curtis, an ex-conductor of the Kansas City Cable.) When Journey was arrested, he handed over not only his "brother," but also his private account book, showing his receipts from that source to have been about \$150, since November 5th, last. His method was to use the "brother" on his first round trip, which was early in the morning, and then deduct from all subsequent trips during the day a sufficient number of fares to show fairly good receipts for the first trip. A marked register was given him one morning, when it was easily discovered he was using another of the same make, and which proved to have been one stolen from the Kansas City Cable Road more than a year ago. The brother-in-law has caused more trouble in the railway family than any mother-in-law ever did.

DON'T LIKE OUR STYLE.

THIS paper is not given to sounding its own praises, but when such kindly words of commendation as the following are received, we cannot refrain from ringing up a couple of fares or so on our private register. Here they are:—

CALLING NAMES.

J. N. Stewart seems to have abandoned all hope of getting satisfaction for his wrongs (?) by way of the law, and has now taken to calling names. He has an article in the current number of the STREET RAILWAY REVIEW that is a shameful slander on Judge Sherman and our council. Only in one way can Mr. Stewart's actions be accounted for. A commission in lunacy should investigate his case. —*Evening Journal*, Ashtabula, O.

A LIBELOUS ARTICLE.

An article in the April number of the STREET RAILWAY REVIEW slanders Judge Sherman and the council at Ashtabula most outrageously. It is headed, "The 'Ashtabula Horror,'" and reviews the J. N. Stewart street railway difficulties from the "street railway" side of the case. Attorneys say there is no question but that it is an out and out libel, and the publishers can be made to answer for it. There is no doubt of the source from which it originated.—*Daily Beacon*, Ashtabula, O.

We are much obliged to our printer friends for their evidently well meant intentions, and which was doubtless the best they could do, though some folks might take exception and consider their remarks rather unpretty. However, we shall keep right on and when the time comes will give a sequel to this charming tale of injustice that may prove a big, double-geerless, high-speed pointer to the bob-tail glimmering of the *Beacon* and its companion, both of whom seem to have fallen into bad company and joined the party of injustice.

Now is the time to subscribe—\$1.00 per annum in advance.

THE alarming extent of pneumonia in New York and Brooklyn the latter part of April, and the early portion of this month, led to a request from the Health departments of those cities that the railway companies operate open cars only on days when the temperature stood at not less than 70 degrees in the shade, and on such days only, between the hours of 9 a. m. and 6 p. m., until May 15th. Warm weather will unquestionably solve the problem.

WE avail ourselves of the invitation extended to its friends, in a recent editorial of the *Electrical Age*, to express our modest opinion that once a month is quite frequent enough for a display of chromatic pyrotechnics. A chemical analysis of the stock from which their carmine ink is made, possibly might not prove it to be of the juice of the red sugar beet, and the blue, other than family blueing, such as is used on Mondays, but an inexperienced person should not be censured if he thought they were. It strikes us our friends in "getting out of a rut," have fallen into the tomato soup.

PERSONALS.

T. A. ROBERTS has been made superintendent of the Augusta, Ga., Electric Railway.

HENRY SCHNIDLER has been elected superintendent of the Newark and Granville, Ohio, electric road.

WM. P. RAYLAND, of Rome, New York, has been appointed manager of the Newburgh Street Railway.

A. H. CHADBOURNE, has taken the general agency of the Railway Department of the Westinghouse Company, at Philadelphia.

GEORGE POOLE, of Robert Poole & Son Company, Baltimore, the well known builders of cable plants, was a recent caller at our office.

PRESIDENT BROWNELL, of the Brownell Car Company spent several days in Chicago recently, making the REVIEW office headquarters.

C. E. HEALY, inventor of the motor bearing his name, has been confined to his home in New London, Ohio, with illness for the past month.

GEORGE E. PRATT, general selling agent of the Lamokin Car Works, favored us with a call when in the city capturing the big Memphis order.

O. W. BRONSON, who has been president of the Mohawk & Hlon Street Railway for the past ten years, has resigned, and J. B. Rafter has been elected in his place.

THOMAS A. EDISON is in the city in the interests of his exhibit for the World's Fair, and is having a decidedly busy time of it, between business and an army of visitors.

R. C. GARIHART, well and favorably known as a former representative of the Westinghouse Electric Company, will represent the Short Company in general Eastern territory for the present.

H. L. NORTON has again accepted the position of secretary and general manager of the Meaker Manufacturing Company and may be found at their new office. The railway men will be pleased to see the genial features of the good natured secretary as once more.

C. P. JONES, president of the Northern Car Company, at Minneapolis, has been in this city on business connected with his company. While here he made us a pleasant call. Mr. Jones reports their works over-run with orders that will carry them through the fall.

S. D. GREENE, formerly of the Edison General Electric Company, has been elected, and has accepted the position as consulting electrician of the Burton Electric Company. Mr. Greene has for a number of years taken a great interest in the heating of street cars by electricity, and the company deems itself fortunate in having secured his services.

SHALL NEW ISSUES OF STREET RAILWAY STOCK BE SOLD AT PUBLIC AUCTION?

PRESIDENT HENRY M. WHITNEY, of the West End Road, Boston, recently addressed the Massachusetts Legislative committee on cities; discussing the provisions of the bill from a standpoint of public policy, Mr. Whitney said:

In the first part of the present session of the Legislature, wearied with having continually to fight for the rights of our corporation, being met before every board and in every legislature with men who were seeking to prevent what I considered to be for the best interests of this community, I believed that perhaps the only way to secure peace was to comply with the suggestion that stock should be sold at auction. But, upon further consideration of this question, being brought face to face with it, in the actual results, which, as it seems to my mind, must follow, I am now opposed to it as a matter of public policy. And, being so opposed, I desire the time of this committee to state what I conceive to be the real public interest in question.

And first, I desire to call your attention to sec. 20 of chap. 116 of the Public Statutes of Massachusetts, page 661, in reference to permitting investments of savings banks and institutions for savings. Describing what investments they may make, it provides:

"Third, in the first mortgage bonds of any railroad company incorporated under the authority of any of the New England States, and whose road is located wholly or in part in the same, and which is in possession of and operating its own road, and has earned and paid regular dividends for the two years next preceding such investment; or in the first mortgage bonds, guaranteed by any such railroad company or any railroad company so incorporated whose road is thus located: or in the bonds or notes of any railroad company incorporated under the laws of the Commonwealth, and whose road is located wholly or in part therein, and is unincumbered by mortgage, and which has paid a dividend of not less than 5 per cent per annum for two years next preceding such investment; or in the notes of any citizen of this Commonwealth, with a pledge as collateral of any of the aforesaid securities at no more than 80 per cent of the par value thereof: but street railway companies shall not be considered railroad companies within the meaning of this section."

Now, it appears that the savings banks of this commonwealth are not permitted to invest even in the bonds of street railway companies: The state itself so far discredits every security of the street railway, that they say that savings banks may not even loan money on them.

The same is true, so far as it relates to the stock of steam railroads. There is no savings banks in this commonwealth which is permitted to invest in the stock of steam railroads, and only 80 per cent. is allowed if the bonds of the corporation are used as collateral.

Now my proposition is this: if the state shall undertake to say how the stocks of these different corporations shall be disposed of, they ought at least to remove the discredit which now hangs over them. If they are not prepared

to make these securities so safe that they will be willing that their own institutions shall invest in them, it seems to me that they ought not to insist upon the manner in which they shall be disposed of.

Now, I had been content, as I said, in the early part of the session, to accept the condition of things and to say that if this Commonwealth will permit savings banks to invest in this property, or will make them so secure that they can safely become an investment for savings banks, I, for one, wearied with all this struggle and contest that I am continuously compelled to wage, would be content to accept it for my people and let this be done.

But, upon further consideration, I see how it is against public interest and public policy that it should be done. And I do not know that I can illustrate this point better than to tell you exactly the history of the West End Street Railway Company, the corporation against which this is aimed.

In 1886, as Mr. Mellen has kindly informed you, about 15 men, having purchased a large tract of land in Brookline which they desired to develop, organized the West End Street Railway Company. It was organized on a capital of \$80,000.

The West End Land Company had bought about five million and odd feet of land, and then they went to the town of Brookline and gave them 700,000 feet of land and \$150,000 and laid out and widened Beacon street.

Was any injustice done to any individual in the town of Brookline by it? Did we not pay the full market value of the property? And because, by our enterprise and operations, we multiplied the value of that property five or ten fold, was any individual wronged?

Go to Brookline and ask the owners of property all along the line if they have suffered anything. Go to the town of Brookline itself, whose taxes collected along that line have been multiplied at least threefold, and ask them what is their opinion of that operation.

We opened that territory to transportation. We took the real estate, which we bought at low prices, and we dedicated it to the uses of the street railway company. We took the property, that cost us whatever you may please, and we placed it behind this corporation at the time when it was absolutely necessary that some such property should be there, in order to carry it through.

What did this corporation then do? Seeing that it was advisable that these different railroad corporations should be consolidated, we bought sufficient amounts of their stock to compel this consolidation.

Now, this consolidation was in the interest of the city of Boston: and the owners of the West End Land Company paid upwards of \$5,000,000 for the stock of the old companies and lost on it from \$1,000,000 to \$1,500,000 clean cash.

I have charged in my own account to profit and loss for the purpose of bringing about this consolidation, a loss of \$653,458.18.

We bought the stocks at the market price, because we were compelled to do that in order to complete this consolidation, and every man who was associated with me in that enterprise has borne his share of loss. The stocks cost us at the time of the consolidation about 105 or 110, including interest and commissions and one thing and another, and to-day they are selling for 85.

This consolidation could have been brought about in no other way, except by compulsory act of the Legislature and after innumerable years of delay and trial.

I am not here complaining that either my friends or myself have suffered loss as the sum total of all these operations, but I say that it was to the enterprise of these fifteen men that this city is indebted, if it is indebted at all, for this consolidation, and if there had been upon your statute books at that time any such provision as it is now proposed to incorporate, that the stock should be sold at auction, it could never have been done.

Now, the theory that the wider the stock is distributed the better the community are served, is a mistaken notion. Wherever a man's treasure is, there his heart is also. And I would prefer to have stock in a corporation that was managed by a few men with large interests, who give their attention to the business, than in one managed by men of small interest scattered throughout all this state.

And that is the secret of the success of the management of any individual enterprise or corporation.

The moral that I desire to point in this illustration is this: That, if you take away from individual enterprise the just rewards of its labor, you will discourage enterprise. And, in my judgment, there would be nothing so unfortunate for this commonwealth as to discourage the spirit of enterprise to which the state of Massachusetts is indebted for her prosperity in the past; and it is this upon which she must hereafter rely to sustain herself in competition with industries in more favored localities and climates.

I know from the manner in which these electric roads are being built throughout all this commonwealth that sooner or later these different corporations will be brought face to face with this same problem, and it is in the interest of this community that they should be encouraged to consolidate, that they should be encouraged to spend money in the development of these transportation interests, and that they should have the fullest scope and invitation to do it.

The way in which this electric business is growing presupposes to my mind that the day is not far distant when, if one chooses to do so, he can travel almost from Boston to Portland by the electric system, and I do not know but clear through. And I can see how, if they are compelled to sell this stock at auction, it would discourage men who would otherwise work out this problem.

Now what has been the result of this consolidation? What has been the result of the issue of stock as the law now is? Has any individual of this city suffered?

What has the city done for us? Why, it has simply given us the opportunity to spend our money for the convenience and the benefit of the people. We give

them better cars and better lighted cars; we carry them comfortably and farther. We pay greater taxes. In 1885 the total tax paid by all these companies to the commonwealth was \$103,000. In the year 1890 it was \$222,000.

So it seems to me that it is unwise for the state to put upon its statute books a provision which will tend to discourage men of enterprise engaging in this or any other kindred undertaking.

I do not believe that capitalists, even if they let you have the money at 4 and 5 and 6 per cent will supply the place of enterprise. There is nothing that will supply the place of that. And, mind you, capitalists do not come in and engage in these undertakings until the thing is an assured success. The men of enterprise come in and take all these chances for the purpose of carrying out their plans; and now that ours is made a success we are asked to forego a large part of the benefits.

I say that, in justice to the men that have stood by us from the beginning, and have brought about this consolidation, and have relieved the blockades, and have placed the street railway system of Boston and vicinity in the only position by which it could improve the transit—I say that those things, it seems to me, are entitled to recognition.

And now one thing more, if the committee will pardon me, not directly addressed to this question.

I am perfectly willing, so far as I am individually concerned, that the stock should be scattered.

The stock, I can assure you, gentlemen, is going out into the community, and will not be retained for a very long time in the hands of the West End Land Company, whatever may be the result of this bill.

But I desire to say to the committee this: That the time has come, in my judgment, when it is absolutely necessary for this committee and this Legislature to give permanency of tenure to the street railway business in order that it may go on. The responsibility for carrying this burden has shifted from my shoulders to yours. If this Legislature and this community are not content that the investments made in the street railway business shall be secure and permanent, then no more investments will be made and the development must stop.

It is for you, gentlemen, sitting in your capacity, who have heard this discussion from beginning to end, to decide what shall be done. We are endeavoring to improve the transit facilities as rapidly as possible, and have spent, and are spending, large sums of money to this end; but, if in high places it is claimed that we have no rights that cannot at any time be taken away, if we are to have no security for these investments, I can do nothing more.

I, therefore, appeal to this committee, as they desire to have these privileges extended quickly, that they shall report some bill under which the investments made in this property can be felt to be secure. That is the first step. And I think that I have asked only what is reasonable, that you shall give us a period of fifty years within which we shall not be disturbed.

And I ask it not more in the interest of my corporation than in the interest of the community.

RAPID TRANSIT IN NEW YORK CITY.

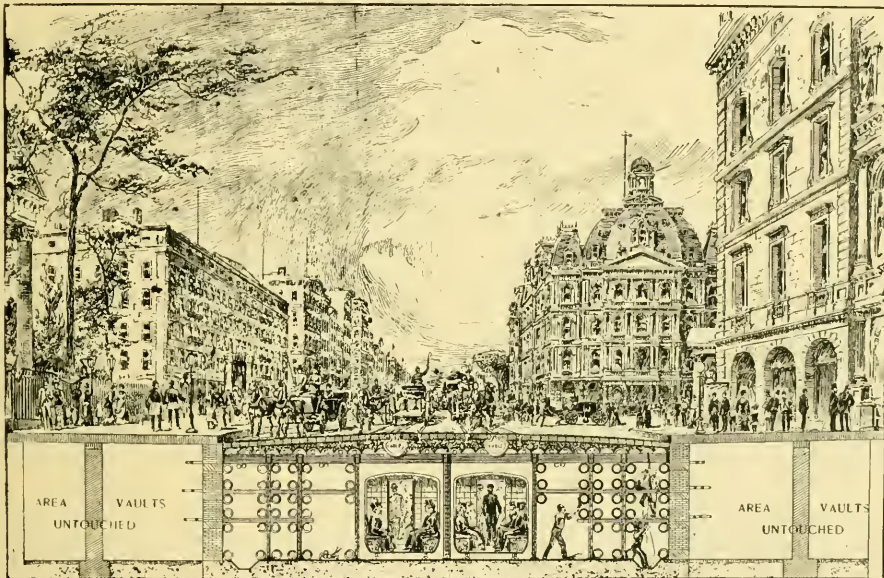
(CONCLUDED.)

BY T. G. GRIBBLE, CONSULTING ENGINEER TO THE AMERICAN PERMANENT WAY COMPANY, AND AUTHOR OF
"PRELIMINARY SURVEY AND ESTIMATES."

As already stated in our previous article, the commission is empowered to settle upon a route or routes and the best method of construction for one or more lines of railway through the city.

The whole problem naturally divides itself into external and internal means of communication. It is only by treating the matter with the comprehensiveness which is demanded by the future development of the city, that an adequate solution can be reached. If the municipal

meeting at Whitehall street, and a third tunnel taking as nearly as possible a bee line for the Grand Central, and having an elevator and exchange gallery in the tunnel to connect the arrival and departure platforms. The New York Central depot is arranged in the opposite way to ordinary American depots, and the exchange gallery would have to be arranged so that the arrival of the one line could cross the departure platform of the other and vice versa.



BROADWAY AS PROPOSED BY NEW YORK SCIENTIFIC STREET COMPANY'S SYSTEM.

authorities of fifty years ago had been able to foresee the present extension of the city, they would have reserved a right of way traversing the whole of the island and on each side of it from end to end. The present difficulty arises from the enormous expense of cutting through about ten miles of substantial town property. If the New York Central had been originally carried down to South Ferry in tunnel or viaduct, it would have provided the Westchester county with rapid transit facilities along three different lines of development, besides wonderfully simplifying the connection of the neighboring cities of Brooklyn and Jersey City with New York. At present the double change at 42d street with two flights of stairs renders the journey to and from Wall street, too tedious to be popular with business men.

The only way now to bring forward the traffic from the Grand Central station would appear to be by a three-way link of tunnels such has have been proposed by Mr. Corbin. Two tunnels across the North and East rivers

In spite of minor difficulties a system such as this would be extremely valuable, not only for passenger traffic, but also for a freight connection. As regards the motive power, the promoters expect to use electricity, but it is not clear from the state of the art whether they will be able to handle heavy traffic by that means. Steam although objectionable, would not be impracticable.

Notwithstanding its value this system would *scarcely touch* the question of internal transit. The two classes of travel are so distinct that they require to be treated in a different manner. Other cities, such as London, Paris or Berlin, are able to combine the two classes to a greater extent. They have their center of business in the middle, with trunk lines radiating from it, which reach the suburbs sooner and handle a large proportion of suburban travel. These lines are also connected by belt lines with an outer and inner circle.

New York on the other hand is like a tongue with the center of business at its tip. She cannot afford to cut

through in all directions with trunk lines, but she has nevertheless to traverse the whole length of the island before she gets to the suburbs, and here is the essential difficulty of the problem. It is feared by many that the numerous obstacles in the way will prevent an ideal solution, but the various points to be aimed at with the two classes of travel may be summed up as follows:

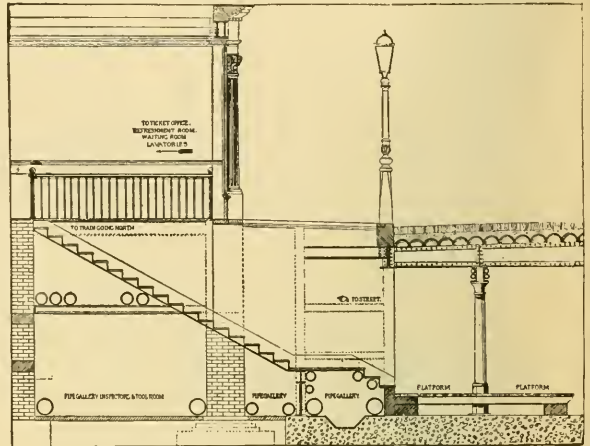
FOR EXTERNAL FACILITIES.—CONNECTING THE ISLAND WITH THE MAINLAND.

1. A comprehensive connection with existing trunk lines having termini in Brooklyn, Jersey City and New York.
2. The expeditious transfer of freight and baggage.
3. A high rate of speed, from forty to sixty miles per hour.
4. Comfortable traveling.
5. Completion within a reasonable period, not more than three years.
6. A cost which will have a fair showing of profit.

FOR INTERNAL FACILITIES.—WITHIN THE ISLAND.

1. The utmost possible rapidity of construction. Not more than twelve months to complete it.
2. A constant service, accessibility and conspicuousness.

It is a weak point in any single scheme for solving this problem if it professes to deal with both external and internal facilities at once. For instance, some of the sub-surface schemes which are suitable to internal transit also



EXIT FROM CARS NEW YORK SCIENTIFIC STREET CO.

propose to operate freight trains. On the other hand some of the high speed deep tunnel schemes which are well adapted to make through connections also propose to handle the short haul by means of way stations.

It is evident from a glance at the time table of the New York & Harlem Railroad that this latter attempt would not be likely to be successful. Short haul traffic will not be diverted to and congested into trunk lines if it can find vent some other way. Both the magnitude and the configuration of New York City demand a dual treatment of the problem.

The question as to whether the road should be above or underground is condensed into a few alternatives. If above ground, the commission may choose between more elevated roads; a colossal viaduct like that of the People's Railway Company, described in the last issue of STREET RAILWAY REVIEW, or an equally colossal viaduct on land reclaimed from the North and East river, as proposed by Mr. Thorp. If underground, there are a few more alterations, and we will now refer to some of those schemes which have been before the commission.

SUB-SURFACE RAILWAYS.

There are quite a number of proposals before the commission for railways wholly or in part under the surface of one of the main avenues.

Some include a surface road, worked in conjunction with a rapid transit road underneath; others run through the blocks on their down town section, and afterwards follow a main avenue. Perhaps the most important and likely of them, is the city railway, promoted by Mr. Coleman Drayton, Col. Rowland Hazard and others; the case for which was argued by Professor Trowbridge, professor of engineering at Columbia College. The line starts from the vicinity of South Ferry and passing at the back of



VAULTS FOR WIRES AND PIPES.—NEW YORK SCIENTIFIC STREET CO.

3. Adaptability to any or all of the city's lines of travel.
4. A speed of from twenty to twenty-five miles per hour, *i. e.* to traverse the length of the island within half an hour.
5. Comfortable traveling.
6. A cost which will have a fair showing of profit.

Broad street, crosses Broadway and parallels it on the west, joins Broadway near thirty fourth street; follows that avenue to Washington Heights as a subway road and crosses the Harlem river by a high bridge. Such a road as this would interfere much less with real estate than a masonry viaduct through the blocks. The profitable use of the purchased property would be much more feasible, since with suitable construction, there would be very little vibration, and the buildings might be turned into warehouses or even residential property.

As compared with a deep tunnel, a subway road has the decided advantage of being more accessible, even more so than the present elevated road. As compared with the latter, it lacks the comfort of a daylight route, but the chief objection to a tunnel on that score, arises from the use of steam. The horse car tunnel along Park avenue is pleasant to ride in, both in winter and summer.

A subway railway has a costly problem to solve in the diversion of the numerous pipe lines which are immediately under the surface. It is a task which is now being undertaken by the Broadway and Third avenue Cable Construction, under much more difficult conditions than would obtain in the construction of a subway.

On the other hand, the interference with the pipes would be a permanent benefit if they were placed in an accessible subway of their own, as proposed by the City Railway Company.

The route proposed by Mr. Drayton's company is to start from South Ferry and follow the west side of the city, partly underneath the houses on a purchased right of way, and partly under the Boulevard to Washington Heights, where it would cross the Harlem river by a high bridge and penetrate the annexed district in Westchester county as far as New Rochelle.

Amongst the points upon which special stress is laid, as favoring the scheme are, 1st.—The shallowness of the excavation, so that it becomes more of a covered way than a subterranean line, a minimum interference with pipe lines and sewer, electric motive power, a noiseless and smooth track and good ventilation.

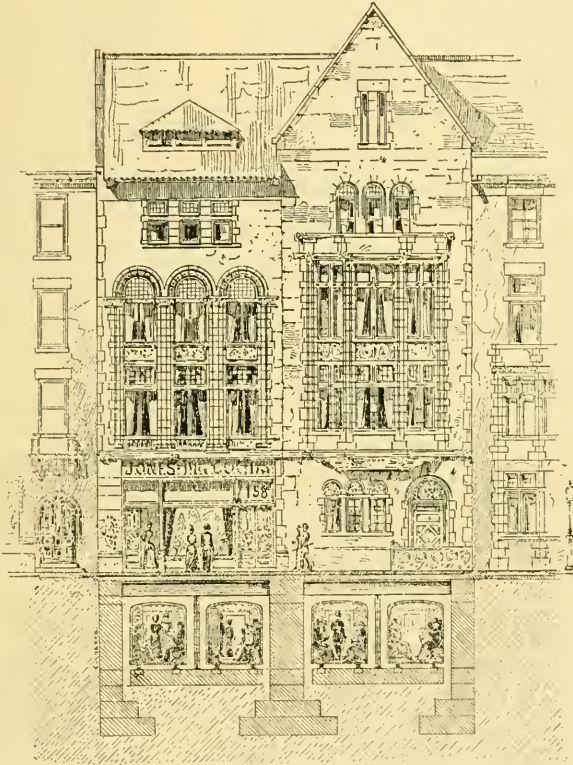
The plans both for the construction and equipment have

occupied the promoters time and ingenuity for a considerable period. The system has been discussed by Col. Rowland Hazard before the British Association at Bath, and is supported by Gen. Trowbridge, Mr. Barclay Parsons and a number of engineers of high standing. The estimate including the real estate which would remain as an asset of the company is \$57,623,811.

THE WRITERS DUPLEX SYSTEM.

It hardly requires argument to show the advantage which would accrue from a combined surface and subway system. The surface road would give accessibility, and the subway road the speed. The latter could have its stations about a mile apart, so as to allow time to get up speed, whilst the former would be available any where. The passenger would not have any walk to the stations, he would join his cable or electric surface car wherever he might be, and obtain a transfer at the nearest subway station. This idea has been simultaneously but independently supported by several other engineers, but the peculiar feature of the writers construction, is a continuous metallic flooring resembling corrugated iron sliced in two. It is claimed that this flooring can be laid down at night and form both road bed for the surface railway and roof for the subway. The whole of the excavations would then proceed from underneath by the ordinary processes of mining. It is further claimed for this method, that it does not necessarily involve disturbing any of the pipes. After underpinning the steel floor, the pipes could be slung on suspension rods, furnished with turn-buckles. They could then be gradually raised, lowered or traversed laterally in long lengths, or left in their present position. This would be effected by guides in the street flooring about every ten feet apart in which the heads of the suspension rods would slide. Finally when the side walls were carried up, transoms would be built into the masonry, which would permanently support the pipes and leave them in a gallery above the railway, accessible at all times to the line-men.

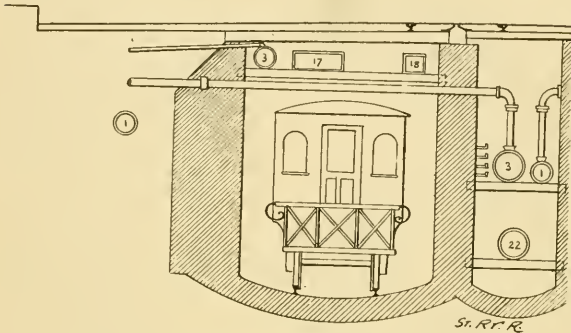
Some pipes and electric subways could be easily and inexpensively diverted, but the removal of the heavier ones would entail an immense outlay, which need not be



CITY RAILWAY COMPANY'S PLAN.—BY J. COLEMAN D. DAYTON.

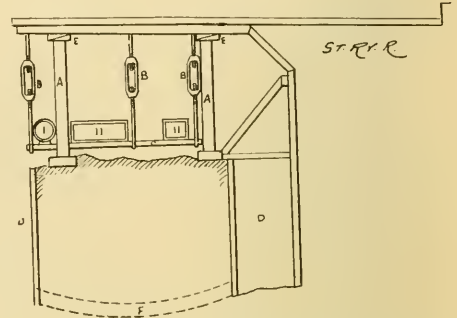
incurred at all. Even the house connections might remain absolutely intact. There would be room between the steel floor for either a cable or an electric conductor, for operating the surface road, and space could be left for a lineman's gangway in order to maintain the conduit always under inspection.

whole line would be under construction simultaneously, and be finished in the time required for one block. The division of labor would thus avoid the difficulties inseparable from the organization of a very large body of men. Each sub-contractor having to look out for his own men.



GRIBBLE'S SYSTEM.

Showing present pipes and underground wires undisturbed. (1 gas, 3 water, 17 pneumatic tubes, 18 steam pipes, 11 electric wires, 22 return steam pipe.



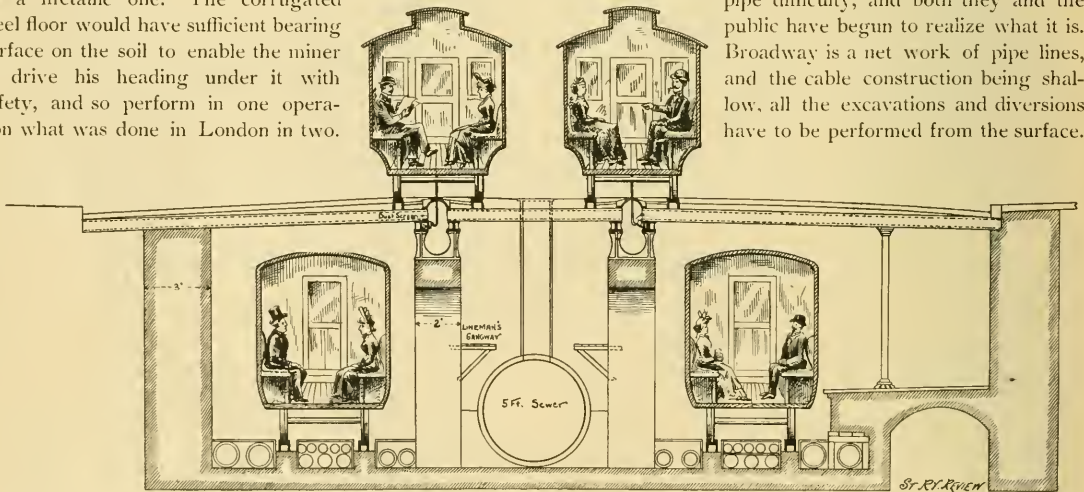
GRIBBLE'S METHOD.

Of supporting mains and pipes during construction of subway.

This process is a simplification of the method adopted in the construction of the London underground railway along Cannon street, where a temporary roof-floor of timbers was laid down at night and afterwards replaced by a metallic one. The corrugated steel floor would have sufficient bearing surface on the soil to enable the miner to drive his heading under it with safety, and so perform in one operation what was done in London in two.

THE BROADWAY AND THIRD AVENUE CABLE ROAD.

Although not under the consideration of the commission, these roads form an important factor in the present problem. They have made the first plunge into the pipe difficulty, and both they and the public have begun to realize what it is. Broadway is a net work of pipe lines, and the cable construction being shallow, all the excavations and diversions have to be performed from the surface.



T. GRAHAM GRIBBLE'S DUPLEX SYSTEM AS COMPLETED.

The estimate for a ten mile length of this system is \$17,000,000. It is worthy of notice that when undertaking a subway system, the construction of a mechanically operated surface road is obtainable at little extra cost over and above the rails, so that a four track system would, according to these figures, be obtained for about the same outlay as a double track elevated road.

Lastly, this type of construction could be completed very rapidly. Adits could be driven from every cross street, so that each block might have four points of attack. It would be let to a sub-contractor, so that the

There is no room for men to work at the pipes so as to sling and divert them in long lengths, under cover, and what the blockade will be, when the block end of Broadway is taken up twenty feet wide is as difficult to be imagined as the cost to be estimated.

In addition to this, the work done upon the pipes will be no help in the improvement of the street construction. The pipes will be covered up again with the sand and when any trouble takes place with the joints, they will have to be got at. The pavement being replaced upon the sand without a good substratum of concrete will be

as short-lived as now. There is no use in putting down a good bed of concrete as long as the pipes are liable to require its being broken up again.

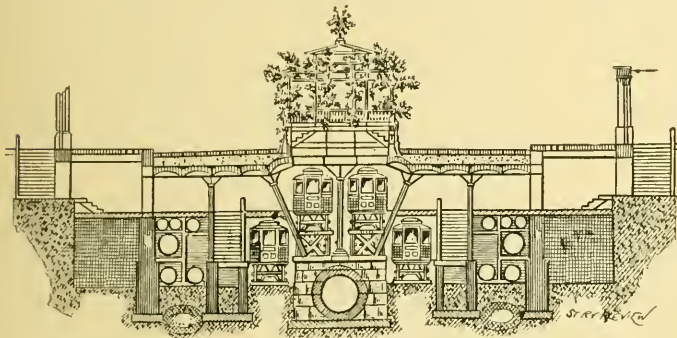
Coming to the cost of these alterations, it is difficult to see where the profit is to come from. The New York Times stated on the 28th ult., that the Broadway Cable Co. had offered the New York Steam Co. \$100,000 to remove one 15 inch main out of their way. Such a proposition does not seem improbable, and is suggestive, if true, of what the total cost is likely to be. It is presum-

ingency not at all improbable: a good deal more gilt will be taken off the edges of the cable-load paper.

THE GREATHEAD SYSTEM.

One of the schemes most prominently before the commission and the public has been the Greathead system.

Amongst many immature schemes brought forward with much assurance as being "just the thing" for New York, the Greathead system stands out in contrast as a method of constructing underground railways which has proved successful in London. It is supported by Sir Benjamin Baker of Forth Bridge celebrity, as a solution of the rapid transit problem in the English metropolis, and the energetic representative in New York, Mr. Louis Sterne, has been able to give the commissioners favorable accounts of the efficient and economical operation of the first railway constructed in this manner; the London & Southwark Subway. Mr. Sterne has furthermore been able to testify to the satisfactory progress of the Hudson River Tunnel, which is being pushed forward at the rate of ten feet per day by means of the Greathead shield.



FORSBURG'S UNDERGROUND SYSTEM WITH SKYLIGHT AND SUMMER GARDEN.

able that the company do not anticipate having to reduce their 4 per cent dividend, therefore the amount of capital created for this present purpose, would warrant the supposition that they expect to carry about three times as many passengers.

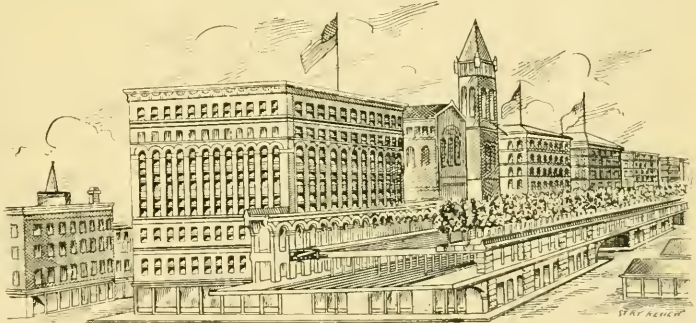
The horse cars on Broadway and Seventh avenue carried in 1889 according to Poor's Manual of August, 1890, nearly 32,000,000 passengers. The Third Avenue Elevated road carried about 70,000,000, handling as it did long haul and short haul and transporting its human freight huddled together in a manner scarcely fit for sheep or oxen.

The Cable road will be limited to a speed of about six miles per hour so that it cannot expect much long haul traffic. On the down town section, what with normal stoppages and abnormal obstructions, the cars will hardly make better time than they do now, and consequently they will not do much more business, for people will not long ride on cable cars for the pleasure of doing so. Economy of operation under mechanical traction as against horses will help the dividend, but on the whole the undertaking has the appearance of a very costly affair for a very small gain to the company.

The benefit to the public will be doubtless great upon the uptown section, and the takings will be much increased, but the fact of its being a surface road circumscribes for ever the rate of speed, the consequent capacity and the commercial value of the undertaking.

If in addition, the commissioners sanction a rapid transit line on Broadway either above or below ground: a con-

dition further developed in London subway construction, where the strata are first a very deep impervious bed of blue clay overlying chalk and green sand, termed the London basin. All the railways running south have had to pierce the line of clay hills upon which the Crystal Palace is built, and have experienced considerable difficulty in getting a brick lining to stand. The clay in swelling produces enormous pressure, deforming the arch or even



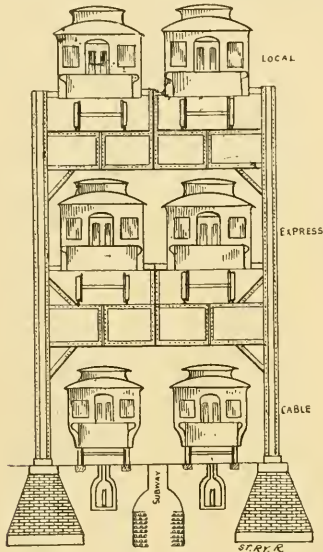
ALFRED H. THORP'S SIX TRACK RIVERSIDE RAILWAY.

crushing in some cases a brick of ordinary composition. In the Sydenham tunnel, after trying six rings of ordinary brick, recourse was had to a blue vitrified brick of great hardness procurable only in the Midland counties.

The Greathead shield is a method of tunneling by means of a lining composed of a metallic cylinder in place of masonry. It is not a novelty. The famous engineer Brunel was the first to achieve the subaqueous connection of London and Southwark, and he must be credited with the first conception, half a century ago. The tunnel was built by a shield in rectangular segments.

Twenty-two years ago, the second Thames tunnel was driven by Mr. Barlow with a circular shield of simplified construction, almost identical in principle with the present Greathead shield. The work was performed rapidly and safely. Scarcely any trouble being experienced with water.

About three years ago Mr. Greathead commenced the construction of the London & Southwark Subway and opened the line, a distance of $3\frac{1}{2}$ miles last autumn.



WEGMAN & BATES' ELEVATED SYSTEM.

The shield consists of a circular iron frame furnished with a cutting edge which is protruded horizontally into the place excavated for it. The miners obtain access to the workings through a trap door in the shield, and are, if necessary, protected by air pressure from irruption of the water. The shield on the second Thames tunnel was driven by screw jacks, whereas Mr. Greathead uses hydraulic jacks.

As the shield is protruded it is replaced by cast or wrought iron segments which are bolted together to form a complete tube, having very much greater resistance than a lining of masonry to deformation by external pressure. The tube can, moreover, be rendered water-tight to an extent impossible with brick or stone.

Mr. Greathead has introduced an ingenious device for filling up the space between the rough surface of the excavation and the iron tube. The segments are furnished with perforations into which, when bolted in place, he inserts the nozzle of a hose pipe and then forces semi-liquid cement mortar, termed grout, through the holes, so as completely to fill the space. This operation performs the threefold duty of distributing the pressure of the clay, preventing leakage and preserving the iron.

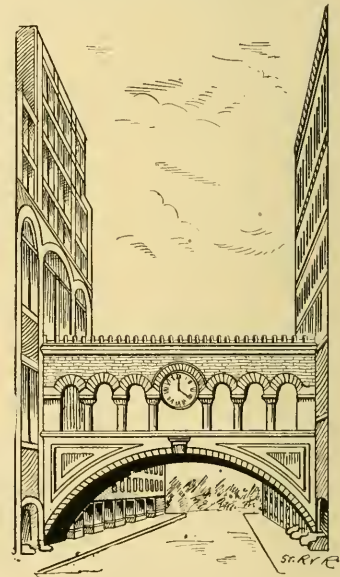
In the application of this system to a railway for city or suburban transit there is the great advantage of freedom from obstruction on the part of vested interests. It

is carried forward at a depth which does not entail asking anybody's leave, and access is obtained when in operation by means of elevators, the stations being on the surface.

It has the disadvantage of having no side shelters for linemen, and if operated by electricity the conductors are in dangerous proximity. The London & Southwark Subway is operated by electric motors at a cost, according to the company's figures, of 7 cents per train mile for motive power alone, the train having a capacity of 100.

At this early stage we may be excused if we receive such figures with extreme reserve. They do not at all correspond with the results of a much more extended experience with electric traction in this country.

The consideration which would more than any other militate against the application of the Greathead system to New York rapid transit is the fact that about four-fifths of the construction of a deep tunnel under this island would be in gneiss rock, which can be driven without any shield as has been demonstrated on the New Croton aqueduct. To adopt a small bore metallic tunnel at one end, thus limiting the size of the entire rolling stock, would not be so good a policy as to go deep enough to build a capacious rock tunnel throughout.



DR. L. T. SHEFFIELD'S ELEVATED SYSTEM.

Mr. Sterne is of opinion that a double track tunnel of 10 ft. 6 inch diameter could be constructed on Manhattan Island for about \$1,000,000 per mile.

A few words must suffice to conclude this article with some reference to two other schemes which have been brought forward.

DR. SHEFFIELD'S ELEVATED TUNNEL.

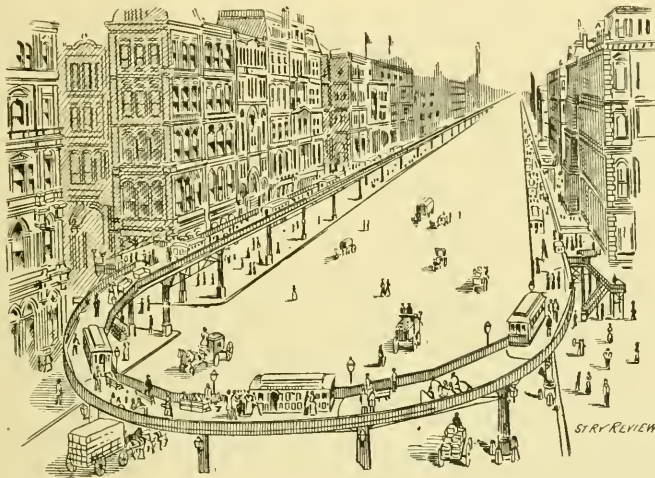
This proposal is a compromise between a high viaduct with a railway on top and running in daylight as described in our last article and a subway under the houses like that of the city railway.

Dr. Sheffield proposes buying up property from the Battery to the north end of the city and reconstructing a belt of residential property, carrying the railroad on the second and third floors. He provides for an express and local service. The masonry would not require to be as substantial as that for a high viaduct, and the buildings could be designed in a more attractive form. It would be open to question whether the sacrifice of the daylight merely for the sake of having the railway half way down would be compensated for either in economy or convenience. The cost of right of way would be about the same as for the viaduct.

MR. SPEER'S ENDLESS BRIDGE.

This is a phase of elevated railway construction having a loop at the end to enable the trains to run round and so avoid switching.

If some such method could be introduced into the operation of the Manhattan Railway, it would greatly help the handling of the trains. The Manhattan have applied for powers to put two more tracks on their present structure in Battery park, without fixing any more columns. This reasonable application has created so much outcry, that it is improbable any form of loop with fresh columns would be tolerated in any part of the city.



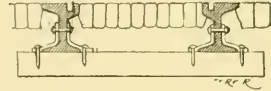
SPEER'S ENDLESS TRAIN SYSTEM.

It is with some regret that we close this article without reference to many other schemes whose merits deserve at least a description, and it is possible that the commission may distinguish with their favor some one which has not been dwelt upon at all. The decision cannot now be long delayed, and many promoters will necessarily be greatly disappointed; but there can be no question as to the competence and determination of the commission to do their best for the city.

A DETROIT SCHEME.

ONE of the aldermen in Detroit has recently introduced a resolution in the city council there to compel the street railway companies to use a street rail, the surface of which shall be flush with the pavement. The rail, a cross section of which is here given, is similar to that in use in England and European cities. The groove in the rail in which the flange is to run, is but one-half inch wide and about one inch deep, and is intended to be so small that no wheel of any ordinary street vehicle could enter in. The space between rails is paved close to the rail and level with its top, making a smooth crossing. This is very nice in theory, but in

practice in latitudes where snow and ice are found, would so fill with frozen matter, as to make it impossible for a car to keep the track. Brushes would not do it in this country, and any spot which chanced to be a fraction of



an inch out of grade, would fill with water and freeze solid. In European cities, also, the municipal authorities are more particular in keeping their portion of the streets clean, so there is nothing like the amount of dirt to get in that there is here.

A NOVEL use of aluminum will be made by the River-

side Park Railway Co., of Sioux City, who have ordered a large supply of street car tickets made from it. This ought to be a profitable move on the part of the company, as nearly every one will want a few of these tickets to keep or send to friends as curiosities, and the probability is the company will never be called upon to redeem a large share of them. The new material is lighter and stronger than celluloid.

FIRE AT SCRANTON.

THE People's Street Railway Co., of Scranton, Pa., has suffered a severe loss in the burning of their main car house on the night of May 1. One of the car cleaners had occasion to replenish his oil can and entered the oil house at midnight, when in some unknown manner the little oil lamp fastened in his cap caught in some waste and in an instant the room was one mass of flames. Despite the prompt efforts of the fire department the entire car house was destroyed, including twenty-nine motor cars, three trail cars, two horses and two mules. The loss on cars and house is \$170,000, on which there was an insurance of \$125,000. The handsome building of the *Scranton Republican*, to whom we are indebted for favors, adjoined the car house and also suffered a loss of \$20,000. President McCabe, who was in New York, left his bed and reached the scene before the ashes had cooled, and immediately telegraphed an order to Philadelphia and Springfield, Mass., for seventeen motors. Fifteen open cars which were stored elsewhere are left the company to operate by horses. Street railway men will regret to learn of this disaster, and will wish their Scranton friends no delay in getting under way again.

A TALE OF THREE CITIES

AND THE ELECTRIC BANDS WHICH UNITE DAVENPORT, ROCK ISLAND AND MOLINE.

SHeltered between the high bluffs which rise on either side of the far famed old daddy of waters, with neat blocks of business houses on the level valley divided by the river, and wide shaded streets lined with handsome residences rising in magnificent terraces upon the hillsides, are the enterprising cities of Davenport, Rock Island and Moline. All possess more than national reputation, and each is prominent in the pages of history as the location of stirring scenes in the days of early settlement or during the Civil War. Before the railroads had reached beyond the Mississippi, Davenport and Rock Island were great distributing points for supplies which were brought on river steamers which

and the first hotel, built the following year, still stands. During the war large numbers of troops were massed here for organization and distribution, and large hospitals were maintained for the care of wounded soldiers who were brought up the river on boats.

The river at this point takes a course almost due west, and Rock Island lies on the opposite bank directly south, while Moline is situated at a point directly east of Rock Island, where the river makes a bend from the north.

In the middle of the river and connected by three bridges, one leading to each city, is the famous Rock Island, than which no more beautiful spot is to be found in traveling from the Alleghanies to the Rocky Mountains.



DAVENPORT AND BRIDGE OVER MISSISSIPPI RIVER AS SEEN FROM GOVERNMENT ISLAND.

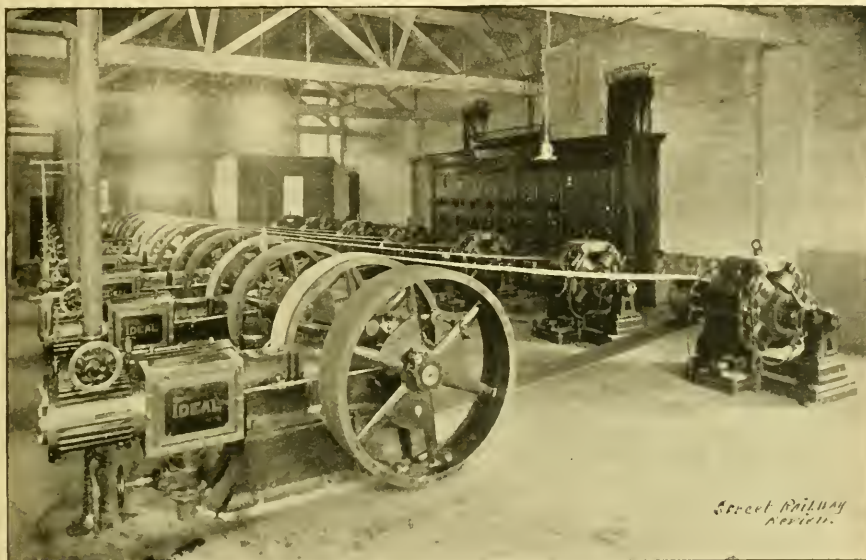
crowded the levees by the score. This has practically ceased, though a large wholesale business is still maintained. Manufactures have come in to take the place of the river activity of former days, and the famous water power at Moline is too well known to warrant detailed mention here. There is an earnest rivalry among the cities, and the population of any one loses several thousand when mentioned by a resident across the stream, but a man on the island in the middle of the river imparted the intelligence that Davenport numbers 25,000 souls, Rock Island 20,000, while Moline marched up some 15,000 strong. The three are now so closely united by the electric lines of the Chicago syndicate operating under the name of the Davenport & Rock Island Railway Company, that they are now practically one fine city of 60,000 inhabitants.

Davenport was founded in 1835, or three years after the Black Hawk war, by the man whose name it bears,

This island is one of the largest in the Mississippi river, and is nearly three miles long. In width it varies from one-fourth to three-fourths of a mile, and contains 970 acres. The surface of the island is generally rolling, and at no point is more than twenty-five feet above low water line. Its surface is covered for the most part with magnificent trees, and the broad drives and stone walks built by the government afford excellent facilities for visitors. The United States acquired this valuable property through a treaty made by William Henry Harrison, governor of Indian affairs, with the Sacs and Foxes, in 1804, but it was not occupied by white men until the war of 1812. Until this time it was a great resort for the Indians, not only for hunting and fishing purposes, but was also the scene of religious celebrations and war councils. In 1816 Fort Armstrong was erected at the north-east corner of the island, and had an interior of 400 feet square. In 1862 an appropriation of \$100,000 was made by congress

for the erection of an arsenal, which is an immense stone building, situated near the bridge connecting Davenport and Rock Island, and is surmounted by a lofty tower bearing a clock, the dials of which are twelve feet in diameter. The building, however, is at present but little used, though the dials can easily be read from the two cities, and the sound of its great bell is also heard. Near the centre of the island are the ten great shops of stone, each of which covers one acre and is three stories high. Five are used for the arsenal and five for the armory, and if crowded to their utmost capacity in time of war would be able to arm, equip, and supply an army of 750,000 men. The gun yards contain many trophies, some captured from the Mexicans, others in 1812 and many in

Chicago, Rock Island & Pacific Railway. The bridge on the Iowa side is 1,848 feet in length, divided into five spans and one draw, which is 368 feet long. It was an interesting matter as to how the trolley and feed wires should be carried across the draw, but this was at last solved by the erection of three towers, one at the piers at either end of the draw and a third in the centre of the draw itself. The draw tower is 125 feet above the water, and has a fixed frame, on which the wires rest, the frame being stationary and hung on a swivel which turns with the draw. This height is ample to keep the wires out of reach of the stacks of the highest steamboats. A feed wire is brought down from the draw tower and supplies the trolley wires which extend to either end of



POWER STATION.—DAVENPORT & ROCK ISLAND RAILWAY COMPANY.

the civil war. During the war there was a great military prison on the island, which frequently contained upwards of 10,000 prisoners of war.

The Davenport & Rock Island Railway Company in its consolidation accomplished what was never before possible, namely, the connecting of the two cities by a street railway line, and the patience and perseverance which was necessary to bring about this concession and secure from the government authority to lay its tracks and operate its cars across the island and over the government bridges, required no small amount of tact and endeavor. The advantages, however, are invaluable. Formerly a passenger in Davenport was obliged to take a car to the ferry, another line in Rock Island, and still another in Moline, making three transfers and four fares to reach Moline. Now, however, the resident of any one of these cities can take a car and go through without change to any of the others and for only one five cent fare.

The electric road crosses the river on two bridges, both of which belong to Uncle Sam, who shares it with the

the draw on both tracks, so that when an electric car passes from the draw to the main spans, the trolley wires are practically continuous.

The electric railway tracks pass across the island almost at the water's edge, and reach the Illinois bank by a second bridge which is 600 feet long. Armed sentinels are always on guard at the bridge entrance to the island, and no one is allowed to leave the roadway and enter the grounds unless bearing proper passes from the Commandant of the island.

The bridge is double-decked, the steam road occupying the upper portion, and the electric cars and other vehicles and pedestrians use the subway. The bridge cost \$1,000,000, and is at present being rebuilt and the wooden timbers replaced by iron girders. This too, without any delay in traffic.

BLACK HAWK'S TOWER.

Three miles south of Rock Island, and situated on a commanding bluff which overlooks the Rock river and

the surrounding country from a height of 225 feet, is the famous Black Hawk's Tower. Here that intelligent and sagacious Indian located his watch, and now from this spot may be seen the cities of Moline, Rock Island, Davenport, and Muscatine, together with a view extending over the surrounding country for 25 miles in one direction, through which the Mississippi and Rock rivers run, presenting a scene of surpassing beauty. Here a magnificent park and picnic grounds have been laid out, and commodious buildings erected for the use of visitors, and to it come tourists and excursionists by thousands from all the adjoining country. Americans who have traveled Europe through and through pronounce it unsurpassed.

A few days ago the syndicate secured control of the dummy line, about 6 miles in length, leading to these grounds, and will now put the same in first class order, and make it a division of the tri-city system. This will

Tower, has a splendid water power, the river at this point having a fall of 12 feet, with three times the volume of water that the Merrimac has at the city of Lowell. The illustrations are views taken from the edge of the bluff 225 feet above the water.

DAVENPORT CAR HOUSE.

Although the company manufactures its lightning in Illinois, it finds the necessity for ample car house facilities in Iowa, and has therefore erected a handsome brick structure at the corner of Second and Rock Island streets in Davenport. This building is 128 feet front by 150 deep; 16 feet high in first story and 13 feet in second. In the front corner of the building and on the first floor are the new general offices of the company, attractively finished in light woods, and comfortable and commodious. The remainder of the first story is tracked, and has a storing capacity for sixty cars. A large elevator quickly



VIEW FROM BLACK HAWK'S TOWER, DAVENPORT & ROCK ISLAND RAILWAY.

prove the greatest possible advantage to the cities, as cars can now be run through without change, from any point in Davenport, Rock Island or Moline, to the hotel on the grounds. It is doubtful if another more attractive spot is controlled by any other street railway system in the country, and as the grounds have also been purchased with the line, which has heretofore been known as the Rock Island & Milan Street Railway, they will have absolute control of both. It is quite likely the line will be equipped with electricity, but if not this summer, then additional motors will be purchased to take care of the business.

Mr. Louderback, a Chicago gentleman who is at present managing director of the Davenport & Rock Island Railway Company, has certainly made a wise and progressive move in securing this property. The town of Milan, through which the line passes in going to the

raises a car to the second story, where is still more storage room. On this floor and extending the entire length of the building on the Rock Island Street side, are paint, repair and machine shops. Power for operating the elevator and machine shop is furnished by an electric motor which takes its supply from the same wire which feeds the trolley wires. A most convenient and somewhat novel feature of this car house, is an elevated platform, under which a car is run for examination or repair of the trolley. This platform is so placed as to clear the roof of the car by several inches, and is divided lengthwise to allow the pole to maintain contact with the overhead wire. It has convenient receptacles for tools, and thus avoids much loss of time in placing ladders and climbing up and down with tools. It also saves all the wear which otherwise would come upon the car roof from workman engaged in making the repairs.

The Moline Car House is one story high, 106 x 168 feet, and is located on Fifth Ave. and Thirty-first St. It has storage room for eighty-five cars, wash room, oil rooms, etc.

THE EQUIPMENT.

The old horse cars which have grown gray in the service, are now replaced by a handsome, modern equipment, in every respect first-class. It consists of fifty motor cars and seventy trail cars. They are from the car shops of the St. Louis Car Company, and some from the LaCledde shops. They are sixteen foot box, and splendidly finished within, while the exterior finish has been done in a superior manner.

Three incandescent lamps in the centre, and one at each end brightly illuminate the car at night, while 14 in. Star Headlights lighten up the gloom without. The seats are prettily upholstered, floors are covered with wooden

of the Davenport & Rock Island Railway Company. The building is on Second avenue, and is 105x115 feet, divided into two sections which extend its entire length, by a fire-wall reaching to the roof. On one side is the boiler room, 54 feet from floor to roof.

BOILERS.

The steam plant consists of a battery of three Hazelton tripod boilers arranged in a row, and equipped with a Roney mechanical stoker.

This boiler is manufactured by the Hazelton Tripod Boiler Company, of Chicago, and has had an immense sale throughout the United States and Mexico within the last few years. It consists of an upright center column of steel, resting on a solid base-plate of cast iron, and containing for almost its entire length parallel rows of holes in which are expanded short lengths of wrought iron boiler tubes, the outer ends of which are closed. The



VIEW FROM BLACK HAWK'S TOWER.—DAVENPORT & ROCK ISLAND RAILWAY.

mats, and the car makes a commodious and staunch conveyance. Adjustable wire gates enclose the platforms and wooden fenders guard the wheels. These wheels are from the well known Griffin Car Wheel Company, and are 36 in. diameter, with patent chilled rim. The trucks are of forged steel, unusually strong and were all built for this order by the McGuire Manufacturing Company, Chicago, whose trucks are now to be found in almost every city. Of the motor cars, twenty-two carry one 20-horse-power motor each, and eighteen are equipped with 30-horse-power motors, the latter to be used in drawing trains. The heaviest grade on the entire system is in Davenport and is a 10 per cent.

Having crossed the bridge we come to a pretty city, with broad, straight streets, and busy with manufactories. A short distance from the river, and facing it, is seen an imposing structure of brick, which is the power plant

water is inside of the shell and tubes, and the flames and gas coming from the furnaces pass up and between the tubes, coming into right angle contact with each one, and then out of the chimney.

Because of its appearance it is often called the "porcupine" boiler. It is encased by a circular wall of brick, which forms also the chimney, and the addition of a few feet above the top of the shell insures a powerful draft. Thus no separate stack is required, and one of the largest items of expense in connection with steam plants of ordinary construction is obviated.

The cheapest grade of Illinois slack is used for fuel, and the combustion is so perfect there is little or no smoke, a most important feature.

The engine and dynamo room occupy the other portion and convenient offices for the men in charge are placed at the front. There are seven 125 H. P. Ideal engines,

built by Ide, Springfield, Ill., resting on a brick foundation of four feet, which in turn rests on bed rock. Each engine drives one generator, resting on a six foot foundation. Five engines will furnish the maximum power required at present, leaving two engines and two generators always in reserve. The generators are multipolar 75,000 Watt machines, built and installed by the Thomson Houston Company, who had the entire contract for all the electrical work throughout, including motors, and who have made the installation in a most satisfactory manner. The detail work has been left to their Mr. Willard, who has put in operation a large number of their railway plants, and who is a very bright young man.

Each engine has two driving pulleys, 72 inches diameter; only one is belted, the other serving as additional balance wheel. The dynamo pulleys are 23 inches diameter, and the distance centre to centre of engine and dynamo pulleys is 18 feet. Engines make 240 strokes per minute and generators 750 strokes. The belting is 3-ply cotton, leather face, and made by Underwood. A 10,000 Watt exciter is run by an independent 7x10 engine running at 270 strokes per minute.

The engines are compound condensing, the high pressure cylinders being 12x20 inches, and the low pressure 14x20, and when all are in operation, give the room an appearance of intense activity, and present a very attractive picture.

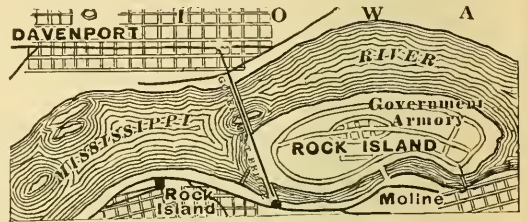
The generators are each furnished with a line switch, an amperé meter and an automatic circuit breaker.

All the electrical power required to operate the cars of this company in the three cities is supplied from this one

the five circuits is fed independent of all the others, so that any disarrangement to one line has no effect upon any of the others. Okonite wire of three-quarter inch diameter carries the current from the machines to the switch board, and braided Okonite is used for the back of the board.

CONSOLIDATION.

The street railway systems of the three cities had been in operation a number of years, but had not made any considerable advance, being operated by animal power. The cars, too, were small and of the old style and decidedly unattractive. When the Chicago syndicate, under

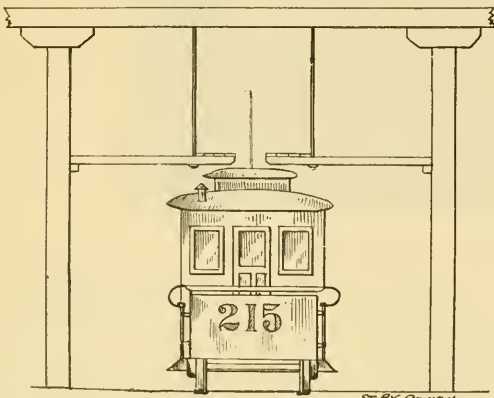


the direction of C. B. Holmes, purchased these companies, an amalgamation of interest became possible which otherwise could never have been brought about, as all former attempts to secure a line across the bridge by any one company was the signal for every possible obstruction from all the others; but when an outside syndicate came in and merged the whole into one, the Rubicon was crossed. Beyond question this inter-urban operation of the street cars will work an era in the development of these cities which will exceed anything in many years, and it is quite evident to an outsider that the majority of the people most interested do not begin to have an appreciable comprehension of the benefits in store for them. The company is officered as follows:

Wm. B. Walker, president; J. J. Mitchell, vice-president; D. H. Louderback, managing director; Geo. H. Hulbert, treasurer; C. Buckingham, secretary; Henry Schnitger, superintendent.

The present mileage is divided as follows:

	MILES.
Davenport,	15
Rock Island,	11
Moline,	3
Bridge,	2
Milan Line,	6
Total,	37



ELEVATED PLATFORM IN CAR HOUSE—DAVENPORT & ROCK ISLAND RY.

central power station, the current being conducted on five main circuits. The one to Davenport crosses the bridge, but it is not made to feed until it reaches the Iowa side. Here it has branch feed wires like the fingers of a hand. The feed wire which supplies Moline is also carried intact and not tapped along the route. Each feed wire has its switch and amperé meter.

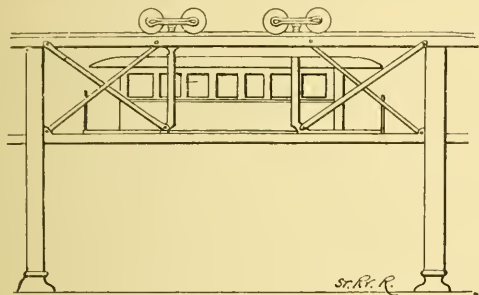
The main switch board is a handsome study in oak and brass, 14 feet high and 25 feet long. The feeder switch board is the same height, but only 10 feet long. Each of

The ride over any of the lines makes a delightful recreation, but the one across the Mississippi and the Government Island, or the trip to Black Hawk's Tower, is exceedingly pleasant and enjoyable, and it is not unfair to presume that the good people of these cities will spend the most of their spare time in the comfortable seats of the electric cars while they are swiftly rolled from state to state and water to water.

A PHILADELPHIA PLAN.

ONE of the latest schemes for an elevated railroad has been devised by a Mr. J. L. Chapman of Philadelphia, who proposes to bid for construction of the elevated road, the franchises for which recently was granted and placed at the disposal of the city. The new system is a somewhat novel one, although it is not unlike in many respects, other plans for suspended railroads.

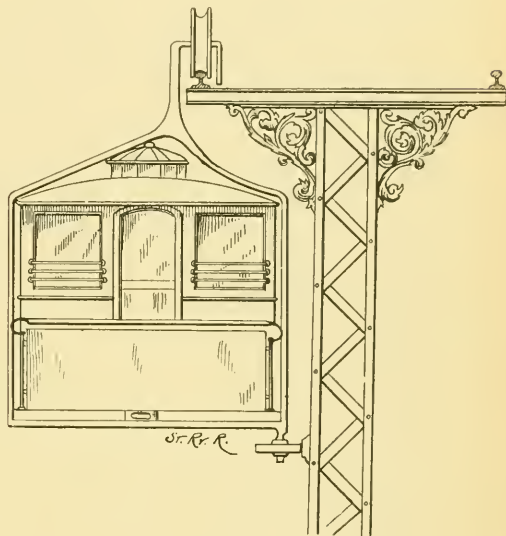
The new method provides for heavy iron posts set 30 feet apart in the center of the street, and rising to a height of 35 feet above the pavement. These posts are intended to be built of fluted metal and will be strong enough to support the weight and strain of a train of two cars running on either side. Heavy steel girders extend from post to post, which are placed at intervals of thirty feet. Across the body of each post a steel girder



will be placed, bolted to the post, and receiving additional support from brackets, upon which it rests, and which are also fastened to the post. On these cross girders are placed the longitudinal girders which extend from post to post, and on the top of which is placed the rail, which is intended to be a heavy one, and securely bolted to the cross girders. The box of an ordinary car would be adapted for use on a road of this kind. Two heavy iron bands, one at each end of the car extend entirely around it, and are fastened to the trucks of two wheels each. These wheels have a double flange to prevent derailment. A strong hook extends from the truck over and partly around the rail, so that should by any accident the wheel break or leave the track, this hook would prevent the car from falling. The iron bands are made to stand a strain of twenty tons each, which would enable the construction with safety of a car, which with its load, could easily weigh thirty tons. A horizontal guide wheel is placed at either end of the car on a level with the floor, and runs along a rail extending from post to post, at the proper height. This is intended to prevent any swaying or swinging motion, caused by the rapid passage of the car or by sudden stops. This rail does not in any way support the car, but acts simply as a guide to keep it steady. The cars are intended to be 24 feet in length, and it is estimated that a road of this kind can be built for \$125,000 per mile.

Although the posts occupy the center of the street, it is believed they would not seriously interfere with street

traffic, as there would be but a single row of them. The great objection to an elevated road, in that it darkens the street, could hardly be raised against a construction of this kind, as there would be very little material to cast a shadow.



The motive power could be either cable or electricity as desired. There would be no snow to block the road, and the wheels would always be sure of a clear rail on which to run.

Short Circuited.

THE American Car Equipment Co., which operated at No. 10 Wall street, though incorporated under the laws of the state of West Virginia, has endeavored to do a larger business than its capital of \$75,000 fully warranted, and will probably pass into a receiver's hands. It is believed that if the settlement is judiciously made, not only all debts can be paid in full, but the stockholders can also receive par on their holdings. The company was organized about three years ago, and bought second hand engines and cars, and repaired and sold them. Among street railway purchases of this class was the entire bob-tail equipment of the Seventh avenue line, New York, at the time that company changed to two-horse cars. The American Equipment Storage Warehouse Company, which was organized one year ago, with a capital of \$100,000 belonged to this concern, but was sold out March 1st. The Storage Company has works at Lake View, N. J., and it was there the repairs were made.

The strike of the drivers and conductors of the Detroit City Railway Company was of short duration, and was settled by a committee of arbitration, one member of which was selected by the company, one by the men and the third by the mayor of the city.

STREET RAILWAY LAW.

EDITED BY MR FRANK H. CLARK, ATTORNEY AT LAW, CHICAGO.

Injury to Minor by Sudden Starting of Car.

The fact that a passenger is evidently very young is a circumstance that must be taken into consideration by a carrier in the discharge of its duty, to stop the car a sufficient length of time to give the passenger reasonable opportunity to alight in safety.

BARCLAY, J., in delivering the opinion of the Court, said: At the time of his injury the plaintiff was but nine years old. He was a passenger on a street-car operated by the defendant as part of a cable railway line. His evidence tended to prove that he notified the conductor to stop at a certain street. As the car approached it, the conductor rung the bell. Plaintiff left the interior of the grip-car, where he had been seated, and got upon the step of the platform, holding the handrail. The conductor was on the platform. The car slackened speed and, while plaintiff with one foot off the step stood ready to descend, it suddenly started forward with a jerk and ran some twenty or thirty yards. The jerk threw plaintiff off, and he fell in such a manner that his arm was run over by the wheels of the following car, inflicting serious injuries. It was the duty of the defendant to plaintiff as its passenger, in the circumstances described, to stop the car a sufficient length of time to give him reasonable opportunity to alight in safety at the point of his destination. That he appeared to be of tender years, was, moreover, a fact to be considered by defendant in discharging that duty. If a passenger is evidently crippled, infirm, or very young, the duty of the carrier towards him while alighting must be performed with due regard to such apparent condition. The testimony strongly tended to show a breach of the duty referred to. Defendant's instruction in the nature of a demurrer to the evidence was therefore properly refused, unless plaintiff be pronounced guilty of contributory negligence as a matter of law.

There was no such variance between the petition and the proofs as would preclude the submission of the cause to the jury. The allegation in the petition that defendant "stopped" the cars to permit plaintiff to alight, is merely matter of inducement. The actual negligence of defendant charged, is in permitting the car on which the plaintiff was a passenger "to be put in motion while plaintiff was in the act of leaving the car, without giving him a reasonable time to alight safely therefrom, whereby he was thrown under the car," etc. There certainly was no failure of proof of these facts and, we think, no substantial variance from the pleading.

The chief contention of the defendant is that there is error in the rulings of the trial court upon the instructions. The first one given at plaintiff's instance, it is claimed, submitted to the jury a theory for recovery predicated on an actual stoppage of the car for an insufficient time, whereas the testimony disclosed that no stop at all was made. This criticism depends on a construction of the language of the Court which, we think, does

not correctly interpret its meaning. The fact submitted to be found was, that the defendant's servants "did not stop a sufficient length of time to permit the plaintiff, acting with reasonable care and diligence for one of his years, to alight in safety." This was supported by evidence that, though the car after the conductor's signal came sufficiently near to a rest to induce plaintiff to get into position to step off, it did not in fact stop at all, but just then shot away with such violence as to throw him off. The instruction does not require the jury to find that the car stopped, but merely that, when it reached plaintiff's destination, it did not stop a sufficient time as described. The rule of law it stated was entirely correct and abundantly sustained by the evidence.

It is next asserted that the second instruction for plaintiff should not have been given. In considering its language, however, as part of the law in the case, it should not be isolated, but read in conjunction with the other instructions. The question which is declared to be one for the jury "under all the facts and circumstances in proof" was "whether plaintiff had at the time sufficient capacity and discretion to understand" that the steps were a more dangerous place than inside the car. But this was not all. In connection therewith, the jury were told by the first instruction that to entitle plaintiff to recover, they must, among other things, find plaintiff "acting with reasonable care and diligence for one of his years". Reading these instructions together, they declare the principles of law quite as favorably for defendant as the case allows. Although plaintiff was a boy aged nine years, he was not absolved from the exercise of all care. It is true, a remark was dropped in *Dowling v. Allen*, 88 Mo. 298, to the effect that "no negligence is imputable to a child," but that case was not ruled on such a theory, and it was obviously too broad a statement. While the law makes due allowance for the thoughtlessness and indiscretion of youth, it does not hold it necessarily irresponsible. A child must be very much younger than plaintiff to warrant the Court in declaring as a conclusion of law that he is incapable of negligence. To the extent that a child has knowledge and understanding of a danger, or where it is of such a nature as to be necessarily obvious even to one of his years, he is under a legal duty to avoid it. So, in the case at hand, plaintiff was certainly bound to use some degree of prudence and foresight to avert injury in the circumstances of his situation. The standard of his duty was such reasonable care and diligence as characterized the average boy of his age. He would be legally responsible for a failure to exercise such care. *Railroad Co. v. Gladmon* 15 Wall. 401; *Moynihan v. Whidden* 143 Mass. 287; 9 N. E. Rep. 645; *Ostertag v. Railroad Co.* 64 Mo. 424. In the light of the facts, it is rather favorable than otherwise to defendant to suggest, in the second instruction) the possible inference that

plaintiff assumed a dangerous position in getting on the step. The proof was that he remained inside the car until the conductor gave the bell signal to halt; then went out to the platform and got upon the step, awaiting the moment when the car would come to a full stop. His entire conduct in the premises was entitled to consideration in determining whether he exercised ordinary care. Even if he were aware that a position on the step was more dangerous than inside, it would not necessarily follow as an inference of law or fact that he was guilty of negligence in getting on the step when he did, in the circumstances. But if there were any error in the instruction in this regard, it was not to the prejudice of defendant. Taking these instructions conjointly, we think they contained no material error to the detriment of defendant's substantial rights.

(Sup. Ct. Mo. *Ridenhour v. Kansas City R. Co.* 14 S. W. Rep. 760.)

Elevated Railway—Forfeiture of Charter—Construction—New York Statute.

Where the charter of a railway company (Laws N. Y. 1874, c. 585,) provides that upon failure to commence or complete the road as therein provided, the company "is to forfeit the rights acquired by it under this act," a cause of forfeiture does not *per se* divest the company of the franchise without suit brought for that purpose, and the company cannot be attacked for its default in condemnation proceedings instituted by it.

Laws N. Y. 1874, c. 585, chartered the Brooklyn Elevated Railway Company and prescribed the time within which the road must be commenced and completed, and provided for a forfeiture of its rights in case of default in this regard. Section 10 provided that the corporation should be subject to all the provisions of the general railroad act of 1850 and the several acts amendatory thereof, except so far as they are inconsistent with the provisions of this act. One of such amendatory acts (Laws N. Y. 1867, c. 775,) provides that if any railroad shall not begin its road within five years and complete it within ten years after its incorporation, "its corporate existence and powers shall cease." *Held*, that this, being inconsistent with the provisions of the act of 1874, does not apply to the road chartered thereby.

The charter of the Brooklyn Elevated Railway Company (Laws N. Y. 1874, c. 585,) required that iron columns should be placed on each side of the streets, etc., "on a line with the curb stone," their location to be subject to the approval of the city engineer; and that iron girders, not more than 36 feet in length, should be placed "across" the streets, and be properly attached to said columns. An amendatory act (Laws N. Y. 1875, c. 422,) required that iron columns should be placed on each side of the streets, "as near as practicable on a line with the curb stone," subject to the approval of the city engineer, and that iron girders should be placed "above" the streets and be properly attached to said columns. The road, as constructed, had its line of columns in the street, there being a space of eight feet eight inches between the

curb and the foundation, and eight feet four inches between the foundation of the two lines of columns. *Held*, that the location was such as the act of 1875 authorized the company to adopt, and, having been approved by the city engineer, was lawful.

(Ct. Appls. N. Y. *Matter of Brooklyn Elevated R. Co.*, 9 Ry. and Corp. L. Jour. 264.)

Street Railroad—Connecting Lines of Road—Charter—City Ordinance—Keeping Street in Repair—Assessment—Estoppel.

The connection by a street railway company of two distinct lines of road which it maintains in one city and the transportation of passengers over such lines to any part of the city for one fare, and its building at the city's request additional lines of road, are a sufficient consideration for the passage of an ordinance relieving the company from paving the street to a given distance outside its rails and imposing in lieu thereof, the duty to simply keep certain portions of the street in good repair, and when the ordinance is accepted and the conditions complied with the original duty ceases.

A company operating a street railroad under a charter which requires it to keep certain portions of the streets through which its tracks run in good repair, cannot without its consent be required to re-pave any portion of such streets.

Parol evidence is not admissible to show that a company agreed to be bound by the terms of a certain city ordinance relating to the duties of street railroad companies, in consideration that the city council would pass an ordinance permitting it to acquire and exercise the rights and franchises of an existing street railway company which was not bound by such ordinance, where the enabling ordinance grants the new company all the rights, privileges and franchises of the old one, for the stated consideration that the new company shall assume all the obligations and duties resting on the old one.

A street railway company whose property is not subject to assessment for paving the streets through which its tracks run, is not estopped from disputing an alleged liability for such paving by remaining silent and allowing the paving to proceed to completion without protest.

(Sup. Ct. Ind. *Western Paving and Supply Co., v. Citizens' Street Railway Co.* 10 L. R. A. 770.)

(NOTE.—In the case of *Sioux City Street Railway Company v. City of Sioux City*, 9 Railway & Corporation L. Jour. 251, 1 STREET RAILWAY REVIEW 132, the United States Supreme Court decided that though the original franchise granted by a city to a street railway company required the company to pave only the space inside the rails, a subsequent ordinance passed by the city in pursuance of Act Iowa, March 15, 1884, requiring the company to pave, in addition, one foot outside of each of the rails, was constitutional.—Ed)

ONE of the aldermen in Memphis, during the electric controversy there was heard to say, "It's a good thing to have rapid transit and all that sort of thing, but when I think of those darned electric cars as the electro-executioners of the poor street car mules, there is a certain something which almost moves me to tears. What will the mules do with their job gone?"

HYGIENE AND VETERINARY.

BY JOSEPH D. TUTHILL, M. D., V. S.

THE readers of the STREET RAILWAY REVIEW are doubtless very well aware that the diseases incidental to street-car horses—so far as Etiology and Pathology is concerned, are precisely similar to that of all other horses used for domestic purposes. However, it will no doubt prove interesting to some of our readers to know that many of the diseases peculiar to the former are decidedly more frequent and fatal than that of the latter. This fact explains the reason why we have thought it necessary to call attention to the matter. The frequency of some of those diseases and their fatality among street-car horses is no doubt very much to be attributed to the exhaustive nature of the work and the peculiar method of feeding and shoeing, adopted by the managers of street car institutions, all of which we expect to prove have more or less to do in cutting short the life and usefulness of this noble animal. All persons who have had much to do with street-car horses do not need to be told that "colic" is one of the most frequent diseases peculiar to this class of horses, and all the employes—from the superintendent down to the hostler claim to have an *infallible remedy* for this disease, and of course everyone thinks his own is the best. We must say, however, that some of the remedies used prove equal to the emergency. A number are, however, inert, while the majority are positively injurious, and no doubt the cause of many of the premature deaths which occur. Whether the majority of deaths are really due to imprudent medical treatment or to mismanagement in feeding and shoeing, or to the nature of the work or to a combination of those circumstances we must leave our readers to decide. We have reason, however, to believe that the *nature, causes and medical treatment* of this—the most common of all diseases peculiar to this class of horses is not very definitely understood—so much so that the STREET RAILWAY REVIEW takes the present opportunity to discuss this matter, from a scientific standpoint, for the benefit of all who may feel disposed to adopt our advice. There are supposed to be two different kinds of colic in horses, namely: "spasmodic" and "flatulent." The first form is recognized by horsemen as *spasms, gripes, cramps and stoppage*. The term stoppage has been applied from the fact that in some cases the patient passes neither Fecus, Flatus or urine, and these stablemen infer, and the inference in some cases is probably correct, that the bowels in this disease are spasmodically contracted. The second form of this disease, and by far the most common, especially among street-car horses, is characterized by bloating of the stomach or intestines, or both, with gas, often accompanied with eructations of gas from the mouth and the frequent escape of gas from the anus. This condition is due to "acute indigestion," fermentation of the food and the liberation of gasses. Some writers on veterinary science have made it a point to be very particular in explaining the distinguishing symptoms which charac-

terize those two diseases, but the writer, who has had, perhaps, as good an opportunity as anyone to study these diseases in their various phases of development, during a practice of thirty years, does not hesitate to state that in his opinion one of those diseases never exists independent of the other. But we will not stop to argue this question, for practical purposes it is immaterial. In fact we believe that the greatest success in the medical treatment of colic is most certain to be attained by the individual who regards those two diseases as a complication one of the other, and prescribes accordingly; simply because he is sure to combine the therapeutic (curative) agents necessary for both pathological conditions.

CAUSES.

The causes of colic are predisposing and exciting. In regard to the former it is well known to physiologists and I presume many of our readers have observed that both men and animals inherit peculiar idiosyncrasies; each are predisposed either through parental defect, temperament, or conformation to certain forms of disease. This peculiarity or predisposition, is said to lurk in breed, and those conversant with the horse's structure and temperament, can readily determine whether he is pre-disposed to certain forms of disease or not: for example, a horse predisposed to flatulent colic is often observed to have a capacious belly, voracious appetite, and does not properly masticate his food, and he is not over particular as to the kind of diet he eats, for we often find him devouring with apparent relish the filthy straw that has served as bedding. We contend therefore, that some horses are predisposed to colic, and this explains the reason why the ordinary exciting causes, such as exposure, fatigue, irritating food, change of diet, damaged food, etc., are operative on the system of one horse and inoperative on that of another. In regard to the exciting causes of this disease we will confine our remarks to those which excite the disease in street car horses. They are as follows:

1st. The peculiar nature of the food fed and its tendency to cause "acute indigestion" and its dangerous consequences.

2d. Exhaustion of the nervous system from over exertion.

3d. Damaged food, etc., etc.

It is a well known fact that water taken with food always retards digestion. The proper solvents of the food are the *gastric fluids*, and the horse has abundant facilities for supplying the requisite quantity. An ordinary horse is said to secrete (while feeding) fluid of salival and gastric characters at the rate of *one gallon* per hour—enough we should judge to saturate a common meal—therefore the water is not needed. Nor do we think it was ever intended by nature that it should be taken with the food. When dry food highly charged with water enters the stomach, the gastric fluids which are composed of *antiseptic* as well

as *solvent* properties, have very little chance to produce any chemical change on the food, for the simple reason that it is already saturated with water, and this of course lays the foundation for an attack of "acute indigestion."—the common result of which is fermentation of the food and the liberation of gases. Turn a cow into a luxuriant pasture of grass or clover, and after partaking of one or the other, she is liable to become bloated; the abdomen enormously distended with gas (either carbonic acid gas, or sulphuretted hydrogen), and unless the same can be condensed or evacuated, rupture and death are sure to follow. This imperfect digestion and consequent generation of gas, is due to the presence of such large quantities of fluids as are found in green fodder. This proves very conclusively that large quantities of fluids taken into the stomach with the food, are as dangerous to the life of cattle as horses, and therefore medically wrong. We contend however, that the life of the latter is far more jeopardized by this method of feeding than that of the former, more particularly street car horses. This is probably due to the many influences tending to produce exhaustion of the vital forces in this class of horses. We claim that exhaustion of the nervous system is one of the *indirect* causes of the most dangerous forms of colic in all horses, but especially horses used for street car service.

1st. Because the physical condition of those horses is not what it might be if they were fed on a more substantial diet.

2d. On account of the peculiar character of the work which is exhaustive.

3d. The method of shoeing which we believe to be contrary to the laws of science and art. A menace to the cause of humanity, and directly opposed to the interests of street railway institutions.

The inefficiency of the food and the exhaustive nature of the work as prolific causes of disease have been so freely discussed in recent issues of this paper that it is only necessary now to call attention to this fact. The method of shoeing as adopted by many companies has largely to do with the promotion of disease, and to an extent little suspected sometimes. All persons who have had a chance to observe know very well that it requires great muscular power to start a loaded car, and the constant stopping and starting to let on and off passengers is a source of constant nervous tension—not to speak of the worry and excitement it produces in some horses. On streets paved with wooden blocks and all approaches to bridges and viaducts—which are invariably laid with plank—the horses labor under much greater disadvantages. All of the locomotive muscles have to be kept in a rigid state of contraction so as to enable the animal to maintain a foot hold, and at the same time perhaps reach the top of some up grade; especially is this feat most trying after a shower of rain or in frosty weather, or on streets where the city compels the company to use sprinklers to lay the dust. That such work produces physical exhaustion and thus lays the foundation for disease no rational being will attempt to deny. In the over-worked horse the muscles that aid in performing the

function of digestion as well as the locomotive muscles are always more or less impaired, and according to this theory the tired overworked animal is incapable of performing the function of digestion *normally*. This explains why over-exhaustion is one of the indirect causes of acute indigestion and its dangerous consequences. The tired overworked horse as a rule is a hungry creature; he devours his food too quickly. It is easily swallowed because it is already moistened in the water, consequently it is liable not to be duly masticated and sufficiently insalivated with the salivary secretions from the mouth. This *per se* is sufficient to cause an attack of acute indigestion. According to the theory of scientists, cut feed, such as is fed to street car horses, is the most difficult food known to digest, and if all of these facts are carefully and collectively considered it is not a very difficult matter to comprehend why colic in street car horses is much more frequent and dangerous to life than in all other horses used for domestic purposes.

The Short New Gearless Motor.

THE "Gearless Motor," the sole invention of The Short Electric Railway Company, is meeting with universal commendation. Already the first factory order is completely pledged, and The Short Company is on the point of closing large orders, which will tax the capacity of their shops for a long time to come. The first gearless motor has now merrily entered on its eleventh week of service with a remarkable record. Although subjected to the severest tests—tests which can never come upon it in ordinary street railway service, there has not been one particle of trouble with it from beginning to end; neither armature or field coil has burned out: the motor runs perfectly cold with very high efficiency and pulls heavy loads over severe grades with entire ease. The motor has enormous reserve power, and it is practically impossible to burn it out. Motors of the first factory order are beginning to come out and will be placed in regular service by May 15th, when the Short Company proposes to demonstrate to the world its ability to make an absolutely successful gearless motor, simple, efficient and strong, perfectly protected, thoroughly reliable and "Standard" in street railway service.

A recent test of the gearless motor made on the private track of the Short Electric Railway Company and also on the streets of Cleveland has demonstrated its high efficiency. Although the E. M. F. of the line was low the current taken was very small considering the service to which the motor was put. On a level and at a voltage of 400 to 450, the ampere readings ranged from 7 to 15. On severe grade and curve work the amperes ranged from 35 to 50, but with a voltage at times of less than 300, showing that the true ampere readings should not have exceeded 20 to 30. At the end of the long and rapid run, the motor was almost stone cold. The remarkable current efficiency of the gearless motor is due to the fact that the wire on both fields and armature is large and the counter E. M. F. is obtained by working up the intensity of the magnetic field to a very high point.

CONSTRUCTION AND EQUIPMENT NOTES.

The Jacobs' Elevated Railroad System.

THE tremendous growth of cities during the past five years has attracted more attention than ever before to improved methods of city transportation which should adequately provide for the rapidly increasing number of passengers. For the very large cities, transit on the surface has been supplemented with elevated roads or plans for underground service. Among the various methods for elevated roads nearly all employ the same principal in the system of supporting the structure, which is by means of vertical iron posts either single or in pairs. The Jacobs' system makes a radical departure from the others in this respect as will be seen in the illustration.

In all localities where elevated railroads are constructed or desired for safe and rapid transit the ground upon which the same are or would be erected is possessed of great value. The unsightly appearance of most structures in use renders them in many respects objectionable—that is to say they shut out the light, obstruct travel, and in many other ways thus materially affect the business interests and depreciate the value of abutting real estate. It is the endeavor of this system to overcome these objections, first, by constructing two or more elevated tracks upon a new and novel plan that will not be re-

quired to occupy more than 5 feet of space: second, by furnishing a superstructure of iron and steel, the leading feature of which will enable the placing of one track above the other in a substantial manner and do away with cross-ties or floor-beams, and therefore more readily admit the light: third, on one side of the superstructure and adjacent to the business property to construct a walk or elevated roadway for pedestrians, which would not only relieve the street, but render the upper rooms of business property in close proximity more desirable and in like manner add to the value of adjacent real estate.

The accompanying illustration will give a good idea of the structure.

Suitable standards or supports are provided as shown, which carry the superstructure. The lower ends of these standards project into the ground and are anchored to blocks or sills of stone imbedded in the ground some dis-

tance below the surface. The superstructure is independent of these uprights or supports, but is firmly bolted to their upper ends, a construction and arrangement which permits of the space or distance between the standards or uprights being varied as desired or rendered necessary.

The superstructure comprises an approximately rectangular frame supporting two tracks, one directly above the other. One of the leading features of the superstructure is the longitudinal Z form beams, girders or chords of the frame. The inwardly projecting flanges of the girders supporting the rails of the tracks. The outwardly projecting flanges of the lower girders rests upon the ends of the uprights or standards, to which latter they are securely bolted. Resting upon the upper face of, and securely bolted to the outwardly projecting flanges of the girders or beams, are upright posts or columns; the upper ends of the same being similarly bolted to the under-

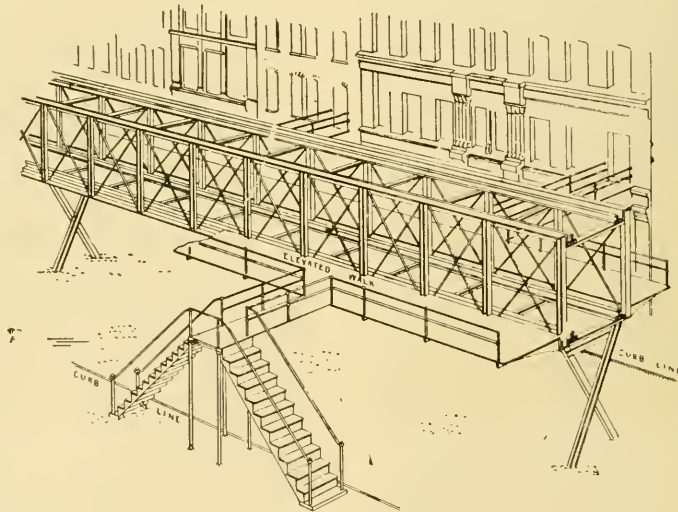
faces of the outwardly projecting flanges of the upper girders or beams.

These posts or uprights are braced by suitable rods or braces as shown. The longitudinal beams, cross beams and the upright posts and their braces form a tubular structure at once light, and capable of sustaining a great crushing strain or weight. The form of longitudinal beam (which form is now so generally used in columns and upright work) will be made up of

sections of suitable length and bolted together, and when thus made up form continuous girders extending throughout the entire length of the structure, a feature deemed of vast importance in structures of this character, as it not only adds to the strength but enables variation in the form, construction and arrangement of the supports for the superstructure which can not well be done under other plans.

Another very important feature in connection with the Z form is that it renders the derailment of a train impossible, and its use is not confined to elevated railroads constructed after this double deck plan exclusively, but equally applicable to all others as well.

Projecting from side of the superstructure, about on a line with the lower track, are brackets or supports which carry a walk as shown. This walk may or may not be extended throughout the entire length of the superstruc-

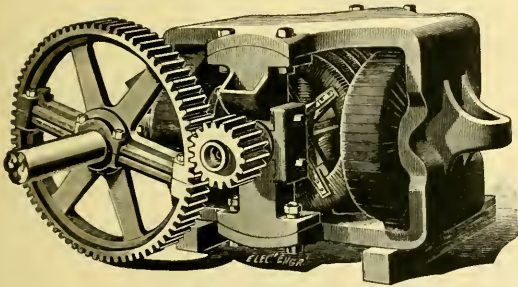


ture. Branch walks are also provided which extend from the main walk or platform directly to the window or door of the building upon either side of the street and enable passengers to pass directly from the elevated structure into stores without having to go down stairs and walk along the crowded pavements.

At the ends of the structure there will be suitable elevators or hoisting apparatus by means of which trains may be raised and lowered from one track to the other. From the foregoing description it will be seen this is a structure that is strong, compact and comparatively cheap, and one that possesses novel features not attainable with the constructions now in use. This system was patented March 17, 1891, by M. Jacobs, of 198 South Water street, Chicago.

The New Edison Motor.

THE Edison General Electric Company, are bringing out a new style street car motor which conveys its power to the car axle by means of a single reduction gear. The machine is tightly incased in a water proof jacket and complete weighs but 2,200 pounds. The motor while rated at 25 h. p., will develop fully 30 h. p. For double truck cars, it is intended to use two motors, one on each truck, but one motor will be ample for smaller cars.



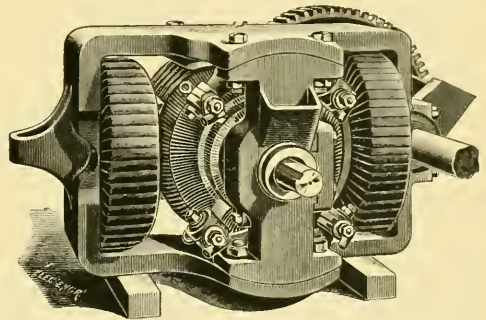
The company also intend building a 15 h. p. motor of the same style for light street railway work. To secure a car speed of twelve miles per hour, the armature makes 460 revolutions per minute. The armature has a diameter of 18 inches and is 13 inches long, carried on a 3 inch shaft, which has a pinion mounted at either end. These mesh with the large gears mounted on the car axle.

The use of a rheostat is avoided by the system of armature winding, the armature being wound in 140 sections, using one continuous wire and each section having a tap wire of german silver leading to the commutator. This very largely reduces the current induced by the short circuit caused when the brush passes from one commutator segment to another, and prevents the usual accompanying sparking.

The *Electric Engineer* says: The machine is of the four-pole type and practically iron-clad. Only two poles, those in the horizontal plane, are wound, the two in the vertical plane being magnetized by induction from the same spools and forming, as it were, consequent poles of

opposite polarity. The entire field, consisting of special soft cast-steel, is made in one casting, with the exception of the pole pieces, which are attached by screw bolts after the spools have been slipped on over the straight cores at the sides. These pole pieces, it will be noted, extend for a short distance beyond the field coils, and practically 80 per cent. of the whole spool is surrounded by iron. As a result of this construction and the employment of cast-steel, the magnetizing force required to attain the proper degree of magnetization is small, and from the nature of the construction there is very little stray magnetism.

The magnetizing coils are wound in three sections on vulcabeston spools, which, as stated above, are slipped on over the cores. In the construction of the machine the facing of the armature bearing and the cylindrical armature space are bored out at one boring, and by loosening two bolts the armature can be slipped out completely, so that inspection can be effected with great facility. The



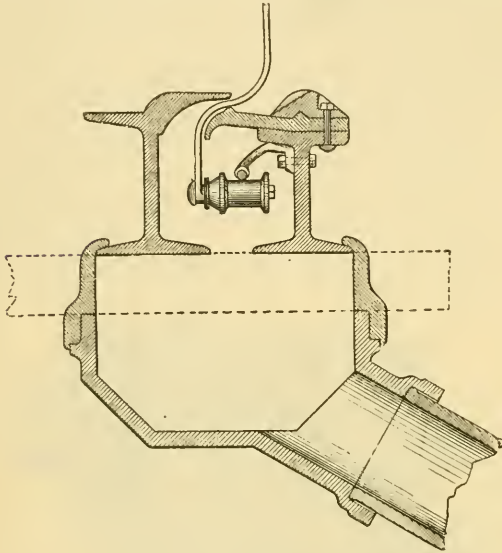
armature, which is of the Gramme type, is built up of punched soft iron rings insulated from each other, and with the end plates of wrought iron and bevelled. On the interior diameter of the hollow cylinder built up in this manner, there are four grooves placed, 90 deg. from each other, and into these grooves the aluminum-bronze spiders are pressed by hydraulic pressure, two spiders being employed and bolted together. In this way a firm mechanical connection is made between the armature shaft and the ring.

THE *Baltimore World* comes pretty near guessing the dimensions of some people, who unfortunately are not confined to that city. Speaking of the final passage of an ordinance for the electric street railway there it says:—"The blank space at the bottom of the North avenue electric railway ordinance has been filled by the mayor's name. The obstructionists are downed and the move of progress can keep right along its flowery way in this city. The anti-progressives can now insert themselves in a hole and pull the aperture after them. They can then be secluded and away from the noise and bustle of busy, progressive life. They can gambol on the soft beds of moss unmolested and without fear of any such a thing as a progressive disturbance.

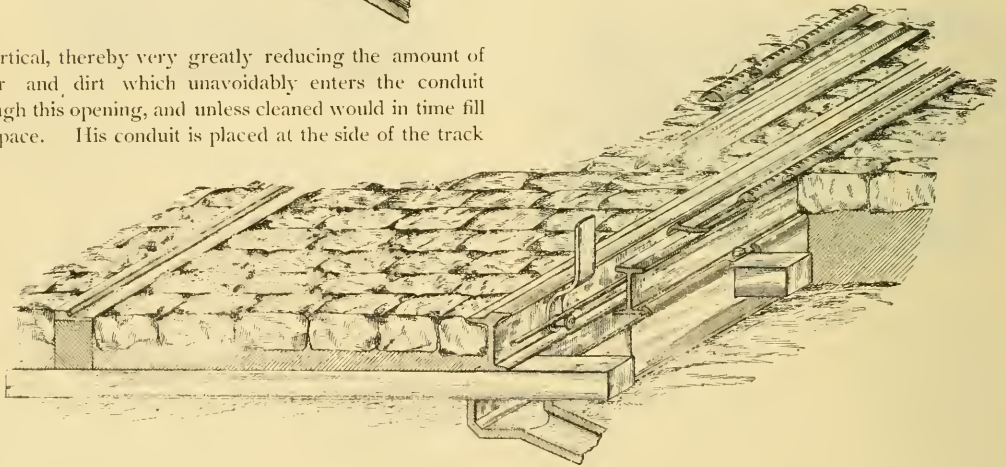
SOME people thinks the storage battery street car is a good deal of a cell.

New Electric Railway Company.

A NEW method for constructing a conduit for electric railways has been patented by R. A. Stewart, of Alleghany, Pa., and is illustrated herewith. Mr. Stewart departs from the regulation cable-electric conduit, in that he makes his slot opening sidewise instead



of vertical, thereby very greatly reducing the amount of water and dirt which unavoidably enters the conduit through this opening, and unless cleaned would in time fill the space. His conduit is placed at the side of the track



next to and parallel with the rail, which is preferably of the girder type. This rail may be laid and fastened in the usual manner. A shallow conduit below is drained at convenient points into the sewer, and the cross ties offer no obstacle as in other systems, but extend across the conduit. A supplementary rail to form the other side, and part of the top of the conduit, is laid parallel to the track rail, and may be formed by any one of several combinations which the inventor suggests. That shown herewith in an I beam fastened at the bottom to the same tie and in a similar manner as the track rail, and supporting an almost flat strip of iron, which is bent downwards where it passes under the top of the girder rail. A small ridge will be seen in the cut, on the flat rail where it comes

under the track rail. This is to prevent water which may flow along the flat rail from so readily passing into the conduit. The liability of horses catching their toe-calks in the slot is also by this means made almost impossible. The advantages of doing away with construction in the middle of track is also desirable on many accounts. The trolley is introduced into the conduit through a trap or at the end of the line, and is bent in the shape illustrated. The trolley wire is held in place by insulated screws. The chief objection which this system would have to contend with in large cities where there is a great volume of heavy street traffic, would be the tendency of the slot to close, especially at street intersections where teams cross the track at right angles. We suggest he could greatly improve his construction by having the supplementary or slot rail made in one solid piece instead of combinations as illustrated. The fewer pieces of iron that serve in railway construction, the better.

The advantages of a simple, thoroughly practical and reasonably cheap conduit for electric railways, in the larger cities, admit of little argument.

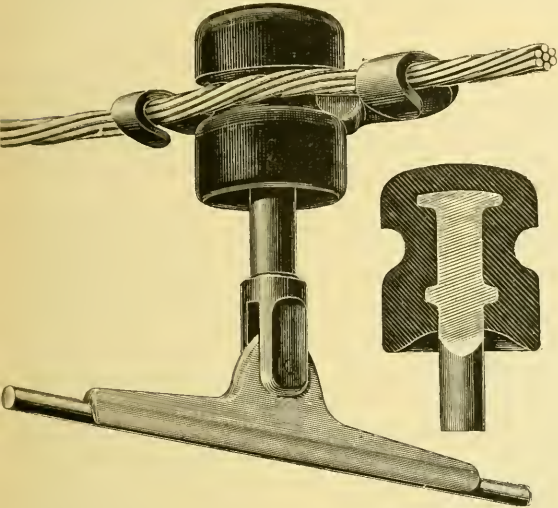
THE city council of Milwaukee has definitely settled the location of electric railway poles by an ordinance which requires, that, hereafter they shall be placed in the centre of the street, and not at the curbs, except the corners.

THE overhead system of electrical railway has reached Bremen, and there is every prospect that the Bremen Tramway Co. will do away entirely with horses and substitute the electric motor on all their lines. Some opposition was raised by the Postal telegraph and Telephone department, but the police authorities reported favorably and the bill passed the Senate. The operation will be watched with interest by hundreds of continental cities, and American manufacturers of electric railway materials may soon expect a large demand from across the water.

THE suit of \$5,000 against the Brooklyn City Railroad did not result in making Theodore Rich much richer as the jury awarded him only \$50.

The "Clutch" Insulator.

THIS Trolley wire insulator has many distinct advantages, which has won for it the unqualified approval of every practical man who has run it. The insulating material is comb stock rubber, the stem and yoke are of malleablized iron, and the pin of brass. The strains on the insulating material are solely those of compression. There are no screw threads or other parts



subject to deterioration from exposure. It is claimed the wire pin is more perfect in its details than any other pins that have heretofore been introduced. The objects aimed at in the design of this insulator, are great strength, high insulation, small size, convenience, durability and cheapness. This insulator is manufactured by Messrs Emmet Bros. & Griswold, 150 Broadway, New York, who will send samples free to any one wishing to examine it.

A BOLD MOVE.

THE Electric Merchandise Company, of Chicago, is nothing if not progressive, and it is a constant source of expectancy as to what general manager Mason will do next. His latest is no less than a bold march on Europe, and to this end Mr. F. X. Cicott, who recently joined the company, sailed on the *Servia* on the 9th inst. Mr. Cicott made extensive travels through England and the continent last fall and winter, and visited all the leading railways there, gathering data for the *STREET RAILWAY REVIEW*, and now returns to take up the matter of electric railways with the tramway companies abroad. This venture has been partly due to the daily inquiries which they have received from managers across the water, and which clearly indicate that what is now needed more than anything else, is a practical acquaintance on the part of tramway managers, with the practical operation of electric railways here. It is believed that when the actual workings and merits are fully explained, there will be rapid advance in this method of construction.

Great interest is being manifested there in the electric

propulsion of street cars, and the Electric Merchandise Co., which already has a long line of customers abroad, is determined to be early in the field. The enterprise cannot fail to hasten electric railway building abroad, and while reflecting great credit on the enterprise of the company, will result in largely increasing their business in that direction. As the great European cities will now soon enter the market for electric railway supplies, this move will not only benefit the company making it, but will also attract attention to electrical interests generally. We wish the Electrical Merchandise Co. all the success their enterprise deserves and which we feel sure they will attain.

PORTLAND PARAGRAPHS.

PORTLAND, OREGON, May 1, 1891.

Editor Street Railway Review:

The Union Power Company is a new corporation that will furnish power to all the roads here, having a capacity of 3,500 h. p. electrically. The officers are I. B. Hammond of Chicago, president H. C. Campbell, president of the Willamette Bridge Railway Company, of Portland, vice-president I. F. Sherman, secretary of the Multnomah Street Railway Company is secretary and treasurer. The power house will be located on the Willamette river at the North Pacific Mills and work has already begun. Power will be supplied to motors for commercial use.

The Willamette Bridge Railway Company has already begun the work of equipping the Trans Continental line with electricity. The distance will be about twenty miles. They have ordered 25 cars from Pullman, 24 foot body, double trucks, McGuire pattern, and will use the new T and H system, single reduction gear. The work is expected to be finished by October 1.

The Metropolitan Railway Company is extending its line about 1½ miles south to River View Cemetery.

The Portland Cable Railway Company has begun an extension to Fairmount Park on the heights.

The Multnomah Street Railway Company has completed their Eleventh Street and Twenty-first Street lines and will run electric cars on as soon as the equipment arrives.

The Willamette Bridge Railroad Company has completed a double track of 1½ miles through East Portland, on the Waverly Woodstock Division. This makes a five minute service over Morrison Street Bridge.

X. X. X.

THE separate coach bill recently passed in the Texas Legislature, requires the railroads in that state to provide separate cars or compartments for white and black passengers. The master mechanics have devised a movable partition, with a door in the aisle, which admits of dividing the coach into two compartments, of which one may be of any required size, according to the amount of car space required. The bill was so framed as to include street cars, but the impracticability of this feature of the act became so apparent that an amendment was passed, exempting street railroads.

THIRTY YEARS A PRESIDENT.

ONE of the most familiar faces at the annual assemblage of the American Street Railway Association is that of President A. Everett. The young man who has just commenced a railway career, together with those who have grown gray in the service, count themselves fortunate when they can secure the coveted opportunity and in some quiet corner listen to the Doctor's kindly counsel, and gather wisdom from the rich experiences which have come to him during more than a generation of active railway service.

Born in Liberty Township, Trumbull County, Ohio, on November 24th, 1821, he has always lived in the State of which he is so ardent an admirer; and during his life as railway manager has witnessed and promoted a series of improvements in street railway methods that form a contrast scarcely greater in any other business.

In 1860 Dr. Everett became largely interested in street railway matters, and foreseeing the development in progress in the city of Cleveland, and the prominent factor which the railway must be in that work, bought a controlling interest in the East Cleveland Rail Road Company, and became its president, which office he has ever since and now holds. At that time Cleveland was not the magnificent city it is to-day, and his road, though one of the institutions at that time would scarcely make him adequate switching facilities for his present needs. Two miles of track, and four very small cars drawn by one horse each, and a small shed into which the "equipment" went at sun-down, comprised the road. The track was not paved, nor the rails spliced, and the cars are not referred to in the records of the company as being of the vestibule pattern. The entire outfit including franchises was stocked for only \$49,000. But the doctor set vigorously at work, and has been at it ever since and can still set the pace on a day's work that will weary many a young man. He built extensions, introduced improvements and kept pressing to the front, until to-day he proudly points to an electric system second in extent to only one in the world, and unsurpassed by any in excellence and management. The two miles have expanded into forty miles of electric lines, with eighty-five Edison motor cars. Thirty miles of feed wire distribute the current to forty miles of trolley wires, and all operated from one-power house of 1,100-horse power capacity, to which on July 1st will be added a completed plant, furnishing 1,400-horse power more. When the doctor thinks of his original four little arks, and then remembers how he carried only a few less than ten million passengers last year, he is not altogether disappointed, and as the prospect shows a certainty of a good twelve million fares this year, one is not surprised to learn that as the result of over thirty years consecutive service as head of the company, he has brought the stock up to \$2,000,000, and that it could not be purchased for several times that sum.

The doctor has a warm spot in his heart for young men and loves to encourage them to strive for large accomplishments, and we cannot wish a better hope for the city and company he has so long and wisely served,

than that he may continue to fill the president's chair for many years to come. To fill that chair in 1860 meant to stand up and put forth every possible effort, and now when the great question of rapid transit has been worked out and he has given his city a model service, his friends will delight in seeing that president's chair a big easy one, from which he can direct his heads of departments and keep the ship which has voyaged so prosperously still on her successful course before a favored wind.

H. H. LITTELL GOES TO BUFFALO.

AT a recent meeting of the directors of the Buffalo Street Railway Company, Murry A. Verner, who has been the general manager, resigned on account of ill health, and will leave in a few weeks for a year's rest and travel in Europe.

To the position thus vacant, the board unanimously elected Mr. H. H. Littell, who is so well known throughout the country as one of the ablest and most successful managers. Mr. Littell has been in active street railway work since 1864. In 1867 he became superintendent of the Louisville City Railway, and in 1889, of the consolidation growing out of the union of that company and the Central Passenger Co. Mr. Littell has been in frequent receipt of flattering offers from other large cities, including one from Chicago, but has heretofore positively declined all invitations to leave Louisville. That he is a most valued acquisition to the Buffalo system will be realized by all street railway men, and Col. Watson and citizens of that city certainly are to be congratulated. Mr. Littell leaves a record with the Louisville Company to which any man can point with pride, and the rapidly developing system in Buffalo will afford him larger scope and possibilities than ever before, and we wish him every possible success in entering this new and broader field. Mr. Littell will enter on his duties June 1st.

THE clerk of the State Industrial School, at Buffalo, was driving with his wife in the outskirts of the city the other day, when he recognized two escaped inmates in a large crowd of roughs. Jumping from his carriage, followed by his wife; whereupon the horse became frightened and ran away; he undertook to arrest them, when the crowd attacked him with stones, shouting, "kill him," and were making short work of the officer when an electric car came in sight. The lady frantically beckoned to the driver, who turned on "full steam" and in a twinkling had reached the field of battle. The conductor and driver armed with brake handles, sailed in vigorously, and after an exciting struggle, not only saved the officer's life, but captured the two escaped ruffians, and taking them on the car, lost no time in delivering the prisoners at the door of the Institution, which is on the line of the road. As no other help was at hand, there are now some people who will never forget the way that the electric car and its brave crew "got there," and the company which desires to build a trolley line across their yard, or up and down their front steps, will not have to call twice for signatures to the petition.



A. EVERETT,

President The East Cleveland Railroad Co.

THE NEW CLYBOURN AVENUE CABLE LINE

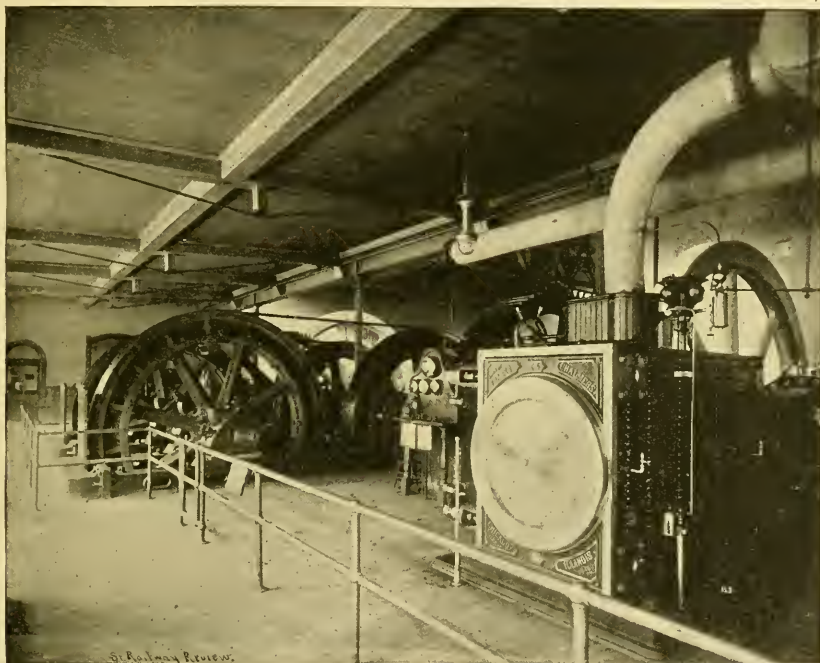
OF THE NORTH CHICAGO STREET RAILROAD COMPANY.

THE North Chicago Street Railroad Company, of Chicago, has just made an addition to their system which, although a comparatively small part of the entire plant, is in itself of such size as to warrant mention.

When the North Chicago Street Railway Co. was acquired by the Philadelphia syndicate and Mr. C. T. Yerkes was installed as president, active steps were at once taken towards the construction of an extensive cable system, to replace that which had been operated by horses

But there was only a very deaf ear to their communications. Steadily the dissatisfaction increased, until along the entire length of the street there were demands made for the cable. They wanted it and would have it. So the problem having worked itself out, it transpired that in May there was great rejoicing on Clybourn avenue, and city officials attended and the street was filled from one end to the other with people anxious to celebrate the inaugural of the new cable road.

The track construction on the Clybourn avenue line is of



or nearly thirty years. Among the lines so proposed to change, was Clybourn avenue, a business street with some manufacturing in the upper stories, but occupied for the most part as flats and tenements above the first floor. The population is almost entirely foreign and very densely packed, and as the line was one largely patronized, the company were glad to substitute mechanical power for horses. But one old fossil stirred up a strong sentiment and in a few days had worked up such a feeling in this Western Europe that Mr. Yerkes changed the plans as originally proposed and cabled another street instead. As time went on and the people on the street watched the business increase, and noted the great advantages reaped by the occupants of property where the cable reached, they began to repent, and to send word to the company they would withdraw their opposition.

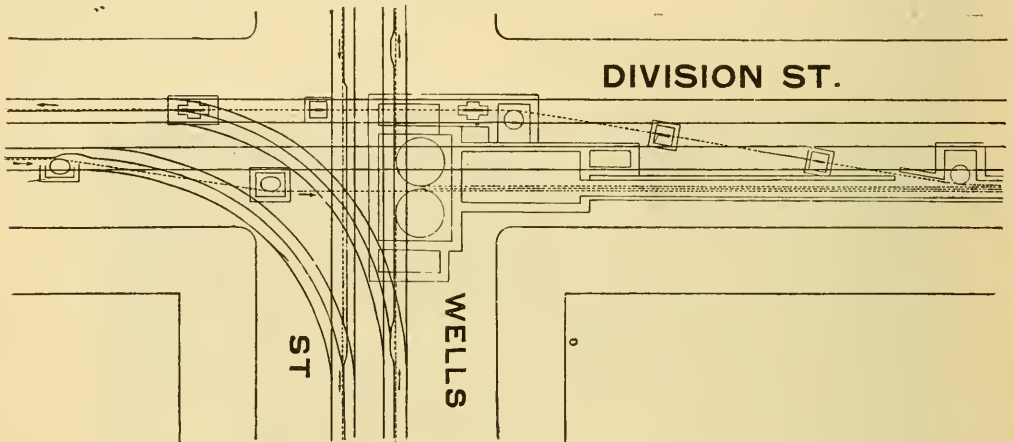
the same general character as formerly built by this company, but has two new features, one of which is specially novel. At Division and Wells streets the new line intersects the Wells street cable line and from this point the cars of the new line continue their down town trip over the Wells street line.

The problem of switching a cable train from one line to another, at a right angle intersection was not so difficult, but at this point there is an immense vault and here it is that three cables are brought to the surface, having been conducted through a closed tunnel from the power house six blocks distant. One set of ropes extends to the north, another to the south on the Wells street line, while the third pair continues on west and operates the Clybourn line. Hence it resulted that the Wells street cars in both directions dropped their cable and crossed the

vault and street, a distance of over one hundred feet, by momentum. The Clybourn ave. cars are also brought around a curve and use the same Wells St. pick up in going down town. On the return they also drop the Wells St. rope, same as Wells St. cars, and a combined slot and rail switch turns them west into the Clybourn cable. The Clybourn cable is dropped going east before reaching the curve and returning is not picked up until on straight track. To provide for this, the curve leading to Wells st. has a sufficient down grade in that direction to enable the train to make it by momentum and gravity.

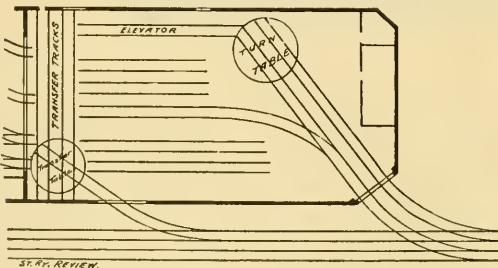
the table, to which it is geared by a series of wheels and shafts and thrown into action by means of a friction clutch. There is a slot in the table which permits the car to run across the table without lifting the grip. The car runs on to the table by momentum from the cable, and when the table has turned delivers the car to the other track. The table is so inclined that the car leaves it and rides to the pick up by gravity. Three levers control the table; one for forward motion, one to reverse, and one operates the brake.

The table is built of steel girders, weighs 21 tons, is



On leaving Wells street and passing to the Clybourn rope on Division street that track has a down grade, but in the opposite direction, giving the unusual construction of a double track curve with an opposite grade for each track. This was worked out by the chief engineer of the company, Mr. S. Potis, Jr., who also occupies the same position for the West Chicago Cable road, and under whose personal direction this work, as well as the installing of the new machinery in the power house, was done.

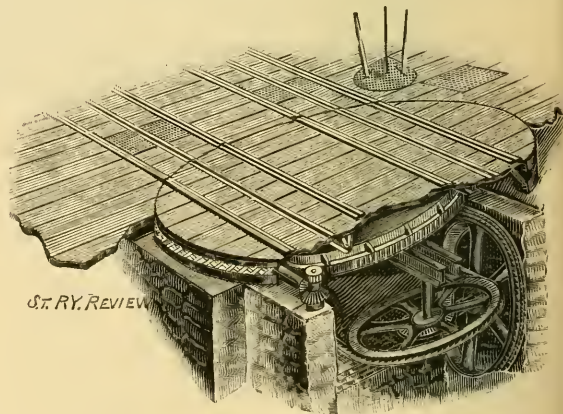
20 ft. in diameter, has two cable tracks and will reverse, something not accomplished in other cable car tables. It makes four complete revolutions per minute. All the driving machinery was devised by Mr. Potis. The table itself was built by the Johnson Company, Johnstown, Pa. A second table is provided, as shown in the plan, by



LOCATION OF TURN TABLES IN CAR HOUSE.

TURN TABLE.

At the end of the line there are no facilities for making a loop and as the cars are built with the driver's room at one end, cannot be "switched back." To provide for this a turn table has been built in the car house at the terminal of the line, and the main cable is conducted into the building and around a 14 foot sheave placed under



TURN TABLE SHOWING MAIN CABLE.

means of which the trail cars are turned at the same time, and this double arrangement permits of handling a very large number of cars without confusion and with the greatest possible dispatch.

POWER HOUSE.

To drive this new cable, which is 27,760 feet in length, with a diameter of 1 7/8 inches, additional power was required at the Elm and Clark street power house, which is one of the finest and largest in the country. The new engine which is a handsome giant of 1,000 horse power, as well as the new driving machinery, was built by Fraser & Chalmers, Chicago, who have also furnished a large portion of the engines and machinery used by both the North Chicago and West Chicago Cable roads. These engines each have 36 in. cylinder, with 60 in. stroke, making 63 revolutions per minute, and weighs complete 90 tons; the engine crank shaft is a pretty little affair of 21 tons, of eighteen inches diameter. Foundations of crushed stone and concrete in equal proportions, of the most solid character, go down 11 feet and rest on hard clay. Two cables measuring 50,600 ft. are driven by this pair on drums also made by Fraser & Chalmers; one set with a diameter of twelve feet, the other 13 feet, the latter weighing 18 tons each. The drum shafts are 18 inches diameter between journals and 12 inches at journals. The Clybourn cable runs 10 1/2 miles per hour. This plant, of which a view is given, comprises 4 engines having a total of 3,000 horse power, and drives 4 lines of cable having a total length of 85,460 feet. The boilers are 8 in number and are heated by oil which is stored in underground tanks made of steel and placed at some distance from the building. It is found a much more uniform fuel than coal, and is more economical, two barrels of oil producing the same results as one ton of the best coal, on the basis of four pounds of coal per horse power per hour.

In the engine room are signal wires leading out through all the cable conduits and tunnels, with boxes at frequent intervals by means of which conductors can communicate with the power house by a simple system of signals.

The entire plant in this station which, is one of the three operating the North Chicago system, has been rebuilt and heavier engines and machinery and shafting introduced. This too, without an hour's delay in the operation of the cars, and is another illustration of what most cable roads experience, viz,—that the volume of traffic that is created by this popular method of propulsion increases far beyond the expectation of owners and engineers.

President Yerkes and his company, as well as the patrons who are thus favored, are to be congratulated on the successful completion and auspicious opening of the Clybourn avenue cable line.

WHEN the electric cars made their debut in Sacramento, Cal., the other evening, the whole populace turned out to witness the event. Among them a Chinaman who had intended to ride, but when the motor car dashed round the corner and sparked a little as it struck some dirt covered track, the affrighted rice-eater took but one look and shouting, "Gues 'em, me walk," gave one jump and disappeared in the darkness.

STREET CAR PATENTS.

The following list of street car patents is prepared for the STREET RAILWAY REVIEW, at the Patent Law Office of Haupt Brothers, 606 Rialto building, Chicago. We refer our readers to them on all matters relating to patents and patent law.

APRIL 7, 1891.

Electric Railway.....	Edw. M. Bentley, New York, N. Y.	449,792
Electric Car-Stopping Device.....	Geo. Blanchard, Waterville, Me.	449,843
Electric Motor Car.....	H. P. Brown, New York, N. Y.	449,752
Pole for Overhead Systems of Electric Railways.....	Jno. L. Brownlee, Detroit, Mich.	449,753
Electric Railway.....	Rudolph M. Hunter, Philadelphia, Pa.	449,797
Electric Railway.....	Rudolph M. Hunter, Philadelphia, Pa.	450,074
Trolley Support for Electric Cars.....	Frank Robinson and P. W. P. Laider, Bangor, Me.	449,886
Propelling Mechanism for Electric Motor Cars.....	Sidney H. Short, Cleveland, O.	449,709
Three Rail Track for Cable Railways.....	Chas. Vogel, San Francisco, Cal.	450,116
Cable Railway Crossing.....	Chas. Vogel, San Francisco, Cal.	450,117
Curve for Cable Railways.....	Chas. Vogel, San Francisco, Cal.	450,118
Apparatus on Cable Crossings.....	Emil Werner, Philadelphia, Pa.	449,985

APRIL 14, 1891.

Safety Gate for Street Cars.....	Francis C. Cash, Lynn, Mass.	450,556
Fare-Registering Apparatus.....	Ferdinand D. Deneker and F. Erhard, Hamburg, Germany,	450,602
Trolley for Electric Railways.....	Arthur S. Hickley, Richmond, Ind.	450,153
Fender or Safety Attachment for Electric or other Cars.....	David Hines, Cambridge, Mass.	450,460
Electric Railway.....	Rud. M. Hunter, Philadelphia, Pa.	450,586
Non-Sparking Clamp for Trolley Wires.....	Chas. A. Lieb, New York, N. Y.	450,163
Electric Railway Wire Support.....	Chas. A. Lieb, New York, N. Y.	450,164
Trolley Wire Support.....	Chas. A. Lieb, New York, N. Y.	450,242
Electric Switch for Electric Railways.....	Frederick Mansfield, New York, N. Y.	450,172
Electric Switch for Electric Railways.....	Frederick Mansfield, New York, N. Y.	450,173
Trolley Device.....	Alexander Palmros, Lynn, Mass.	450,184
Electric Motor Cars.....	Francis A. Poocock, Scranton, Pa.	450,189
Reciprocating Electric Railway Motor System.....	Chas. J. Van Depoele, Lynn, Mass.	450,542
Switch Device for Street Cars.....	Jeremiah Young, Boston, Mass.	450,549

APRIL 21, 1891.

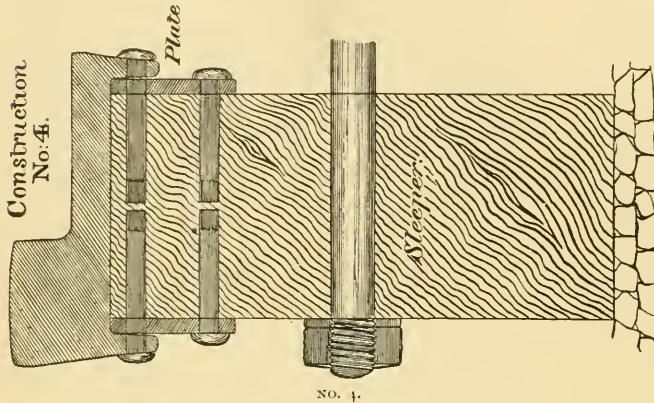
Gripping Mechanism for Cars or Vehicles.....	H. Bowman, Philadelphia, Pa.	450,661
Tramway Switch.....	Chas. A. Beach, Albany, N. Y.	450,607
Electric Railway.....	Frank S. Culver, Eau Claire, Wis.	450,613
Fare Register.....	Silas E. Haskins, Denver, Colo.	450,936
Electrical Propulsion of Vehicles.....	Edw. H. Johnson, New York, N. Y.	450,742
Power Transmitting Device for Electric Railways.....	Edward H. Johnson, New York, N. Y.	450,744
Trolley or Traveler for Electric Railways.....	Sidney H. Short, Cleveland, O.	450,683
Vestibule Street Car.....	Jno. Stephenson, New York, N. Y.	450,848
Wheel Brake.....	Jno. Stephenson, New York, N. Y.	450,850
Railway Gate Crossing for Overhead Lines.....	Elihu Thompson, Lynn, Mass.	450,687
Elevated Railroad.....	Jno. N. Valley, Jersey City, N. J. (reissue)	11,158
Trolley Wheel Support for Electric Cars.....	Harold A. Webber, Passaic, N. J.	450,853
Electric Locomotive.....	Geo. Westinghouse, Jr., Pittsburg, Pa.	450,652

APRIL 28, 1891.

Electrically Propelled Car.....	Rud. M. Hunter, Philadelphia, Pa.	451,155
Electric Railway.....	Rud. M. Hunter, Philadelphia, Pa.	451,154
Electric Railway.....	Rud. M. Hunter, Philadelphia, Pa.	451,402
Tension and Cut-Out Device for Electric Railways.....	Byron Jennings, San Jose, Cal.	451,326
Trolley.....	Roderic Macrae, Baltimore, Md.	451,211
Street Railway Switch.....	Claude A. Ward and M. M. Martin, Kansas City, Kas.	451,093

"Composite Girders" for Street Railways.

WE have examined with much interest the "Composite Girders" illustrated below, which seem well calculated not only to overcome many of the weak points in girder rails, but also, by reason of the



NO. 4.

shape of the rail used with them, to afford special advantages for wheel service.

The two constructions, 4 and 5, are alike, in consisting of a wooden sleeper embraced at its top by a long metallic plate on each side pierced by a double series of oblong, oval holes. Through the lower series spikes with central cutting edge placed vertically to avoid splitting are driven, securing the plates firmly to the sleepers, preferably before bringing these out upon the street. These plates are 7½ feet long, and cover the entire side of the sleeper in length, but not in width.

Construction number 4 rests upon ballast, tamped firmly in a narrow longitudinal trench, and the opposite sleepers are maintained at gauge by occasional tie rods across the roadway. The elasticity of a deep wooden sleeper will contribute much to the smoothness of the track.

The rail for both constructions is a heavy rail, 55½ lbs. to the yard, with a broad, flat base between deeply depending flange.

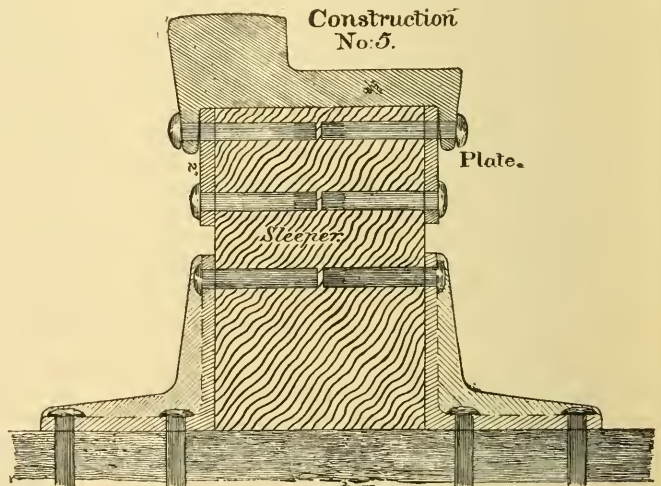
Through these holes are punched or drilled, coincident

broad base, supported its whole width and its whole length by a wide, vertical support, faced each side with metal.

Construction number 5 has sleepers of less depth than for number 4, seated upon cross ties, to which they are attached by embracing chairs spiked to both and maintaining gauge. An interval between the bottoms of the plates and the tops of the chairs precludes concussion or jars as the wheels pass above them.

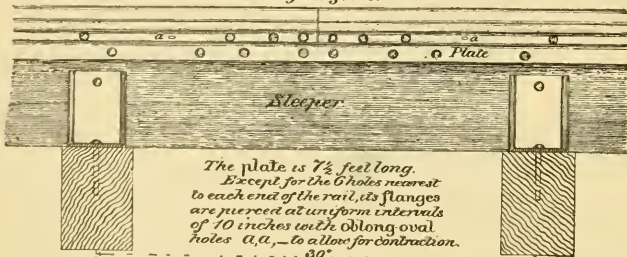
It will be observed in both these constructions that the rails and plates assure a complete water shed for the sleepers, and that these are thoroughly protected alike from alternations of wet and dry, without vertical holes from above, admitting decay to the heart of the timber.

The inveterate knocking at the joints which has given so much trouble in all constructions when a few months laid, seems at last to have been met and mastered by the plate and sleeper joint. In this device, abandoning hope from splice bars, the inventor seems to have secured an arrangement with-



NO. 5.

Side view of Construction No. 5, showing the joint.



The plate is 7½ feet long. Except for the 6 holes nearest to each end of the rail, its flanges are pierced at uniform intervals of 10 inches with oblong oval holes *a, a*, to allow for contraction.

in shape and position with those of the upper series, and spikes through them attach the rail to the substructure; a

out leverage and accumulating in its power upon the ends of the rails as the center of the plates is reached. The average interval for these holes through body of the rail is but 10 inches. So numerous, therefore are the spikes attaching the rail to its more elastic support, that the longitudinal vibration of the rail is absorbed or annulled; and at the end of the rails they accumulate rapidly, binding the rail on each side to a vertical metallic plate, thoroughly supported its whole length, several times as long as any splice bar. The above outline of the construction, which is the invention of the

Price Railway Appliance Company, Philadelphia, Pa., will be explained in detail by addressing the company.

FOUND ON THE RUSH TRIP.

ALABAMA.

BIRMINGHAM.—The Birmingham Railway & Electric Co. will at once proceed to construct a line by the overhead system.

SHEFFIELD.—Messrs. Reed and Roberts, of this place have leased the dummy line to Tuscumbia, and will operate it for the next year.

ARKANSAS.

LITTLE ROCK.—An electric line is now talked of to run from Fort Smith to Van Buren over the new railroad bridge.

CALIFORNIA.

ALAMEDA.—Permission has been granted Theo. Metz to change his motor line to electricity any time within the next three years.

BERKELEY.—The Claremont, University & Ferries Street Railway has been purchased by a new company: the officers are as follows: President, Louis Gottshall; Secretary, S. G. Siebert; Treasurer, W. E. Sell.

SACRAMENTO.—The Central Railway Co. has been reorganized under the name of the Central Electric Railway Co., with a new board of directors which includes L. L. Lewis and Gen. J. G. Martine, of this city. New tracks will be laid and additional cars purchased.

SAN FRANCISCO.—The Consolidated Piedmont Cable Co. will shortly commence the construction of an additional line from Clay to Fourteenth street to the Sixteenth street depot.

COLORADO.

DENVER.—About fifty miles of street railway will be built in this city this summer. Electricity will be the motive power for the most part. The City Cable and Tramway companies are doing most of the building.

The real estate firm of Merritt, Gommer & Winne have petitioned for right of way for a street car line on the State lands immediately north of the City Park. The petition will probably be granted.

The Rapid Transit Co. is changing its tracks from single to double, between Colorado Springs and Manitou. The company has ordered a Wenstrom motors, strong enough to draw a train of three cars.

LEADVILLE.—Surveys are being made for the proposed extensions of the electric road.

CONNECTICUT.

BRIDGEPORT.—The close of the State Legislature has rendered it impossible to construct the electric line here this year. The company will, however, improve its service this summer by the addition of a large number of open cars.

DELAWARE.

SALISBURY.—The Salisbury Street Passenger Railway has been incorporated, with Thomas Perry as President; C. C. Waller, Vice-President; L. E. Williams, Secretary, and W. H. McConkey, Treasurer. Franchises have been asked for.

DISTRICT OF COLUMBIA.

WASHINGTON.—The Belt Line road of this city have just closed a contract with the Johnson Co., of Johnstown, Pa., for ten miles of eighty pound rails which they will use in re-laying the present lines.

The District Commissioners of the Washington & Georgetown Railway Co. have reached a satisfactory understanding as to the conditions upon which the extension of his cable road on Pennsylvania avenue and Fourteenth street is to be laid, and the permission has been granted. President Hunt is entitled to great credit for his untiring efforts to secure a good cable road for this city, to accomplish which he has given his most constant effort during the past four years, and already has one of the finest systems in the country.

FLORIDA.

ARCADIA.—The Arcadia Street Railway & Improvement Co. has been incorporated, with a capital stock of \$100,000, by Anthony Peters of Boston, Homer Rogers of Boston and Frederick C. Peters of Arcadia.

JACKSONVILLE.—Survey has been completed for an electric line to connect this city with Panama. The construction of the road has not yet been fully decided on.

ST. AUGUSTINE.—The North Beach Railway Co. is asking for franchises for a number of extensions and expects to spend \$15,000 in construction work this summer.

GEORGIA.

AMERICUS.—By next fall the street railway of this place will be extended around the town, making a belt line which will connect nearly all the factories.

ATLANTA.—Horace I. Bettis of Salem, has been elected superintendent of the street railway here.

AUGUSTA.—The electric road recently carried 30,000 passengers in two days with an equipment of 28 cars. The company have put on sale special tickets for school children at half price.

CEDARTOWN.—A franchise for a street railroad has been granted to Messrs. Allen & Co. of Rome, this state. Work will be commenced very soon.

THOMASVILLE.—A survey has been completed for a street car line in this city. The indications are that it will be built at once.

ILLINOIS.

ALTON.—The business men are endeavoring to organize a company to construct a street railway, and have offered bonus bonds of \$10,000 towards the road.

COLLINSVILLE.—John S. Gordon is constructing a dummy line, which is well under way towards completion.

PEORIA.—The Central Street Railway Co. are making a number of extensions, which will very greatly improve the facilities of their excellent system.

WAUKEGAN.—The city council has rejected the ordinance for the proposed street railway, on the ground that it grants the company too much power. A new ordinance will be asked for.

CHICAGO.—President Yerkes, of the West Side Street Railway, has refused the ordinance for the right to lay track upon North avenue, on account of the clauses which require the payment to the city of \$800 per mile per year.

SUPERINTENDENT POPE of the Chicago City Railway, has issued an order prohibiting newsboys from selling papers on the cars of that company. This has been rendered necessary from the fact that a number of suits have been brought for injuries suffered from newsboys jumping on moving trains.

THE first suit against the Lake St. elevated R'y. has been filed by a property owner at 315 Lake Street, asking \$10,000 for damage done his property by shutting out light and air.

THE Cicero and Proviso Electric Railway is meeting with great success, and on a recent Sunday carried 10,000 people with an equipment of only twelve cars.

It is rumored that the North Side Cable system will extend its down town loop on Clark street as far south as Polk street, east on Polk, turning north at the Polk street depot, and continuing on Dearborn and Monroe, where it reaches the present terminus. The extension will be about a mile in length, and it is understood that the South Side Cable Road have given their consent to the use of their tracks on Clark street for this purpose.

A PERMIT has been granted to The Equitable Transportation Co. for an elevated road on a number of streets, to connect that portion of the city as far south as ninetieth street, with the Alley Elevated Railway, whose present terminus is now at Thirty-ninth street.

BEGINNING with May 25th, the gripmen and starters of the West Chicago Street Railway will appear in uniform of blue caps and suits.

THE Chicago City Railway have withdrawn the special three cent fare ticket for the letter carriers on duty, and now they put up five cents or walk.

INDIANA.

ANDERSON.—A new company has been organized, which has purchased the old horse car system, and if it can secure an extension of the franchise for twenty years, will put in a \$250,00 electric road.

ELKHART.—The Electric Street Railway Co. have moved their offices into more comfortable quarters at 113 Main street.

KOKOMO.—Elmer Haines, formerly of Sault Ste Marie has arrived and will have charge of the electric street railway here.

TERRE HAUTE.—The street railway company have ordered a new 250 H. P. compound Westinghouse engine and an additional dynamo, which are made necessary by the rapid increase in the company's business.

IOWA.

CEDAR RAPIDS.—The franchise for an electric railway has at last been granted to the Thomson-Houston Electric Co. It extends for fifty years and is exclusive for five. The company has sixty days in which to accept the franchise, but must have the road in operation within six months from such date. It is intended to build ten miles at the start.

CEDAR FALLS.—A company is being organized to build an electric road.

DAVENPORT.—The consolidation has been effected of the Brady street & West Davenport lines, under the name of the Davenport Electric Railway, Light & Power Co., with Dr. W. L. Allen as president. As both companies were owned practically by the same stockholders the consolidation will make but little change.

DUBUQUE.—Creditors representing claims of nearly \$20,000 have filled liens against the Key City Electric Railway, and it is possible the road will be consolidated with the Allen & Swiney System. J. K. Deming has been appointed receiver.

WATERLOO.—A franchise has been granted to Superintendent Angell of the Eighth street line, Dubuque, and his assistants, for the construction of an electric line here. Work must begin by August 1st, and be completed within one year.

KANSAS.

ATCHISON.—Dr. W. L. Challis has purchased a controlling interest in the Atchison Street Railway Co.

LEAVENWORTH.—A charter has been filed for the Suburban Street Railway Co.: capital \$250,000. It is the intention to build from this city to the Fort and Soldiers' Home. The incorporators are: Geo. A. Baker, Wm. Dill, George Barrows, Laurens Haun, of Leavenworth; J. C. Lutle, of Exeter, New Hampshire, and W. A. Patton, Kingston, New Hampshire.

KENTUCKY.

LEXINGTON.—Since the introduction of electricity the receipts of the line have been doubled.

LOUISVILLE.—The street car stables at Twenty-sixth and Market streets caught fire recently, but the fire was extinguished with but small loss.

LOUISIANA.

SHREVEPORT.—At a special meeting of the City Council a franchise was granted extending the term of the rights of the Shreveport Railway Co. and the Shreveport Railway & Land Improvement Co. thirty years. The extension is for the purpose of securing valuable improvements which both companies desire to make.

MAINE.

GARDNER.—The Augusta, Hallowel & Gardner Electric Railway has proved one of the best investments of the kind ever made in the city. The road has been in operation but one year and the stock has already reached par.

MARYLAND.

ANNAPOLIS.—The Edison Electric Light Co., has been granted permission to lay tracks for an electric railroad between this city and Bay Ridge, the same being exempted from the payment of any royalty for twenty-five years.

The cable railway on Howard street has been injured by the sinking of the street from the excavations of the Belt Railroad Co., who have been putting a tunnel across this part of the street. It will delay the completion of the road about two weeks.

[SALISBURY.—J. A. Perry, C. C. Waller, L. E. Williams, and others have petitioned the City Council to build a street railway here.

MANITOBA.

WINNIPEG.—The City Council has granted a franchise for twenty-five years for an electric street railway. It is hoped to have the line in operation this summer.

MISSISSIPPI.

VICKSBURG.—The street railway company here is planning an extension of its line on Washington street, South street and Cherry street.

MASSACHUSETTS.

BOSTON.—In the Superior Court a jury ordered the West End Street Railway Company to pay the sum of \$17,000 to John Brown Smith, a nine-year-old colored boy, who met with an accident on one of their cars. The case will probably be re-heard, as the amount is excessive.

BROCKTON.—Patrick Mahoney, who was eighty years of age, was found dead on a Clifton avenue car, on which he was a passenger.

GLOUCESTER.—W. A. Strangeman, superintendent of the street railway here, has been presented with an elegant gold watch by the employes of the road.

LOWELL.—The Lowell and Dracut Street Railway Companies have been consolidated and will be equipped with electricity.

ONSET.—It is stated that the owners of the East Wareham, Onset Bay and Point Independence Street Railway have secured control of the Dummy Road, running from Onset Station to Onset Grove.

QUINCY.—The Railroad Committee reported a bill to incorporate John Q. Adams, Henry L. Higginson, Charles H. Porter, W. G. A. Pattee, P. L. Saltonstall, G. E. Armstrong and J. R. Graham, as the Quincy Electric Freight Railway Company. The location is to be fifty feet wide and the gauge is of standard width. The capital is to be \$300,000, and \$150,000 in bonds may be issued.

WORCESTER.—The street railway companies of this city have been petitioned to extend their lines through Shrewsbury and Belmont streets to the lake, and it will undoubtedly be built.

MICHIGAN.

DETROIT.—The *Tribune* of this city is advocating the cable line for Woodward avenue.

THE Detroit & Suburban Street Railway Co. has petitioned for franchises from Griswold street to Wyandotte.

GRAND RAPIDS.—The employes of the Consolidated Road have asked for an increase in their wages of 25 cents per day, the present rate being \$1.25.

CONTRACTS amounting to \$180,000 have already been let for the equipment of the consolidated lines with electricity. Work is progressing rapidly.

THE Valley City Street Cable Railway Co. have succeeded in securing the right to occupy a number of streets for thirty years. This has been a hard fight, and was finally passed by a vote of 15 to 5.

THE Reed's Lake Electric Railway was opened on April 27th, and carried 2,000 people with one motor and a trail car.

THE Consolidated Company have closed a contract with the Edison Electric Light Company of this city to furnish power for the electric line until the company's additional power house is completed.

SAGINAW.—The stockholders of the Union Electric street Railway have voted to spend \$100,000 at once, in extending their system. A new power station will be erected and an equipment of twenty new cars ordered. A considerable portion of the main line will be double-tracked.

SANDWICH.—The Street Railway Co. of this city have purchased property, and will at once commence the erection of a large stone building for their electric plant.

SAULT STE. MARIE.—Geo. Cody has been elected superintendent of the electric street railway in this city.

MINNESOTA.

MINNEAPOLIS.—The City Railway Co. propose building a large dock, to be anchored in Lake Harriet, which is at the end of one of their electric lines. A large band has been secured and concerts will be given every night. The 30 H. P. motors which have been used on the electric line between this city and St. Paul, have been found inadequate, and new ones are being built, with a capacity of 50 H. P., which it is believed will not only take care of the business, but enable a considerably higher speed. It is now proposed to build an electric line to Medicine Lake. The electric line to Minnehaha Falls, which is now a single track will shortly be double-tracked its entire length, and the service increased to a car every five minutes, instead of one in forty-five minutes, as at present.

ST. PAUL.—A party of capitalists from New York were here a few days since, looking over the prospects for the construction of an elevated railway between this city and Minneapolis to be operated by electricity.

THE first experiment in electric railways in Minnesota outside the city lines is to be made between Stillwater and St. Paul, a distance of 24 miles. The Commissioners of Washington County have granted a right of way to Chauncey F. Gregory, of Stillwater. It is intended to have the road in operation by October 1st, for both freight and passenger traffic.

WINONA.—The Council has passed the ordinance permitting the substitution of electricity for steam power, and extended the limit of the franchise to fifty years from 1883. Work will commence June 1st, of changing the horse road to an electric line, which is expected to be completed in about two months.

MISSOURI.

KANSAS CITY.—On May 11th, the cable railway station at the Union Depot was destroyed by fire, also the connecting station at the elevated railway. The stations were at the bottom of the steep incline, which is the chief means of reaching the bluffs. The Union Depot had a very narrow escape and the loss will amount to \$20,000.

THE West Side Street Railway Co. has commenced the erection of a new power house.

ST. LOUIS.—Work has commenced in the re-construction of the Benton-Bellefontaine Railway from animal to electric power. The expectation is that the line will be in operation within four months. The Jefferson Avenue line will also be changed during July.

MONTANA.

BUTTE.—The City Council took advantage of the non-operation of the Park Street line, which was formerly a dummy line and is now being converted into electricity, to declare the ordinance under which the dummies were operated, as forfeited.

GRANITE.—A syndicate of eastern capitalists is to build and operate a cable road between Phillipsburg and Granite, Mont. It is estimated that it will cost \$250,000 to build and equip the road, and the projectors expect to have it in operation by the latter part of August.

NEBRASKA.

LINCOLN.—The Lincoln Street Electric Railway has secured an ordinance which allows them to erect overhead wires for both lighting and railway purposes, on any street or alley in the city not already occupied by some other company.

THE Lincoln Street Railway has purchased a piece of ground 100x316 feet, and will proceed to erect at the earliest possible moment a fire proof car house of brick, capable of storing 200 cars. The company's offices will be located in it, and a portion of the building will be devoted to repair and manufacturing purposes, as the company intend to experiment with the building of cars on their own account.

BEATRICE.—Work is going forward nicely and a considerable portion of the track is now down.

NEW JERSEY.

CAMDEN.—The Camden Horse Railway Co. has contracted with the Johnson Company for the relaying of a large amount of its tracks with their rails.

EAST ORANGE.—A franchise has been granted the Rapid Transit Street Railway Co., of Newark, to operate an electric line in East Orange. This is a franchise over which there has been a long controversy, and the company is to be congratulated on its success.

JERSEY CITY.—President Thurston has succeeded in overcoming the objections of the property owners in the vicinity of Van Vorst Park, and the completion of the line will be made at once.

NEWARK.—The transfer system between the Rapid Transit Co. and the Essex Passenger Street Railway Co. is proving very successful and is rapidly increasing. Upwards of twenty-five thousand passengers per week are thus exchanged between the companies.

PATERSON.—The Patterson Railway Co. has absorbed the Passaic, Garfield & Clifton Electric Railway Co., which runs a line of electric cars through Passaic. There is no change in offices. The electric railway will be extended to Clifton. Electricity will eventually be made the motive power of the Patterson lines.

TRENTON.—Under the consolidation of the City Passenger Railway and the Trenton Horse Railway Co., Col. Louis Perrine becomes president and general manager of both roads. The new syndicate has ordered a reduction in wages, by which drivers are reduced from \$1.75 to \$1.25; conductors from \$2 to \$1.50; stablemen from \$1.50 to \$1.20, and other employees in proportion.

THE litigation in the Supreme Court, by which the Trenton Horse Railroad Co. desires to substitute electricity on some of its horse line has again been postponed. The delay is most vexatious, as the company have already ordered a large number of electric cars which they will not now be able to use until the court renders its decision.

PLAINFIELD.—The city council has granted to the Plainfield City Railway Co. a franchise to operate in the city an electric railway by the overhead system.

NEW MEXICO.

MEXICO CITY.—The Valley Railway Co. has contracted with the Secretary of War to connect all the military barracks in and around the city by rail.

NEW YORK.

ALBANY.—The Capitol Railway, with a capital stock of \$10,000, has been incorporated for the purpose of building a surface road on Eagle street and Washington avenue.

BROOKLYN.—Almost two-thirds of the 600,000 shares of stock of the Brooklyn City Railway were represented at the meeting held to act on the issue of \$6,000,000 of new bonds, and every vote was in favor of the increase.

BUFFALO.—The Central Labor Union is making a vigorous protest against having mail boxes placed in the street cars. Their reason being that it would prevent the street car men from striking, if they desire to do so; as the cars would then become common carriers of the mail, and it would be an offense against the government to delay them.

LONG ISLAND CITY.—The strike which has been brewing for many weeks on the Steinway & Hunters' Point Railway came to a head on May 3d, and the road was tied up one day, but the advice of Mayor Gleason induced the men to go to work.

TROY.—The Troy & Lansingburg Railway Co. has increased their capital from \$100,000 to \$200,000 for the purpose of electric equipment.

RECONSTRUCTION of the old lines and extension of new ones in the city will involve an expenditure this year of fully \$200,000.

NORTH CAROLINA.

RALEIGH.—The troublesome delays which have prevented the completion of the electric line here, have been settled. Work will be continued, and the entire system not only completed but extended further than it was originally intended.

WINSTON.—The Winston-Salem Land and Investment Co., have closed their contract with the Electric Light Motor & Power Co. by which the latter agrees to build a system of street railway over its land, which embraces 518 acres. A fine park has been laid out at the terminus which will cover eighteen acres.

WILMINGTON.—Maj. Chas. M. Stedman, representing the syndicate who has the option for the purchase of the horse railway here, has secured an ordinance from the city which permits the construction of an electric line on any street or alley in the city, with the exception of three streets. This privilege extends for a space of eighteen months, and placed the syndicate in a position to carry out the improvements and extensions, which are said to be quite extensive.

OHIO.

BEREA.—Permission was granted the Berea Street Railway Co. to extend its lines to the city limits of Cleveland. This grant is for twenty-five years and the electric system will be used. The distance is eight miles, and work will commence at once.

COLUMBUS.—The County Commissioners have granted the Glenwood & Greenlawn Street Railway Co. the right to lay tracks to Greenlawn Cemetery.

MANSFIELD.—Clark Rude, who is the principal stockholder in the new company, promises to put in an electric system this summer.

OBERLIN.—The question of building a street railway here is again being agitated, but no definite steps have yet been taken.

PAINESVILLE.—A company has been formed to build an electric line to Fairport.

TOLEDO.—The employes of the street railways here have organized an association called The Brotherhood of Street Railway Employes.

THE Consolidated Company has been granted permission to extend its Metropolitan Street line to the Post Office in West Toledo.

CANTON.—The Akron syndicate, who purchased the Canton and Lakeside Street Railway of this city a year ago, has now sold it to local capitalists, the consideration being in the neighborhood of \$100,000. Mr. Lynch will serve as president and treasurer and R. A. Miller will be vice-president.

ZANESVILLE.—Col. A. L. Conger and party, of Akron, who own the electric line here, are still in possession of the road, the trade with the local capitalists having fallen through. The company intend now to bond the road.

OREGON.

ABERDEEN.—Work on the electric road is progressing, and the entire line of four miles must be completed this year.

PORTLAND.—At the annual election of the Cable Railway Co., of this city, Eugene B. White and J. H. Page were elected directors to fill vacancies caused by resignations in the Board.

THE Portland Cable Co. is considering the construction of a line from the incline of the company's property near Mt. Zion.

THE Portland & Vancouver Railway has commenced electric service and is already doing a large business.

THE Washington Electric line will soon begin laying track on Twenty-second street, power for which will be furnished by the Union Power Co.

SALEM.—The Chicago syndicate that has purchased the Salem street car line is here completing, the transfer of the property. It is rumored that the new management will electrify the entire road and extend the system some three or four miles.

PENNSYLVANIA.

BRADDOCK.—The Braddock & Turtle Creek Passenger Railway Co. had an interesting time in trying to lay its tracks on Eighth street, which was already occupied by the rails of a rival road, the Braddock Electric Co. When the old tracks were torn up at midnight, the police arrested the employes, but the new company secured the discharge of their men, and succeeded in having a constable arrest the police. A fire alarm was sounded which attracted a great crowd, but before the police succeeded in getting bail the new company had completed the construction of their lines across the territory in question.

DURYEA.—There is a great scheme on foot to connect all the towns in this valley, from Duryea to Nanticoke, by a system of electric roads, for which a company has already been formed and a large capital subscribed. The proposed line is to commence at Duryea and pass through the towns of Pittston, Wyoming, Kingston, WilkesBarre, Plains, Parsons and Pleasant Valley. The intention is to furnish cheap and rapid transportation, and thus bring the several communities into closer relationship. The most any passenger will be required to pay even if he rides over the entire line will not be over 10 cents, while most distances will be but 5 cents.

ERIE.—The very excellent electric system here is adding further improvements by additional dynamos at the power house, and extra cars which will be put in service at once.

HARRISBURG.—Within ten hours after the papers were signed for consolidating the two street railways, a large force of men were at work on the foundations for the new power house, which will be 54 x 135 feet.

LEBANON.—The Lebanon & Annville Electric Street Railway Co., has ordered six cars from the John Stephenson Co., to be delivered at the earliest possible moment.

PITTSBURGH.—The Central Electric Railway has commenced work on their line, contracts having been let. The line will be opened October 1st.

SHENANDOAH.—The directors of the Mahanoy City, Shenandoah, Girardville & Ashland Electric Railway Co. have contracted with the Edison Company for the construction and equipment of ten miles of road, to cost \$160,000, and to be completed within ninety days.

SCRANTON.—G. Mortimer Lewis, of Wilkes Barre, is president of the company known as the Scranton & Carbondale Street Railway Co., which has been incorporated for the purpose of connecting the two cities by an electric line.

WAVERLY.—The Waverly Street Railway Co. has been organized with a capital of \$35,000. Among the directors are Walter H. Baldwin and W. A. Watrous, of this city.

SOUTH CAROLINA.

GAFFREY CITY.—Good progress is being made in the construction of the street railway line from this place to Limestone.

TENNESSEE.

BRISTOL.—Work is progressing nicely on the electric road here, and when completed it will be one of the best systems in the South.

CHATTANOOGA.—Coffin & Stanton, of New York, who own Cameron Hill, a famous fort in war times, are building an electric line which will make the property much more accessible. The present incline will be abandoned.

MEMPHIS.—The Main street tracks have been changed to standard gauge, for the new electric cars, which will be operated by mules until the electric wires are ready for service.

NASHVILLE.—One of the leading merchants in this city recently chartered an electric car, which was handsomely decorated and displayed a few attractive advertisements, and had it run over all the lines in the city during the day.

TEXAS.

EL PASO.—The unusually high water in the Rio Grande river has washed away considerable track for the International Street Car Co., and the company's stables are also inundated.

GALVESTON.—Conductors and motor men of the City Street Railway Co. have all been placed in uniforms, which are of the regulation blue, made into a straight front sack coat with rolling collar, and brass buttons bearing the monogram of the company. The caps are blue with brass badges.

HOUSTON.—A Denver Syndicate headed by Judge T. B. Stuart are endeavoring to secure a franchise for the construction of fifteen miles of an electric railway in this city. The new construction will cost with equipment not less than \$10,000 per mile.

THE Houston Rapid Transit Railway Co. has filed their charter, with a capital of \$300,000, the incorporators being James T. D. Wilson, Harvey J. Wilson and James A. Paton.

LAMPASAS.—Denver capitalists are here looking into the matter of building an electric line between the two principal springs, which are a mile apart.

SAN ANTONIO.—The charter for the San Antonio Street Railway Co. has been granted, increasing the capital stock to \$800,000.

FORT WORTH.—On the morning of April 23d. the Tenth street car stables of the City Street Railway Company, of this city, were burned, and seventeen mules and six cars were destroyed. The employes asleep in the barn barely escaped with their lives. Loss \$5,000.

UTAH.

SALT LAKE CITY.—J. N. Kennedy has applied to the County Court for a franchise for a street railway in the suburbs just beyond the city limits. Eastern capitalists are pledged to the scheme by the sum of \$200,000. It will probably be known as the East Boulevard Railway and will be two and one-half miles long.

The East Side Rapid Transit Co. has been absorbed by the Salt Lake Rapid Transit Co., and an electric line will soon be in operation between Salt Lake City and the Penitentiary.

PRESIDENT UPMAN, of the Rapid Transit Co. is in the East on business connected with his road.

The Street Railroad Electric Car Line on South Second street will shortly be extended a distance of two miles further west. It also has in contemplation the extension of one of its lines reaching to the north.

The annual meeting of the stockholders of the West Side Rapid Transit Company was held this morning. The following is the board of directors elected: J. G. Jacobs, E. W. Senior, B. A. M. Froisett, J. F. Beyle, T. A. Davis, C. E. Wantland, A. J. Dutton. This is the old board of directors excepting Messrs. Wantland and Dutton.

VIRGINIA.

NORFOLK.—The stock has all been taken for the building of the electric railway, and work will commence as soon as the charter has been approved.

STAUNTON.—Permission has been granted the railway company to extend their lines to the Park Addition.

SUFFOLK.—Work is moving along nicely with the construction of the street car line in this city. It will be a little more than two miles in length.

WASHINGTON.

ABERDEEN.—The Pacific & Wheelless Electric Railway Co., has let the contract for the construction of its road, and asked the City Council for franchises over three other streets.

LYNDEN.—At a recent meeting of citizens \$25,000 was subscribed toward a motor line between this place and Whatcom. It is expected that a bonus of \$10,000 will be pledged.

SPOKANE FALLS.—The City Park Transit Co. expects to build to Union Park, and another line to a point three miles from Lidgerwood.

SEATTLE.—The Yesler Avenue Cable Line is putting in a new engine, two new boilers, and a million gallon pump. It is also laying out and improving its grounds, and when completed will have a very pretty little park.

The Rainier Power & Electric Co. have received their franchise for the construction of the electric and cable line, which must be completed within twenty-two months from date. The franchise runs for twenty-five years and is to be a five foot gauge. If electricity is used the poles must be painted black to a height of eight feet above the ground, and lights must be carried on poles, not to exceed four hundred feet apart.

WISCONSIN.

BARABOO.—The company which was organized recently to construct an electric line from this place to Devil's Lake is getting well under way, and has elected the following officers: President and Treasurer, F. T. Wrewster; Vice President, J. P. Witwen; Secretary, G. A. Kartack; General Manager, H. J. Irwin.

WEST SUPERIOR.—The street railway company intend to build a large car house for the storage of their new motor cars. It will be of brick and very complete. Contracts amounting to over \$500,000 have been let by the Electric Railway Co., and a very large force of men are now at work.

RACINE.—The Belle City Street Car Co., expect to relay their entire east track and put in a first-class electric plant.

Through Seven States.

Commencing March 29th, the Northern Pacific resumed its double daily passenger train service between St. Paul and Minneapolis on the east, and Helena, Butte, Spokane Falls, Tacoma, Seattle and Portland on the west.

West bound trains will leave St. Paul at 9:00 A. M. and 4:15 P. M., respectively, carrying complete service of Pullman First Class and Tourist Sleeping Cars, First and Second Class Day Coaches, Free Colonist Sleeper and Elegant Dining Cars. The morning train out of St. Paul [No. 3] will carry First Class Vestibuled Sleeper from Chicago, leaving that point at 5:30 P. M. daily, over the C. M. & St. P. Ry., reaching the Pacific Coast, via the line through Butte.

Train No. 1, leaving St. Paul at 4:15 P. M., will carry both Pullman First Class and Pullman Tourist Sleeping Cars from Chicago, via the Wisconsin Central Line, leaving the latter point at 10:15 P. M. daily, running via Helena to Spokane Falls, Tacoma and Portland.

Passengers from the east leaving St. Louis in the forenoon and Chicago in the afternoon will make close connections with the morning train out of St. Paul the following day; leaving Chicago at night, connection will be made with Train No. 1 out of St. Paul the next afternoon.

With two transcontinental passenger trains running daily between eastern and western terminals, the Northern Pacific Railroad—the Yellowstone Park Route—offers the best possible service to the tourist, business man or settler. The equipment on this line is unsurpassed in point of beauty and convenience, while the service is first-class. It is the short and direct line to Montana and all North Pacific Coast points, and passes through the grandest, most productive and richest sections of seven States, viz: Wisconsin, Minnesota, North Dakota, Montana, Idaho, Oregon and Washington.

District Passenger Agents of the Northern Pacific Railroad will take pleasure in supplying information, rates, maps, time tables, etc., or application can be made to CHAS. S. FEE, G. P. & T. A., St. Paul, Minn.

Write to above address for the latest and best map yet published of Alaska—just out.

CENSUS OFFICE BULLETIN.

An advance report has been issued by the Census Office, prepared by Mr. Charles H. Cooley under the direction of Mr. Henry C. Adams. It represents a large amount of persevering labor in gathering and compiling. The Bulletin embraces statistics of fifty lines of street railway, ten of which are

From the foregoing the following is deduced. Operating expense per car per mile—cable 14.12 cents; electric 13.21 cents; animal 18.16 cents. Operating expense per passenger carried, cable 3.22 cents; electric 3.82 cents; animal 3.67 cents. These tables are the first of the kind prepared in this country.

ANIMAL POWER LINES.—I. DESCRIPTION AND COST.

Number.	DESCRIPTION.				Total cost of road and equipment.	Number.	DESCRIPTION.				Total cost of road and equipment.
	Length.		Number of cars.				Length.		Number of cars.		
	Length of line—street length. (Miles.)	Length of all tracks, including sidings. (Miles.)	Total.	Average operated at once.			Length of line—street length. (Miles.)	Length of all tracks, including sidings. (Miles.)	Total.	Average operated at once.	
Total..	319.22	552.43	3,398	1,494	\$22,788,277.96	15	6.48	12.96	33	20	\$169,318.21
1	7.00	14.00	115	66	974,720.44	16	2.50	2.75	9	6	49,000.00
2	7.92	23.15	181	76	3,063,587.67	17	6.50	6.50	27	25	184,755.22
3	9.58	19.16	196	110	2,779,369.47	18	13.34	16.13	72	30	383,454.63
4	78.35	184.25	1,569	500	4,561,246.75	19	11.31	14.60	51	25	293,835.87
5	22.50	46.75	166	127	1,462,616.77	20	29.25	45.00	90	73	1,629,949.47
6	11.40	21.35	218	88	2,197,774.43	21	12.17	12.94	55	21	280,410.07
7	11.69	23.04	204	82	874,272.98	22	4.17	5.00	26	11	96,000.00
8	8.00	16.00	60	24	594,500.00	23	4.35	4.83	13	7	89,678.68
9	1.57	3.14	10	6	331,299.53	24	12.75	13.50	39	17	313,333.44
10	5.12	10.25	67	34	320,063.54	25	5.03	5.38	18	7	100,340.22
11	8.00	13.00	65	30	281,394.00	26	5.90	6.50	18	6	82,314.67
12	6.27	10.90	37	26	424,286.83	27	1.88	1.94	6	5	64,261.22
13	7.83	17.00	57	30	448,392.77	28	4.50	6.34	13	9	70,471.82
14	4.79	4.94	23	17	221,739.00	29	3.37	4.34	13	8	51,590.90
						30	6.30	6.69	13	8	53,686.96

operated by cable, ten by electricity and thirty by animal power. In the accompanying tables that road is placed first which carries the greatest number of passengers per mile per year. This is obtained by dividing the total number of passengers carried by the length of the line. The tables of cable and animal roads require no explanation. In the table of electric lines No. 10 is storage battery system, but the data is small as only one car is reported on. The other nine lines are overhead wire systems. The comparisons in electric lines are also less complete, from the fact that four of the ten lines had been in operation less than one year, while the cable and animal lines all report a full twelve months. There is one road which used all three systems, and is No. 5 of cable railway, No. 2 of electric and No. 12 of animal power.

The columns giving the operating expense per car mile and per passenger carried, also show by the greater variations the exhibit in the case of electric railways, that the statistics of these railways are less uniform than those of the animal and cable lines. For example, the expense per car mile of operating electric cars is seen to vary from 8.34 to 36.04 cents, the latter being over four times the former. In the case of cable railways, the variation is from 9.39 cents per car mile to 21.91 cents, or but little more than 100 per cent. For railways operated by animal power the variation is from 9.10 to 27.02 cents.

The West Jersey Railroad Company have decided to run their motor cars from Ocean City to Townsend's Inlet, a distance of fifteen miles, during the coming summer. They will commence to run about May 1st. This is intended to furnish a day's outing to Atlantic City

ANIMAL POWER LINES.—2 STATISTICS OF OPERATIONS.

Number.	Length of time covered by operating statistics. (Months.)	Car mileage.	NUMBER OF PASSENGERS CARRIED.		OPERATING EXPENSES.		
			Total.	Per mile operated.	Total.	Per car mile. (Cents.)	Per passenger carried. (Cents.)
Total..		38,466,414	190,434,783	596,563	\$6,986,919.95	18.16	3.67
1	12	2,168,100	14,688,551	2,093,364	465,775.30	21.48	3.17
2	12	1,973,627	15,609,959	1,970,959	509,496.50	25.82	3.26
3	12	2,356,567	15,432,194	1,410,876	557,941.81	23.68	3.62
4	12	13,570,000	66,500,000	848,756	2,505,535.86	18.46	3.77
5	12	3,373,638	18,925,520	841,134	616,565.53	18.28	3.26
6	12	1,494,962	8,954,675	785,498	292,002.16	19.53	3.26
7	12	1,666,490	7,327,220	660,705	288,598.54	17.32	3.94
8	12	995,000	4,900,000	500,200	229,974.20	23.02	4.67
9	12	126,276	838,088	533,813	32,570.32	25.79	3.89
10	12	1,169,416	2,613,976	610,542	129,155.02	11.04	4.94
11	12	925,640	3,745,274	468,159	186,908.91	20.19	4.99
12	12	851,017	2,245,293	359,101	78,397.98	9.21	3.49
13	12	695,630	2,744,536	350,515	99,480.39	14.30	3.62
14	12	417,560	1,366,203	285,220	55,858.94	13.38	4.09
15	12	737,837	1,793,806	276,822	70,866.43	9.60	3.95
16	12	162,240	677,070	270,828	18,167.00	11.20	2.68
17	12	632,340	1,723,420	265,142	57,553.61	9.10	3.34
18	12	538,829	3,235,116	242,512	112,188.95	20.82	3.47
19	12	432,603	2,728,935	241,285	108,667.44	25.12	3.98
20	12	2,305,146	5,834,514	196,129	224,928.06	9.74	3.85
21	12	536,213	2,287,684	187,928	103,742.14	19.35	4.04
22	12	121,180	754,863	181,051	32,588.91	26.89	4.32
23	12	178,786	711,805	163,633	24,837.21	13.89	3.49
24	12	342,513	1,951,197	153,035	66,993.48	19.30	3.39
25	12	132,322	650,692	129,362	30,827.93	23.30	4.74
26	12	125,182	693,419	117,529	26,891.53	21.48	3.88
27	12	40,000	214,060	113,862	10,806.51	27.02	5.05
28	12	197,100	500,600	111,111	18,243.30	9.26	3.65
29	12	74,460	288,015	85,464	8,742.04	11.74	3.94
30	12	126,338	509,143	80,816	23,911.95	18.93	4.70

parties through Ocean City, Sea Isle City and Avalon.—Camden, (N. J.) Post.

CABLE RAILWAYS.—I. DESCRIPTION AND COST.

Number.	DESCRIPTION.							Total cost of road and equipment.	
	Length.		Steepest grade.		Number of cars.				
	Length of line—street length. (Miles.)	Length of all tracks, including sidings. (Miles.)	Per cent.	Length in feet.	Grip.	Trail.	Average total used at once.		Indicated horse-power of engines.
Total.	75.22	142.92			601	832	563	13,300	\$26,351,416.62
1	8.60	17.00	10.00	1,300	116	380	118	1,450	5,812,693.77
2	5.75	11.50	10.40	412	65	76	50	500	1,467,000.00
3	5.65	11.00	70.00	500	48	10	32	1,175	2,628,996.59
4	3.20	8.40	4.00	2,250	26	47	40	1,500	1,219,615.63
5	11.69	23.38	13.94	666	76	141	106	3,400	3,028,755.37
6	10.15	20.40	18.53	1,000	71	119	77	1,900	2,649,735.84
7	8.86	10.10	80.00	413	58	8	48	425	1,510,495.84
8	8.57	17.15	4.00	1,600	81	-----	36	1,250	2,257,860.34
9	2.72	6.44	2.16	290	12	-----	10	200	433,097.71
10	10.28	20.65	15.50	150	50	51	60	2,100	4,343,935.53

2. STATISTICS OF OPERATION.

Number.	Length of time covered by operating statistics. (Months.)	Car mileage.	NUMBER OF PASSENGERS CARRIED.		OPERATING EXPENSES.		
			Total.	Per mile operated.	Total.	Per car mile. (Cents.)	Per passenger carried. (Cents.)
Total.		23,272,654	101,995,695	1,355,965	\$3,286,461.64	14.12	3.22
1	12	6,290,172	36,218,807	4,261,036	1,063,834.50	16.91	2.94
2	12	1,833,303	10,020,491	1,744,433	356,415.13	21.50	3.54
3	12	1,413,280	8,229,809	1,496,329	200,030.65	14.16	2.43
4	12	1,404,000	4,607,587	1,439,871	145,299.39	10.35	3.15
5	12	4,698,120	12,662,044	1,083,152	441,151.59	9.39	3.48
6	12	3,355,435	9,505,979	936,550	344,229.99	10.26	3.62
7	12	1,244,760	8,113,655	915,762	272,721.43	21.91	3.36
8	12	1,548,650	6,761,683	791,328	225,069.39	14.11	3.32
9	12	310,331	1,346,820	495,154	57,697.94	18.59	4.28
10	12	1,307,613	4,498,820	437,628	180,948.54	13.84	4.02

ELECTRIC RAILWAYS.—I. DESCRIPTION AND COST.

Number.	DESCRIPTION.							Total cost of road and equipment.		
	Length.		Steepest grade.		Number of cars.					
	Length of line—street length. (Miles.)	Length of all tracks, including sidings. (Miles.)	Per cent.	Length in feet.	Motor.	Tow.	Average total used at once.		Indicated horse power of engines.	
Total.	55.56	67.22				118	34	78	2,370	\$2,426,285.12
1	11.71	16.35	12.50	7,920	47	-----	32	1,050	1,156,354.28	
2	4.11	7.54	5.20	475	12	15	9	125	266,730.10	
3	5.00	5.22	6.50	1,200	12	4	6	80	125,801.27	
4	10.60	12.13	8.00	800	21	6	14	450	382,600.00	
5	6.00	6.36	6.00	500	7	4	4	390	115,694.50	
6	3.00	3.26	7.50	300	4	-----	3	100	95,226.16	
7	4.25	4.50	4.00	500	6	-----	5	80	73,000.00	
8	2.80	2.80	6.50	250	3	2	2	2	106,407.15	
9	4.25	4.50	3.00	300	4	3	2	150	65,368.44	
10	4.44	4.56	7.00	300	2	-----	1	35	39,104.52	

2. STATISTICS OF OPERATION.

Number.	Length of time covered by operating statistics.	Car mileage.	NUMBER OF PASSENGERS CARRIED.				OPERATING EXPENSES.		
			Total.	Per mile operated.		Total.	Per car mile. (Cents.)	Per passenger carried. (Cents.)	
				For period covered.	Per year.				
Total.		2,442,106	8,031,214	222,648	\$326,961.26	13.21	4.82		
1	6	762,729	2,752,382	235,045	470,090	95,109.48	13.53	3.46	
2	9	317,656	826,736	291,157	248,047	31,030.30	9.77	3.75	
3	12	257,733	1,047,978	208,396	208,396	28,531.04	11.07	2.74	
4	12	634,000	1,680,000	168,000	168,000	94,700.00	14.94	5.64	
5	6	92,400	463,713	77,619	155,238	12,640.57	13.68	2.71	
6	12	85,668	323,244	107,748	107,748	19,694.47	22.99	6.09	
7	12	186,400	400,000	94,118	94,118	15,550.09	8.34	3.89	
8	12	17,375	221,415	79,077	79,077	10,114.76	14.17	4.57	
9	12	74,340	239,009	61,061	61,061	12,470.87	16.78	4.81	
10	11	19,754	69,217	15,562	14,798	7,115.77	36.04	11.82	

PRESIDENT SHAFFER RESIGNS.

MR. J. C. SHAFFER, who has been president of the Citizens' Street Railway of Indianapolis for the past two years has resigned and W. H. Fowler, of Chicago, has been elected to fill his place. During Mr. Shaffer's presidency, thirty miles of new track and one hundred and fifty new cars were added. The Indianapolis lines are owned by a Chicago syndicate. Mr. Shaffer owns the street railway at Richmond, Indiana.

A STRIKE is on at Grand Rapids, Michigan, and the company is operating with difficulty. A piece of gas pipe eight inches long, and filled with nitro-glycerine was found on the tracks.

THE WALKER MANUFACTURING Co. received a few days ago, an order from England for two of their patent Differential Cable drums, which are to be used in a haulage plant there. This is a recognition from a source which will shortly place a large additional order for the same kind. The success of the Differential drum has been phenomenal, and this indication of its acceptance by engineers abroad, who are very slow to depart from old systems is especially gratifying.

OBITUARY.

HON. HOMER A. NELSON, a director in a number of street railway companies, died April 25th, at his home near Poughkeepsie, N. Y. He had been for many years a prominent office holder.

MR. GEORGE D. DUKEHART, for a long time superintendent of the Citizen's Passenger Railway Company, of Baltimore, died recently in that city from the results of a fall four months ago. His last illness lasted only one week.

THE young popular secretary of the New Orleans City & Lake Street Railway Company, committed suicide April 24th, at the residence of his parents, by shooting himself through the head, death resulting instantly. Mr. Lewis has had his position only a little while, and his desire to make a strong record, coupled with poor health had so worried him that for two months past he had been haunted with insomnia.

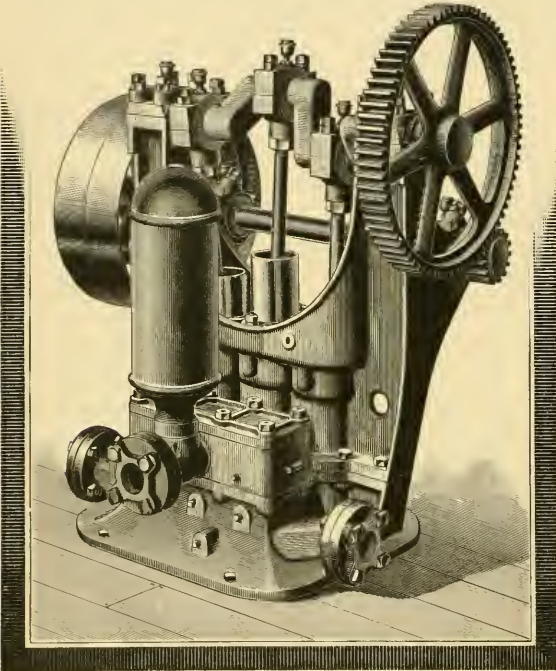
He seemed to labor under the impression that he could not do justice to himself or the company. He evidently was temporarily insane at the time, as \$12,000 of the company's money was found in a band box in his room, although no effort had been made to conceal it. His books and accounts at the company's office were found to be all right.

P. L. MOEN.

This well known member of the Washburn & Moen Manufacturing Co., died April 23rd, at his residence in Worcester, Mass. He suffered a stroke of paralysis one week before his death and grew constantly weaker. The works at Worcester were established in 1847 and had grown to immense proportions, and until at the present time 3,000 were employed.

Power Feed Pump.

THE splendid record of the water heaters of Wm. Baragwanath & Son, Chicago, is so well established that all users of steam will be interested in their latest manufacture, which is a triple-acting Power Boiler Feed Pump. As a power feed pump can be operated at from one-sixth to one-third the expenditure of fuel that would be required to do the same work by the ordinary steam fed pump, the great saving in fuel will be at once recognized. The Baragwanath power pump



illustrated herewith is strong and compact and built for continuous heavy service, and is geared five to one. The crank shaft is of steel, operating three alternating plungers, one of which is always lifting and another forcing water. There is no intermission between the strokes, which follow each other constantly, thereby attaining the maximum evenness of delivery and steadiness of flow. The valves are plain metal easily re-ground, and the whole apparatus is a model of simplicity, strength, and accessibility.

Cable Traction.

THE cable is attracting a good deal of attention in New York City these days. Among the companies who are seriously considering its adoption are the Sixth Avenue, who have a petition now circulating among the property owners; and the Forty-second Street, and Manhattanville and St. Nicholas Avenue Company are strongly inclined to adopt cable power.

THE WESTINGHOUSE people are equipping a road at Ottawa, Canada.

ECHOES FROM THE TRADE.

THE PULLMAN COMPANY, have received the order for new electric cars for the new line in Plainfield, New Jersey.

THE EDISON GENERAL ELECTRIC CO., have secured the contract for motors for the Indianapolis & Broadripple Rapid Transit Company.

THE PORTLAND, MAINE STREET RAILWAY CO., have ordered the McGuire trucks for the new cars which are building for their electric line.

THE WOODBRIDGE & TURNER COMPANY, of New York, have the contract for the construction work for the electric railway at Portland, Maine.

THE Baltimore *American* relieves itself as follows: Those who say that the car horse must go, have evidently not been progressing behind that unobtrusive animal lately.

THE SHULTZ BELTING CO., St. Louis, have closed a contract for over 900 feet of their double leather cemented belting. Two are 160 feet long and 72 inches wide and the balance are 16 inch belts.

THE BALL ENGINE CO., have recently issued a neat little book of about 40 pages entirely filled with testimonial letters from the many users of their engines; it is nicely gotten up and bespeaks volumes for that company.

C. E. LOSS & Co., Chicago street railroad contractors, have moved their office from No. 113 Monroe Street to larger and attractive quarters in Room 219 First National Bank Building, where they will be happy to receive their friends.

FROM sworn reports made to the city register of St. Louis, it appears that during the first three months of this year, the street railway in that city carried 17,546,415 passengers, which is an increase over the same period last year, of 3,680,074 passengers.

THE FULTON FOUNDRY CO., of Cleveland, report the sales for their steel-tired wheel rapidly increasing, the tests which have been made proving very satisfactory. They also report receiving orders from all parts of the country for gears and pinions for electric cars.

THE SHULTZ BELTING CO., of St. Louis, have recently closed a contract with the St. Louis & Suburban R. R. Co. for two 72 inch belts, each 154 feet long. Also ten belts 16 inches wide aggregating 700 feet. All belts to be double leather and cemented only, no rivets or pegs to be used.

A BOOM TOWN out West that wants to appear in line with modern improvements, advertises at great length the advantages of its electric line, and then in a small type foot note adds: "Pending the perfection of the storage battery system, the motive for the electric cars will be furnished by mules."

THE extension of the St. Paul line in the adoption of electricity has rendered necessary the appointment of two superintendents. A. P. Wilkes will have charge of all the electric lines, and C. P. Morgan will act as superintendent of the two cable lines under the direction of General Manager Scott.

THE WEEMS ELECTRIC RAILWAY system has been organized in New York City with a capital of \$2,500,000 for purchasing the Electro Automatic Transit Co. of Baltimore. The object of the company is to demonstrate the practicability of using electricity as a motive power for railroads now operated by steam.

THE MEAKER MANUFACTURING COMPANY are now comfortably settled in their elegant offices at 134 W. Washington St., and the machinery for the manufacture of their fare registers will be forwarded from the East in a few weeks. No delay, however, will be experienced in filling orders during the time occupied in moving.

THE MCGUIRE MANUFACTURING Co., certainly deserve the title of "record breakers," having received in twenty days recently, orders for 189 trucks, among them were 80 for Milwaukee, 28 for Lawrence, Mass., 28 for Toledo, O., and 30 for Harrisburg, Pa. The last named to be placed under bodies built by the J. G. Brill Co.

THE ST. LOUIS CAR CO., of St. Louis, recently took an order from the St. Louis & Suburban Ry. Co., of that city, for 120 cars. This is a very satisfactory order and speaks well for the ability of that company, who, however, on account of a large number of orders received from all parts of the country, find their shops full, which causes them to run tight.

THE Superintendent of the Quincy & Boston Electric Line was riding on one of his lines one day, when an express wagon accidentally collided with the car with considerable force. Rushing to the front platform he grabbed the motor man rather savagely by the arm, at the same time asking his name. The employee turned, saw who the speaker was and replied: "Well, I guess its Dennis, now."

THE CHICAGO CITY RAILWAY Co. has prepared plans and commenced the erection of a fine office building for their exclusive use, to be located next to and north of their main power station at 2020 State street. The building will be 53x80 feet, three stories in height, and will cost not less than \$25,000. The entire building and floors will all be of hard wood, and finished in elegant style.

GEORGE CUTTER, of Chicago, has lately received several carloads of simplex wire, much of which will be used for railway feeders. To this he is adding an assortment of incandescent lamps and of magnet wires. He reports large sales of the rubber bells, two-part and three-part insulators, made by the Revere Rubber Co., and continues to decorate all new lines with the Morris poletops.

THE SHORT ELECTRIC RAILWAY Co., of Cleveland, find the demand for their new gearless motor is fully equal to all expectations, as they are receiving inquiries from all parts of the country, and its success has been so proven that no company contemplating buying new or adding to their old equipment can afford to deal before seeing this new motor.

THE LAMOKIN CAR Co., at Chester, have appointed Buss & Weston, with office in the Phoenix building, Chicago, as selling agents for their street cars. This company have for some time been selling coaches, and all cars built by them have given great satisfaction. The company's business in the West is rapidly increasing, in consequence of which agents will be kept constantly on the ground.

THE WIGHTMAN MOTOR Co., were called on to furnish a car to the People's Street Railway, of Scranton, when the company lost all its cars by fire a few days ago. The new motor proved such a success, that the Scranton road after using the Wightman a few days, immediately placed an order for ten double 15 h. p. motors and pronounce the motor "about as simple and practical a machine as it is possible to get in the line of electric street railway apparatus."

DIDN'T MOTE.—The Belding Motor & Manufacturing Co., have made an assignment. The company was organized three years ago with a capital of \$100,000, and when fairly started in their factory at Hermosa, were burned out last January and lost everything. A new building was erected from the insurance money, but the losses on machinery proved heavier than was expected; until the assignee can make an inventory it will not be known whether a reorganization will be attempted or not.

THE STANWOOD MANUFACTURING COMPANY are now nicely located at their new factory which is at the S. E. corner of 17th and Clark Sts., Chicago. Although their step for street cars has not been on the market but a little over a year, too much can not be said in its praise, having been the first and only step of the kind to be had. Their sales have taxed their former shop to its utmost. Mr. Stanwood, their general manager, states that their new shops are much larger and every way better prepared to care for their very large increasing business.

THE BALL ENGINE COMPANY, of Erie, Pennsylvania, are now represented in New York by the enterprising firm of E. T. Copeland & Company, 106 Liberty Street, who will look after the interests of this very popular engine in New York and New England. The manufacturers have very greatly increased their facilities by large additions to their works, and the equipment of special tools insuring absolutely perfect construction in their work. They can furnish promptly Simple, Tandem, Compound, Cross Compound and Triple Expansion engines up to 500 h. p. and the splendid record which these engines have made in electric railway work entitles them to a careful investigation by all railway managers.

THE LAMOKIN CAR WORKS, Chester, Pa., have shipped six vestibule cars to the electric road at Newark, Ohio, all of elegant finish. This is the line belonging to Judge Altgelt, of Chicago. Also 4 16 ft. closed car bodies to the Danville Street Car Co., Danville, Va. Orders were received from the Williamsport, Pa., Passenger Railway Co., for 4 16 ft. cars and 2 vestibule cars. The delivery was also made to the Lincoln, Neb., Street Railway Co., of 30 16 ft. closed cars, and 2 6 seat open cars to the Salem, Ohio, Electric Railway. The works are crowded with orders and will run on extra time until October 1st.

THE ALLEN PAPER CAR WHEEL CO., with factories at Hudson, N. Y., and Pullman, Ill., which have for so many years been making paper-filled wheels for passenger coaches and the finest sleeping cars, have combined their long experience and very valuable patents, and are now making their new steel-tired wheel, especially adapted for cable and electric cars. The wheels are made with a cast-iron centre, the hollow spokes being filled with paper pulp, oakum, or mineral wool, which deadens the sound and makes them comparatively noiseless. Upon these spokes the steel tire is shrunk, which enables them to replace the tire at any time.

BEECHER, SCHNECK & BENEDICT, general managers of the American Casualty and Insurance and Security Co., have added a department to their already very complete lines of insurance, which will be of special advantage and interest to all employes in the street railway service. By the payment of only a few cents weekly the employe can be insured in case of accident or death, or both. In case of accident he receives each week a sum equal to his wages and the payment of his doctor bill, and in case of death his funeral expenses are paid by the insurance company. To accommodate those who are drawing small wages the company, for a less charge, will give one-half the above benefits, and for a very small additional charge will pay in addition to the above as high as \$3,000 in case of death. Managers can render their men a genuine benefit by examining the plan offered, and taking steps to bring it to their attention.

THE SIOUX CITY ENGINE WORKS have been so crowded with orders they are now obliged to work extra shifts, and are running their shop twenty-three hours out of the twenty-four. Their facilities are the very best, and a specially gratifying feature of their sales is that every sale brings a new order. All the electric roads who have ordered of them have returned a second order, where they have increased the original power. Among such duplicate orders was one last week from the Lincoln, (Neb.) Electric R'y., who purchased a 250 H. P. last fall and now ordered a second engine—a 22x42 Corliss, of same power as the first. Visitors to Chicago may see a Sioux City Engine Co.'s 16 x 12 engine running in the new pipe mill of the Crane Manufacturing Co., or may call on Mr. S. W. Gregg, 327 The Rookery, who is the manager of the branch house here.

WESTINGHOUSE, CHURCH, KERR & Co., reports business active at their Boston office. Their recent sales of the larger sizes of engines include one 250 horse power, compound, to the Fairchild Paper Co.; one 100 horse power to Frank Jones, president of the B. & M. Railroad; two 75 horse power to the Okott Falls Paper Co.; three 80 horse power, compounds, to Howland & Ellis for an electric railway in Burlington, Iowa, and five, 5 horse power, six 10 horse power, four 15 horse power, one 25 horse power, one 35 horse power, one 45 horse power, one 60 horse power, one 100 horse power, one 125 horse power, two 150 horse power, and one 200 horse power for a complete subdivided power plant in the Bleachery and Print Works of the Dunnell Manufacturing Co., at Pawtucket. They are meeting an active demand for their new specialty, known as the Steam Loop, having entered orders for a large number of systems from the Dunnell Manufacturing Co.; Flint and Pocasset Mills at Fall River; Forest Paper Co. of Yarmouthville, Me.; the Grosvenor Dale and Peace Dale Mills; Woonsocket Rubber Co. and others.

WANTED. An Electric Street R'y Co., who are newly equipped or extending their lines, can secure the services of a gentleman with several years experience with horse and cable companies; experienced in outside as well as office work. Best of references. Address, Engineer, care this office.

Electric Railways.

C. E. LOSS & CO.,

118 Monroe Street,
CHICAGO.

Contract for the Building and Complete Equipment of Electric Railways.

Correspondence Solicited.

References Furnished.

THE HALE & KILBURN MFG. CO.

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Made with or without Springs. Covered in CARPET, PLUSH or
RATTAN.

OUR NEW ELASTIC SLAT SPRING SEAT IS THE CHEAPEST AND
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CORRESPONDENCE.

We cordially invite correspondence on all subjects of interest to those engaged in any branch of Street Railway work, and will gratefully appreciate any marked copies of papers or new items; our street railway friends may send us, pertaining either to companies or officers. Address:

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VOL. I. JUNE. NO. 6

ONLY four months until convention.

LEEDES leads out in building the first overhead system in the United Kingdom.

PARK travel is a month late in many Northern cities on account of the late spring.

ALL the rights have been obtained, the contracts closed and work is even now commencing on the first electric road in England to be operated by the trolley system. The line is a suburban one at Leeds, and will do more to demonstrate the actual merits of the system than all the papers which could be read before conventions of scientific and professional men in a generation. Seeing is believing.

NOT many of our readers are subscribers of "Pantobiblian," and doubtless wonder what it is. It is a monthly magazine of nearly 300 pages, published in St. Petersburg and edited by a Russian engineer. It is a sort of review of mechanical reviews and at present its articles are written in only eight languages, but others are promised soon. It treats of almost everything from agricultural to marine arts.

EVERY street railroad man will feel a certain sense of pardonable pride when he remembers the president of the United States found a street car a welcome and pleasant feature of his visit to a certain southern city recently. A man who belongs to a fraternity which can entertain presidents and postmasters-general has a right to spread himself. Probably Buffalo and Boston will now get those letter boxes on their street cars.

EVEN with its magnificent viaduct system, described in this issue, Berlin is considering the construction of an underground railway. The promoter proposes to sink sixty entrance shafts for objective points, from which to tunnel, and has already petitioned for permission to erect necessary buildings above ground as well as for authority to prosecute the underground work. The motive force, not yet decided on, will be either electric, pneumatic or hydraulic.

THE report of the English Derby was delivered to New York within 30 seconds after its receipt at the London agency. When it is remembered that submarine cables have been in existence but forty years, and have now well nigh attained perfection, it offers every reasonable ground of belief that those points which at present annoy railway electricians may, with every confidence, be expected to find a speedy and complete solution.

FOR nearly one month past the ex-employees of the street railway lines in Grand Rapids, Mich., have been guilty of the most overt acts of lawlessness. Not satisfied with their wages they all struck. That they were free to work for whom they pleased no one questions. But they at once went on record as neither willing to work or allow others who were anxious to do so. The company stands ready, and has, to operate its cars, but the lawless mob boarded its cars, and with bricks, clubs and other missiles attacked and injured both employees and passengers. More than this, at midnight they broke into the dwellings where the new men were sleeping and made a most disgraceful assault and drove the inmates out at the point of revolvers.

At 3 o'clock in the morning of June 10th, a premeditated attack was made on the company's property by a mob of 200 men composed of strikers and members of other unions. The plan was to blow up with dynamite the pit of the cable road. The police, however, anticipated them, and when the marauders began to tear up the track, the police came from ambush and ordered them to disperse. This was greeted with a volley of stones. A second order called out a pistol fusillade from the strikers during which two policemen were shot. The strikers advanced and the encounter became a hand to hand fight, in which the officers made a most gallant stand and drove back the mob, capturing thirteen, who are now in jail. It is easy to boast of a free country, but no country is free where a few misguided and belligerent men are allowed to jeopardise life and property. Every man who is half a man should not hesitate to come out and put down such outrageous proceedings. Laborers have rights, but to coerce others and destroy property not theirs is not one of them. Any sympathy which the strikers may ever have had has been long since forfeited and it is to be hoped that the leaders and those who are known to have assisted in these depredations and assaults will be safely landed in the penitentiary, where they belong.

MANY of the daily papers in Brooklyn and New York have arrayed themselves in a solid rank and are using every means within their reach to create an unfair impression of the electric system. Such papers seem to have made no effort to discover any good features, or if by accident they do find a commendable instance it is immediately thrown aside. In order to secure at least a fair hearing before the people living along the route of the proposed lines, President Wm. Richardson has had compiled and published in neat pamphlet form the views of the mayor and railway managers in most of the large cities. The tract is entitled, "What is the truth about the trolley electric system for the propulsion of cars in city streets?" and is an able document.

THE field of the street railway is being constantly broadened. Once it was confined exclusively to the transportation of individuals, but with the advent of rapid transit, its usefulness has been proportionately enlarged. There are now lines successfully operating a parcel delivery service; on others, heavier freight is hauled; several furnish funeral cars; and now comes the proposition to put in service a number of postal cable cars in St. Louis, for the delivery of pouches from the general office to a large number of sub-stations, from which carriers may start. The company offer to furnish cars at \$1,500 each per annum, and Postmaster Harlow estimates the saving in time over present system to be fully one hundred hours daily and \$12,000 annually. The same cars would receive the mail from collectors. St. Louis railway managers favor the plan, which it is greatly to be hoped will be adopted. In some cities the plan would not be a practicable one, but in many places it would, and managers will find the subject well worth investigating. In St. Louis they would rebuild some of the old 12-foot cars for the purpose, which could be done at little expense.

A MAN in St. Paul estimates the misery which has come to him at an even \$3,000 worth, and blames it all to the railway company. Late at night he wanted to go out in the rubarbs somewhere and took a short line car at a period in his life when he wanted a long line ride. Having run its allotted course the conveyance turned back. Taking another car the awful dilemma of paying a second fare presented itself. It was an outside line and other people were glad to pay a second fare to ride. But he was one of those brave, noble men, who would sooner die than perish, and when the conductor took up the collection he refused to put anything in the hat. The complexion of the night was of a deep Soudan, the road was paved with mud, and the sprays of Minnehaha danced in the air. Firmly but gently the conductor led him into the exterior of the car. He walked about 3 miles in three hours, and estimates his services at \$1,000 a mile. The only regret that the company has is that he did not keep on walking and never stop. But he is entitled to something and we hope the judge will give him fatherly advice, admonishing him withal, that \$3,000 damages do not grow on 5 cent spites.

Trolley Wins the Telephone Case.

A MOST important decision was handed down by the Supreme Court of the State of Ohio recently. The telephone company of Cincinnati brought suit against the Cincinnati Inclined Plane Railway Company on the occasion of the latter opening its electric line, which was by means of a single overhead wire and a ground circuit. The telephone company was granted an injunction restraining the electric road from so operating. The lower courts decided against the railway and it was only with the greatest difficulty that the railway secured an order of court to operate, pending the appeal to the supreme court, and on the filing of heavy bonds. The opinion of the highest authority in the State of Ohio is that the streets belong to the public, and are dedicated to travel, and that the rights of users of the telephone whose wires are in the streets are subordinate to the rights of travelers. That the electric railway is an improved conveyance and that the telephone company has no vested rights in the ground circuit. It is a splendid victory, and will be hailed with delight by many managers who have been the object of claims from the telephone companies. In another column will be found the decision in full.

Struck for a Cap.

THE failure to provide a uniform cap at the time set for a driver on an eastern road to do so, resulted in the discharge of the employe, and a general strike which tied up the road one day.

It would seem from the bare statement given above, that it was a small matter for discharge and still more trivial as a cause for men forcing their grievances on the public, and causing great inconveniences to innumerable persons who had not in the slightest degree contributed to the dissatisfaction. A street railway manager certainly needs to be actuated by broad ideas and possess in more than ordinary degree a large amount of good common sense. He must not allow any personal sense of official authority to warp sound judgment, neither can he permit any relaxation of firm but just discipline. A company most unquestionably has a right to require its employes to wear its prescribed uniform during those hours in which the time of the employe belongs to it: and no uniform can be complete without suitable headwear. In the case cited it would seem that the failure to comply with the reasonable order was not due to want of suitable notice or inability to provide the same, but rather from a spirit of defiance of authority. There never yet was a body of men in uniform who were every one suited. Some want one kind of visor on caps, others another; the thin man likes a double breasted coat, and the fleshy one an open cutaway with only one row of buttons—and so it goes. From long personal experience the writer knows that in fact the men themselves seldom really know what they best do like, for in one instance, repeated requests for a certain style of garment when at last granted was promptly followed by objections, and from the very ones who had wanted the change. A rigid but always humane discipline is simply imperative in an insti-

tution of this nature, and where impartially enforced will be found to give better satisfaction to the men than any half hearted vacillating policy can ever do. In justice to those other men who obeyed the order to wear the cap, some action was unavoidable on the part of the superintendent, but whether the man's previous record and the circumstances of the case were such as to require instant discharge we do not know. This much is certain, the rights of the patrons of a company should always be considered, and the manager who is most the man, will never discipline to gratify personal feelings. But it is just as true that the same convenience and welfare of the public can only and ever be served by the enforcement of strict and what may seem to people who do not know, unnecessarily severe restrictions.

EXASPERATING, VERY.

THE *Leesburger*, published at Leesburg, Florida, whose editor, possibly, has never seen an electric car, prints the following: "One of the most exasperating accidents that happen in connection with the trolley system of propelling electric cars is the killing of horses by the breaking of the trolley wire." It is doubtless most exasperating to have a rich relative die and leave one so many dollars that the legacy becomes a positive burden; but most people are willing to take their chances on that kind of risk. It is most exasperating to have an eclipse of the sun just at the very instant when two lovers are about to get six tintypes for 25 cents; and, not unlikely, it would be in a measure exasperating to have on hand all the necessary features of a wedding except the bridegroom. But none of these calamities often come to pass, and while there are cases on record where an occasional disaster of the character named has occurred, still they are few and far between.

Until the adoption of mechanical power, in the city of Chicago alone, over 600 horses died every year from causes resulting directly from their connection with the animal system of propelling horse cars. The horses that are killed through contact with electric railway wires in a whole year, in the entire country, can be counted on the fingers of one's hands. From a humane standpoint alone, there can be but one opinion in the matter.

A RATE war has broken out between the Pittsburg Traction Company and a parallel line, and the former has made a 3-cent fare for a 6-mile haul. As the company has purchased three barrels of pennies to supply its conductors there would seem to be little cents in the change, though some people will still imagine there are barrels of money in the business.

WHEN a fire occurs in a certain Illinois town which has an electric road the company puts extra cars on the line which leads to the conflagration and does quite a rushing business.

A GOLDEN spike was none too good with which to commence the construction of the street railway in Beaumont, Texas.

A MOST IMPORTANT DECISION.

THE history of the celebrated telephone-trolley case in Cincinnati, is familiar to all our readers. In the lower courts, the telephone won, and the electric line had to give heavy bonds to enable it to run, pending the appeal to the Supreme Court. On June 2d, Judge Dickman, rendered the following opinion reversing the decision of the Superior Court, and is as follows:

1. The dominant purpose for which streets in a municipality are dedicated and opened, is to facilitate public travel and transportation, and in that view, new and improved modes of conveyance by street railways are by law authorized to be constructed, and a franchise granted to a telephone company of constructing and operating its lines along and upon such streets, is subordinate to the rights of the public in the streets for the purpose of travel and transportation.

2. The fact that a telephone company acquired and entered upon the exercise of a franchise to erect and maintain its telephone poles and wires upon the streets of a city, prior to the operation of an electric railway thereon, will not give the telephone company, in the use of the streets, a right paramount to the easement of the public to adopt and use the best and most approved mode of travel thereon; and if the operation of the street railway by electricity as the motive power tends to disturb the working of the telephone system, the remedy of the telephone company will be to re-adjust its methods to meet the condition created by the introduction of electro-motive power upon the street railway.

3. Where a telephone company, under authority derived from the statute, places its poles and wires in the streets of a municipality, and in order to make a complete electric circuit for the transmission of telephonic messages, uses the earth, or what is known as the "ground circuit," for a return current of electricity: and where an electric street railway afterwards constructed upon the same streets, is operated with the "single trolley overhead system"—so called—of which, the ground circuit is a constituent part, if the use of the ground circuit in the operation of the street railway interferes with telephone communication, the telephone company, as against the street railway, will not have a vested interest and exclusive right in and to the use of the ground circuit as a part of the telephone system.

Judgment of the Superior court at general and special terms reversed, and petition dismissed.

For the week ending May 23d, the receipts of the City and South London (underground electric) were \$3,840, against \$3,325 for the preceding week.

SPECIAL tickets have been authorized by the Atlantic Avenue Company in Brooklyn, which are sold at four cents each, for the use of school children.

LAST year the electric railway in Monchsberg, near Salzburg, carried 66,712 tourists and 1,000 tons of freight. A dividend of 7 per cent. was declared and it was voted to at once make additional extensions to the line.

The Trolley in Brooklyn.

WITHOUT doubt President Daniel F. Lewis has never received greater satisfaction from an investment of 5 cents than he did on the morning of May 29th, when, with a party of distinguished guests he entered one of his electric cars and paid the first cash fare, and thus inaugurated the first electric road in the city of Brooklyn. Already 6 miles of the road are completed and forty cars are in operation. They are of a dark olive color and very handsomely decorated within, and reflect great credit upon the builders, the Lewis & Fowler Manufacturing Company. The trains consist of one motor car and one trail car, and run from Thirty-ninth street ferry to Gravesend Bay.

The car house is at the foot of Fifty-second street, and is 100x350 feet. Two 500-horse-power McIntosh & Seymour engines furnish the power, and there are three 500-horse-power Babcock & Wilcox boilers. The car house has storage room for 100 cars and combines all the modern improvements. The turn tables are operated by electricity. Since the opening of the road, business has very largely increased and the system is very popular with the public. This practical demonstration of the advantages of an electric line will do more to counteract the wild imaginations of the Brooklyn and New York press than could be accomplished in any other possible way. The road is perfect in every detail, and is a most valuable addition to the model system of the Brooklyn City Railway.

New York Rapid Transit.

THE long looked for report of the commissioners has been made, and while not final is a long step towards the desired end. The recommendation is for a four track underground railway in Broadway, starting near South Ferry and extending to Fifty-ninth street. Thence under the boulevard to the vicinity of One Hundred and Sixty-ninth street, with such length of viaduct at and near Manhattan avenue as may be necessary; thence under Eleventh avenue and beneath private property immediately west of it as may be necessary; thence by viaduct across Spuyten Duyvil Creek; thence by tunnel or viaduct to city limits.

It will be seen that this report calls for both subway and overhead construction. This, if carried out would necessitate a quite deep tunnel in that portion of Broadway, in which, by reason of the quicksand, the Broadway cable people have been obliged to lay a piled foundation. The recommendation, however, is to follow as near as possible the present great arteries of travel but to keep as near the surface as possible. The route chosen is practically the alternative route proposed by Mr. Colman Hazard, of the City Railway, and strongly points to an arrangement with the Broadway Cable road. If there should be too great opposition the commissioners might still change their levels to a deep tunnel while maintaining the same route. The detailed length of the above contemplated route is 18 miles. It now appears as though Austin Corbin and Jay Gould are both defeated as to

their West Side plans. As regards the East Side it would seem that its first objective point should be connection with the Grand Central from South Ferry; that is only four miles and does not involve as many difficulties as the West Side construction. In any event the cost of the enterprise will necessarily reach far into the millions, and will be the most stupendous enterprise of the kind ever undertaken. The motive power as settled by the commission must be electricity or some other smokeless force.

IT MADE THE TOWN.

ONE of the old settlers in Minneapolis recently said to a *Journal* reporter: "I see the street railway company is tearing up their old line here. Well, when they tear up these tracks they tear up a good deal of the early history of improvement in this town. I guess it was about 15 years ago that Tom Lowry, then not as rich as he is now, built this old University line, and I can tell you, all us East siders felt made up when the gaily painted bob-tails bowled along the streets behind a single horse. Those were great days for us. We used to turn around on the street when we saw a car go by and admire it silently for a few minutes and then chuckle and say 'Oh, Minneapolis is to be a big town yet, just you wait and see if it won't.' Whenever visitors from the East would come to see us we would trot them all down to this here barn to see the new cars. Our friends would always laugh and say we had only a little village anyhow and that the cars didn't amount to much, they were just bob-tails. Then we would get mad and tell them to wait a bit and we could show them as good as the best; and now they have waited and we can show them the best."

THE State legislatures are adjourning, and the afflicted and persecuted street railway manager is beginning to secure a good night's rest once more.

THERE were carried by the street railways in New York State last year, 686,000,000 passengers, which is the equivalent of one hundred rides for each inhabitant.

THE New Orleans *Delta* says: The cars of Augusta, Ga., are to be allowed by the City Council to make 12 miles an hour. If our City Council would only devise some means by which the street car companies of this city could be induced to make about eight, it would earn the undying gratitude of a long-suffering people.

AN electric car furnished the wings recently for an avenging Nemesis. Three Italians had a friendly little discussion while walking on the tracks of the Coney Island Electric road. To emphasize the argument two of them neatly cut the throat of the third. When the car came up to the dying man the others were a considerable distance. The driver put on the full current and soon overtook the desperadoes and with the aid of the conductor and passengers bound the fugitives with ropes and carried them to the end of the line where they were turned over to the police.

INSURANCE AND THE TROLLEY.

AMONG the numerous frightful forms and shapes which have of late been held up before the gaze of the Brooklyn and New York public by certain papers in those cities, has been one which has occasioned no small alarm, and which has served to prejudice the minds of many timid people. It has been asserted that the erection and use of the trolley wire would be a continual source of danger to the city; that parents would leave their children at home only to return and find it a crematory; that the old orthodox brimstone perils which shall overtake the wicked in the hereafter would certainly threaten even the righteous in the present; also, and by no means an inconsiderable tribulation would be the immediate heavy advance in the rates of fire insurance, if indeed, any insurance could be had at all. This fear is based on the same reasoning that pictures instant and total annihilation of a goodly portion of the community by electrocution: though there has yet to be recorded in all the cities where the electric railway is in use, the first instance of death having been occasioned from the current conducted through a trolley wire. Contrary to the impression entertained by some people, Father Time has not hung a row of scythes on these wires which only wait an excuse to drop and gather in reinforcements for his cemetery. Neither has it become necessary for a fire extinguisher to be placed upon every pole, and in no city does the electric car carry a hook and ladder outfit.

To ascertain the truth of the claims set up, that in trolley wire cities the residents along its streets were waited upon by the agents and treated to an advance in the current rates of fire insurance, or even barred out from carrying any insurance at all, we have taken pains to make inquiries in a large number of the more important cities in which electric lines are operating, with a view to establishing the truth or falsehood of this charge. Responses received from sixteen cities, without a single exception, the report was that insurance rates had not been changed on this account. Boston with sixty miles of its street car tracks overhung with trolley wires naturally comes first in the list, and the more convincing on account of its exceptionally narrow streets with a curve at every corner, and frequently a sharp crook in the line in the middle of blocks. The busiest business streets are also the very ones where the electrics are thickest, and the way the different lines cross and recross, wind around and double on their own tracks, makes an intricacy of wires, the arrangements of which it should not be expected of a Brooklyn newspaper man to comprehend. Certainly in old conservative Boston, if anywhere on earth, if there was any real danger from this source it would have been long since established. In this connection, therefore, the following letter from a gentleman who is probably the best known insurance man in New England and who has made a life-long study of insurance in all its details, of the highest value, as indicative of the position of insurance companies not only in that city but abroad.

BOSTON, May 11th, 1891.

Editor Street Railway Review:

Mr. F. H. Monks, general manager of the West End Street Railway Company, has referred to me for attention and reply your favor to him of the 29th ult. I have had occasion to very carefully investigate the question whether or not rates have been raised because of the introduction of electric trolley wires by street railways, and I have never yet found a single authenticated instance, nor do I find any sentiment amongst fire underwriters, that such an advance in rates for such a cause is required.

As the United States manager of important English fire insurance companies, I am in close contact with the insurance rates at most important points east of the Rocky mountains, and my facilities for examining into this question are not only good, but owing to contention here by gentlemen of position not connected with the insurance business, I have taken the trouble to avail myself of the facilities, with the result already herein stated.

When the trolley system was first introduced in this city, some of our citizens, and some members of the board of fire commissioners, were of the opinion that they would prove a serious increase in the fire hazard of the city, and serve to impede and retard the fire department in their efforts to extinguish fires, but no instance has so far arisen that has served in any degree to show the correctness of the opinion then held by those gentlemen, and, on the other hand, the contrary opinion I then held and freely expressed, not only in the board of underwriters, but before the city government, has so far proved to be correct.

I am, dear sir,

Yours respectfully,

JOHN C. PAIGE.

Cleveland has one of the largest electric roads in the country, and the report from that city is: "There is absolutely no change in insurance in this city arising from the erection of trolley wires for street railroad purposes." Passing on still further West, the situation in St. Paul and Minneapolis is not found to be particularly alarming, as C. G. Goodrich, general manager of the lines there writes: "I have asked our insurance companies in regard to the matter, and they say this is the first time they have heard the question raised. There has been no advance in rates on account of the electric trolley wire."

It will be remembered that Minneapolis has already some seventy miles of electric road, while the last horse car went into oblivion in St. Paul two months since: yet a forest of poles is springing up now in these cities for new lines just building.

Duluth has a big lake as one of its suburbs which may possibly account for the fact that "there has been no advance in insurance rates here on account of trolley wires."

And now we come to St. Louis, with one of the best fire departments in the world, constantly on the alert to

prevent as well as extinguish fires, and where people carry parasols in the winter so they won't get sun burned, and yet, despite all these, note the following letter:

ST. LOUIS BOARD OF FIRE UNDERWRITERS,
May 20th, 1891.

Editor Street Railway Review:

Dear Sir:—In reply to your query of May 19th, I beg to say that there has been no advance in insurance rates on account of the introduction of the electric trolley system in St. Louis.

Yours obediently,
JAMES A. WATERWORTH,
President.

There are six electric railway companies in St. Louis, and there are three lines building.

Indianapolis has enjoyed the benefits of a first class electric line for two years past, and struggled along without burning themselves up, and Secretary Anderson writes: "The companies have never advanced the rates on account of our electric equipment."

In Omaha there seemed to be a far greater fear that the crazy Missouri would get on a tear, and they would wake up some morning as a part of Council Bluffs, than of all the trolley wires in Christendom. Secretary Goodrich writes under date of May 19th: "No change has been made in rates here, and no cause for any advance surely, since our electric railway service was adopted. We have operated since July, 1889, and in no case, directly or indirectly, have the insurance people been able to find any loss traceable to us."

Down in Kansas City, the sun shines so hot that the business men have to carry fire insurance on their lives, still with a large electric mileage in the different companies, the rates have not gone up with the trolley poles.

Buffalo is just coming into the fold, having but one line in operation and that does not come down into the business centre. The new lines now under construction will, however, very soon permeate the whole city, but the Buffaloes have not fled to the hills on this account, and the manager of the rating department of the Buffalo association of fire underwriters writes us under date of May 20th: "The electric trolley system is not at present used on our down town streets, and very little on the outlying streets, and has not been considered by this association." The Brooklyn papers evidently have not scared the underwriters there.

The reader may have supposed it was our intention to forget to mention Albany, N. Y., but we have purposely saved that for the last. General Manager John W. Mc Namara, of the Albany (Electric) Railway, writes on May 20th: "Yours of the 19th inst. asking whether insurance rates have ever been advanced in Albany on account of the erection of trolley wires has been received. We are happy to answer that the rates have not been increased, and we have not heard that there was any intention on the part of insurance companies to increase rates on that account."

There was a fire some time ago in which it was claimed the current from the electric road entered the telephone exchange and burned it out, but it has not yet been proved that it was the railway wires which did the mischief.

If the discussion could be confined to Brooklyn, it would not be so bad, as the residents there travel freely and can easily satisfy themselves of the truth. But the incendiary utterances of the Brooklyn press are being copied as gospel by papers in small places where companies are endeavoring to introduce rapid transit, and the minds of people being poisoned in consequence. The average country editor knows less about electric railways than he does about running a paper even, and becomes an easy victim. The Brooklyn papers fail to back up their assertions about insurance rates with any instances of record.

THE BALTIMORE CABLE LINE.

THE city of Baltimore is greatly to be congratulated on the completion of the splendid cable system of the Baltimore Traction Company, which was opened for travel May 23d. The history of the enterprise has been that of many another in which the most stubborn opposition has had to be met and overcome; and like others the very people who worked the hardest to prevent its building are now taking on themselves great credit for a success which "they always predicted." The inauguration was without any special ceremony, but was entirely satisfactory to all interested. At 5 o'clock, A. M., the first of twenty cars went out, followed at short intervals by the entire equipment. Notwithstanding the early hour there was a great crowd gathered along the street to witness the start, and the cars were immediately filled. A little later in the day the cars were not able to contain the crowds desiring to ride. Fifteen additional cars will be put on as soon as completed, which will enable the present headway of three minutes to be considerably reduced. Stops for passengers are made only at the end of blocks, and the plan is already meeting with favor by the public. The distance between termini is 5 miles and is now made in thirty minutes. This will soon be shortened. The old running time with horses was fifty-eight minutes. The system comprises 11 miles in which there are twenty-seven curves. The track construction was exceptionally difficult. There are two power stations similar in plan, and handsome structures of pressed brick. Each contains two 500-horse-power 28x30 Corliss engines. The yokes are cast iron weighing 500 pounds each and are placed 5 feet apart. The road is strong enough to carry the heaviest train run on any steam road in the country. The cars are of the combination pattern carried on two 4-wheel trucks and weigh 15,000 pounds.

Over 7,000,000 brick were used in the construction of the two power houses. Power is transmitted to the driving drums by cotton ropes, from a wheel of 26 feet diameter. Most of the driving machinery was made by the Robert Poole & Sons Company, Baltimore.

THE SEASON OF THE OPEN CAR.

THE open car question which has excited so much comment in Brooklyn and New York this spring and in which the health commissioners of those cities have taken so decided a stand, is but another illustration of the fact that there are some things which cannot be best regulated by municipal ordinance. Had it not been for the fact that the past spring has been a most unhealthful one, the subject doubtless would not have received a passing notice. It is therefore not the open car which is to blame for the alarming prevalence of lung troubles, unless it can be shown that the open car is responsible for the unhealthful weather of January, February and March. Big medicine men have been free in their expression that the running of open cars was largely responsible for the greater part of the existing ailments; but others standing certainly as high professionally, and representing the various schools of medicine, have been equally as pronounced in their belief that where the disease was so widespread, the public were in far greater danger riding in a closed car with passengers either recovering from or suffering with the malady, and that it being conceded the difficulty is largely contagious that the line of safety was in the greatest possible amount of fresh air. In many cities whose lines are operated by cable or electric power, open motor cars are used throughout the year, and in others, the cars are built on the combination plan, which gives a considerable number of exposed seats all through the year. In all such places there will be found only a few days in the entire year in which these open seats are not used. In Chicago, whose winter days do not by any means call for straw hats, these outside seats are largely in use by ladies as well as gentlemen. In cities where the open car is a fixture, the public will not tolerate the closed car when the weather is at all favorable, and managers have had this proved to their satisfaction time and again. There are some who would perhaps never use an open car, and who call for a closed box car in July, but such class is confined to the very feeble and a few cranks. In Chicago three years ago, numerous requests were made from one of the swell residence streets, to one of the roads, to run an occasional box car all through the summer to accommodate passengers who considered themselves in health too delicate to endure the open ride. The request was finally granted, and a number of box cars were put out and drawn in the same train with an open car. But actual observation developed the fact that the very people who made the demand were riding in the crowded open car, while the forsaken winter car behind was without a passenger, and the car did not earn wheel grease. Even during rush trips, these box cars were only taken when the open cars could not contain any more, and passengers seemed to prefer riding on the foot board of an open car, to occupying the heavily upholstered seats of the other conveyance.

This then is certainly one of those incidents in the management of street railways in which the superintend-

ent must be governed by judgment and discretion growing out of actual experience. This is in no measure an unreasonable concession on the part of either the public or municipal authorities, as the officers in charge of the street railway lines throughout the country, with scarcely an exception, are men who have had long and practical training for their work. The company's greatest interest is obviously that which will best suit the public, and for every "pro bono" who writes a long letter of distress to his daily paper there are 500 sensible, practical people, who use the cars to a much greater extent, but who have no time to write letters, having other and more useful occupations. In most of the large cities of the country the climate is such that there do at times occur days in January which are better suited to open cars than other days in August. The daily temperature must be the governor that regulates the decision of the manager when he gives his order as to what cars shall run out in the morning. The railroad companies would in very many instances be better off could they get along with only one set of cars, for the duplicate equipment involves an enormous outlay of money, on the greater part of which interest, insurance and storage, must be paid for twelve months in the year, while the repair bill though not doubled is largely increased. Many people too, complain because the open cars are not drawn in the minute the temperature changes, as it often does on the hottest summer afternoons. They do know that many companies are compelled to store the idle cars on the second and third and in some cases fourth floors, and that it takes time, and lots of it, to call in all the open cars and get out the boxes. In busy hours of the day it is next to impossible to do it without so interfering with the amount and regularity of service on the street, as to be a far greater evil than the one sought to be remedied. There is just as much sense and equity in passing an ordinance that a man shall not wear summer underclothing except during specified months of the year, as there would be in trying to legislate the open car's *debut*.

Car builders have now so improved the open cars that they are readily converted into well protected conveyances in case of sudden rain or fall of temperature.

President Wm. Richardson, of the Atlantic Avenue Line, Brooklyn, whose experience in railway work extends over so long a period, very appropriately summed the whole question up when he said recently at a meeting of railway managers and the health commissioner—the latter having stated that one year ago the grip prevailed during January, February and March—“Not one open car was run in Brooklyn during that period.” Now, I want to say right here that when any city official wishes any changes in the management of the Brooklyn railroads the surest and therefore the best way to secure these changes, is to ask for a conference with the railroad officials. We have run open cars for twenty years and I will say they were first run on the Atlantic Avenue Road. We found it paid

to run them, and why? Because the people wanted to ride in them. When we please the people we make money in doing it. When we don't please the people we lose in not doing it. The man who would run an open car in cold weather is a fool. It is to our interest to have all the people well enough to ride on both open and closed cars. There should be no law that could forbid us running an open car on a day in the latter part of September when the temperature may be 90 degrees. I don't believe there is any more need for a law on this subject in the year of our Lord 1891, than there was in the year 1881. It is not the cold so much as the draught that is injurious to health. There is more danger from draughts in a closed car in which some crank opens one of the front windows than in an open car with a closed glass front and back. If you could get through a law that would do away with open cars entirely, it would be a God send to us, for we have to pay enormously for the storage of this double equipment of open and closed cars."

In no city in the country would an iron clad law setting bounds on the time in which the open car shall run be in any sense a practicable one—nor could it be for the best interests of the public.

No company can afford to long enforce a policy in direct opposition to the best interests of the large majority of its patrons, and those who are in charge of the great street railway systems of the country, make a ceaseless study to promote those best interests in a way that the public little dream and rarely appreciate.

Single Track Turnouts.

SOME of the good people of Atlanta, Ga., are inclined to object to the request from the new electric railway company there, for permission to change existing single tracks to double, in the residence district. They base their opposition on the ground that if one track with turnouts offers disadvantages to carriage driving, two tracks will be twice as bad. The *Constitution* of that city, comes out in favor of the double track, and cites an instance in Chicago to prove its claim. The street referred to though not called by name, is Indiana avenue, which for many years has been and still is one of the most pleasant residence streets in the city. When the track was laid the property owners objected to the double track, and continued to do so for fifteen years. When it became necessary to relay the track about three years ago, the railway company made a strong effort for a double track, but met with a very pronounced opposition. The street was densely shaded with large trees that arched in the center of the street, and which occupied a space between side-walk and curb. Finally the owners agreed to having all the trees cut down and the company bore the expense of moving back the curb 3 feet on each side, and the owners tore out all the old wooden walks and substituted concrete or stone of a uniform width, and to this was added handsome street lamps. The result was a most radical change for the better in the appearance of the street, and those who had been strongest in opposing the double track became its most

pronounced advocates. The change from the unsightly turnouts to uniform lines of track, enabled the cars to make a trip in one-half the time previously required and driving was all that could be desired. It is estimated that the improvements above mentioned which covered a distance of 2½ miles, enhanced the value of property fully \$500,000.

There are many places where it is impracticable to lay more than one track, and others where the business will not warrant it; but for streets that are 25 feet or more wide it will be found with few exceptions much more desirable to have a double rather than a single track.

In the case of the Indiana avenue line no one would ever consent to the return to the old single track and turnouts, and the owners in thus joining the company and working hand in hand promoted their own interests to a far greater degree than the advantages which accrued to the railway people.

Want Fast Riding.

PEOPLE will not quietly submit to a slow speed service when once they have enjoyed the advantages of quick travel. In Augusta, Ga., recently, where the electric cars had been operating at 12 miles an hour, the council, for want of something better to do, passed an ordinance restricting the rate to 5 miles; or put the service back to the days of mule power. But the people who had not desired any such restriction, were so outspoken and emphatic in their indignation that the objectionable order was speedily annulled. In several other places, city authorities have taken a similar action, usually basing their reason for so doing on the fear that the high speed will occasion accident. We have several times alluded to the fact that as a rule the 10 and 12 miles an hour speed will be found at the end of a year's trial, to result in less accidents than a 5 mile speed. It is not unfrequently the case, that the introduction of rapid transit results in a few accidents at the outset, though this is by no means the rule, as we know of many cities where the high speed is in use and have never had a serious one. But it will be found that by the time the city council gets around to limiting the speed, the public have become educated up to the new and better order of things, and their restrictions are needless. An electric car limited to 5 miles an hour is as aggravating as sending a messenger boy for an umbrella on a wet day.

Gone in a Gust.

IT looks very much as though the projected street railway was clean gone, when the LaPorte, Ind., *Argus* says, "it has disappeared in a gust of pretentious wind and a cloud of glittering promises." Many a supply man who reads this will call to mind more than one hard trip made only to discover the above mentioned condition of affairs.

THERE died in Brooklyn recently a car driver named John Donnelly who had been in the service of the Brooklyn City Railway ever since its incorporation thirty-seven years ago.

KEOKUK, IOWA, OPENS ITS ELECTRIC LINES.

A GOOD SERVICE AND AN EXCELLENT TRANSFER SYSTEM.

IN this number we show the power house of the Keokuk Electric Street Railway and Power Co., and the line on its principal street. Nowhere can one receive a more favorable impression of the workings of an electric railway than at Keokuk. Being under the management of Mr. O. J. Chapman, a gentleman who has profited by 12 year's experience as manager of street railways in Muscatine, Iowa, Wichita, Kan., and Des Moines, Iowa. The service on the road and its equipment are the subject of continual admiration of the people of Keokuk and the special topic for comment by strangers.

of his practical experience. The other officers of the company are three brothers, George L., William J., and Henry C. Reiner, who are also very energetic and successful merchants in the city. A more beautiful city in which to make such an addition could scarcely be found. A growing and progressive city of 22,000 inhabitants, situated on a high bluff overlooking the Mississippi river, it gives views of river scenery that are unsurpassed. That the scenery is appreciated is evidenced by the great number of handsome residences in the city. It is a significant fact that an expert in



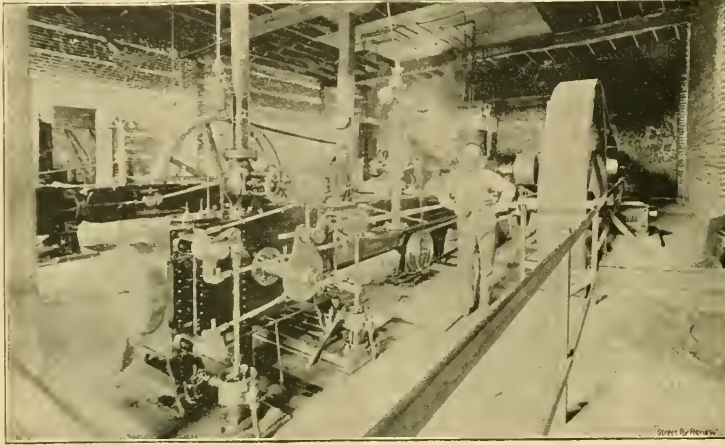
MAIN LINE KEOKUK ELECTRIC STREET RAILWAY AND POWER COMPANY.

Six beautiful vestibuled cars and four commodious summer cars, under the care of uniformed and courteous motorneers and conductors constitute the service. These run over six miles of track connecting the principal points of interest with the various business portions of the city. Taking a car on Main street, by a most admirable arrangement, one can go to West Keokuk and the immense lumbering and packing establishments, or to the most beautiful park in the West and the base ball grounds, or to the several cemeteries and the fair grounds, or to the Union depot. On any of these lines the ride is $1\frac{1}{2}$ miles, with the privilege of transfer to any of the others. In this arrangement alone Mr. Chapman has shown the wealth

estimating values of property recently observed that in his ride about the city, he saw but one house for rent.

This delightful position also permits the city to boast of being one of the most healthful places in the country. In a business way Keokuk has long enjoyed the reputation of being the leading wholesale market in the state of Iowa. To the splendid retail trade the city will soon add by constructing a high bridge over the Mississippi, thus opening the trade of some of the best farming country of Illinois to Keokuk merchants. Many manufacturing establishments have recently located here, among them being the starch factory of the J. C. Hubinger Bros. Co., with a capital stock of \$1,000,000; the Du Pont Powder

Works with a capital stock of \$1,000,000, and the Huis-kamp Shoe Co. with a capital of \$500,000. Besides the canal costing \$7,000,000 the government has recently built dry docks and a court house costing \$100,000. It is only a question of time in which to interest capital in the undeveloped resources that will make this city one of the



INTERIOR POWER PLANT, KEOKUK ELECTRIC STREET RAILWAY AND POWER COMPANY.

greatest manufacturing centers of the West. The best civil engineers have estimated the fall of the river in front of the city and say that at a cost of \$200,000 the greatest and best water power in the country may be developed. This in connection with late inventions in electricity, by means of which power may be transmitted, gives flattering hopes for the future and great things may be expected.

The cars are marvels of comfort and attractiveness and of splendid workmanship, having been built at the shops of the St. Louis Car Company. They are 16 feet in length, and are each equipped with two 15 horse power motors. The electric system is that of the Edison Company, and the engines are two Hamilton Corliss of 125 horse power each. The lines are working nicely, and the management of the company are the deserved recipients of many congratulations in which the STREET RAILWAY REVIEW is happy to join and wish the enterprise all possible success.

The officers of the company are: G. L. Reiner, president; H. C. Reiner, vice-president; W. J. Reiner, treasurer; O. J. Chapman, secretary and general manager.

A JUMBO verdict was rendered against the Chicago City Railway Company, whereby Martin Make, an 8-year-old boy, was awarded \$10,000 damages for the loss of a leg by one of defendant's cars. Case appealed.

Vulcabeston.

VULCABESTON is the name given by the H. W. John's Manufacturing Company, to their excellent insulator. It is composed of asbestos, India rubber and other vulcanized gums, combined with materials for special requirements, and is manufactured by a process which is the best that has yet been devised. Vulcabeston is unequalled as a steam packing and electrical insulator, as it is practically indestructible by acids, gases and moisture, and has also a permanent resistance to heat. Two kinds are made, the acid, water and steam proof, for acid chambers, electrical accumulator cells, and is also moulded into gaskets, rings, etc., for steam packing. The fire and waterproof vulcabeston will withstand a high degree of dry heat and is an absolute non-conductor of electricity. It is made in sheets of any desired thickness from $\frac{1}{16}$ of an inch to 1 inch, and 36x36 inches in size.

The H. W. John's Company is one of the largest manufacturers of asbestos products for every purpose, from a fire proof theatre curtain to a $\frac{1}{4}$ -inch washer. By their process this material can be drilled, topped and turned, though for every ordinary electrical purpose it is moulded into the desired shape and size. Vulcabeston will not shrink, warp or expand.



ITS FIRST BIRTHDAY.—Many of our readers have received a delicate announcement card, which the Electric Merchandise Company sent out June 1st, in honor of the first birthday of the company, which commenced business under its present name just one year ago and which has since been so phenomenally successful. The managers, however, while young men, have handled electrical goods ever since the opening of the first electric road in this country.

RAPID TRANSIT IN THE CITY OF BERLIN

BY T. GRAHAM GRIBBLE.

THE question of rapid transit in the new cities of this continent has suddenly attained a position of first rank amongst the counsels of municipalities and the debates of legislatures. It will be attempted to throw some side light upon the subject from the experience of Germany's capital.

In the main, the question must be thrashed out in America by American methods. Old country notions are too close fitting a garment for American shoulders. European jog-trot is very nice for the New Yorker or Chicagoan when on his vacation in Paris, Rome or Berlin, but when he gets back to the new world of "biz"

the subject of urban upbuilding and means of transit. Why is it that the moneyed people make a stampede out of this country into Europe every year? Is it not to some extent because their own cities are not attractive? New York is unsanitary in summer and every one leaves it who can. Healthy London has its height of season at midsummer. The mere fact of American cities being new and so lacking historical reminiscences, would be made up for in great measure by the many-sided interest attaching to their rapid growth. People go to Europe the first time in search of the antique, but they go regularly because they prefer the surroundings. If America



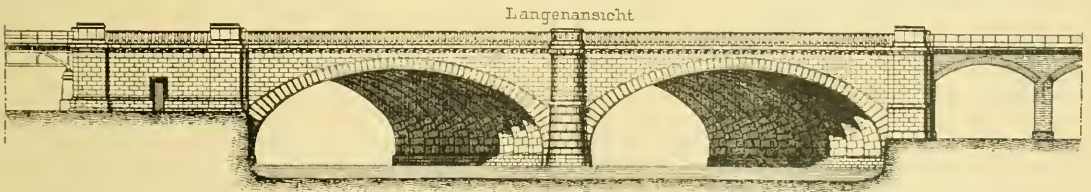
RAILWAY SKETCH MAP OF THE CITY OF BERLIN.

he wants rapid transit and as one of the promoters put it before the New York commission, he wants "immediate rapid transit."

But America needs something more than ramshackle make-shifts, cheap and unsightly structures, which might convey the impression that the citizens were only tenants

to keep her money more within her own borders she must have cleaner, more artistic, and more interesting cities.

The press is fully alive to the fact and is constantly stirring up the public mind to it. When the real owners of the city, the tax payers, bestir themselves suf-



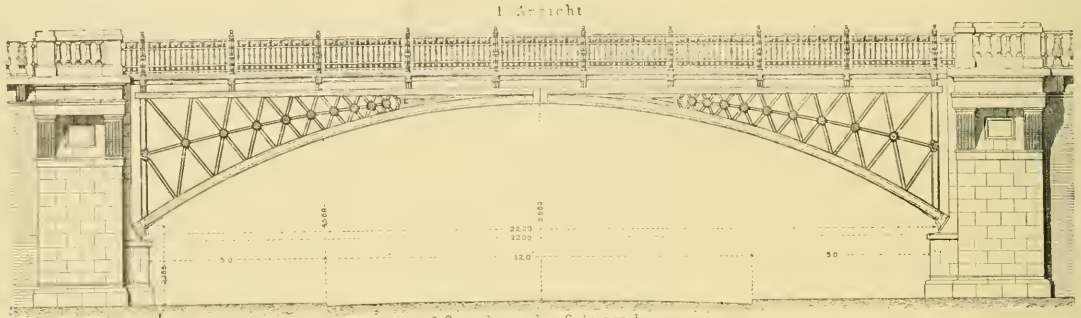
BRIDGE OVER THE RIVER SPREE.

at will and did not wish to risk any money in betterments. The vast influx of wealth into the country, the marvelous development of its arts, manufactures and mines, the ever-increasing strength and solidity of its institutions, in fact the entire phenomenal development of the continent since the civil war, calls for a different root-principle in handling

efficiently to rescue their property from being the shuttlecock of political parties and establish a permanent management, in which a dollar spent will bring them a dollar's value, and be accounted for to them, as it is in their private business, they will find themselves with cash in hand for beautifying their city without raising the taxes.

The Stadtbahn, or city railway of Berlin, which was opened for traffic in 1882, is suggestive as an example of substantial, economical and as far as possible artistic railway building within the limits of a great and handsome city. The imperial capital of Germany occupies a commanding position as a focus of railway communication. It is favorably situated for construction, being only about

Both politically, socially and commercially, Berlin is an empire city and her citizens take great and deserved pride in her. They have been slow in building, and are still slow in operating their city railway, but what they have done will bear inspection and furnish food for reflection. The first terminal depots of Berlin, as in most old European cities, were built as near to the commercial

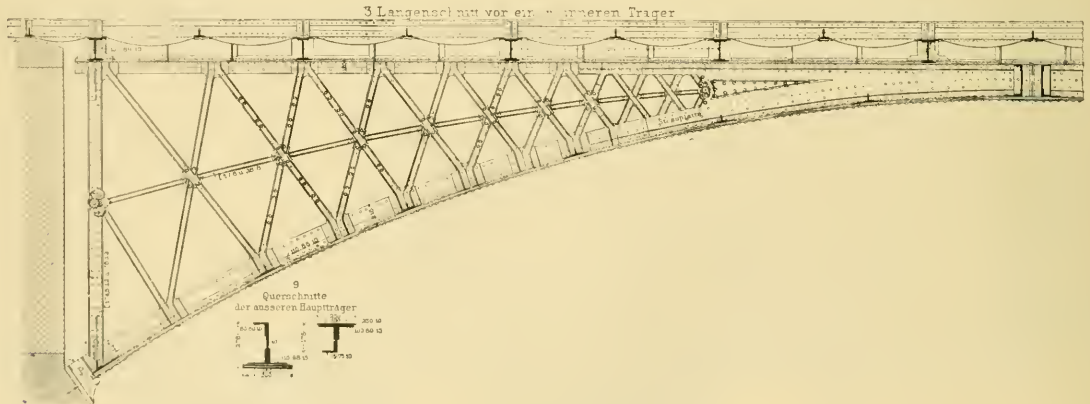


BRIDGE OVER STATE STREET.

100 feet above sea level, although 100 miles distant on an air line from the Baltic. The great sand flats stretching out to the sea facilitate the gradients of all the larger railways and the Stadtbahn itself is almost level.

The growth of Berlin since the seven weeks war, which ended in a united Germany, has been on a par with that of most American cities, and has been largely the result of railway development. At the end of the war, in 1867, the population was 700,000, twenty years afterwards it was 1,500,000 and during that time six new lines of ex-

center as the price of property and the opposition of conservative owners would allow. In 1872, when the Stadtbahn was first promoted, the depots were nearly all outside the city limits, but they are now well within them. There was no connection between them, and of course no attempt was made to systematise the carrying business. Each company had in its turn to run the gauntlet from one form of opposition to another, and win its footing by its own invincible obstinacy. When we reflect upon the strategic importance of rapid interchange of transport at



ENLARGED LONGITUDINAL SECTION OF HALF SPAN.

ternal railway, a circular or belt railway, called the Ringbahn, and the Stadtbahn or city railway, have been constructed.

Berlin is, however, not as dependent upon railways as most inland cities. The navigable river Spree, upon which she is situated, together with its tributary canals, places her in communication with northeast Germany and Poland and the water carriage exceeds that of the Rhine.

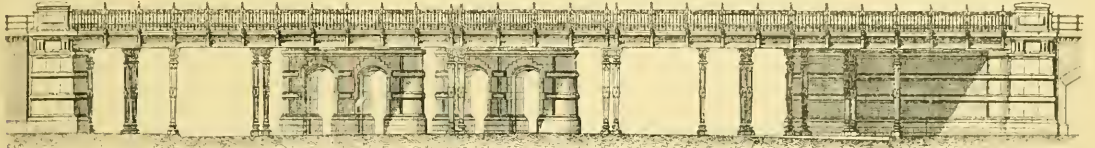
the center of distribution, we wonder at the tardy manner in which the governments on both sides of the Atlantic have occupied themselves with railroad terminals. But if we go farther and begin to estimate the expense to the companies of acquiring property for union railways and central depots, after the value of real estate has advanced to ten times what it was when the first lines were constructed, we have a fertile field for moralizing upon the shortsightedness of human nature. The most

remarkable fact remains that the cities are being planned in the New World with every prospect of immense and rapid development, but with no more consideration for the after problems of traffic distribution than if railways were still in their experimental stage. If State law would step in at the laying out of a new city and prescribe a sufficient additional width for two or more of the main avenues of the city to provide for future trunk lines, together with a central square for the future union depot, it would not merely help the railway companies, but it would in many cases make the city.

on one-quarter hour headway, another runs every half hour, and the third every forty minutes.

There are thirty-six horse tramways running in all directions, the headway ranges from five to fifteen minutes, and the fares from 2 cents upwards. An electric railway has also recently been opened.

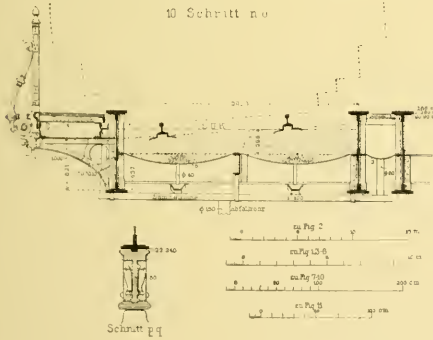
The STADTBahn is an elevated railway of four tracks, dividing the area contained within the Ringbahn and traversing the city from East to West. The promotion was commenced in 1872 and the line opened in 1882. It received government support from the outset, but financial



VIADUCT CROSSING OLD MOABIT STREET—ELEVATION FROM THE NORTHWEST.

Berlin has had to grapple with the problem of this distribution as well as that of internal city transit within the last ten years. The Ringbahn which was commenced before the Stadtbahn, formed a valuable freight connection between the eight trunk lines radiating from the city, but it was too far out to afford convenient transit for passengers from one part of the city to another, neither does it do so now; the trains upon it run at one hour headway. Internal city travel was then accomplished by tramways, omnibuses and cabs, and is to a large extent still, but the Stadtbahn is run on a ten minute headway,

difficulties kept it back. The designs were furnished by Herr Orth, a celebrated architect, and the construction was carried out by Herr Dirksen. The illustrations in this article, and most of the description, are taken from the official *Zeitschrift für Bauwesen*, and the map of Berlin from Baedeker's Hand-book for 1890. In 1874, a combination was formed of three railway companies, a financial syndicate and a construction syndicate, with a joint capital of about \$12,000,000, and incorporated as the Berlin City Railway Company.

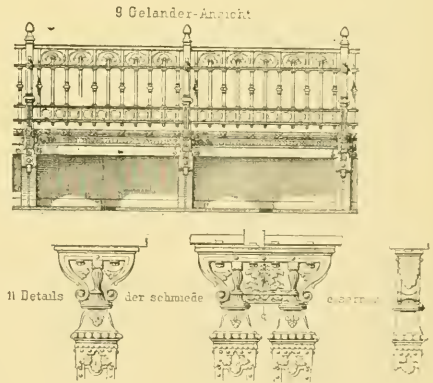


TRACK CONSTRUCTION ON CURVE OF IRON VIADUCT.

and affords an immense gain to the development of the city both by its connection with the trunk line terminals, and as a cross town rapid transit line.

When we speak of rapid transit we must remember that express trains in Germany even now, rarely exceed 25 miles an hour, and this used to be such a high rate that it was graded down by four different rates before the ordinary "passenger train" was reached, the speed of which might well have earned it the title of "Huckleberry Line."

There are three steam tramways in Berlin, one of them



DETAILS OF RAILING.

Before determining upon the character to be given to the railway, an examination was made of the urban railways of London and New York, and close study was devoted to the requirements of Berlin both for the present and future. The two following fundamental points were established as regulating the construction:

1. The railway was not to be regarded merely as an independent means of communication, but as forming a connecting link with the extremities of the Ringbahn.
2. It was to be a passenger railway with two tracks for short, and two for long haul.

The line is about 7½ miles long and is carried on a viaduct through the city proper, then on walled embankment, and in the suburbs upon ordinary sloped embankment. There are two terminal depots, two intermediate stations, and five "halting places" or way stations.

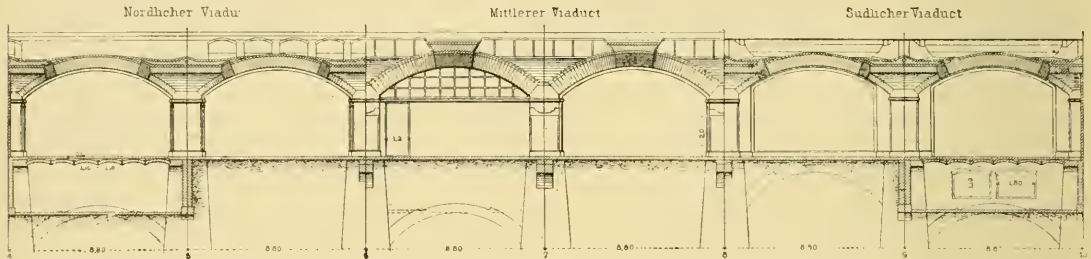
The total cost amounted to \$17,912,000, and included a great deal of handsome and expensive work.

The right of way cost, - - - -	\$ 8,575,000
Viaduct including two stone bridges over the Spree, - - - - -	3,100,000
Eastern junction with street approaches -	1,300,000
Western junction station, - - - - -	1,415,000
Remainder of work - - - - -	3,522,000
Total - - - - -	\$17,912,000

as for instance in the sinking of the concrete cylinders for the quay walls of the river Clyde, assisted by hopper skeps styled after the inventor Milroy's digger, and sunk by enormous masses of iron in the form of rings. It is interesting, however, to note that the wells in the Spree were finally sunk by the simple Indian shovel after trying more modern appliances with less success.

The Indian shovel is an instrument somewhat like a large hoe and is termed a Phaora. It is used with a long handle until the wall has been sunk some distance. Then a short curved handle is substituted, the name is changed to Tham and the shovel is worked by means of a cord and pulley.

The chief peculiarity about this method is that the native remains under water, frequently as long as one



LONGITUDINAL SECTION THROUGH THE OPENINGS IN THE PIERS OF THE VIADUCT.

The classification of the viaduct was as follows:

	Miles.
Arched viaduct including stations, way stations, and stone bridges, - - - - -	4.94
Viaduct with iron superstructure, including street crossings and iron bridges, - - - - -	1.12
Embankment between retaining walls, including the Silesian railway station, - - - - -	0.40
Ordinary embankment including the Charlottenburg station, - - - - -	1.04
	<hr/>
	Miles, 7.54

The breadth of the viaduct between face walls is 51 feet, the crown of the arch was about 20 feet from the ground. To determine the character of the foundations, borings were made every 60 feet throughout, and the total length of 4.94 miles was founded as follows:

	Miles.
1. With plain masonry footings, - - - - -	2.85
2. With footings between sheet piling, - - - - -	0.48
3. On concrete between sheet piling, - - - - -	0.88
4. On wells, - - - - -	0.38
5. On piled platform, - - - - -	0.35
	<hr/>
	Miles, 4.94

The two last methods were confined to the bed of the river Spree. The well sinking was performed in the usual way, by means of a curb upon which brickwork was built until the interior was elevated so as to settle by its own weight. This ancient method by which the natives of the East Indies carry down their wells to a depth of 40 feet, has been greatly developed by modern appliances,

minute. Wells have been sunk as deep as 40 feet in this way, but with great labor.

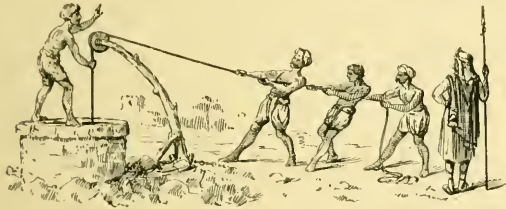
The curbs for the wells were of oak, 6 to 10 inches thick, and varying from 14 to 18 feet square. The steining was of brick, two rings thick, laid in cement, and rendered also in cement on the outside. When the well was sunk, the bottom was filled with concrete for a depth of five feet, after which the water was pumped out, and the rest of the interior built up in masonry.

With the Indian shovel, four men would excavate about 1.3 cubic yards per hour. The water was frequently pumped out to facilitate the sinking, and the total time per well about four weeks. Twenty-five piers were built in this manner upon eighty-three wells and cost about \$938 per pier, sunk to an average depth of 19 feet below main water level.

Very little trouble was experienced with obstructions in sinking the wells, except that occasionally a tree root would cause delay and would be removed by divers.

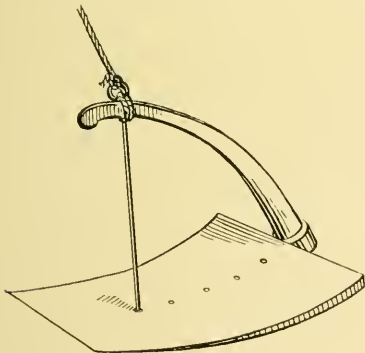
The valley of the Spree is an extended area of fine grained compact sand, and the difference in the method of foundation already alluded to, arose not from variation in the nature of the material, but in the height to which it was saturated with water. So large a proportion of the viaduct was built directly upon the sand, that it was determined to carry out extensive experiments upon its supporting power, unprotected by piling or otherwise from lateral displacement. This was done by means of small test piers of brickwork in hydraulic lime, built close to the finished piers of the viaduct. The test piers were 1.67 feet square above the footings and 1.67 by 3.38 feet on the base. The tests were arranged in five groups, accor-

ding to the angle at which the footings were stepped. These inclinations were 19° , 55° , 60° , 65° , 69° . The load was applied by means of a heavy plate girder lever, having its fulcrum under the archway of one of the finished piers and weighted at the other with pig-iron. The tests were gradually applied and distributed over the area by means of a saddle casting on the top of the pier, having a spherical socket. As might have been expected, the steeper angles stood the greater strain. The least strain



NATIVE METHOD OF SINKING A WELL.

per square foot at which any crack occurred was on a pier having its footings at an angle of 49° , and under a pressure of 2.65 tons per square foot. This crack was, however, in line with the face of the test pier and a settlement of somewhat over $\frac{1}{8}$ of an inch took place in the foundation before the crack occurred; another pier with footings at the same angle stood 3.39 tons per square foot without any crack. The greatest pressure resisted by any pier was on a pier with footings at an angle of 69° and under a pressure of 5.66 tons per square foot. The highest



SIDE VIEW OF THAM, OR INDIAN SHOVEL.

pressure actually applied was 9 tons per square foot. The crack extended from top to bottom of the footings and under the body of the test pier, but the brickwork above was intact, and being half the area of the base, was subjected to 18 tons per square foot.

The aggregate results led to the conclusion, that upon a foundation of fine-grained compact sand and from one to two yards deep below the surface, a pressure of $2\frac{3}{4}$ tons per square foot may always be applied, but in most cases even $4\frac{1}{2}$ tons per square foot would be permissible. The slopes of the footings should not be flatter than 1.15 perpendicular to 1 base, and need not be steeper than 2.60 to 1. The tests further show that well built ordinary brickwork in lime may be loaded, without producing fracture, up to 18 tons per square foot. The brickwork

is not in practice loaded up to any such pressure as this. It is supposed that the St. Rollox chimney at Glasgow, Scotland, may have to sustain a maximum pressure during high winds of 15 tons per square foot, that the average is, over the base, 9 tons. It is rarely that pressures are allowed to exceed 5 tons. The maximum estimated pressure on the Berlin viaduct was 2 tons per square foot.

PIERS.

The piers were built of coursed rubble, in mortar, in the proportion of 2 of lime to 5 of sand. Where they sustained a series of arches, they were designed as "abutment piers," that is to say, having a stability equal to the horizontal thrust of an unloaded arch. The calculations of the thrust under different conditions of load were carried out and tabulated with great minuteness.

When the spaces between the piers were intended to be used as cellars or stores, openings were provided in the piers to furnish access from one space to the other. In the earlier portions of the viaduct, they were low and narrow doorways, having the lintel below the springing of the arch, but in the later ones, the openings were made much wider and higher, in some cases as high as 13 feet. The concentrated pressure produced upon the pier by the arches, then entailed the use of ashlar in cement instead of brickwork.

ARCHES.

The arches were all segmental and formed of dressed stone. When built on a gradient, the neighboring skewbacks were built on the same level, so that the arch itself followed the gradient. The spandrel walls were perforated with drainage conduits across the viaduct and at the back of the arch small chases were cut to lead away the water.

The impervious covering of the arches was formed of asphalt in various compositions. The principal one used was an asphalted felt in thin sheets laid somewhat like shingles, and carried up the spandrel walls also. The cost was about 9 cents per square foot.

(To be Continued.)

A CORRESPONDENT of a New York paper writes to know why the officials of the New York elevated roads "refuse to allow a woman to carry into a car a nice clean little dog, and yet permit their morning and evening trains to be crowded with inexpressibly dirty Italian laborers, who render the air so foul as to provoke the risibilities of a sensitive stomach." This is certainly a momentous and far reaching question, and it is feared will tend to excite the Italian government to unthought of hostilities. That "the risibilities of a sensitive stomach" should be "provoked" is a downright shame, and all out of gauge. A stomach in any such condition as above cited should have some extra tie-rods and be well tamped, to which should be added a new set of fish plates every Friday. For people of culture who are accustomed to the society of agreeably and well bred canines, it is an indescribable outrage to be obliged to occupy the same car with Barons and Counts who, mayhap, may be Mafia and Banditti in disguise.

STREET RAILWAY LAW.

EDITED BY MR FRANK H. CLARK, ATTORNEY AT LAW, CHICAGO.

Cost of Adjusting Bridge Erected by Street Railway Company in Case of Widening Street.

The cost of adjusting a bridge, erected by a street railway company to carry its tracks over a street crossed by its right of way, to the new width of the cross street after it has been widened by the city under the power of eminent domain, is a proper element of damage to be allowed the company in proceedings to condemn a portion of its property for the purposes of such widening, notwithstanding the company's enabling ordinance provides that the company must erect and maintain a suitable bridge over the cross street so as to allow it to be used to its full width.

BLACK, J. delivered the opinion of the court:
This was a proceeding instituted by the City of Kansas to widen Vine street, formerly designated "Henry street," so as to make it 70 instead of 50 feet in width. Vine street runs north and south, and is crossed by Twentieth street, which runs east and west. The defendant owns and operates a railroad which runs east and west, on and along Twentieth street. At the crossing of these two streets, the defendant owns property on the north side of Twentieth street which extends up to the lines of Vine, and which is used as right of way in addition to Twentieth street. The railroad is carried over Vine street by a bridge, which was erected under the terms of the ordinance hereafter mentioned. Damages were allowed the defendant for the land taken in widening the street, but no damages were allowed to compensate it for reconstructing the bridge, so as to make it conform to the street as widened: hence this appeal. By an ordinance approved in 1882, and which was accepted by the defendant, the defendant acquired the right to build a double track railroad from the eastern to the western part of the city across and along designated streets. This ordinance provides that the railroad shall cross certain streets at the surface thereof, and others by carrying the street roadway over the railroad, and in other instances the railroad must be carried over the streets by means of bridges. The ordinance gives the defendant the right to construct its road on and along Twentieth street where that street crosses Vine street.

* * * * *

The position of the city here is this: That the defendant must alter its bridge, without compensation therefor, so as to conform to the street as widened, because by the ordinance it is made the duty of the defendant to "erect and maintain a suitable" bridge at this crossing, "so as to allow the use of the full width of said Henry street." In support of this proposition, we are cited to a vast number of cases.

* * * * *

There is no complaint here that the bridge obstructs or interferes with the use of the street below, so that many of the cases cited, some of which have been noticed, do not dispose of the question at hand: nor do these authorities show that a duty on the part of a railroad company to maintain a bridge structure devolves upon it the further

duty of reconstructing the bridge, at its own expense, so as to make it conform to the street as subsequently widened by the city, by the exercise of the right of eminent domain. Where it is sought to open a street or road across a railroad by proceeding to condemn property, the damages are not limited to the land thus appropriated, but include the expenses of building cattle-guards, fencing, and such like outlays, entailed upon the company. *Old Colony & F. R. R. Co. v. Plymouth county*, 14 Gray 155; *Chicago & G. T. R. Co. v. Hough*, 61 Mich. 507.

Here the city seeks to widen the street, and in doing this, not only appropriates part of the defendant's right of way, but throws upon the company the expense of removing banks of earth, and re-adjusting the bridge to conform to the new order of things. These expenses thus brought about, on the plainest principles of justice, constitute elements of damages to be allowed the company in the proceedings to condemn property; for the bridge structure is property as much as the land on which it rests. If the city is relieved from the payment of these expenses, it is because the defendant, in accepting the ordinance, agreed to change and alter its bridge from time to time, so as to conform to the street, as it might thereafter be widened. We find no such undertaking in the ordinance. It was passed and accepted in view of the then established width of the street, and it makes no provision concerning this bridge in case the street should be widened. As there is no agreement on the part of the company to re-adjust the bridge at its own expense, to conform to the street as widened, and as no rule of law casts that expense upon the company because of its duty to maintain the bridge, it follows that the expenses of removing the embankment and adjusting the bridge to the street as widened are proper elements of damages to be allowed the defendant.

(Sup. Ct. Mo. *City of Kansas v. Kansas City Belt R. Co.* 10 L. R. A. 851.)

Electric Railroads—Rights conferred by City Council—Kind of Poles to be used—Transfer Tickets—Michigan Statute.

A common council having granted permission to a street railway company to operate its lines by electricity, cannot, in thereafter fixing the kind of poles to be used, impose a condition that the company shall furnish transfer tickets without cost, as a consideration for the right to use any particular sort of pole, notwithstanding a reservation, in the original permission, of power to make additional regulations, as such condition is in direct conflict with How. (Mich.) Stat. chap. 95, sec. 14, forbidding a common council to revoke its consent once given, or to deprive a company of the right and privileges conferred.

It is the duty of the common council of a city, which has granted permission to a street railway company to operate its lines by electricity, and to erect poles to support its

wires, the "kind and pattern thereof to be approved by the common council," to fix and determine the kind of poles to be erected and used by such company.

(Sup. Ct. Mich., *Electric R. Co. v. Grand Rapids*, 47 N. W. Rep. 567.)

Master and Servant—Right of Employer to discharge Employee.

A railroad company may discharge an employe, with or without cause, at pleasure, unless restrained by contract, irrespective of the questions of malice and want of probable cause, if the right is exercised in such manner as not to cast an unjust imputation upon the employe's character, except such as may be inferred from his bare suspension.

(Sup. Ct. Pa., *Henry v. Pittsburgh & Lake Erie R. Co.* 21 Atl. Rep. 157.)

Corporations—Subscriptions—Release of Subscribers.

A contract of subscription to the capital stock of a corporation to be formed, reading: "We, the subscribers hereto, agree to pay the above amount" of the capital stock, and "for a faithful performance of our respective parts of the above contract we bind ourselves," followed by the name of each subscriber, with the amount of his subscription, is several, and a subscriber may be sued severally by the other party to the contract, who agreed to erect the building for the proposed corporation.

Where this contract between the subscribers and the parties proposing to erect the building, is modified in a manner which improves the building, with the consent of a majority of the subscribers, but without the knowledge or consent of one of them, that one is not released from liability for his subscription by reason of such change.

The expenditure of money in the erection of the building by the parties to whom the subscriptions run, is a sufficient consideration to support the promise of the subscribers. The actual incorporation of the company with a larger capital stock, divided into a greater number of shares, at a less amount per share than stipulated in the original contract, does not release a subscriber to that contract from his liability to the parties who have erected the building in accordance with part of the agreement.

(Sup. Ct. Wis., *Gibbons v. Grinsel*, 9 Ry. & Corp. L. Jour. 335.)

Electric Street Cars—Duty of Motor Man—Sounding a Gong—Frightening Horses.

Sounding the gong of an electric street car to warn persons of its approach, causing horses which were hitched in the street to become frightened and run away, does not constitute negligence rendering the company liable for injuries sustained by the team, where it is not shown that the driver knew the horses were frightened, and the sounding of the gong was not a violation of law or of any city ordinance.

A motor man on an electric street car may act upon the presumption that teams not upon or approaching the track, but standing on the side of the street, are hitched, or, if not hitched, are not liable to become frightened and run away.

(Tex. Ct. Appls., *North Side Street Railway Company v. Tippins*, 14 S. W. Rep. 1067.)

Track Occupied by Loaded Wagon—Care Required of Driver of Street Car.

Special vigilance is imposed upon the driver of a street car when he knows that one of the tracks is occupied by a wagon loaded with lumber projecting from its rear end, which is likely to leave the track at any time and to swing around in such a way as to strike the car he is driving.

(Sup. Ct. N. Y., *Alexander v. Rochester City & B. Railway Co.* 12 N. Y. Supp. 685.)

Receiver of Railroad—Cause of Action Against—Negligence—Destruction of Street Car—Liability of Railroad Company.

Where several millions of dollars of the net earnings of a railroad, while in the hands of a receiver, have been invested in betterments and improvements, and the receiver has been discharged and the property restored to the company, it is liable on a cause of action which accrued against the receiver for the destruction of a street car by collision with a train.

Locomotive engineers, firemen, switchmen and yard foremen, are *prima facie* competent as experts to give an opinion as to the speed of a train.

(Tex. Ct. of Appeals, *Brown v. Rosedale Street Railway Company*, 15 S. W. Rep. 120.)

Getting Upon Moving Street Car—Negligence.

It is not negligence for a passenger to attempt to get upon a moving street car which he has signalled to stop, before it has fully stopped, but when it is almost at a standstill and when it appears quite certain that he will safely reach the car unless it starts up suddenly before he has time to accomplish his purpose.

(Sup. Ct. N. Y., *Moylan v. Second Avenue Railway Company* 35 N. Y. S. R. 644.)

(NOTE.—In the case of *Cornell v. Detroit E. R. Company*, 46 N. W. Rep. 791, 1 STREET RAILWAY REVIEW 85, the Supreme Court of Michigan decided that it is not negligence on the part of an electric railway company not immediately to stop the train on seeing a frightened horse with its driver at its head near a crossing 350 or 400 feet distant, where the speed of the train is decreased and there is nothing to indicate to the employes that there is any particular danger.—ED.)

A PITTSBURG paper cites the governmental and municipal restrictions, which are placed on street railway companies in Dresden and Berlin, and thinks the same conditions would benefit American cities. The theoretical view from this long distance is quite charming, but few Americans who have ever visited these two or other continental cities where similar laws are in force as at the two cities named, could be coaxed into the statement that they would want the street railway service of this country operated on the "European Plan." Their tram system comes as far short of the advantages provided by railway managers in this country, as their steam railroad service is behind ours in common sense and convenience: and an attempt to enforce the ridiculous police regulations which exist across the water, would not be tolerated in American cities for a single hour.

HYGIENE AND VETERINARY.

BY F. T. M'MAHON, V. S.

IN this issue of the STREET RAILWAY REVIEW, we intend to describe a disease which is more common in street car stables than to any other class of horses, owing to the quality of food that is fed. The disease to which we refer is termed Azoturia.

Azoturia is the term applied to a complex morbid condition, or assemblage of symptoms intimately associated with, or dependent on disturbed assimilation, the most characteristic features of which are certain muscular nervous phenomena, particularly tonic spasms of the great muscles of the posterior part of the trunk and limbs, and the discharge of highly colored nitrogenous urine,—the result of an over supply or presence in the system of nitrogenous material, due to over feeding and want of exercise. The presence of such effete material in the circulation provokes tonic spasms of the muscles and loss of motor power in the posterior, and sometimes the anterior extremities and death by extreme muscular prostration. In fatal cases the spasms and convulsions have been succeeded by extreme muscular debility, the muscles scarcely contracting on the application of a stimulus, in other cases, the animal has overcome the violent symptoms, but has remained paralyzed in one extremity. It is certainly plain that whatever the changes may be and however they are carried out in the disease, that the muscular elements are more affected than any other structure. Whether they are affected through the contact of unwholesome, nutritive material, acting upon and destroying their inherent power of contractility, or whether we are to look to the poisoning of the nerve centres directly, or to the influence of the operation of reflex action, for the occurrence of the tonic contractions and paralysis of the muscles affected, seems rather doubtful. The extreme suddenness of the attack, the difficulty to imagine that the great muscles involved could be affected in any other way than by being acted upon by the nerve power. To uræmic intoxication or poisoning, the result in all animals most probably of retained effete material, which by disturbance of function in some steps of the assimilatory process is prevented from undergoing the changes requisite for its final removal, this peculiar condition bears some resemblance. However, although it may resemble uræmia in the character of certain of the symptoms exhibited, such as the actions developed in connection with the phenomena of disturbance of the great nerve centres, it seems somewhat to differ from that in the causes which produce the uræmic condition of the fluids, and probably also in the mode of production. In uræmic poisoning we have the most of the symptoms intimately associated with or dependent on the cranial nerve centres being chiefly involved, marked by coma, rapidly developed, and more or less profound, with stertorous breathing. In cases of azoturia simulating this form of uræmia, we see fewer than of the other, more resembling epileptic spasms, which are always developed suddenly, but are of varying

intensity, in which the muscular system is largely implicated, either directly through defected nutrition of muscular tissue, or from disturbance of nerve function from direct or reflected irritation, or probably from both. It is of this latter mode of development that the cases of so-called azoturia most frequently present themselves; sometimes the forms are combined and we have coma with muscular spasms and convulsions.

At one time this condition was believed to be confined to mares; this, however, has been disproved, as neither sex, breed nor age, provided the animal has reached maturity and is in good condition, seem to grant immunity from the attack. In all cases it is more apt to occur under favorable conditions succeeding a period of active work followed by idleness, as when an animal is being treated for a corn or prick from a nail in the foot, etc.

In those cases where the loss of muscular power is so great and so suddenly developed that the animal is unable either to move or maintain the standing position, prognosis is unfavorable. So long as the animal is able to stand, although unable to execute any movement, there is always some prospect of recovery. When neither violence nor excitation are features of the case, but there exists simply muscular spasms and deflected motor power, together with disturbed urinary secretion, it is better to place the animal in a stall than in a box, taking precaution that everything which is done to him is carried out without hurry or excitement. In further assisting the case, the first and probably chief point is that of favoring secretion, with the view of eliminating from the system that which we believe to have produced and to be maintaining the largely distributed functional disturbance. This is most readily done by operation on the alimentary canal, for, in addition to being easily accessible to medical agents, it is as regards secretion the most potent and far reaching in its influence of any organ in the body. To insure an active movement and complete emptying of the bowels there is nothing so good as a full dose of aloes, about eight drams, which is better given in the form of a pill than solution, as it annoys the animal less and acts quicker. Should there be much irritation or fever, good will result from the administration every two hours of a saline febrifuge, as liquor acetate ammonia with chlorate of potash. This will be taken in the drinking water, which should not be restricted and thus obviate the necessity of drenching, which in such condition is to be avoided if possible. Should the muscular spasms be severe they will most likely induce irritability and restlessness, in which cases benefit is derived from the local use of warmth and moisture, applied by means of woolen cloths wrung out from warm water and laid across the loins. This seems to relieve local irritability and to soothe and calm the system generally, and in this way favorably influence the course of the disease.

In cases where the horse is unable to stand, it will be needful to insure his safety as far as possible by having him laid in a roomy box stall, and taking precaution that in throwing himself about damage is not sustained. When thus prostrate, it is always advantageous to remove the urine every two or three hours by means of the catheter, by which also the bladder may be washed out with tepid water: it is necessary to assist the animal in attempts to drink every hour or two and obtain a change in position every three or four hours. Following the action of the cathartic and the discontinuance of the fever medicine, small doses of diuretic medicine may be given, such as one-half ounce of nitrate of potash once every day, in drinking water, alternated with some vegetable tonic, as tincture of gentian in half ounce doses three or four times daily. Should there be weakness and want of appetite after the purgative, it is good to allow a stimulant to be given, as alcohol or spirits nitre, in half ounce doses every three or four hours.

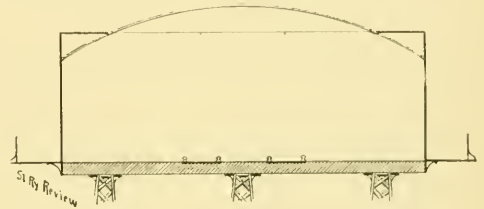
When unable to rise after the third day and the appetite is not entirely absent, it is advisable to attempt to raise the animal by appropriate means, such as slings. In the greater number of instances which are not of the worst type, and which do not terminate fatally in a short time, recovery or distinct symptoms of improvement are likely to follow the action of the purgative. During convalescence much care is always needed first to prevent overloading and disturbance of the digestive organs, and by the judicious use of medicine to restore tone and healthy action to the entire system. In conclusion it may be said that prevention is the proper treatment for this disease, by watching the condition of any animal that happens to be off duty, whether to rest or to be treated for some slight lameness, and if he is fat and strong *be sure* and have him gently exercised previous to going to work.

ST. PAUL AND MINNEAPOLIS INTER-URBAN LINE.

ONE of the most delightful electric car rides in the whole country is that to be had on the new Inter-Urban Line connecting St. Paul and Minneapolis. The distance from city to city is about ten miles, but since the opening of the line, residence building has progressed rapidly on both sides the handsome street, in the center of which the tracks are laid, with the trolley wires hung from the cross arms of center poles. These poles are placed between the tracks, leaving a safe distance between them and the body of the car, and as pole after pole stretches out along a hill top, down its side and away across a level stretch, the perspective is pleasing and the whole presents a most attractive picture. In both cities the line starts from business centers, and by an admirable system of transfers a passenger may take any car in one city and be transferred to the Inter-Urban Line. As a point half way between the two cities is approached, the conductor announces the fact and that beyond this point another fare will be collected.

The train crew then turn it over to another driver and

other conductors, who set their registers back to zero and commence their run. No time is lost in making this change. Arriving in the other city a transfer is granted to other lines which carry one to any desirable locality. By this arrangement a resident of one city may take a car at his own door and ride to any part of the other for ten cents. Cars run on ten minute headway and the twelve miles is made in from 40 to 45 minutes. Trains consist of two cars each,—at present one open and one closed. Under the Minneapolis system all



METHOD OF SUSPENDING TROLLEY WIRES ON VIADUCT.

open cars are guarded with a woven wire guard which extends the entire length of the car on both sides, the passengers entering from the rear platform and reaching their seats through a center aisle. All cars are likewise gated on both front and rear platforms on the side next the other track. The traffic on the Inter Urban has been truly wonderful, the cars averaging 50 passengers each way during the entire day.

Along the "Inter" portion of the line the track is laid with 60 pound Illinois Steel Company's iron; and in the "Urban" parts we find the Johnson Company's standard girder.

The line crosses the Mississippi in Minneapolis, on a high, steel arch bridge, over which the cars run at full speed, and the remainder of the trip is a charming variety of gently rising hills, from the top of which may be had fine views of the surrounding country for miles around.

The system of crossing steam railroad tracks is admirable, there being but one grade crossing and that an unimportant one. The steam tracks in Minneapolis are crossed by passing under them, and the large number of tracks which are met before reaching St. Paul, are passed by means of a magnificent viaduct over which the electric cars are run. To avoid using centre poles on this viaduct, which is quite a long one, the wires are sustained by 4 inch gas pipe joined as shown herewith, and springing from the dividing fence which separates the foot passageway from the road. The centre of this arch is fully 30 feet above the rails, and the whole is a very substantial construction. There are no severe grades on the Inter-Urban, but several long ones—however, the time made in climbing them is excellent, and there seemed no difficulty in securing full speed in going two or three car lengths after stopping for passengers at the steepest points. At night, as the gayly lighted train skims along, it is a most fascinating sight, especially late at night, when one misses by a moment the last car, and it sails away in the darkness and you are not in it.

As a means of harmonizing the interests of the two cities, so many of which are mutual in their character, it is by far the most potent agency which has appeared in years. On the trip to St. Paul the writer noticed several Minneapolis residents who were inquiring the location of certain stores in St. Paul, and on the return were others on their way to avail themselves of bargains in Minneapolis. Between the two is a remarkable and rapid development and residence building, and before long these twins will be as actually united as were the Siamese twins.

A LONG LIVED CABLE.

ON the Grand Avenue Cable Line in Kansas City is the heaviest grade of any cable road in the country, and a person who has once rode over the route will always remember what seemed very like a balloon ascension. There was taken out of service on that line recently a rope which was 18,800 feet in length, of $1\frac{1}{4}$ inches diameter and which had been in constant use at a speed of 14 miles an hour for 672 days. During this time it had made a mileage of 135,872 miles and its usefulness was by no means exhausted even then. The rope was one of Roebbling's crucible steel of their standard make.

WAKES THEM UP.

A BEAM is cast by the New York *Sun* which reads thus: "It was an ingenious advertising idea to credit these cars with the power to cure the diseases of their passengers; but while they were curing a few they were producing insomnia in whole communities.

Just what we have always said,—if there was any one thing more than another which would wake up an old dead town, it was an electric line. It creates a general stir and enthusiasm like that which some people never experience save when a circus comes to town.

CORRESPONDENCE.

NEW ORLEANS, May 30, 1891.

Editor Street Railway Review:

Having read your article in April 1891 number, will state have been feeding for the past five years, oats and hay to the stock of the Crescent City Railroad Company just as it comes out of sack and bale, and no corn. Finding after careful noting of effects, that the mules and horses have been less sick than heretofore from worms and colic, and have not lost one animal from colic. Have entirely discontinued the use of worm and colic medicines at all the stables of the company; but before that, colic and worm medicines were the chief and largest bottles in the medicine chest. All of which have ceased since the stoppage of the use of *corn* as feed for animals.

Yours respectfully,

A. L. V. SMITH,

Supt. C. C. R. R. Co.

ENGLAND'S FIRST TROLLEY.

ONE of the most important events electrically that has reached us from across the water since the opening of the city and South London underground road in December last, is the intelligence just received of the enterprise, which will construct an overhead trolley system in Leeds, England. An effort has been made for some time past, in this and other cities, to secure permission to build at least a short line with which to demonstrate the claims set up by the promoters. Until now, these endeavors have been fruitless and most discouraging. But perseverance and the trolley, have at last won, and in the suburbs of Leeds, a double track line $2\frac{1}{2}$ miles long is assured. The privileges have been granted to W. S. Graff Baker, the resident agent at London of the Thomson Houston Company. All the contracts for material have been let and work is now under way. The road must be completed in three months. Although the line is a suburban one, it marks the dawn of an important era in the United Kingdom, and from this time an electrical construction may be expected where now the undertaking is impossible.

Success to the trolley in Leeds.

From our Special Correspondent.

SEATTLE LETTER.

SEATTLE, June 1, 1891.

For a place of its size, there is no city in the United States, with more miles of street railway in profitable operation than Seattle. The great era of street railway building was in 1890, when $46\frac{1}{2}$ miles were constructed: 9 miles of them for cable roads. Since January 1st about 5 miles more have been put in operation, and these, together with what was built before 1890, gives a total of over 65 miles. Of this total about 20 miles is in cable, the rest electric, with the exception of 2 miles on which small motors run.

Car building works have been established, and have already turned out a number of very good electric cars. No cable cars have yet been made here.

On May 31, the Union Trunk System of cable and electric railways began the operation of its southern branch. This system runs a cable line directly east up the steep hill from the city's water front; when the top of the hill is reached electric lines run north, south and east. The cable line has been in operation for sometime, and now the southern branch is giving a ten minute service. Work is being pushed on the north and east branches, in the hope of getting them into operation before the summer closes. This company has begun building cars of material, all of which comes from the State of Washington, with the exception of the glass.

An increase in receipts of 15 per cent is reported by the United Electric Street Car Lines of Nashville, Tenn., over this time last year.

It is said more people ride on street cars in Galveston, Texas, than any other city of 50,000 inhabitants in this country.

CONSTRUCTION AND EQUIPMENT NOTES.

The Burton Electric Heater.

SCARCELY any improvement that has come to street railway service has had to battle with more general objection than that of heating cars. The public immediately pronounced the delay as due entirely to an impecuniousness on the part of companies. This, however, was not the reason, as few managers can be found who will not frankly admit the increased travel to be credited to the heater. Street cars and car houses are

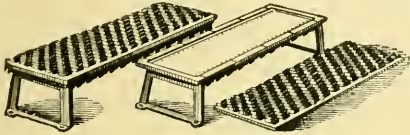


FIG. 1.

peculiarly inflammable in their construction and the history of street car fires is that but little, if any, of the rolling stock is ever rescued. Hence, managers have been very reluctant until the improved heaters of the past few years appeared, to put into their cars a hard coal fire, lest some careless employe should imperil a costly property. It has been conceded that for electric lines, an electric heater was the ideal method, and while it is generally understood that cars can be heated by this method, it has also been

ilar substance, will, without danger of fusing, carry an electric current of such strength as would instantly destroy it if not thus surrounded. In this way, the entire surface of the wire might be covered by the material which, although able to communicate the heat to the surrounding atmosphere, is of such high electrical resistance that it will not carry off a sufficiently large portion of current to prevent its efficient action as a heat producer. The patent was granted to Dr. Burton upon the practical application of his invention in 1887, and some time later he secured another patent on an improved method of electrically connecting the heaters. Up to the present time, however, its use has been confined to electric cars. The apparatus used in street car work and the method of wiring, will be readily understood by reference to the accompanying diagram. Figure 1 shows the iron casing with a corrugated covering to facilitate the radiation of the heat, which contains the German silver wire stretched back and forth across the case, and embedded in the fire clay. In wiring the ordinary street car, two such heaters are usually placed on each side under the seats, as shown in figures 2 and 3. The wiring is very easily done. Connection is made to the trolley wire in one corner of the car, and the current conveyed through the heaters under one seat and carried to the other side to a ground

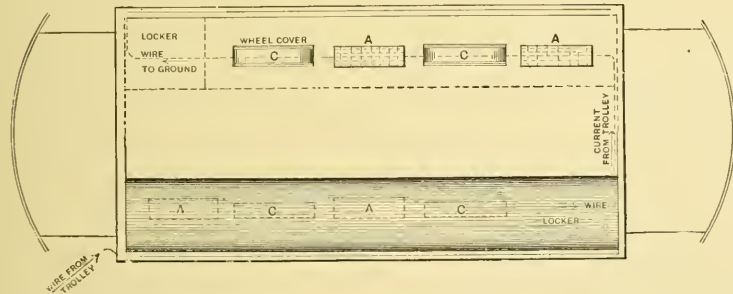


FIG. 2.

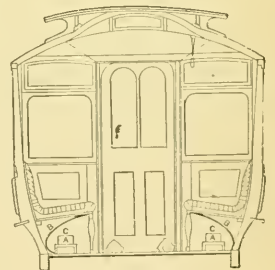


FIG. 3.

considered rather a possibility than an economical and practicable undertaking. This problem, like many others, once thought impossible, has now been fully worked out. The history of this invention, in many respects remarkable, chronicles some marked triumphs, not unhampered, it is true, by the usual suspicion with which a new departure is regarded. For some years Dr. Burton has devoted much attention to electrical science, and had carried on a long series of experiments with electric heaters. Beginning with the well known fact that the heat generated in a conductor is proportional to the resistance of such conductor and the strength of current used, the problem was to devise some arrangement whereby the wires when given current, such as would heat them to a requisite intensity, would yet be in danger of fusing. After much experiment, it was discovered that the platinum or any wire or refractory material, even when of considerable length, if surrounded by finely powdered fire clay or sim-

connection on the truck. The method of wiring adopted by the company is shown in figure 4, and for street car service, the electrical resistance of the heaters is so adjusted that on a 450 volt circuit they use three amperes of current. When, therefore, the handle of the switch "A" is turned on "L" ("shunt" from line connection) and "B" closed, the heaters are thrown in series of two for a short time, only causing the use of six amperes of current in each set. When a sufficiently high temperature has been attained in these, which will be in fifteen or twenty minutes, the handle "A" is turned on "C" (ground connection), and "B" opened. This causes them to be thrown in series of four, when the heat will be maintained in them for a long time without being appreciably lowered, with the use of only three amperes of current.

The process of warming the cars is supposed to take place in the morning before the car leaves the shed, when there is no other use for the current. The normal use of

the current, however, being only three amperes, the cost should be calculated on that basis. As far as regards expense, it is claimed that it is fully as economical and even more so when service and contingent expenses are considered, than the ordinary coal stove. Lieut. S. Dana Greene, the well known electrician, and who is consulting electrician for the Burton Company, estimates the cost to amount to less than 10 cents per day for each car, and in some cases, this estimate has been

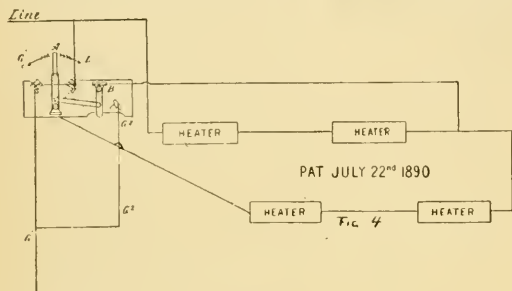


FIG. 4.

found too great. The company are constantly in receipt of testimonials from various roads speaking of the heater in the highest terms as regards safety, comfort and economy. The patrons of the road using the heater are even more enthusiastic than the officials.

Other uses for the heater are innumerable and suggest themselves at once. With its almost ideal qualifications, its general application is warmly urged by those familiar with its operation, and when once before the public, there can be no doubt of its rapid sale.

The John Scott legacy medal has been awarded the inventor for his electric heater, on the recommendation of the Franklin Institute, of Philadelphia. The heaters are manufactured by the Burton Electric Company, Richmond, Va., for whom the Electric Merchandise Company of Chicago are selling agents.

Passengers are not calling for heated cars at present, but this is none too early to take up the question.

SUPPOSED OC WAS SELLING PAPERS.

A GOOD one is told on a young gentlemen of Chicago who has been prominently connected with one of the leading electric supply houses, who not long ago changed his occupation to take a good position on one of the electrical journals of this city. His little 6 year old sister claimed the brother as her special property, and listened with profound interest to his announcement, that he was going to be a newspaper man, but did not seem to look upon the change with any special degree of favor.

On the first day of his journalistic work, a visitor at his home noted the far away and almost sad expression on the face of the little miss, who was usually the life of the household. At last the clock struck the hour of three, when she drew a long sigh, and with a voice so full of sympathy as to attract the attention of all, remarked, "Poor Oc, he's out on the streets selling papers now."

A Railway Sprinkler.

THE opening of the new Inter Urban Line between St. Paul and Minneapolis, has discovered the fact that outside the cities and while traversing some 6 miles or more of the distance which is beyond the pale of the water mains, that on certain favorable days the dust is found to be a no small and decidedly unpleasant feature of an otherwise delightful ride. To remedy this evil there is almost finished at the shops of the Minneapolis City Railway, a giant tank, made of $\frac{1}{8}$ inch boiler iron, and mounted on a flat car carried on four 36 inch wheels. A piece of four inch steam pipe capped at each end, and suitably perforated with small drill holes, rests across the rear platform. The connecting pipes of the same diameter as the cross pipe, connect it with the tank and insure a bountiful supply of water. It is intended to draw the tank car behind a motor car and by making a trip every two hours, the entire length of the line will be sprinkled in a round trip of eighty minutes. The tank is closed except for a manhole in the top which has a suitable cover, the entire tank car is strongly built and from a little distance resembles the tender of a locomotive. It will be handsomely painted, and will combine novelty and utility as well as serving a useful purpose.

DIRECTLY opposite the office of the STREET RAILWAY REVIEW, the roof is being placed on a magnificent building sixteen stories in height. We passed along the sidewalk the other day, with D. G. Hamilton, of this city, the president of the Pacific Railway Company, which owns five of the street car lines in St. Louis. After looking up at the sky-scraper a minute, he said: "The site on which that building stands was my homestead, and where I lived for twenty-three years. It was then in the outlying residence district, and we had a large front yard shaded by trees, and here on what is now Dearborn street, with its car line, and filled with teams and pedestrians, we had our garden, with currants and strawberries, and rows of cherry trees and sweet corn, and a nice melon patch." Mr. Hamilton is not yet 50 years of age, but the spot is surrounded by ten and twelve story buildings, while immense business houses extend for two miles beyond. Although he has an elegant residence on the boulevard, fully three miles from his old home, the solidly built residence district extends five miles beyond that. And it must not be forgotten that the city's growth has been equally as great on both West and North sides. On the same street and less than two blocks from the office of this paper are now building an office building eighteen stories high, and directly opposite an hotel which will have some of its choicest suites on the twentieth floor.

THE largest verdict ever returned in New York State for an injury of the kind, was recently affirmed by the State Supreme Court, wherein \$25,000 was awarded a child for the loss of a leg. The child was less than 4 years of age at the time of the accident, and was playing in the street. It is claimed the driver of the car had his horses on a gallop and was looking the other way.

The Westinghouse Multipolar Generators.

THE demand for large, slow-running generators for street railway work, is constantly increasing as their advantages become more generally known and appreciated. To meet this demand, the Westinghouse Electric & Manufacturing Company has placed

The pole pieces are built up of thin sheet iron plates bolted together and cast into the cylindrical yoke. The shunt and series coils are wound side by side upon metal hobbins which are slipped over the pole pieces and held in place by bolts. The insulation of these coils as well as the armature is of ample thickness and of superior quality.

The bearings are self-oiling as well as self-aligning and a great amount of bearing surface is obtained, owing to the length and large diameter of the journals.

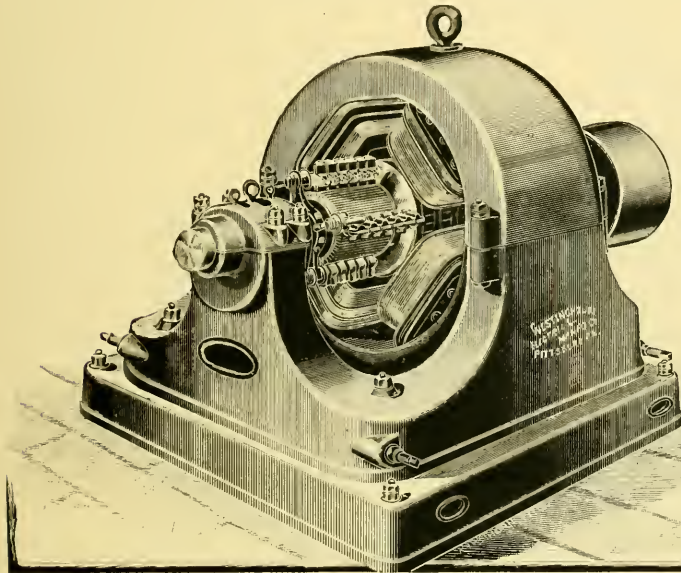
The armature is of the grammé ring type, the cores being laminated in the usual manner.

The armature and series coils are wound with wire of great capacity and as a consequence the heating effect is almost unnoticeable. In fact, when it is stated that the electrical efficiency of these generators is from 94 per cent to 96 per cent at full load, the perfection of the design will be admitted at once.

These generators are wound for 500 volts, can be worked up to 550 or even 600 volts with the same armature speed, by throwing resistance out of the shunt circuit with the hand regulator.

In no respect is the excellent design of these generators more apparent than in the matter of regulation.

The action of the series coils is such as to cause a considerable rise in voltage as the current being drawn from

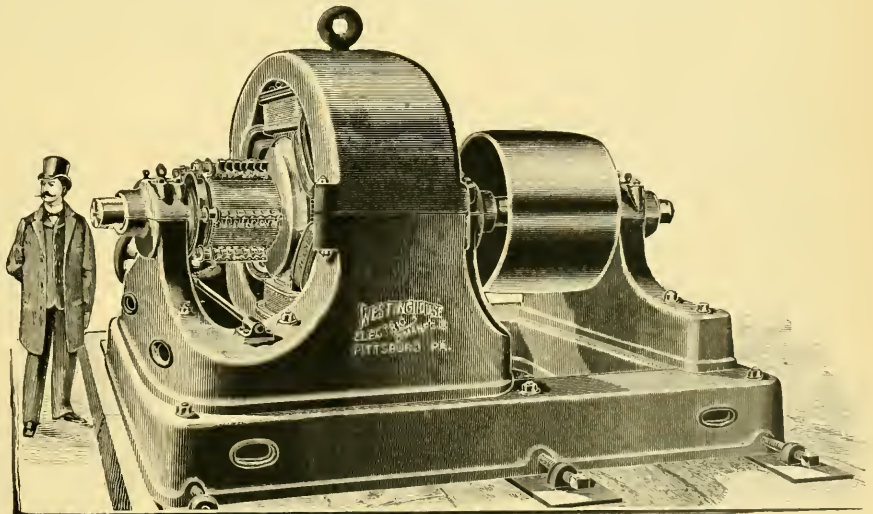


1.—250-HORSE-POWER GENERATOR.

upon the market a compound-wound, multipolar generator. This machine is at present built in three sizes, viz.: 125, 250 and 500-horse-power.

By referring to the accompanying engravings, it will be noticed that in general design, these generators resemble the well-known Westinghouse Alternating Current Dynamo. There is the same cylindrical yoke parting along a horizontal plane through the shaft, and the same arrangement of inwardly pointing pole pieces, but with a much smaller number of the latter.

The 125 and 250-horse-power machines have, as shown in Fig. 1, four pole pieces, and in the 500-horse-power size, see Fig. 2, there are six poles. In this latter machine, the shaft has a bearing outside of the pulley, which relieves it in a large degree from the bending strain, and adds much to the rigidity of the armature.



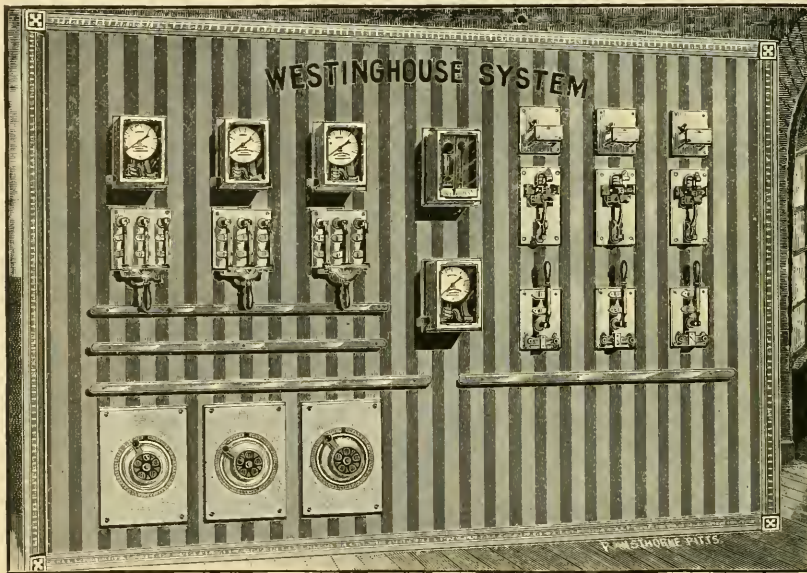
2.—500-HORSE-POWER GENERATOR.

the machine increases. It is claimed that even at full load this rise in voltage is sufficient to make up for any ordinary loss, or "drop" in the line.

The number of sets of brushes correspond to the number of pole pieces, and the alternate one, being of the same polarity, are connected together. Each individual brush has its own spring, by means of which its pressure on the commutator may be adjusted, and any one may be removed without disturbing the others.

The dynamos are reversible and may be run in either direction.

We give a view of a railway switch board equipped with Westinghouse appliances, some of which, namely, the circuit breaker and lightning arrestor, have previously been described in detail in these columns. This board accommodates three generators and three feeders.



3—SWITCHBOARD.

TOBOGGAN RAPID TRANSIT.

THE much abused sea-serpent will not stand much of a show this summer unless the New York Rapid Transit Commission soon decide on a plan, and remove the hopes of would be promoters, who have had unrestricted opportunities for bringing their schemes before the public.

Surely as original as any of the numerous devices suggested, is that of the Henning Rapid Transit system, for the promotion of which a stock company has been already formed.

The first necessity of this method is a subway to contain two tracks laid in the usual manner and equipped with a cable to be operated at 15 miles per hour, under the ordinary system of cable propulsion for street cars. The stations which are also to be underground are located at convenient distances and easily accessible to the street by a few steps. Leading in either direction, the road makes a down grade of 8 or 10 per cent from the station, and the plan proposed is to run by gravity down this incline and as far up the grade leading to the next

station as possible, and when the speed of the car falls below that of the rope, (15 miles an hour), the gripman is to grip the cable and climb the hill at that speed.

By this means it is believed a maximum speed between stations of 56 miles an hour could be attained, on which basis a train could run from the Battery to Harlem in twenty-six minutes, including twenty-six stops, which is the number of stations on the line of the elevated road, which requires one hour to cover the distance. The line would be independent of water pipes, streets and buildings, and it is claimed, could, by working in sections, be completed in 264 days. Trains would contain six coaches and accommodate 600 passengers. *

An indicator on the grip car would show the speed and when it fell to the 15 mile an hour rate, the driver would use the cable.

The idea is so closely associated with a Coney Island toboggan, that the plan will at first thought provoke a smile, but like some other motors that have been suggested by different people at various times, there can be no possible question about the ability of the system to run down.

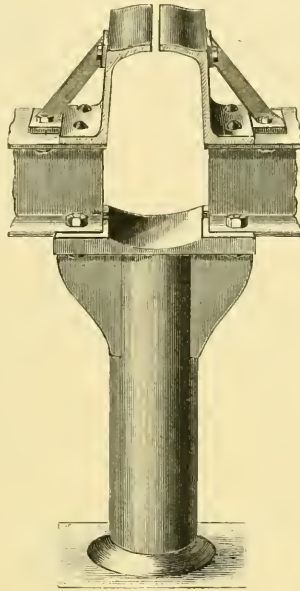
THE definition of rapid transit according to the Baltimore *Herald* is: "In a word, rapid transit means progress in municipal life, while the old, slow and pokey tramways of the past simply hang as a dead weight around the neck of improvement."

AN old man thought to block the wheels of commerce by getting in front of a cable train in Kansas City. When the car stopped the old gentleman surprised everybody by crawling out unhurt from under the car where he had ridden with his feet on the fender, and holding to the brake rod.

White's Cable and Conduit System.

THE fast increasing number of underground wires of all kinds, in every large city, has of late attracted special attention to any method which promised to solve the double problem of street car propulsion and a safe and suitable place for the location of gas and water pipes and electric wire conduits. With a view to solving this problem, as far as connected with cable construction, R. T. White, of New York, took out a series of patents a few months ago on a combined cable and conduit system. In this construction, which will be readily understood from the various illustrations, he has aimed at simplicity in details and economy in cost of materials and labor necessary. The excavation covers the space between the two outside rails, and is preferably continuous throughout the length of the line. This gives a roomy, and at all times, easily accessible conduit, in which may be laid water, gas and steam pipes, telephone, telegraph and electric wires without number. Any changes or repairs on any of these can be made without disturbing the pavement or impeding, in any way, the traffic on the street. If the conduit space is not desired, the required excavation is but that necessary to contain the small conduit for the rope and pulleys, and holes in which to place the posts.

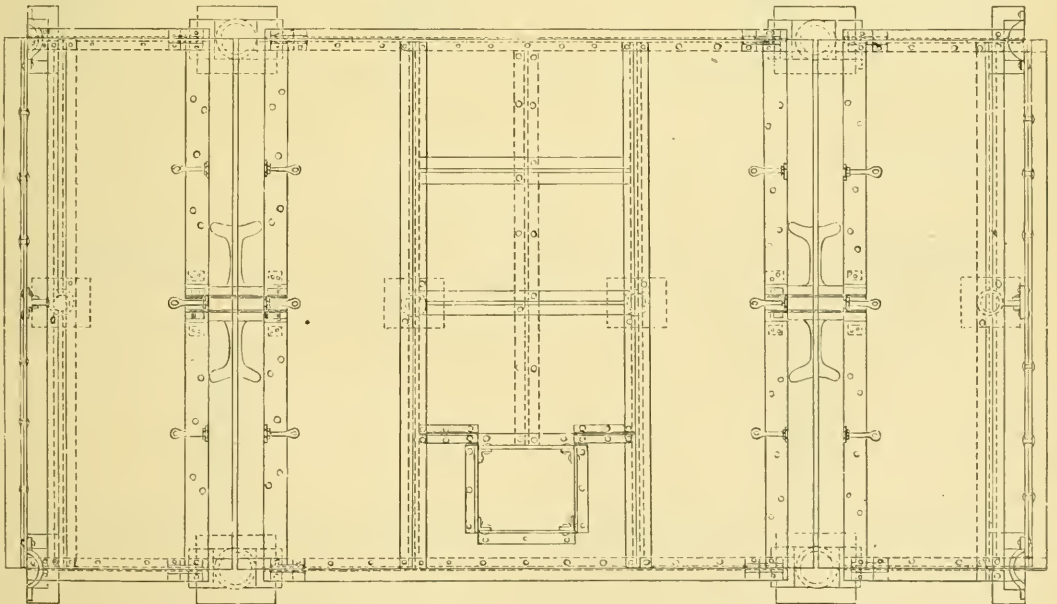
duced without disturbing them in any way. It will be noticed no yokes are used; the system consisting of vertical metal posts, one under each wheel rail and Fig. 1, large posts directly beneath the slot opening. Steel girders of I beams extend across the back from one main post to the other, and to them are securely bolted the slot rails, while steel covering plates rest upon the I beams and form a roof to the conduit, and carry the paving, which as shown in the illustration may be either granite or asphalt. The posts are of cast iron and rest on a bed plate set in concrete.



1.—MAIN POST.

The side walls which extend on both sides in line with the posts carrying the outside rail, may be either of iron plate, as shown in Fig. 3, or bricked up if preferred. In Fig. 4 is shown a side view, with a line of main posts, one of which supports the carrying pulley. These main posts are designed to be set from 9 to 12 feet apart, according to the necessities of the case. As the conduit may be made high enough for a man to walk upright, it will be seen with what ease the pulleys may be examined and repaired.

The slot opening would afford such continuous ventilation, that gas could not gather in quantities to cause an explosion, as is so frequently the case in small conduits containing wires. Manholes are placed between the tracks, as



2.—PLAN VIEW WHITE'S CABLE AND CONDUIT SYSTEM—PAVING REMOVED.

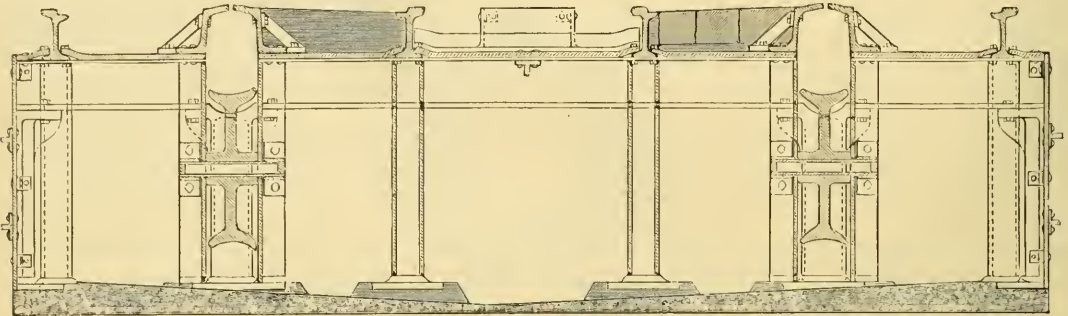
Where the street is already largely occupied with a network of pipes, wires and similar obstructions to conduit building, this form of construction could usually be intro-

duced in Fig. 3. If at any time it was desired to take out the cable and operate by electricity, the trolley wire could be easily attached along the conduit, and

carried to the motors by a device of the inventor, which extends through the slot, same as a grip. Feed wires to the trolley wires would also be safely cared for in the conduit. In Fig. 2 is shown a plan view with paving and top plates removed. In Fig. 3 will be noticed the excel-

WANTS A CODE.

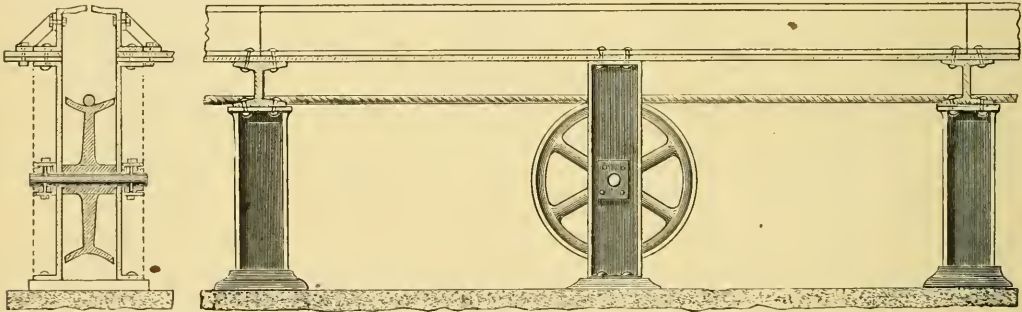
A COLOR-BLIND correspondent, writes a Rochester, N. Y., paper, advocating a code of signals for the use of electric motor cars, and the general convenience of the public. His claim is that in the even-



3.—VERTICAL SECTION BETWEEN MAIN POSTS—WHITE'S CABLE AND CONDUIT SYSTEM.

lent drainage secured, the floor sloping to the center, where at intervals it connects with the sewer. No wood is used in the construction which is entirely iron, cement and brick or stone. A complete working model show-

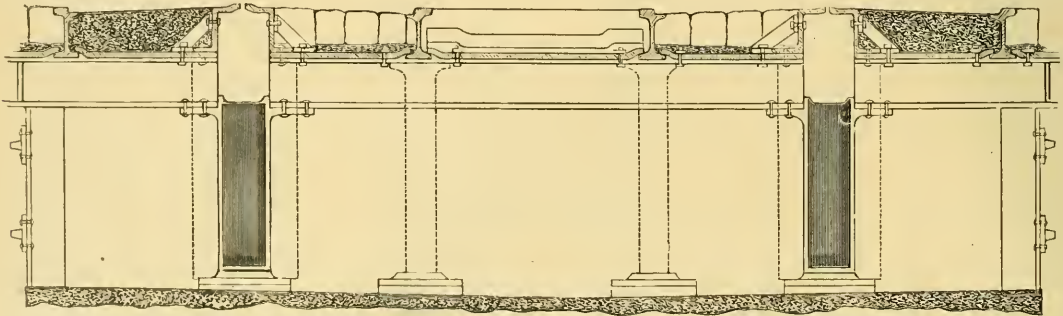
ing especially, it is very difficult for some people to distinguish the various colored lights which indicate the different lines, and where so many lines use a common starting point down town, he frequently finds himself on the



4.—SIDE VIEW SHOWING MAIN POSTS—WHITE'S CABLE AND CONDUIT SYSTEM.

ing every detail may be seen at the office of R. T. White, Mills' building, New York, who will be pleased to impart any desired information regarding his cable and conduit system.

wrong car. To obviate all this, he suggests a code something like this: On one line the drivers should sound their gong with two even blows, thus: — —; and another, one long and two short blows, — — —; another, two short



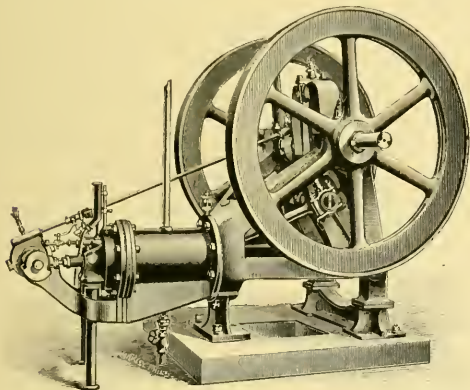
5.—VERTICAL CROSS SECTION AT MAIN POSTS—WHITE'S CABLE AND CONDUIT SYSTEM.

The grip barking cough is a new motor for use in street cars. Properly worked, it will make even the man with the paper hiding his face, stand up and give the invalid his seat. After getting the seat the cough ceases to bark.

and one long — — —; or, in other words, practically adopt so much of the Morse telegraphic alphabet, as may be necessary to provide each line with its particular gong signal.

The Atkinson Gas Engine.

GAS engines are constantly gaining favor where the amount of required horse power is small, thus far its application as a force for generating electricity has been limited. The history of gas engines dates over a very respectable period, as long ago as in 1862, Clerk, in his work, "The Gas Engine," refers to a pamphlet published by Beau de Roches, in Paris, in 1862, in which he states that to obtain economy with an explosive engine,

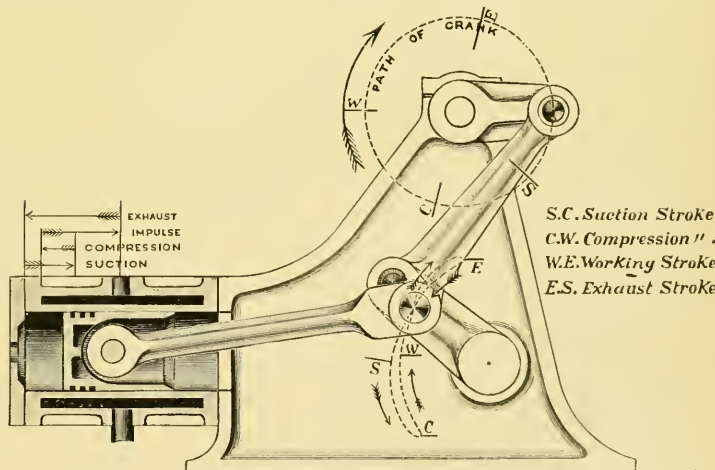


four conditions are required: (1.) The greatest possible cylinder volume with the least possible cooling surface. (2.) The greatest possible rapidity of expansion. (3.) The greatest possible expansion. (4.) The greatest possible pressure at the commencement of the expansion."

In designing an engine to meet the conditions laid down above, the first may be provided for by careful designing, and the second by high piston speed; this being limited by the time necessary for complete combustion. But the difficulty begins with the third, as the greatest possible expansion can only be obtained by expanding the charge to a volume greater than the original volume; for when expanded to the original volume only, the charge will have a high terminal pressure, and if expansion is only carried to this point, the products of combustion will be discharged with a large amount of energy not utilized. The difficulty also continues with the fourth, as the purer the mixture the higher will be the pressure at the commencement of the expansion, and in an engine in which the four strokes are of equal length, it is impossible to obtain a pure mixture, owing to the fact that the necessary compression space is, after the exhaust stroke, left full of the products of combustion, and these, of course, adulterate the charge and reduce the pressure. There is also another disadvantage attending the use of such a compression space, and that is, that it places a limit upon the size of the engine; for if an engine of large power is built

the cooling surface of the cylinder will bear such a small ratio to the volume of the cylinder, that the percentage of heat lost to the surfaces by the products of combustion during the exhaust, suction and compression strokes will be very small, and the temperature of the charge will be so high, that when the heat due to compression is added, a premature explosion will take place, and the motion of the engine be retarded or reversed. Consequently, to increase the power of engines after certain power has been reached, one or more cylinders have been added, forming in reality, separate and distinct engines connected to one crank shaft.

The new engine referred to—Atkinson's Cycle Gas Engine—performs all the operations in one revolution of the crank shaft. Fig. 1 is a perspective view of the engine, and Fig. 2, a sectional elevation showing only the mechanism by which the above operations are effected. It will be noticed that the different operations are obtained by the addition of but two parts—a link which vibrates through the arc of a circle, and a connecting rod—and by changing the position of the crank shaft in relation to the cylinder. The outer end of the piston connecting rod is attached to a pin passing through the crank connecting rod, and the latter is connected to the link; the different centers are so placed in relation to each other and to the center line of the cylinder, that the center of the pin to which the piston connecting rod is attached, travels in a curve resembling the figure eight, passing over the portion S. C. during the



suction stroke, over C. W. during the compression stroke, over W. E. during the working stroke and over E. S. during the exhaust stroke. The figure shows that the compression stroke is shorter than the suction stroke, that the working stroke is almost double the suction stroke, that the exhaust stroke ends with the piston as close to the cylinder cover as it is possible mechanically to have it, and that the working stroke takes place in one-quarter of a revolution. It is apparent that, with a given rotative speed, great rapidity of expansion can be obtained with this engine, and that it is possible to expand the charge to such a volume that the terminal pressure will be reduced

to the lowest practical point and that, owing to the purity of the charge, the greatest possible pressure will be attained at the commencement of the expansion. Further, that, owing to the fact that practically all the products of combustion are expelled, the incoming charge will attain no higher temperature in a large engine than in a small one and, consequently, large sizes can be built.

Tests made by competent and disinterested parties are said to show that the friction is no greater than in an ordinary engine. This engine is now in use in England to a considerable extent, and is now being introduced and will be manufactured here.

Aluminum Shades.

THESE are not sun shades, but are a new and interesting as well as highly useful application of this strange metal, and are to be used as office and street car shades for incandescent lights. They are handsomely finished and spun in one piece. As they will not tarnish and do not readily break are specially adapted to street car use. They have been brought out by the Electrical Supply Company of Chicago.

Likes the Differential.

THE General Superintendent of the St. Louis Cable and Western Railway which was one of the first to adopt the Walker Differential Drum, writes as follows under date of May 30th last:

The Walker Manufacturing Co., Cleveland, Ohio.

Gentlemen: In answer to your favor of 23rd inst. I beg to say: The cable machinery made by you for this company, with Differential Drums, commenced service on the 28th day of June, 1888. Since that date this company has not lost one moment in the operation of its line on account of your machinery.

It has rendered absolutely reliable duty from the moment the wheels first turned.

The Differential Drums have rendered valuable service in prolonging the life of our cables 50 per cent, besides saving a large sum in the amount of fuel.

Very truly yours,

Signed, A. de FIGUEIREDO, General Sup't.

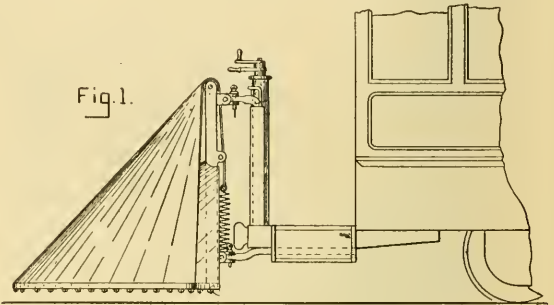
LOWELL AND SUBURBAN.

THE consolidation of the lines in Lowell, Mass., has been completed and the reorganization is well under way, and the work of construction will shortly commence. The single tracks will be double tracked and additional lines built which will involve an expense of about \$250,000, nearly all the old lines being extended. The power house will be located at the corner of Middlesex and Pawtucket streets, and will include ear house and workshops. On lines where the cars do not run through, transfer checks will be used and the facilities very greatly improved. An expenditure of \$1,000,000 is contemplated which will give a first class plant and rapid transit.

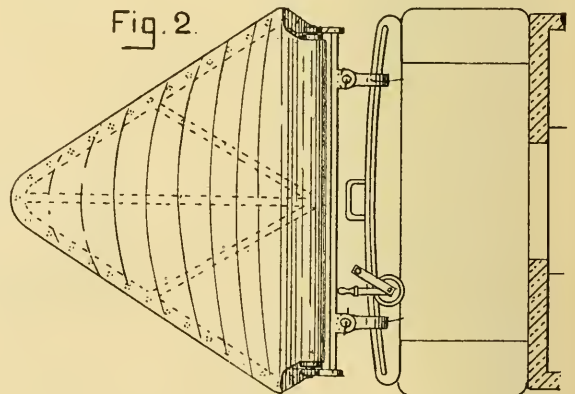
WE acknowledge receipt of an India proof of the steel plate engraving of President Thomas Lowry, which will appear in the annual report of the American State Railway Association. It is a splendid likeness, a veritable work of art, and a welcome addition to our portrait gallery.

A New Fender.

MANAGERS operating electric and cable cars are rapidly adopting some fender for the motor car, and car builders have strongly recommended the plan and devised several styles. The latest in this line was recently patented by David Hines, of Cambridge, Mass. It consists of a strong metallic frame covered with two sheets of heavy canvas, one sheet on the under



side, the other covering the outside and leaving a space between the two. This makes a sort of cushion and greatly reduces the force of the blow which would come to any object which might be struck. It also makes a comparatively light construction. As will be seen in Fig. 2 the canvas is fastened at the bottom to the frame, while the top passes over a roller and is kept taut by a strong spring. When the fender strikes the spring yields and the force of the blow comes first on the outer stretch of canvas and an instant later on the second. The



frame of the fender is attached to the car in a manner quite similar to that employed in hanging a headlight on the front dash, and, like it, may as easily be changed from one end of the car to the other. It is believed that should a person by chance be struck by the fender the canvas would act as a spring to throw him from the track, but without causing the severe blow which would result from being struck by some hard substance such as wood or iron. The fender should be painted same color as the car.

Standard Girder Joint.

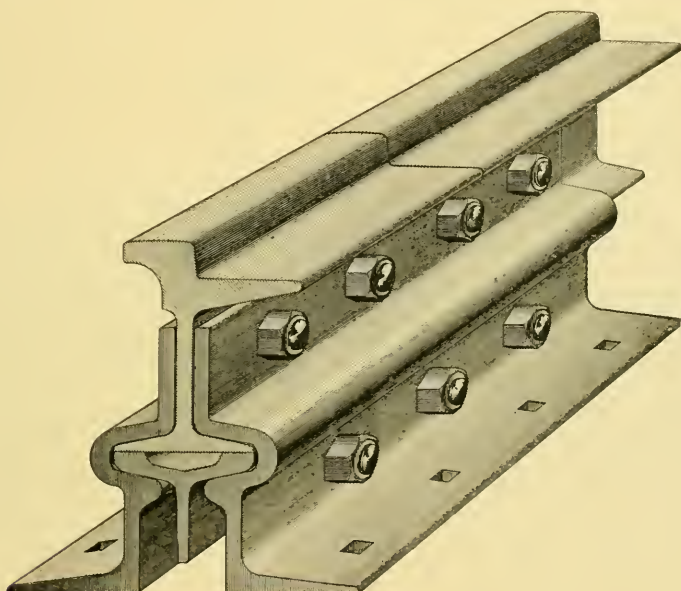
CATALOGUE number 7, of the Johnson Company, Johnstown, contains 204 pages, profusely illustrated and replete with information of great value—the table of estimates having been compiled with great pains and exactness. The catalogue is entirely devoted to street railway supplies of steel and iron, and the number and extent of the devices will surprise even an old railway manager.

One of the most interesting, as it is one of the latest products of this progressive concern, in the list is their new Standard Girder Joint, which is illustrated herewith. As the Johnson Company were the original designers of the girder rail, any appliance related to it offered by them cannot fail to interest. This joint is the result of a demand created by electric and cable cars which in

progresses should be the joint. A man with a hand hammer and wrench should precede the pavers and go over every joint. It should be done in this way: With the hammer each bolt head should be struck several blows; after this the wrench should be put upon the nut, and while bearing on the wrench to tighten the nut the head of the bolt should be repeatedly struck by the hammer. Every bolt should be so treated. It is the last and perhaps smallest turn of the nut that does all the work.

We also urge in strongest terms the use of supported joints. Put a cross-tie and chair under every joint in ordinary construction, and a yoke in cable railway construction. It will repay the trouble and time. Do not use suspended joints."

It would be difficult to imagine a strain which could be carried on rails that would be able to spring this joint.



weight and speed have so greatly increased the strain over the slow old style cars. This joint has been submitted to the most severe tests. It consists of two side clamps of rolled steel, each a girder of great strength, and a supporting tee-bar on which the abutting rails are seated, the whole clamped by nut-locked bolts above and below. The wedge, or splice-bar fit is utilized, and the bearing secured against play and wear is not less than four times as great as in any other joint. This gives a joint that is stronger than the solid rail; it is supported, and it positively counteracts the motion or play that is so fatal to its life. The manufacturers feel that with this new girder joint they are now in advance of the demands for heavy track for electrical purposes. In speaking of the value of leaving a joint thoroughly tight the Johnson Company says:

"After all the joints have been once tightened up the work is not done. The last thing looked to as the paving

NEW CABLES IN CHICAGO.

THE cable of the West Chicago Street Railway has proved successful and popular, as the company is now preparing to increase their mileage operated by this power and have closed contracts for the changing of Blue Island avenue. The new track will include some 10 miles and will afford rapid transit to a large territory now dependent on horse car service. For this work \$1,000,000 bonds bearing 6 per cent interest will be issued and the work will be commenced soon. The new line will use the tunnel under the Chicago river on which the company have been at work several months, and its completion and operation will be awaited impatiently by the residents and business men of a large district. The contract has been let to O. W. Meysenburg & Company, who also had the contract for building the Milwaukee Avenue Line for the West Chicago Road. The details of the plans have not yet been announced.

The Sioux City Corliss Engine.

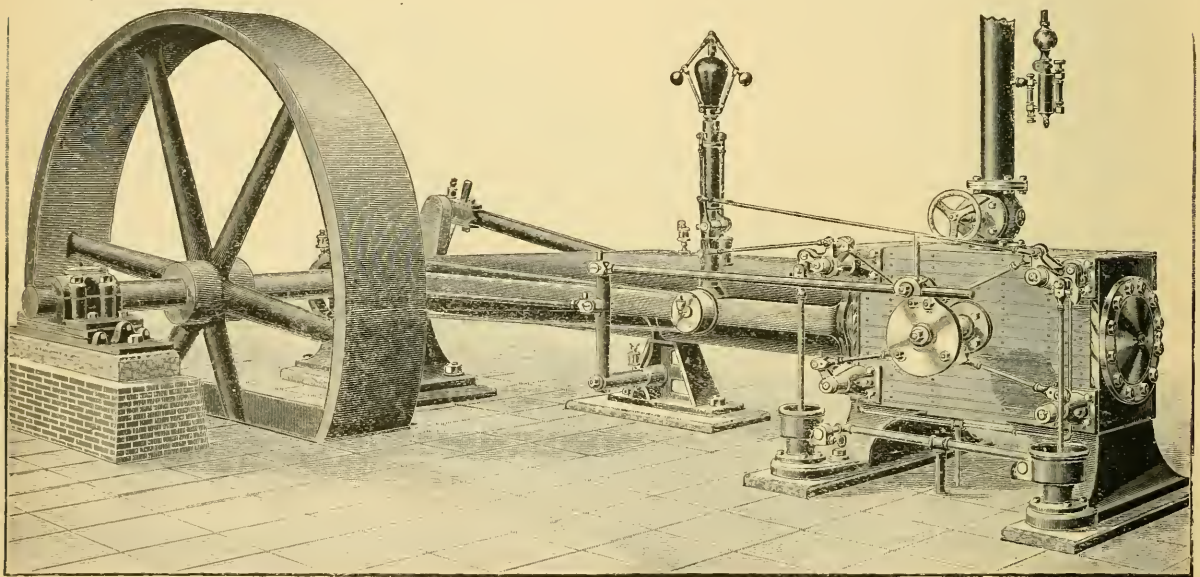
WE give our readers in this number of the REVIEW a cut of the Sioux City Corliss engine, which has attained such popularity in the west for electric railway driving. These results have been attained by the careful study on the part of the Sioux City Engine Works for the requirements of the trade. This has resulted in a re-designing of their engine with special reference to increasing the weight and stiffness of bed, and a large increase in weight of the fly-wheel, a much larger and broader bearing on foundation for both cylinder bed and shaft and very greatly improved governor and valve gear. The latter having special reference to attaining to the closest possible regulation for Corliss engine in electric railway service.

The Lincoln Street Railway Company, Lincoln, Neb., have placed their second order with the engine works

a large night force by electric lights to keep up with the demands of the trade for early delivery for their popular selling sizes.

Mr. W. J. Hobson, of St. Joseph, Mo., who bought one of the 150-horse-power Sioux City Corliss for his Wyandott Park Electric Railway plant two years ago, has recently placed an order with them for two of the 150 horse-power compound condensing Corliss engines, also for two 125-horse-power Stirling water tube boilers, for which this company is the western representative. This equipment is for Mr. Hobson's Electric Railway Lighting plant now in process of construction at Waco, Texas. In addition to these sales, the engine works have very recently taken some large orders for some of the most prominent manufacturing establishments in Illinois.

We hope at some future date to give our readers a descriptive article of their compound condensing Corliss,



THE SIOUX CITY CORLISS.

for a larger engine, on the results shown by the use of their first engine for one year, which has attained a record within 3 per cent variation for railway work, and which has not been surpassed by any authentic records yet published. As the cut shows, this engine has a decided advantage over many others for beauty of design. The appreciation being shown by the trade for this type of engine, possessing, as it does, so many valuable features to electric lighting and the railway trade, goes plainly to show that it has a bright and prosperous record before it.

The large new works recently built by this company are thoroughly equipped with the very best of first class, modern tools, besides some special tools of their own design and manufacture, adapted to this work. They have built up a business which now requires a production of from 80 to 100 engines per year, having over 100 horse-power each. At present they are obliged to work

together with economy, tests, etc. These engines have already made for themselves a record on economy unsurpassed by any engine of similar style and size now on the market.

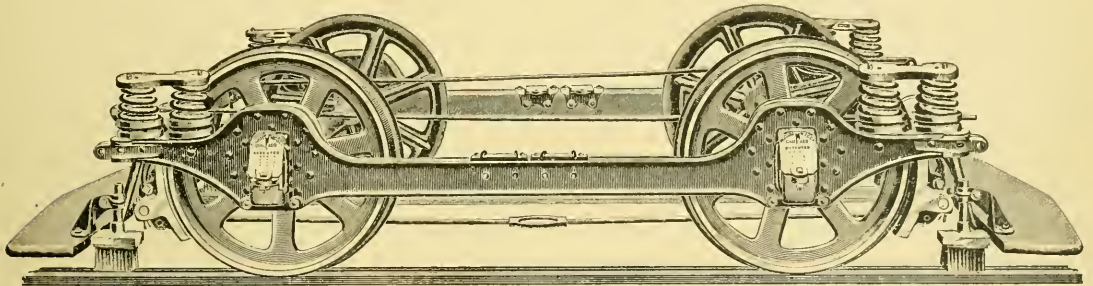
ONE of the finest catalogues of the year is that of the Lewis & Fowler Girder Rail Company, which has just come to hand. It gives evidence of the most careful compilation and covers every possible detail of street railway track construction. The illustrations are excellent, and the whole in keeping with the well known high grade of everything bearing the name of Lewis & Fowler.

FIVE HUNDRED men are now at work on the construction of the Third Avenue Cable Road in New York.

AN electric railway is proposed to run from Pasadena, Cal., to the summit of the Sierra Madres. It will attain an altitude of 6,000 feet with a grade of seven in 100.

McGuire New Electric Motor Truck.

THE large number of McGuire trucks which have found their way to every part of the country, literally from ocean to ocean, testifies to their excellent qualities. But not satisfied with previous efforts, this company has worked out and improved in every possible way their standard make, and now offer what they confidently claim to be a complete and perfect truck for electric motors. The illustration is the best description a practical railway man can have, but it may be added that the frame is made from solid pressed steel. Each side and ends of the truck frame is composed of a single piece of pressed steel, with a two inch flange top and bottom, and firmly riveted in the strongest possible manner. It is peculiar, in that its construction is complete without a single bolt in the whole truck, and it is claimed is the only truck of which this can be said. Nor is there a joint between the points of support for the car. Although so firm and staunch it is also elastic in every direction, and so proportioned that the strains in service are equally distributed upon every part of it. This produces not only an easy riding but noiseless truck, and all produced with-



out complication, for it is simplicity itself, and with splendid wearing qualities. Attention is also called to their patent safety wheel brake, which is two brakes in one. The journal boxes are water tight and the springs are easy on both truck and load. With this truck the motor is carried on the wheels, and the car box resting on double sets of springs as it does, is no more affected by the weight of the motor than if it was not there. Taken altogether it is a truck which will interest every reader, and is well worth a careful investigation.

A MUNICIPAL RAILWAY.

BY the terms of the franchise the street railway of Toronto, Canada, came into possession of the city, on May 17th, on the payment of \$1,453,788, as decided by appraisers. The former employes and some of the officials were continued until the city makes up its mind what to do with the purchase. Bids have been received as follows: Millar Bros., Philadelphia; Messrs. Geo. W. Kiely and William McKenzie, of Toronto, and Henry A. Everett, of Cleveland; and the Kerr-Brock syndicate. Receipts averaged \$2,500 per day the first week.

READ IN EUROPE.

THE following appeared May 5th, in the *National Review*, of Dublin, concerning a recent number of this publication. It says:

One of the most important of the great trade journals of America, the *STREET RAILWAY REVIEW* of Chicago, for March, contains an interesting sketch of Mr. William Anderson, the able manager of the Dublin Tramway Company, and a full page portrait of that gentleman. The *STREET RAILWAY REVIEW* speaks very highly of Mr. Anderson, and, after inviting him to the States to see the latest novelties in electrical and cable street railways, says that in the way of horse traction the American managers would be glad to have Mr. Anderson's views "which are the result of long service as manager of one of the largest and certainly one of the best conducted horse car systems in the world." This is high praise for our Dublin tramways and their skilful manager.

For the first quarter, the Third Avenue, New York Road, reports earnings \$367,443; operating expenses \$240,082; net earnings \$127,361.

DOWN IN A COAL MINE.

THE following is one of the many commendatory letters received at the office of the Ball Engine Company.

COLUMBUS, O., U. S. A., April 28, 1891.

The Ball Engine Co., Erie Pa.

Gentlemen:—Replying to your inquiry regarding the work performed by your engines lately purchased by us.

We have two of your 13x12 Automatic engines at the Helvetia Mines, Helvetia, Clearfield Co., Pa. These engines are running two of our 80-horse-power dynamos, generating power for transmission into the mines for the purpose of running our Jeffery Electric Coal Mining Machines. The duty these engines are called upon to perform is very severe; perhaps more so than street railway work, for the reason that the load is thrown off and on by the short run of each engine and consequent sudden stop. We require a regulation for our work that shall not exceed a loss in revolutions of 2 per cent. The Ball engines at the above mines have been running about four weeks, and are giving entire satisfaction. They are noticed for their beautiful and solid construction and the quietness and steadiness with which they run.

Yours truly,

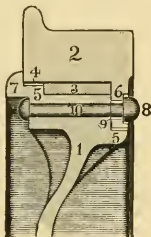
THE JEFFERY MFG. CO.

THE ROCHESTER CAR WHEEL WORKS, have moved their New York office to 222 East Twenty-eighth street. Mr. F. D. Russell, their general selling agent, has equipped their new shop with the latest devised wheel fitting machinery. They will also carry in stock a full line of street railway wheels, hereafter.

The Cushion Car Wheel.

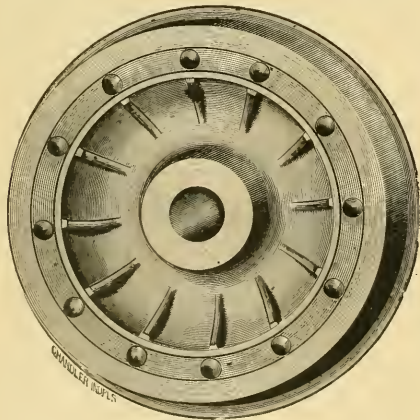
THE above title will immediately suggest the peculiar and special qualities of this new car wheel which is adapted equally well to street railway and steam road service. Indeed, with the increased weight and speed of electric and cable cars, there are many of the mechanical appliances of the operating department in which the requirements are almost as severe in one as the other.

In steam railroading the manager can always depend on practically a clean rail, while in operating along the



streets of even the cleanest cities, is ever more or less of obstructions which jar and shake the car. As to crossing switches and intersections, a street car will pass over twenty a day to one of the steam coach. Hence any improvement which can help to deaden noise and conduce to smoother riding is appreciated by patrons and reduces the cost of car repairs.

This wheel is composed of but two main parts, the tire and the centre, while between the two is a continuous rubber cushion, which makes the wheel almost noiseless in operation. The sound caused by running over some



obstruction on the rail goes no farther than the rubber cushion and is stopped there instead of being communicated through axle and standard and sills into the box of the car.

The sectional view of wheel is explained by reference to the numerals as follows: 1. Cast steel or iron center. 2. Rolled tire. 3. Rubber cushions. 4. A shield of sheet steel or iron No. 20 guage. 5. Safety guards on center. 6. Inwardly projecting annular flange. 7.

Flanges on wheel center. 8. Bolts or rivets. 9. Holes in flanges on tire. 10. Holes in center for bolts or rivets. As the cushion is thoroughly protected it cannot be affected by outside influences. The tire is so fastened that should a transverse break occur, the remaining bolts would hold the remaining portion and permit finishing the trip. On a recent test in which a set of these wheels ran 25,000 miles with an average stop of once in 4 miles, the rubber cushion showed no signs of displacement or wear, while the wear on the tire was only half the usual wear of tires shrunk on solid centers. The wheel is the invention of practical railroad men, and is made by the Cushion Car Wheel Company, of Indianapolis, Ind. H. P. Leach, who was formerly with the Pullman Palace Car Company, and who is now the master car builder of the Indiana, Illinois & Iowa Railroad, is the vice-president of the company.

Grand Excursion to Yellowstone National Park and Other Western Resorts.

The Union Pacific, "The Overland Route," proposes to run, in July, 1891, a grand excursion from Omaha to Yellowstone National Park, Great Shoshone Falls, Idaho, Ogden, Salt Lake City, Garfield Beach, Denver, Clear Creek Canon, the famous Loop, and other points of interest. The Union Pacific will furnish six horse Concord Coaches, which will carry the party from Beaver Canon, Idaho, to and through Yellowstone National Park. These Coaches will also be taken to Shoshone Station, and used for the ride to Great Shoshone Falls.

From Beaver Canon to Yellowstone National Park, the trip will occupy three days going, three days returning, and eight days will be spent in the park. Excellent tents and good equipment for camping out will be furnished by the Union Pacific, en route from Beaver Canon to the Park, and while in the Park, the tourists will be quartered at the various hotels.

The very low rate of \$250.00 per passenger has been made from Omaha. This rate includes Railroad, Pullman, and Stage fare, Meals and Hotel bill from the time of leaving Omaha until the return of the excursion, in all 30 days. No half fare rates.

Only thirty-five passengers can be accommodated, and as accommodations are limited, early application for same should be made.

In ordering tickets, send money for same by express, to Harry P. Duell, City Ticket Agent, U. P. System, 1302 Farnam St., Omaha, Nebraska.

No children will be allowed on this trip. For further information relative to this excursion and itinerary, apply to

E. L. LOMAX, or W. H. KNIGHT,
Gen'l Pass. and Ticket Agt. Gen'l Agt. U. P. System,
OMAHA, NEB. 191 CLARK ST., CHICAGO, ILL.

Metal Cross Tie.

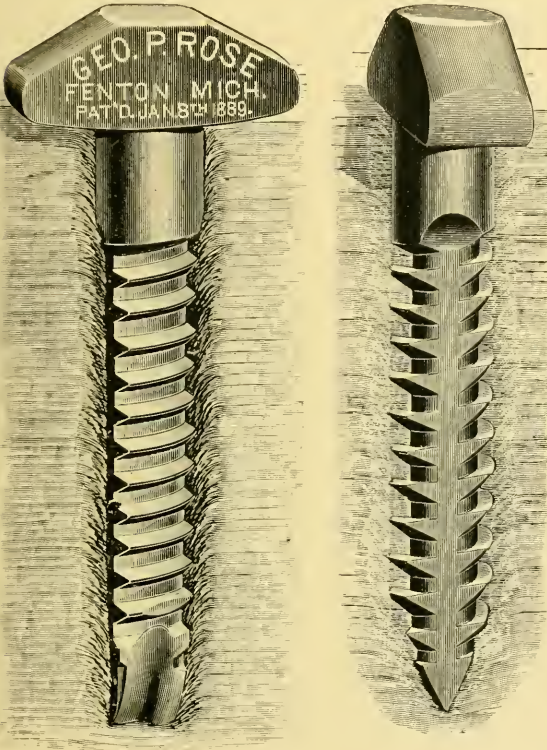
A NEW metal cross tie for steam and street railroad use has been patented by Bridges Smith, a resident of Macon, Ga. It is a hollow box 7 feet long, 8 inches wide, 4 inches deep, and is made of $\frac{3}{4}$ steel plate, and is shaped at the ends in an entirely new design. It weighs 100 pounds and costs about \$2.50 but should last at least fifty years. A patent fastener by which the rail is secured to the tie is also a part of the invention.

A NEW road has been organized in Baltimore, to be known as the North Avenue Electric Road.

AN electric road 41 miles in length will probably be built between Asheville and Rutherfordton, Ga. The latter named place is 112 years old, and has never had a railway of any kind until within the last two years.

A Screw Spike.

AN interesting invention in the way of a railway spike has been brought out by Geo. P. Rose, an extensive manufacturer of Fenton, Michigan. As the cut will show it is a spike and screw combined. The peculiar cutting edge of the point will be noticed. In driving, the elongated head should be placed next the rail, with the cutting edge cross-wire to the grain. Drive down until the head touches the foot of the rail. Then give the spike a quarter turn which draws it out of the



broomed or broken wood and into the solid wood. From the time the spike is given a quarter turn either way it becomes a screw. In experiments recently made with white oak ties it was found the head of the spike would break off before the spike would draw out. For use on the outside rail of curves it is specially valuable and on switches and cross-overs. It is expected the spike can be sold at about the same price as the ordinary spike. A feature of this spike is that when the rail wears down into the tie by giving a half or full turn the head can be brought down as tight as when first laid. The cutting edge is beveled with two concaves, to prevent the spike twisting in its course when driven.

THE Kings County Elevated Railroad earned \$313,608.58 the first quarter this year, and netted \$16,868. The increase in earnings over the same quarter a year ago is \$124,958.

A Turned Wood Pole.

A DECIDEDLY new feature in trolley wire poles is being put on the market by Brownlee & Company, of Detroit, Mich. The wooden poles heretofore have been for the most part octagonal, but the firm above named have succeeded in building a machine whereby they are enabled to turn a 30 foot pole. The illustration will give a good idea of its appearance, which is much more slightly than the old style pole, and is less liable to suffer from exposure to the weather and from being scratched by vehicles in the street. The strength is fully equal to that of the octagon wood pole. It will be noticed the pole is so turned as to secure a uniform taper from ground line to top and the manufacturers claim by their patent process of turning can be sold at a lower figure than the old style, which necessarily requires much more labor. The turned Brownlee pole is all "machine made."



Storage Batteries.

NINE cars operated by storage battery system have been put in service on the lines of the Dubuque (Iowa) Street Railway. The cars are 14 feet long and seat 22 people, and are handsomely finished, and are attracting a great deal of attention. They were built by the J. G. Brill Company of Philadelphia. The storage system is the Edco. Heretofore the operation by storage has been confined to an occasional car operated experimentally and the commercial results which this service will afford will be watched with much interest.

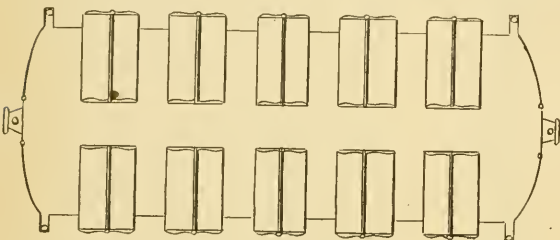
Stephenson New Car Shops.

A TRACT of twenty-five acres has been purchased by the John Stephenson Company at Larcomont, N. Y., on the line of the New York, New Haven & Hartford Railroad, with a frontage of nearly one-half mile on the railroad tracks. The company will shortly erect large shops there in which to build the large combination and electric cars for which there is now such an increasing demand. In addition to the shops, which will cover several acres, the Stephenson company will erect a large number of cottages for the use of its employes, who with their families will number about 1000 people. "Street car building, however," says Secretary DeLamater, "will be continued as usual at the old stand, with the same careful attention to quality and efficiency as have always characterized our work."

ST. AUGUSTINE, the oldest city in the United States will now have an electric railway, which will swiftly transport the astonished visitor, from modern hotels to to moss covered antiquities which have been standing for three hundred years, a striking contrast of a new and the old world both within the single glance of the eye.

A CHANGE IN OPEN CARS.

IN Chicago the open car is a great institution and they run early and late in the season and are an absolute necessity as the people insist upon them. The uniform style in use here for many years has been the cross seat extending all the way across the car and reached only from the foot-boards at each side. The West Chicago company have rebuilt a large number and will change all their opens so as to have a narrow center aisle



extend the entire length. This will enable the conductor to make collections without passing outside and in wet weather will be a great advantage. When there is an unusual crowd safe standing room is also afforded in this passage way and passengers at one end of the seat can more readily leave the car on the opposite side when desired, by passing through the aisle. Seats are stationary and each car accommodates forty passengers.

Twin City Rapid Transit Company.

ON June 4th, the above named company was incorporated under the laws of the state of New Jersey with its principal office with the National State Bank of Elizabeth. The company will deal in street railway stocks and bonds, and will engage in the building of street railways in St. Paul and Minneapolis, Minn. The capital is placed at \$20,000,000.

The shares of stock are \$100 each. The incorporators and stockholders are Henry W. Cannon, J. Kennedy Tod, New York; George Bliss of Morton, Bliss & Co., New York; George S. Coe, President American Exchange Bank, New York; ex-Congressman John Kean, Jr., of New Jersey; Charles Fairchild of Massachusetts, and Thomas Lowry of Minneapolis. The principal office of this company will be at the National State Bank, this city.

A NEAT little pamphlet of 90 pages is the report of the eight annual meeting of the Street Railway Association of the State of New York, for a copy of which we are indebted to Secretary W. J. Richardson. The association was organized December 20th, 1883, and is a decidedly vigorous and influential body. Those who were present cannot peruse the pages of the report without calling to mind the pleasure and profit that was theirs while the guests of the Rochester City Railway.

SOME parties in Detroit who have been secretly working on a storage battery for two years, announce that they have made a great discovery, and will give the system a trial on July 1st.

PATENTS FOR MAY.

Tubular Pole for Electric Railways.....	T. J. Bray, 452,255
Compressed air, Tramway System.....	F. H. Richards, 452,051, 452,052
Trolley Stand.....	R. M. Jones, 452,186
Car Brake.....	D. L. Barnes, 450,948
Car Brake.....	T. Tripp, 450,761, 450,762
Car Gear.....	M. G. Hubbard, 450,726
Insulated Electric Car.....	J. Stephenson, 450,846
Car or Vehicle for Pleasure for Railways, Toboggan Slides, etc.,.....	H. Borman, 450,659
Trolley Wheel Support for Electric Cars.....	H. A. Webber, 450,853
Electric Cable.....	W. I. Bunker, 450,734
Electric Machine or Motor, Dynamo.....	A. L. Parcell, 450,975
Electric Motor Mechanism.....	S. E. Mower, 450,970
Electric Motor or Generator.....	J. F. Seiberling, 450,639
Safety Device for Overhead Electric Wires.....	M. Kerstein, 450,626
Electric Railway.....	F. S. Culver, 450,613
Elevated Railway.....	J. N. Valley, R-11,158
Pneumatic Railway System.....	G. L. Du Laney, 450,700
Combined Tie Bar and Slide Plate for Railway Tracks.....	A. A. Strom, 450,983
Electric Railway Trolley or Traveler.....	S. H. Short, 450,683
Car Truck.....	J. H. Bickford, 450,608
Car Truck.....	P. M. Kling, 450,941
Car Truck.....	J. Krehbiel, 450,627
Car Truck.....	Lamb & Van Dyke, 450,813
Armature for Dynamo Electric Machines or Motors.....	E. Thomson, 452,951
Adjustable Support for Electric Wires.....	T. H. Brady, 453,036
Electric Safety Switch.....	G. L. Hall, 453,046
Electric Switch Board.....	J. B. Lyon, 452,921
Electric Locomotive or Street Car Motor.....	R. Eichemeyer, 453,167
Automatic Safety Electric System for Locomotives.....	E. Deming, 452,871
Electric Railway.....	R. M. Hunter, 452,920
Railway Rail Fastening and Support.....	G. B. Fisher, 452,863
Railway Rail Joint.....	D. W. Miller, 452,939
Cable Grip.....	J. H. Masters, 452,077, 452,078
Electrically Propelled Car.....	S. H. Short, 451,080
Motor Car for Electric Railways.....	S. H. Short, 452,035
Electric Motor Car.....	J. Christiansen, 452,176
Mounting for Electric Motor Cars.....	S. H. Short, 451,981
Automatic Track Sweeping and Oiling Attachment for Street Cars.....	R. H. Nesmith, 452,279
Driving Mechanism for Electric Motor Cars.....	S. H. Short, 452,005
Machinery for Propelling Electric Cars.....	S. H. Short, 452,036
Safety Grip Brake for Cable Cars.....	C. E. Naylor, 451,949
Electric Railway.....	F. O. Blackwell, 452,160
Electric Railway.....	M. W. Dewey, 452,099
Street Railway Rail and Pavement.....	P. Bargion, 452,333
Overhead Track for Railways.....	E. H. Thatcher, 452,201
Electric Railway Car.....	S. H. Short, 452,622
Railway Car Fender.....	S. S. Putnam, Jr., 452,530
Mounting of Electric Motor Cars.....	S. H. Short, 452,621
Electric Motor.....	E. Gray, 452,429
Electric Motor or Generator.....	A. L. Riker, 452,717
Controlling Device for Electric Motors.....	F. O. Blackwell, 452,422
Glass Covered Electric Wire.....	W. Curry, 452,565
Trolley Device for Electric Railways.....	D. N. Cook, 452,542
Overhead Trolley Wire Crossing.....	J. Kuehne, 452,576
Adjustable Car Strap.....	B. P. Johnson, 453,083

ST. LOUIS has ten electric railways in operation now.

IN another column will be noted mention of a most important event in the history of electric lines in Europe.

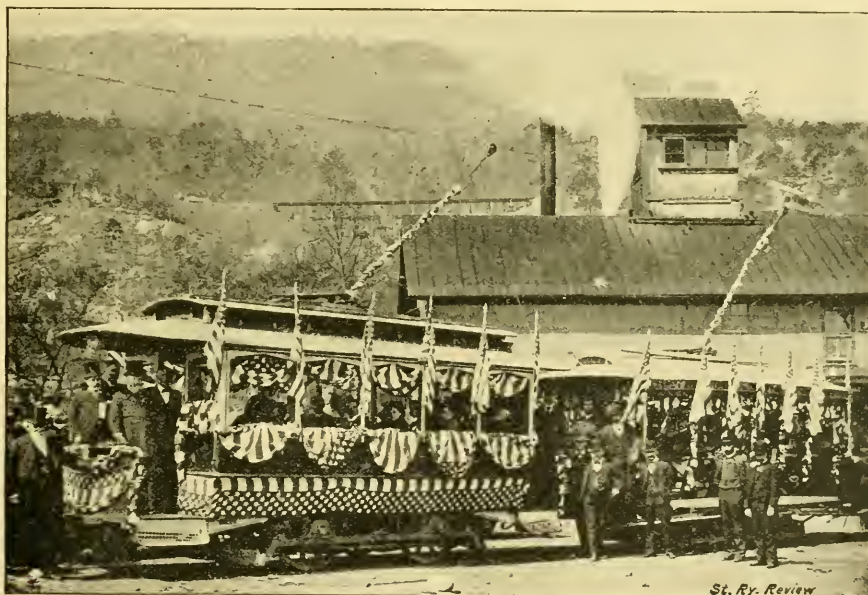
AN average of \$41.43 was what the three electric cars on the Watertown, N. Y., earned the day the road was opened.

NUMBERS three, four and five of the law report of appealed cases of importance to street railways, covering the issues of March, April and May have been received from Secretary Richardson of the American Street Railway Association.

THE PRESIDENTIAL CAR.

IN no other country in the world probably would the chief executive of the nation be allowed to ride in a street car. But in this land of freedom, not only are there now in most cities street cars, which are good enough for presidents, but a man who considered himself above riding in one, could never hope to be elected to the office. The illustration is taken at the foot of Lookout mountain, at a point $3\frac{1}{2}$ miles from the city, during the recent visit of the Presidential party, which remained four hours. On the front platform stands the President, with his son on his right and the Post Master General on the left. Mrs. Harrison is seated within the car, looking out the first window. The car which was gayly decorated with the national colors, was built by Brill, who, if he was across the pond, would ever after be advertising himself as "Purveyor of street cars to the President." The party boarded the electric train at the depot, and were

house is equipped with 4 150-horse-power boilers, 2 135-horse-power and 1 150-horse-power Beck engines, and 250-horse-power Armington & Sims engine. The generators are No. 32 110-horse-power Edison, and are five in number. There are already 35 miles of road constructed and projected lines will increase this to 50 miles, which will reach five lively suburbs. Lines also extend to Lookout Mountain and Mission Ridge, both very popular resorts, and to the National, Forest Hill and Mt. Olivet cemeteries. The horse lines are being rapidly changed to electric, and within the next twelve months will have 50 cars so equipped. The present Chattanooga Electric Railway is the result of the consolidation of the Chattanooga Electric Railroad Company and the City Street Railroad Company—horse lines. By a recent contract made with the city, the new company enjoys practically, an exclusive right to the railway privileges of the city.



THE PRESIDENT AT LOOKOUT MOUNTAIN.

given a most delightful ride, expressing themselves as greatly pleased with the road and its management. It was a great day for the electric road and the system. The line was the first built in the South, having been opened July 1st, 1889, and naturally had to meet and overcome many of the trials then incident to electric railroading. But these are all long since past, and it has for a long time operated to the delight of the management and the satisfaction of the city, of which it is one of the most popular institutions. All of the repair work is done in their own shops, including armatures and fields, for which there is a complete winding department. So perfectly is the line operated that, while maintaining the schedule to the minute, many cars have records of 10,000 to 12,000 miles, without any repair expense. The power

We are indebted to General Manager S. W. Divine for the photograph from which the illustration is taken, and when we get to be president, shall surely commence right by spending not four hours, but a week enjoying the generous hospitality of the Chattanooga Railway.

MARRIED.

Joseph H. Rhomberg, superintendent of Dubuque Street Railroad, was married May 26th, at the Cathedral of the Sacred Heart, to Miss Elizabeth Meuser. The occasion was made doubly interesting from the fact that the bride's sister was also married at the same place and time. Mr. Rhomberg is the son of President Rhomberg, who gave the groom \$25,000 in railway stock as a wedding present.

M. C. OF S. A.

EARLY in the morning, when the birds were waking from their slumbers, on the trees freshly robed in verdure by the gentle spring showers, into a beautiful southern city, from all directions came a body of enterprising and intelligent men. The title letters which appear above, might indicate that this assemblage was composed of members of congress; or reading further, one could imagine "S. A." stood for Salvation Army. As the procession marched to their barracks at the tavern, the natives were at a loss to know which of the conjectures was correct, or if indeed, they might not belong to both.

The gathering was none other than the Memphis Convention of Selling Agents; a gathering of the clans which will long live in memory and history. For three whole weeks, the convention held daily sessions for song, conference and experience; and it was even found necessary to labor far into the night with some of the more hardened brethren. It would hardly be in good taste to publish the minutes of the convention in advance of their official appearance, hence, we reluctantly pass the many profitable meetings, which were usually characterized by a large exchange of ideas; nor could the ordinary reader be expected to fully understand and appreciate the many technical points which were raised.

This brings us to what must necessarily be, an all too brief sketch of the delegates, who were as follows:

J. A. Hanna, who is the general eastern and southern agent of the J. G. Brill Company, and makes his headquarters in Philadelphia. He was chosen as one of the end men, but having departed from the tenets for which the group were photographed, was slighted to that extent by the camera.

T. E. Mooney, was chosen as a member of the directory, because he kept the address of all the others and could furnish information on short notice. Having sold the celebrated Bradford belt so long he naturally went around a good deal, but like the rest—was not in it.

John S. Pugh, whose heart is rightly proportioned to his size, was at all times a wise counsellor and genial companion. He was especially enthusiastic over the Baltimore car wheel. He also claims not to be within the wheel.

E. Lang, who is a direct descendent of "Auld Lang Syne," represented the Louisville & Nashville Railroad, an institution which was prepared to haul all the equipment in the land if it only came to Memphis. The delegates remember his many kindly services and although he "was in it," it was felt that the picture was not complete without him.

W. S. Love stands for the Pond Engineering Company, of St. Louis, he received a bid to come, but withdrew to attend a funeral.

J. A. Corry does not appear to be a specially wirey individual, but he represented all the Roebling's Sons & Co., of Trenton, and was made welcome at all times.

G. Pantaleoni has been connected with the Westinghouse Electrical and Manufacturing Company since its

inception, and before that in other electric lines. His district is a very large one, and he is recognized as one of the brightest electrical men in the country. He belongs to all the clubs in St. Louis and is famous as an entertainer. He led the evening meeting several times.

C. Daigh came to preach on a text from St. Paul, which read, "The Electrical Engineering Supply Company." He greatly endeared himself to all the brethren. He tarried too long at the lunch counter in Champaign, and lost the train, which occasioned much sympathy.

J. A. Vail registered from St. Louis, where he manages the western agency of the Hamilton Corliss engine, which position he has successfully held for a long time.

H. J. Crowley, Atlanta, Ga., is engineer and southern agent of the Thomson-Houston Company. He is not connected with the railway department, but happened to be in the city—neither was he in it.

Wm. J. Clark is the special agent of the Thomson-Houston, and resides in Boston. He came early and stayed late, and furnished his share to the life of the party. He repeatedly urged the brethren to gird up their loins.

E. W. Tucker was rightly taken by the hotel clerk to be a distinguished citizen and was promptly assigned to the room which Grover Cleveland had occupied when visiting the city during his presidential term. When it was discovered that he was not a minister plenipotentiary and only one of the laymen from the E. P. Allis works, the clerk wanted to trade rooms. However, E. W. would not Tucker out and peace was eventually restored with Milwaukee Best.

W. L. B. G. Allen, who has a long name because his company is the Short Electric, of Cleveland, was found a pleasant, quiet gentleman whose stories were always good and his presence a delight. His closing discourse was on the words "Man wants but little here below but wants that little Short."

D. W. Pugh, naturally suggest meetings and ministers, and the thoughtful, pious expression of his face comes from genuine goodness of heart as all who know him will testify. He has been a colporteur for the John Stephenson Company for these many years, during which time he has visited every city in the country.

F. X. Cicott sits next him in the group, but is now in Europe in the interests of his company, the Electric Merchandise of Chicago. He has charge of their rail department—the Tramway of Pittsburg—and was a great addition to the party, having been an extensive traveler.

C. B. Osgood who comes next in the collection of bearded gentlemen, is the special agent of the railway department of the Westinghouse Electrical & Manufacturing Company, Chicago. He was formerly with the Sprague people and ranks among the best posted electrical men in the country. He has been with the Westinghouse since they entered the railway field and is ever a most genial companion and the warm friend of every one of the party.

F. A. Rogers, came from the Short Electric Railroad Company, Cleveland, and did a good deal of thinking.



STANDING.—1, J. A. Hanna. 2, T. E. Moore. 3, John S. Pugh. 4, J. A. Cory. 5, E. Lange. 6, W. S. Love. 7, G. Parake. 8, C. Daugh. 9, J. A. Veil. 10, H. J. Crowley.
 SEATED.—1, Wm. J. Clark. 2, E. W. Tucker. 3, W. L. B. G. Allen. 4, D. W. Fugh. 5, F. N. Cleat. 6, C. H. Oswood. 7, F. A. Rogers. 8, D. R. Dean.

He was a quiet, pleasant gentleman, but always welcome at the discussions, and was much liked by all the members. His baccalaureate was founded on the text "For there so many called but few chosen."

D. B. Dean, of the Electric Merchandise, Chicago, is the other end man. He was formerly connected with the *Electrical Review*, where he made a bright record, and brought to his present connection hosts of friends and a wide range of information and observation. He greatly contributed to the life of the party at all times. However, it could not be said he "was not in it."

Having completed their labors, the convention came to a close, and those who "were not in it" returned, with many pleasant recollections of three week's life in the southern city.

the site selected is by all odds splendidly adapted to the purpose and all that could possibly have been desired. We illustrate herewith the plan as adopted for the electrical display, in which will be so much of interest to street railway men, and in and around which probably more than in any other building will general interest center. The contract for the building has been let and work upon it will commence at once. Notwithstanding its immense size, electricians are disappointed that it was not even larger. The map on the opposite page will show the location of the various buildings. Already \$9,500,000 is pledged to the management, which is \$4,000,000 more than was spent on the Centennial, while there are yet a large number of sources to hear from. It will be the grandest exhibit ever made.



THE WORLD'S FAIR.—THE ELECTRICAL DISPLAY BUILDING.

THE WORLD'S FAIR.

THE work is progressing satisfactorily and rapidly at the grounds where the great fair will be held in 1893. An army of 2,000 men, most of whom eat and sleep in tent si scamped there, and hundreds of teams are moving in every direction. Tram roads for dirt cars extend in various direction, and six mammoth steam dredges are eating out the space which will be connected with Lake Michigan and afford lakes and landing for the largest craft that floats. The scene is one of intense activity and it is conceded on all sides that

Quite a little stir was created in the East by the report that the Chicago City Railway was endeavoring to import contract laborers in violation of the law. A Chicago gas company was also included in the charges. Neither of these companies are making any considerable extensions this year and have use for but a very little unskilled labor, and with the number of men of this kind available in this city the canard takes a rather humorous aspect to any one who is familiar with the situation. It is needless to add there is not the slightest ground of truth in the report.

ECHOES FROM THE TRADE.

HORACE A. KEEFER & Co., Kansas City, have taken the agency for the southwest, for R. T. White's Railway Specialties, and are securing a large amount of business in that line.

THE J. G. BRILL COMPANY have sold a large number of cars and trucks all through the South the past month. General Agent Hanna took orders for 27 Brill cars and trucks for Birmingham, when in that city a few days since, and reports a strong demand for additional equipment.



Young Johnny hitched upon the cars
Of every cross-town line;

WE are in receipt of a neat series of catalogues issued by The Engineering Equipment Company, 143 Liberty street, New York. They are gotten up in colors and show a large line of street railway supplies sold by this company, including price list of the Underwood Belting Company, for which company they act as general selling agents.

GOULD & WATSON COMPANY, of Boston, have sent us through their Chicago agent, Mr. R. B. Pierpont, a very handsome catalogue and price list, showing the many designs of line specialties manufactured by that company. Mr. Pierpont has gotten nicely settled in their new office in the Northern Building, and reports business very satisfactory.

THE DETROIT CITY RAILWAY COMPANY, after giving the Healy Steam Motor a test of thirty days, on the Jefferson Avenue Line, have now decided to have four more built as soon as possible, which they will run to Grosse Point, the new extension of the Jefferson Avenue Line. It is their intention to have them finished for summer traffic to this pleasure resort.

THE CROWN LUBRICATING COMPANY, of Chicago, report their trade with street railway companies rapidly increasing. This company is now handling a full line of lubricating oils, including machinery and cylinder oils, besides making a speciality of their greases for cable pulley work, having many of the largest cable companies in this country among their customers.

C. E. Loss, the Chicago street railway contractor, is receiving very high praise from the papers in Kankakee, Ill., where he has the contract for the track work for their electric road. He has laid and finished five miles of track in less than 30 days, and with an average force of only 85 men. This was the more remarkable, on account of the difficulty experienced in opening the street, which is an old and very hard McAdam pavement.

□ R. T. WHITE, 18 Mills' building, New York, has added a new feature to his business, and is in position to correspond with any roads desiring to place bonds for the purpose of construction work. He has already placed bonds for several roads, and is negotiating the consolidation of railway and electric light interests in another city. He is also figuring with parties who contemplate the adoption of his cable and conduit system, which is illustrated on another page.

THE H. W. JOHNS manufacturing Company, whose works are in Hartford, Conn., with large distributing depots in New York, Philadelphia, Chicago and Boston, are giving special attention to the wants of electricians, in the line of a practically indestructible insulator and packing, a compound of asbestos and rubber, and which they call vulcabeston. It is made in sheets as thin as the lightest paper or as thick as a board, and is also cast in moulds in any desired shape. It is everywhere giving splendid satisfaction and has earned a splendid record.

THE CHAS. MUNSON BELTING COMPANY have recently shipped a 72-inch belt, 150 feet long, weighing 3,000 pounds, to the Missouri Street Railway Company at St. Louis. This belt has been made for transmitting 2,000 horse power, and is belted to a pulley 108 inches in diameter, with a 78-inch face, and weighing 14,000 pounds. The tightener pulley is 60 inches in diameter, has an 80-inch face, and weighs 5,000 pounds. This road are also using two 54-inch belts, also made by the same company, which is certainly a very good recommendation for the Munson belt, showing the favor it is receiving from street railway men.

THE NORTHERN CAR COMPANY, of Minneapolis, have their shops full in every department. The business has so increased that they have found it necessary to at once begin the construction of a large addition to their present works. The new shops will cover five acres, being equipped with the most complete machinery, enabling them to turn their cars out much more promptly than heretofore.

THE CARETTE COMPANY, of Chicago, reports sales for their cars very good, having recently received orders for a large number, some of which went to Halifax, Nova Scotia. There are companies being organized at Baltimore, Orange, N. J. Grand Rapids, Mich., and a number of eastern cities, which will make sales for about fifty more in the near future. They report their Buffalo line running most satisfactory.

THE BURTON HEATER COMPANY, of Richmond and Chicago, through their President, Mr. W. R. Mason, reports the sales of this new heater rapidly increasing. They are also meeting with many inquiries from owners of large buildings and apartment houses for this heater for warming rooms as it is claimed by them that the expense will be less than using coal, and would do away with all smoke and dust.

THE BABCOCK & WILCOX COMPANY report a number of orders for street railway work, through their western manager, Mr. G. E. Palmer, among them being 500-horse-power boilers for the West Superior Street Railway Company, at West Superior, Wis.; 1,500-horse-power for the Washington & Georgetown Railway, at Washington, D. C., and 1,000-horse-power for the new electric line, at Grand Rapids, Mich.

THE GREAT WESTERN ELECTRICAL SUPPLY COMPANY are now preparing one of the most complete catalogues for general electric street railway supplies ever issued, besides including a full line of the specialties manufactured by that company, and also will include the many different devices sold by them. This will be sent to all the electric roads and should be received by the street car men contemplating using electricity.

THE ELECTRIC MERCHANDISE COMPANY are very jubilant over their capture of the large Memphis order, as they succeeded in securing the contract for the poles, rail bonds, and overhead fixtures for the entire forty miles of the electric road. As the material had to be approved by the electrical company putting in the apparatus, it was all the stronger an endorsement of the quality of the material manufactured by this busy concern.

ENGINEERING EQUIPMENT COMPANY announce the connection with the concern, on June 1st, of W. F. D. Crane, M. E., who will give his time to continued development of the company's growing business in the Anderson trolleys, line materials, etc, the Kellogg combination steel center and side poles and other equipment materials

for electric railways and engineering works in general. He will make his headquarters at the general office of that company, at No. 143 Liberty St., New York.

W. D. NUTTALL & COMPANY, manufacturers of Railway specialties, at Allegheny, Pa., have recently constructed a large building, to provide more room for their large and increasing business. This they have filled with the latest improved machinery, much of which has been designed especially for them. Beside this, they have finished a large foundry in which to do their own casting work. This company have recently placed upon the market a new compression spring trolley which is meeting with a large sale; they also report business in every department rushing, necessitating their running nights to keep up with orders.



But when the doctors stitched on him
It wasn't quite so fine.

NEW DEPARTURE BELL COMPANY.—Gabriel can now lay aside his historic and resounding trumpet, for if anything was ever a competitor with that tuneful instrument, it is the bell of the above named concern. When it was sounded in New York, the other day, Chief Swenie of the Chicago fire department heard it and immediately placed an order for one for use on his personal fire wagon. So much pleased was he that an additional order was given for a large number of carts and trucks, and the fire insurance patrol also adopted them. On the North Chicago Cable Road, and on the Chicago City Railway, the experiment is meeting with great favor. The blow is produced by the driver pressing a button with his foot, and rings when depressed, and also when the button raises. The sound can be made to reach five blocks. The police department are using them and the street railway people here will undoubtedly adopt them also.

THE BALL & WOOD COMPANY, with offices at 15 Courtland street, New York, report their new factory at Elizabethport, New Jersey, nearly completed. This will be a model factory in all its details. It will have all the latest tools and machinery, enabling them to make prompt deliveries of their new high speed engines made under the Ball patents.

MR. W. H. CRARY, general manager of the Benson & Halceyon Heights Railway, Omaha, Neb., was recently in Chicago, buying equipment for the purpose of making theirs an electric line: the Electrical Supply Company having received the order for the overhead work, while the Westinghouse motors are to be placed upon Pullman cars with McGuire trucks.

New Ball and Wood Plant.

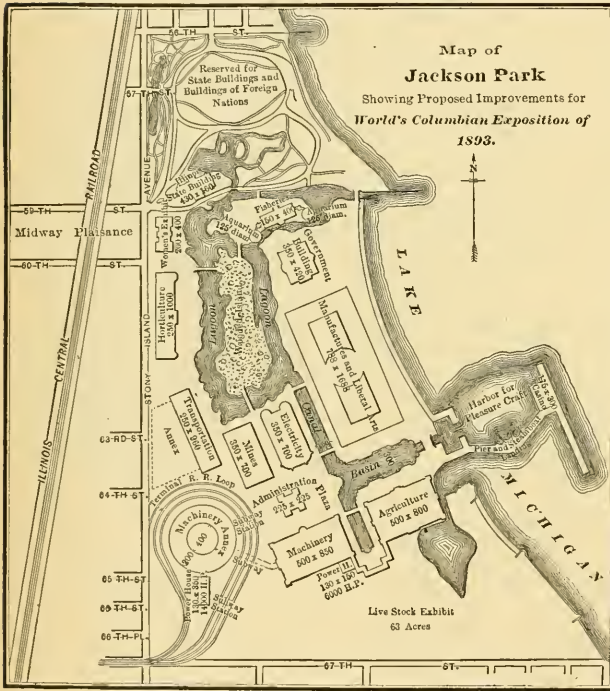
THE new plant of The Ball & Wood Company, at Elizabethport, promises to be a model in equipment and convenience for building the Improved Ball Automatic Cut-off Engines. With a length of 900 feet between the main tracks of the Central Railroad of New Jersey, and Trumbull street, with the Singer park at one end and the railroad station at the other, it is an ideal manufacturing site. Two railroad sidings will serve, one the main machine shop, into which it passes, and the other the foundry, which at present is in contemplation.

From the city hall, in New York, to the factory station, is exactly 10 miles, and a long distance telephone will connect these points, placing purchasers of these engines in instant communication with the source of supply. In the main machine shop, even a wide-awake engineer will be impressed with the mechanical progress made in the last decade. A glance will embrace an enormous room, light and airy, 70 feet high to the roof, and flanked with wide and substantial galleries sustained by iron columns. Overhead, a Shaw Electric Crane will noiselessly raise a completed compound engine of twenty tons, from the testing block, carry it the length of the shop, and place it on a car in readiness for shipment. On either hand are new and massive tools, the latest product of the shops, both east and west, and throughout the entire establishment an air and order of system prevails, which, in itself, will guarantee substantial and excellent work.

It is the intention of the company to increase its plant by adding in length when it becomes necessary, and this can be done without interrupting the work in progress. A number of orders for the Improved Ball Engines are already entered, and in another month the factory will be a busy scene, well worth the inspection of engineers as well as purchasers of this well known engine.

CHANGED TO TROLLEY.

ST. LOUIS is about to make an extensive addition to its already extensive electric system. Mr. Theo. P. Bailey, manager of the railway department of the Thomson-Houston Company, reports the sale of electrical equipment for forty-five cars, including ten generators of 100-horse power each, to the St. Louis and Suburban Railway. This road has 19 miles, so divided that 12 miles are on one side of the power station and 7 on the other. This road has had a checkered career, having been cabled as a real estate speculation. The company were forced to accept a route so full of sharp curves as to be practically impracticable for a cable railway and the operation of the line was always at a loss and the road had been in a receiver's hands for several years. Its conversion to an electric line is a wise change and in this connection calls to mind a prediction made by Mr. Bailey two years ago, that he would some day place a trolley equipment on a cable road. The cable road at Grand Rapids, Mich., is another similar instance and should never have been built, the volume of business not warranting it. It, too, is being changed to overhead electric system.



THOMAS EDISON was recently in Chicago, completing the plans for the opening of a general supply house, much more complete than this company have ever had in the West before. They have leased the six-story building, numbers 173 and 175 Adams street, at an annual rental of \$15,000 per year and will spend \$25,000 in remodeling, they will take possession about July 1st.

THE LLOYD & PAXTON COMPANY, of No. 2 Wall street, New York, have nearly finished the equipping of their factory at Newark, N. J., and will soon have a daily capacity of 300 storage batteries, for which they will guarantee a capacity of 175 ampere hours. Their cells are entirely made by machinery, and will be put on the market at \$5 per cell, exclusive of the rubber boxes.

PERSONALS.

G. H. KNOWLES has been elected president of the Nassau, N. H., Street Railway.

WILLIAM C. MILLER, general manager of the Broadway Electric Line, Albany, N. Y., has resigned.

J. D. WILKES, of Toledo, O., becomes superintendent of the East Side Street Railway, Brockton, Mass.

JOHN PUGH, Baltimore Car Wheel Company, had a pocket full of orders just secured, when he called.

GEORGE S. WALES, of the Wales Manufacturing Company, Syracuse, N. Y., called on us a few days ago.

MR. E. R. GILMAN, president of the Great Western Electrical Supply Company, is in the East on a business trip.

MR. W. B. PIERSON, selling agent for the Ball Engine Company, with office at Chicago, has left for a several week strip to the Pacific coast.

G. F. PAGE, of the Page Belting Company, of Concord, N. H., was recently in this city looking after the interest of their western business.

GEORGE B. KERPER was a most welcome caller at our office recently. He spent several days in the city and was accompanied by Mrs. Kerper.

S. K. GREGG, manager of the Chicago office for the Sioux City Engine Works, has moved his office from the "Rookery" to 48 South Canal Street.

JOHN BRADLEY, formerly a division superintendent on the Cotton Belt road, became superintendent of the Hot Springs, Ark., street railway on June 10th.

EDWIN M. BUSHNELL, secretary and treasurer of the E. L. Bushnell Spring Company, Poughkeepsie, spent several days in Chicago and made us a pleasant call.

ODEN BOWIE, president of the Baltimore City Passenger Railway Company, has been confined to his residence for two weeks with severe illness, but is now able to be out.

P. F. SULLIVAN, who has made an enviable record as secretary of the Lowell & Dracut Company, has been elected general manager of the consolidated roads in Lowell.

LEE DAFT, who formerly owned the Electric Traction Works at Marion, N. J., is about removing to Tacoma, Wash., to engage in the manufacture of electric motors.

J. A. HANNA, general eastern and southern agent of the J. G. Brill Company, gave us a pleasant call. He has just returned from an extended southern trip and will be in Chicago all this month.

THOMAS J. MINARY, formerly of Versailles, has been elected manager of the Louisville, Ky., Central Street Railway, which practically puts him at the head of all the street railways in Louisville.

EDWARD LAWLESS, formerly superintendent of the Metropolitan Cable Railway of Kansas City, and now engaged in the manufacture of cement in Salt Lake City, was in Chicago a few days since and called.

FREDERICK J. WILSON, formerly with the Railway Department of the Thomson-Houston Company, has accepted the management of the western office of the Short Electric Railway Company, with headquarters at Chicago.

FREDERICK BROWN, electrical engineer of the Walsall Electrical Company, Walsall, England, called at our office when in the city last week. He will spend some time in travel in America. He reports a growing interest in electrical study by the tramway managers abroad.

JOHN WALKER, vice-president and general manager of the Walker Manufacturing Company, Cleveland, sailed from New York on the steamer City of New York, on Wednesday morning, June 10th. His entire family accompany him and will remain abroad three months, visiting the continent.

JOHN STEPHENSON who has been confined to his bed for several weeks with a severe illness, is now slightly improved and has been able to sit up a little during the past few days. We voice the earnest wish of the entire street railway fraternity in expressing the hope that his recovery may be speedy and complete.

ALFRED DICKINSON, the general manager of the South Staffordshire Tramways Company, and who is also consulting mechanical engineer of the Birmingham Central Tramways Company, was a caller last week. He is spending considerable time in this country for the express purpose of inspecting the operation of electric lines.

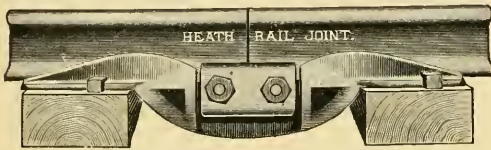
SHE couldn't have weighed over ninety pounds with all her wraps on. But she made her presence manifest. Every time the car stopped to take on a fresh passenger, a look of troubled annoyance came over her face. Finally she could stand it no longer. She jumped to her feet, motioned the conductor to stop, saying as she did so: "This is shameful! Crowding the cars to this extent, and in such slippery weather! Think of the poor horses! I must get out and walk; there shall at least be one less to be carried!"

Out she jumped, amid the audible smiles of her fellow travelers. When she reached the sidewalk, she looked at the retreating car with the satisfaction that only a virtuous action can give. She probably thought the horses would turn, in their gratitude, and thank her for her thoughtfulness. But she was disappointed; it was an electric car.—*Sally Joy White.*

An electric railway in Houston, Texas, will be started in a few days.

HEATH RAIL JOINT.

AMONG the simplest as well as strongest rail joints yet offered is that of the Heath Rail Joint Company whose office is No. 311 Globe Building, Minneapolis. As will be seen from the illustration, it has a truss cast solid to the bed plate, the ends of which rest upon and are spiked to the ties, and without the use of bolts. With this chair it becomes impossible for the rail to turn over without taking the ties with it, nor can the rail creep as each rail is independent of the others. It is impossible for the nuts to work loose, as they do not come in contact with any movable parts; with this joint the rail cannot crush into the tie. It is cast from malleable iron or made



of rolled steel as desired, and while it does away with splice bars costs less money. For street railway lines operating cable or electric cars it is specially adapted, and has also the great advantage of being easily applied, requiring no skilled labor, and is also easily paved. The president of the Heath Rail Joint Company is one of the best known railroad men, Mr. E. P. Caldwell, who is also the inventor of the rotary snow plow which has been used so successfully on steam roads. It will be noted the joint is strongest at the point where the greatest strain comes. Street railway managers will be interested in investigating the details of the new joint.

Garfield Beach on Great Salt Lake, Utah.

The famous health resort, Garfield Beach, on Great Salt Lake, 18 miles from Salt Lake City, is reached via the Union Pacific, "The Overland Route," and is now open for the season.

This is the only real sand beach on Great Salt Lake, and is one of the finest bathing and pleasure resorts in the West. Owing to the stimulating effect of the brine on the skin, or the saline air upon the lungs the appetite is stimulated, and after a bath, the bathers are ready for a hearty meal and feel greatly invigorated.

Fine bath-houses, accommodating 400 people have been erected at Garfield Beach, in connection with which there is a first class restaurant and a large dancing pavilion built out over the lake. All of these are run by the Union Pacific, which guarantees a first class resort in every respect.

For complete description of Garfield Beach and Great Salt Lake, send to E. L. Lomax, General Passenger and Ticket Agent, Omaha, for copies of "Sights and Scenes in Utah," or "A Glimpse of Great Salt Lake," or to

W. H. KNIGHT, Agent U. P. System,
191 Clark Street, Chicago, Ill.

RAPID TRANSIT has struck the city of Baltimore all in a heap since the opening of their cable road, and the announcement is now made that Governor Bowie will proceed at once to cable 18 miles of his principal lines and the intention is to commence work at the earliest possible moment. This, it is believed settles the question of the lines of the Baltimore Passenger Railway Company passing out of the hands of the present owners. It is hoped to have the road in operation within one year.

CAR HEATING CASE.

THE celebrated car heating case, in which the West Division Railway was sued for failure to heat one of their cars during the past winter, has just been decided in the county court. It will be remembered the city council passed an ordinance last fall requiring all street cars in the city of Chicago to be comfortably heated when the weather was of sufficient severity as to require the same. The various railway companies had already equipped nearly all their rolling stock with various kinds of heaters, but the case in question arose from the failure of one particular car to be so heated. In the Justice court the case was decided against the company, as the latter made no attempt to defend itself, but allowed the case to go by default and promptly appealed it to the higher court. Yesterday, Judge McConnell, in reviewing the case, decided that the city council had no authority to pass an ordinance of this kind and that it could only be made compulsory by an act of the legislature. As the legislature of this state has adjourned it is not likely that any special act of this kind will have an opportunity of coming into existence for the next two years at least. In the mean time the company are putting in heaters as they would have done had there been no action of the city council or other powers in authority to take action in the matter.

THE SHORTEST ROAD.

THE shortest horse railway in the world is probably to be found in New York, along the sunken road that begins at 85th street and Fifth avenue and ends at 86th street and Central Park West, less than half a mile. The line is three avenue blocks long, and consists of a double track. Its equipment is two small cars, two lanky horses, two car hooks and a played-out piece of broom. Two conductors and two drivers man the road, and the fare is 5 cents, as much as on the elevated or the other horse car lines from the battery to Harlem, 10 miles. From all appearances the line is doing a paying business, it being largely patronized by people in the eighties, on both sides of the park. Were connections made with some of the trunk lines of the East and West sides, this road would indeed be a great convenience.—*New York Recorder*.

A. L. IDE & SONS succeeded in securing the order for the six 150 horse power high speed engines for the electric road in Memphis, which scores another point for their excellent high speeds.

THE City Council of Mobile, Alabama, have granted the Mobile Street Railway Company a franchise to operate their lines by electricity.

A BALTIMORE man says: "A great many people who used to ride on horse cars, now invariably walk unless they can reach their destination over the cable line. It looks to me as if every line in the city would have to be made a rapid transit line or shut up shop, as the cable has scooped the business."

FOUND ON THE RUSH TRIP.

American Street Railway Association.

HENRY M. WATSON, PRESIDENT, Buffalo, N. Y.
 W. A. SMITH, FIRST VICE-PRESIDENT, Omaha, Neb.
 CHARLES ODELL, SECOND VICE-PRESIDENT, Newburyport, Mass.
 A. D. RODGERS, THIRD VICE-PRESIDENT, Columbus, Ohio.
 WM. J. RICHARDSON, SECRETARY AND TREASURER, Brooklyn, N. Y.
 EXECUTIVE COMMITTEE—THE PRESIDENT, VICE PRESIDENTS, and THOMAS
 LOWRY, Minneapolis, Minn.; D. F. HENRY, Pittsburgh, Pa.; ALBERT E. THORNTON,
 Atlanta, Ga.; H. M. LITTELL, Cincinnati, O. and THOMAS C. KEEFER,
 Ottawa, Can.
 Next meeting will be held in Pittsburg, Pa., October 21st, 1891.

Massachusetts Street Railway Association.

President, CHAS. B. PRATT, Salem; Vice Presidents, H. M. WHITNEY, Boston,
 AMOS F. BREED, Lybb, FRANE S. STEVENS; Secretary and Treasurer, J. H. EASTON,
 Lawrence.
 Meets first Wednesday of each month.

New York Street Railway Association.

President, DANIEL F. LEWIS, Brooklyn; Vice Presidents, JNO. N. BECKLEY
 Rochester, JOHN S. FOSTER, New York; Secretary and Treasurer, WILLIAM J. RICH-
 ARDSON, Brooklyn; Executive Committee, JOHN N. PARTRIDGE, Brooklyn; CHARLES
 CLEMENSHAW, Troy; C. DENSMORE WYMAN, New York.
 Next meeting, Hotel Metropole, New York City, Sept. 15th, 1891.

Ohio State Tramway Association.

JOHN N. STEWART, Ashtabula, President; JOHN HARRIS, Cincinnati, Vice President;
 J. B. HANNA, Cleveland, Secretary and Treasurer; E. K. STEWART, Columbus,
 Chairman Executive Committee.

The Street Railway Association of the State of New Jersey.

President, JOHN H. BONN, Hoboken; Vice President, THOS. C. BARR, Newark;
 Secretary and Treasurer, CHARLES Y. BAMFORD, Trenton; Executive Committee,
 OFFICERS and C. B. THURSTON, Jersey City; H. ROMAINE, Patterson; LEWIS FER-
 RINE, JR., Trenton.

CALIFORNIA.

OAKLAND.—The Consolidated Piedmont Cable Com-
 pany, will very soon begin the work of transforming the
 Fourteenth Street Hill's Car Line to cable. A considerable
 amount of the pit work in the streets is already com-
 pleted.

THE opening of the electric road has taken nearly all
 of the travel which was formerly carried on that part of
 the Southern Pacific Railway. It is now intended to
 either cable or operate electrically all the way to Berkley.

A BLIND man named Maduro, who has been in the habit
 of jumping on horse cars while in motion, recently
 attempted it late at night, and was run over and killed.
 He had for a long time been a wonder for his daring.

AN electric road is proposed to connect this city with
 San de Andro and Haywards. It is one of the most
 important projects which has been proposed for a long
 time. Capital stock \$500,000.

COLORADO.

DENVER.—The Colfax Electric Company will build a
 line to Fairmount cemetery, and will operate funeral cars
 on the new line.

THE Tramway Company will erect a large power house
 at Fay street and Gallup avenue.

PUEBLO.—The East Side Electric Line is now an
 assured fact and the road will be completed within ninety

days. Contracts have been signed. The line will pass
 through one of the most beautiful portions of Pueblo,
 giving a fine view of the surrounding mountains. It will
 be termed the "Scenic Street Car Line."

DELAWARE.

BLOOMINGTON.—Edwin W. Heald, who has been for
 three years manager of the City Railway, has resigned.

WILMINGTON.—The street railway has reduced its fare
 to five cents. To avoid interference of wagons in the
 street, the work of adjusting the trolley wires on Market
 street is being done at night.

DISTRICT OF COLUMBIA.

WASHINGTON.—The Washington & Arlington Railway
 Company is being backed by strong capitalists, and in
 addition to the line to Arlington intends to build to Mt.
 Vernon and Alexander.

GEORGIA.

ATLANTA.—The Consolidated Street Railway Com-
 pany has ordered twenty new electric cars from the Pull-
 man works.

AMERICUS.—By an order of the court the franchise
 and property of the street railway will be offered for sale
 on June 27th.

IDAHO.

BOISE CITY.—Work was begun and is being actively
 pushed in the construction of an electric railway. The
 road will be completed ready for operation July 1st.

ILLINOIS.

AURORA.—The railway people have purchased a
 \$10,000 farm and will convert it into a park.

BLOOMINGTON.—A new company has been incorpo-
 rated, under the name of the Citizen's Railway Company,
 for the construction of an electric line here. Capital,
 \$250,000. The incorporators are James S. Neill, F. M.
 Churchill and Geo. W. Stubblefield. The Bloomington
 Fair Association are interested in the scheme.

CAIRO.—The city council is inclined to be rigid with
 the proposed company and at present the building of the
 electric line is a little doubtful.

DECATUR.—One of the electric cars here recently
 earned \$93.45 on a single day, being the occasion of a
 public celebration.

GALESBURG.—The College City Railway is making
 extensions, using Johnson rails, which, when completed,
 will give it seven miles of track and involving an
 expenditure for new work of \$50,000.

HARVEY.—W. S. Reed has accepted the position of
 superintendent of construction of the new electric line
 here.

MATTOON.—E. P. Rose, G. S. Richmond and I. B. Craig, have taken out letters of incorporation for the Citizen's Street Railway Company, with a capital of \$50,000.

MURPHYSBORO.—T. M. Logan, H. W. Clark, A. D. Minton and J. B. Gill have incorporated a street railway, with a capital stock of \$25,000.

PEORIA.—Capt. Hill has at last succeeded after long and persistent effort in securing his desired ordinance, and will proceed to build at once.

The Central Railway has opened its electric line on Knoxville avenue, and have entirely discontinued the use of animal power.

SPRINGFIELD.—The two street railway companies carried 20,000 passengers each on a recent Sunday.

SOUTH CHICAGO.—An ordinance has been granted the South Side Street Railway to construct electric lines on a large number of streets, using either overhead or underground wires or storage battery. Cars must be heated from November to March inclusive, and a \$10,000 bond filed to secure completion of the road within two years.

CHICAGO.—Henry Smith, a West Division street car driver, was recently found dead in one of the barns, having been kicked to death by one of the horses.

The Cicero & Proviso Electric Railway is erecting a two story brick and stone building on Madison street, near Fortieth, to be used as car shops and waiting rooms. Their business is increasing daily.

The Lake Street Elevated Railway is somewhat at a standstill, and is very much in the same condition in which it has been for the last year. The company now desire to increase their capital stock in order to complete the road. They have not yet secured a down town route.

The South Side "Alley Elevated Road" are proceeding with their construction in the alley between State street and Wabash avenue, for which a franchise was recently granted by the city council. The great majority of property owners along the alley are very much in favor of the construction of the road there.

It is rumored that a company is being organized, consisting of Chicago and Milwaukee capitalists, for the construction of an electric line connecting the two cities. It is proposed to expend \$5,000,000 and operate it at a very high rate of speed.

The bill introduced in the present Legislature, which would allow elevated railroads to be authorized on the petition of a majority of the property owners along the entire route has been killed. A majority of frontage must be secured in each mile.

INDIANA.

CRAWFORDSVILLE.—The Edison Company have offered to build an electric line here.

INDIANAPOLIS.—A Chicago syndicate have secured a right of way over Michigan street, which is the most available route for an electric line, and it is believed prevents the construction of the proposed competitive line of the Greenwood & Suburban.

STREET railway companies are warned against a scheme which was worked here by a party giving his name as G. Conner, who secured about \$800 from the business men of the city, for the sale of tickets and advertising on programmes of an alleged entertainment to be given for the benefit of the Street Railway Employees' Association. There is no such association here and the entertainment was all a myth.

ARRANGEMENTS have been made for placing the bonds, amounting to \$150,000 of the Indianapolis & Broadripple Rapid Transit Company.

LOGANSPORT.—The stables of the street car company were burned, together with twenty-eight mules, entailing a total loss of \$25,000.

MARION.—The Queen City Electric Railway has contracted for a new power house, to be 50x90 feet, with a high tower and built of stone and pressed brick. It will be finished in sixty days.

TERRE HAUTE.—The new electric extension to the Fair grounds, was opened on June 7th, with a band concert, which was furnished by the railway company.

IOWA.

BURLINGTON.—The electric line was opened the first of the month. Its system is the Westinghouse and includes 12 miles of track.

DUBUQUE.—The Dubuque Street Railway has filed a twenty years' mortgage with the Illinois Trust and Savings Bank, Chicago, to cover \$250,000 of its present twenty years' bonds.

KEOKUK.—The Electric Railway here has had ten years added to its franchise, making its life thirty years.

KANSAS.

LEAVENWORTH.—The street railway here has been sold, and a new organization has been formed, under the title of the Leavenworth & Suburban Railway, with a capital of \$250,000. The new directors are Geo. A. Baker, William Dill, Geo. Burrows, Laurens Hawn and J. C. Lysle, of Leavenworth, and W. F. Putnam and W. A. Patten, of Exeter, N. H.

SALINA.—The contract has been let for five miles of electric railway, which will be operated on a five minute headway.

KENTUCKY.

NEWPORT.—The electric railway is distributing poles, and the indications are that a five cent fare and rapid transit will soon be an assured thing.

MAINE.

PORTLAND.—The electric line will be opened for business in a few days. Seven cars will be placed upon the road at the start. The speed will be 12 miles per hour.

MARYLAND.

BALTIMORE.—The opening of the cable road has excited the highest interest throughout the city. On the second day of its operation over 60,000 passengers were carried, many remaining on the cars for a number of trips. No accidents have attended its inauguration, and the stock of the company is rapidly advancing. Survey for Carey Street Cable Line is being made.

THE Union Passenger Railway has decided to file a mortgage for \$1,500,000 for the purpose of converting its line from horse to cable or electricity; which system has not been decided upon.

MASSACHUSETTS.

BOSTON.—It now appears that W. H. Clark, formerly one of the division superintendents of the West End Railway, was a trustee for some \$3,000, which would have been due a few days after his disappearance, which may account for his mysterious departure.

POSTMASTER HART is considering a plan to place letter boxes on the street cars which come into the city from the suburbs, as they pass through many localities not within the reach of the delivery and collection systems.

BROCKTON.—J. D. Wilkes, of Toledo, O., has become superintendent of the East side Electric Railway.

LAWRENCE.—Construction work is progressing satisfactorily with the new electric line.

MICHIGAN.

GRAND RAPIDS.—The managers of the Reeds Lake Electric Road, which extends from Reeds Lake to the outskirts of the city, are very jubilant over securing franchises, which enables them to build to the heart of the city.

THE railway strike has been kept up for three weeks, during which time one of the new men was killed and a number injured. A few nights since the house in which the company was boarding its men, was raided and the new men severely handled and driven out. The Union propose, to keep up the fight and are running a line of busses for the purpose.

JACKSON.—The contract has been accepted by T. C. Brooks for the the track work. The electric line will be completed by August 1st.

KALAMAZOO.—Stephen G. Earle, formerly steward at the asylum here has been elected general manager of the street railway.

MINNESOTA.

DULUTH.—The Duluth Street Railway has been granted a franchise to operate electric lines in the suburbs to Lakeside, and will construct a road this sum-

mer. The Duluth Street Railway will proceed with its new line on Fourth Street immediately. The project for an incline road bids fair to go through.

MINNEAPOLIS.—Contracts have been let for the equipment of the additional electric lines here, which will amount to nearly 80 miles.

MISSOURI.

JOPLIN.—An ordinance has been granted to extend the electric line to Blendeville. It will be built at once.

ST. LOUIS.—The Southern Street Railway has inaugurated a package express system in connection with its passenger business.

A SYNDICATE has been organized by local capitalists under the name of the St. Louis Electric Railway & Power Company, which proposes to construct an electric line to Webster Grove.

THE St. Louis & Suburban Railway Company, which is the new owner of the St. Louis Cable & Western Railway, has filed a mortgage with the American Loan & Trust Company to secure an issue of \$1,000,000 worth of bonds. The new company is also allowed to issue as much more if it desires to take up the outstanding bonds of the old company.

MONTANA.

BUTTE.—When G. F. Woolston, general manager of the electric and cable lines boarded one of his cars a few days since, the conductor was so intoxicated that he ordered him to the office to get his time. In descending the stairs shortly afterwards the conductor fell, and some of his friends supposed he had been thrown down. Whereupon the mob attacked the manager with shouts of "lynch" him, and for awhile matters were very lively.

THE mention last month of the forfeiture of the ordinance for the dummy on Main street gave the impression that the Consolidated Company was the loser thereby. Instead of that the franchise was relinquished and officially declared dead, with the consent of the company and in order that a new franchise might be granted, extending for the full term of twenty years and containing valuable privileges not enjoyable under the old permit.

NEBRASKA.

LINCOLN.—Chas. C. Upham, formerly vice president and general manager of the Salt Lake Rapid Transit Co., has been elected general manager of the Lincoln City Railway. E. L. Woolley is general superintendent. The Rapid Transit Company, has been sold to the Lincoln Street Railway, who will make the lines genuine rapid transit with electricity. It has been a dummy line here until now.

OMAHA.—The Patrick Land Company, on a recent Sunday, laid a considerable amount of track, fearing an injunction. The road is now being completed and will be soon finished. Work has at last commenced on the Inter State Street Railway & Bridge Company's line between Council Bluffs, East Omaha and Omaha.

NEW HAMPSHIRE.

MANCHESTER.—The Manchester Horse Railway have voted to issue \$80,000 of bonds to cover recent and contemplated extensions.

NEW JERSEY.

JERSEY CITY.—A man 60 years of age, attempted suicide twice by jumping from the front platform of one motor car directly in front of another approaching at high speed from the opposite direction. The driver, however, stopped his car so suddenly as to throw the passengers from their seats, and the man was uninjured. He made the attempt the second time, but was unsuccessful.

NEWARK.—The people in Vailsburg, a suburb of this city, have petitioned the Rapid Transit Company to build them an electric line.

THE Rapid Transit Company have just received sixteen new vestibule cars, which were made at Pullman. They are very elegantly decorated and are the finest ever seen in the city.

NEW YORK.

BROOKLYN.—The new electric road on Second avenue, which is one of President Lewis' lines, has been opened for traffic and is working in a highly satisfactory manner. There will be forty cars put on at first and increased as rapidly as required.

FLUSHING, L. I.—Chas. A. Fray, secretary of the Flushing & College Point Electric Railway, is reported missing from his home. He has been in ill health for some time and it is feared his mind was affected.

NEW YORK CITY.—Conductor J. E. McGill, of the Staten Island Rapid Transit Company, recently went on a spree, taking \$1,500 of the company's money. The superintendent recently received a letter from him returning \$600 of the money.

PERMISSION has been granted the Third Avenue Road to increase its stock from \$2,000,000 to \$5,000,000, for the purpose of changing to cable power. The company is also authorized to issue \$1,500,000 of bonds.

THE Board of Railway Commissioners have approved of the increase of the capital stock of the Manhattan Railway Company from \$26,000,000 to \$30,000,000.

THE suit for \$5000 damages for alleged injuries to Flora Hirschberg, on account of falling from a Houston West End and Pavonia Ferry Street car has been decided in favor of the railway. The case has been desperately fought by the plaintiff, who during the trial had an alleged attack of insanity, and entertained the court room with alternate selections from the various operas, and fits of screaming.

ROCHESTER.—On June 1st H. A. Loomis assumed the duties of superintendent of the Manitou Beach Electric Railway. Five miles of track are now laid.

THE "free-list" was cut off on June 1st., and hereafter very few passes will be issued.

SENECA.—Construction work is nearly finished on the electric line here, and the company will for the present get its power from the Waterloo Electric Light & Power Company.

SCHENECTADY.—The street railway is circulating a petition for electric lines on Gillispie and Union avenues.

TROY.—When A. S. Cradle, one of the foreman of the Troy and Lansingburg Railway was called to the power house at two o'clock in the morning to repair an accident, he was surprised to find the employes of the company gathered to present him with an elegant gold watch and chain.

WATERTOWN.—The electric railway was opened on May 20th, with great success, and is carrying on a good business. Electricity is generated by water power.

OHIO.

ALLIANCE.—The indications now are that the railway extension to Rockhill's Grove will be made.

CLEVELAND.—The Woodlawn Avenue and West Side Company are seriously considering a change to electricity, which if made will require an expenditure of \$750,000. Work on the Rocky River branch will be commenced at once.

SPRINGFIELD.—The Stockholders of the Springfield Electric Railway Company have organized with the following officers: I. Ward Frey, president; A. S. Bushnell, vice president; E. C. Gwyn, secretary. Construction work is progressing rapidly and the line will be opened within thirty days.

TOLEDO.—A strike of short duration occurred on the lines of the Consolidated Road, but has been fixed up and the men returned to work. The causes of the disaffection were chiefly imaginary.

WARREN.—Al. Johnson, of Cleveland, was the only bidder for the franchise to construct a street railway. He will probably accept it.

OREGON.

PORTLAND.—The cable road will extend its line to the City park, and, in addition, the company proposes to buy several acres of land for the laying out a private park of its own.

PENNSYLVANIA.

BEAVER FALLS.—The Beaver Valley road which connects this place with New Brighton, has been purchased by the Central Electric Street Railway Company, which was organized recently for the purpose of building a competitive line. It is understood that the sale will involve almost \$1,000,000. A new line will be built at once.

CONNELLSVILLE.—The Connelville, New Haven & Leisenring Street Railway has been incorporated for \$100,000 by Joseph Soisson, of Connelville, A. D. Boyd, John K. Ewing, Nathaniel Ewing and John K. Ewing, Jr., of Uniontown. The capital stock is \$100,000.

ERIE.—Franchises were granted the company, the Erie Transit Company, who intend to build considerable amount of track, to be operated by electricity.

NEW CASTLE.—Electrician H. E. Woodworth, while repairing a motor in one of the pits of the car house, accidentally brought his head in connection with the rheostat, causing a current from the trolley to pass through him into the damp ground. Notwithstanding over 500 volts passed through his body, he experienced no serious results.

PHILADELPHIA.—The Pennsylvania Iron Works have secured the entire contract for the cable machinery of the Third Avenue Road in New York.

HORACE T. POTTS has been elected superintendent of the Second and Third Streets Passenger Railway. He is an able and popular manager, and has been superintendent for a long time.

It is now found that City Treasurer Bradley, who is short in his accounts to a large amount, has been speculating heavily in Chicago railway stocks and bonds, also Baltimore and Philadelphia roads.

PITTSBURGH.—The Citizens' Electric Line to Sharpsburg is being rapidly completed and will be finished in time to do a good summer business.

A PARTY of German capitalists from Berlin investigated the lines here, and were much pleased with both the electric and cable systems.

THE Pittsburgh Traction Company, which has reduced its fare to 3 cents on competitive business, is carrying nearly 100 passengers on every trip.

THE Citizens' Traction Company has received fifteen new cars to replace those recently burned.

READING.—The Stone Creek branch of the East Reading Electric Railway has been opened and is doing a good business. It passes for three miles through parks, picnic grounds, woods and farms, and connects with the main line for the city.

THE committee from the city council which visited Boston for the purpose of investigating the trolley system, were very much pleased with their visit, and are in favor of introducing the system here.

WEST CHESTER.—The electric railway will erect a fine station and office building of brick, two stories high.

YORK.—The firm of Bangager, Kuntz & Stewart, of this city, have secured the contract for furnishing the yokes for the Third Avenue Cable Railway.

RHODE ISLAND.

PAWTUCKET.—A franchise has been granted the Union Electric Railway Company to build its electric line to Cranston. It is hoped a line to Providence will be authorized soon.

TENNESSEE.

FLORENCE.—It is rumored that the Dummy line will shortly be changed to electricity.

KNOXVILLE.—The first electric car on the Elmwood Dummy Line was run on June 3d. People along the road are delighted with the change.

MEMPHIS.—At a recent auction sale of the Memphis City Bank of 2,300 shares of stock of the Citizens' Street Railway, Hon. R. Dudley Frayser was the purchaser for \$131,000. The bids started at 30cts, and went up to 57c. Work on the electric construction is progressing satisfactorily, and it is hoped to have the cars to Jackson Mound Park running by July 15th.

NASHVILLE.—It is reported that capitalists in this city are endeavoring to secure a right of way for an electric line from this place to Gallatin over the road of the Turnpike Company.

THE Citizens' Rapid Transit Company has completed their line and cars are running. A rate has been made to school children of \$1.00 per month.

TEXAS.

BEAUMONT.—A street railway company has been organized with a capital of \$100,000.

BONAN.—An attempt is being made to raise a bonus for an electric railway, with good prospects of success.

GAINSEVILLE.—The street railway company has gone into the hands of a receiver, who is Gladney of this city.

PARIS.—Local and St. Louis capitalists are joining in a scheme to build an electric railway here, completely covering the city.

SAN ANTONIO.—The two railways have virtually consolidated and have contracted with the electric light company to furnish power for ten years. Chas. T. Hicks of the old line is to be auditor and M. M. Shipe general manager.

WASHINGTON.

MOSCOW.—A capital of \$15,000 has already been subscribed toward to building of an electric line here.

MT. VERNON.—An ordinance is being prepared for an electric line in this place.

PORT GARDNER.—A company with \$100,000 capital has been organized to build an electric road for Snohomish and Port Gardner.

SPOKANE FALLS.—Suit has been brought against the North End Electric Railway, for \$300,000 for damages received by a passenger whose knee was struck by a projection board as the car passed him.

WALLACE.—A franchise has been asked for a street car line from the Hospital to Canon Creek to the base ball grounds, a distance of two miles.

VIRGINIA.

RICHMOND.—The electric railway connecting this city with Manchester has been opened and is already very popular.

WISCONSIN.

MILWAUKEE.—The Milwaukee City Railway have decided to extend their line to Whitefish Bay, a distance of $3\frac{1}{2}$ miles.

THE rumor that the entire street railway system of this city was about to pass into the hands of the Villard syndicate is denied.

RACINE.—Allen Showman and C. H. Holmes, of St. Louis, have purchased the Belle City Railway, and will equip it with electricity.

A CONDUCTOR on one of the down-town car lines in New York City is evidently a great admirer of his lady passengers, for he pays them the following tribute in which he does not forget himself: "My car gets packed solid full of women in wet clothes and carrying bundles. Now, I can go up and down through a car full of men without any trouble, but women leave no crevices, and the work I do to collect my fares is terrible. I run around to the front platform and work my way through the car. I get nothing but hard looks and often hard words, and by the time I get back to my own platform I am a total wreck. If I ever get rich I am going to build a monument in honor of the New York car conductors. They are heroes if there ever were any. You can talk about your brave soldier boys who fall on the field of battle; my heart is with the poor devils that meet the female sex when it's out on the rampage.

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THE NORTHERN PACIFIC runs two daily express trains with Dining Car and complete Pullman Service between St. Paul and Tacoma and Portland, via Helena and Butte with Through Tourist and Vestibuled Pullman Sleepers from and to Chicago via the Wisconsin Central, and first class through sleeping car service in connection with the Chicago, Milwaukee & St. Paul Ry.

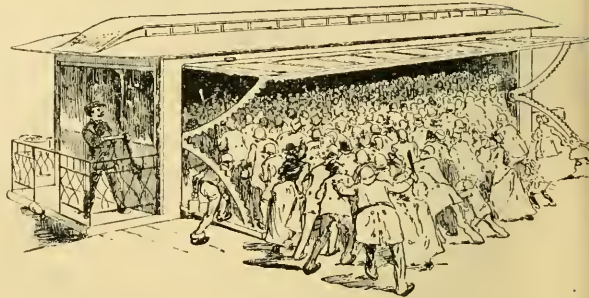
Passengers from the east leaving St. Louis in the forenoon and Chicago in the afternoon, will make close connections with the morning train out of St. Paul at 9:00 a. m. following day; leaving Chicago at night, connection will be made with Train No. 1, leaving St. Paul 4:15 the next afternoon.

Yellowstone Park Season, June 1st to October 31st.

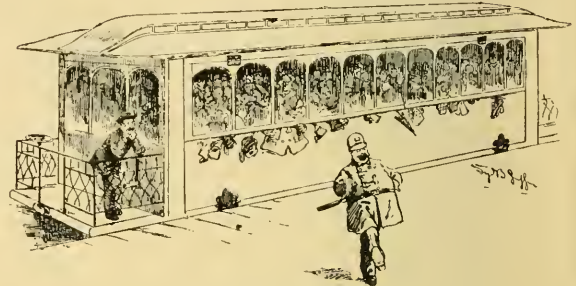
District Passenger Agents of the Northern Pacific Railroad will take pleasure in supplying information, rates, maps, time tables, etc., or application can be made to CHAS. S. FEE, G. P. A., St. Paul, Minn.

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CORRESPONDENCE.

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THE citizens of an Iowa city gave the new electric line a "benefit" by all turning out and taking several extra rides the opening week. That town is fit for presidents to be born in.

CHICAGO'S new mayor announces that hereafter the old companies can secure no more franchises unless they are paid for at so much per mile. Heretofore, in some cities, the rate has been at so much per alderman.

COMMENCE now making your plans to attend the convention of the American Street Railway Association, at Pittsburg, October 17th. Indications point to a larger attendance of ladies than ever and that the delegates will far out number any previous meeting.

IT is a good many years since the plow cast its rugged furrows in that portion of Manhattan Island now known as Broadway; but as an instance of how we turn to the old things it is interesting to note that plows drawn by four horses are an important factor in the work of preparing the conduit for the cable road.

AUTHORITY was granted a few days ago by the British Parliament for the construction, by a new company, of four miles of underground electric railway similar to that now operated by the City and South London Railway. In connection with the passage of the bill it was said that the success of the above named road had been so great that the members would not be justified in rejecting the measure.

FOR weeks the daily papers of Philadelphia cast disturbing articles upon the placid surface of public opinion, until the chief topic among all classes and in all places was rapid transit. At last the city council voted a right of

way for an elevated road and instructed the city clerk to advertise for bidders therefor. For many days a long advertisement appeared in the papers, and accordingly at noon on Tuesday, June 16th, the mayor and committee met to receive offers. But not a bid was made, and the only communication was from the chairman of the Rapid Transit Association, stating they had failed to scare up any bidders, but would try again next fall. It is very unlikely that any capital can be found to accept the ordinance, which, as it now stands, is very exacting.

A BRILLIANT mind that at present is struggling within the narrow limits of opportunity offered by the editorial rooms of a Scranton paper, and which, by reasons of its qualifications, belongs at the head of some great railway syndicate, insists that that rule requiring street cars to stop at street intersections for passengers to board or alight does not go far enough. He would have the car come to a full stop whether there are any passengers at or for that point or not. One of these days when he gets a free ticket to a public dinner, and is a half hour late in starting, we hope that the car he takes will not only stop at cross streets, but at ever alley, and get him to his destination just in time to hear the long-winded, after-dinner speeches that are enough to sadden a professional humorist.

THE city of Toronto, which a few weeks ago came into possession of the street railway lines there, finds it has something of an elephant on its hands. For the fifteen days ending June 13th the receipts were \$56,142 against \$57,284 for the same period a year ago; while the expenses rose from \$31,904 in 1891 to \$38,083 as against 1890. It requires no very great amount of study to discern that a municipality cannot operate a street railway system as economically as a private corporation, even now when the road is still moving under the momentum attained during thirty years of operation. Already dissensions are arising and rumors of "boodle" heard, and political "pull" attaining a money value as the necessary means of securing employment on the road. Not a few thoughtful people there are beginning to question the wisdom of the plan, and others openly affirm the city has blundered.

SHORT on stature and long on elevated roads is the condition of Jay Gould. When he endeavors to throw dust in the eyes of the public just as his "L" trains do every minute in the day, by claiming an underground route is impracticable, because it would be smoky and ill-ventilated, he does not fool anybody but himself. The Boston *Herald* confidently expresses a judgment founded on actual observation when it says: "To say that electricity cannot be utilized as a motive power in view of the immense use that is made of that force in this city, is to wilfully shut one's eyes to accomplished facts. While it is probable that, with the improvements which scientific research will make from time to time in electrical apparatus of various kinds, the methods of applying electricity as a motive power will be materially improved, the

immense number of street cars that are now run by electric motors, and the daily operation of these cars, both in good and bad weather, show that it is not the unsolved problem that Mr. Gould pretends to believe it to be."

At the same time it is very questionable as to how popular underground roads would prove in this country, as the conditions are not the same here as in Europe.

A FINE of \$5.00 was assessed the president of one of the Washington, D. C., roads the other day, in a police court, because one of his cars chanced to stop in such a way as to obstruct the crossing. Police regulations are necessary evils, and it is conceded the car should not have stopped until it had reached a point three or four feet further on; but for straining at gnats and swallowing a street car this is a sample. A street car company is in one sense unfortunate in being both responsible. Had the offense been that of some peddler, who, with a blind horse and a worthless wagon of old iron and rags drove upon the track and delayed a train load of passengers, impatient to reach home, doubtless no notice would have been taken of the matter, although there is a police regulation that the cars shall not be so delayed. But railways do not make the laws, hence they must obey them whether or not anyone else does. This is a large, free country, and especially adapted to the ideas of some people.

WHILE we are further advanced to-day in electric propulsion than our brethren across the water, yet they are not idle, and in some respects are in advance of us. Another underground road has just been granted a franchise by parliament. An overhead railway is now in course of construction there, and two other underground railways are nearing completion. The manufacturer of apparatus in America has had so much to do that he has not been able to give proper attention to foreign business. Yet this is a field which cannot much longer be neglected. Some people have an idea that American made electrical apparatus is inferior to that built abroad. This, however, is an egregious error, and prices are also greatly in our favor. To-day machinery for the propulsion of cars is sold at a lower figure here than the same class of machinery can be purchased abroad. We have this on authority from a gentleman now here from England, and fully posted on such matters. While they may install the apparatus with more care, both on the continent and Great Britain than we do here, our apparatus is more practical in every respect and better adapted to the purpose than any now in use or being manufactured there. This applies not only to Great Britain, but also to the Continent as well.

SINCE our last issue the long continued strike on the Valley City Railway, of Grand Rapids, has been declared "off," though about the only thing off seems to be the ex-employees who knocked themselves out of both a job and the respect of the community. After the road had been running its cars with new men and pursuing the even tenor for a couple of weeks, the

strikers adopted some resolutions, whose sarcasm is fairly disclosed in the words: "We, the Central Labor Union, hereby resolve that we recommend to the Street Car Employes' Union that they declare the so-called strike at an end, and that they try to obtain work away from a company which has no self-respect, and has shown itself to have no regard for the rights of others." The strikers had previously shown their "regard for the rights of others" by one murder, numerous assaults and an attempt to blow up the company's property with dynamite. They now call on all other "good citizens" to join with them in eternally "hoofing it" in order that financial ruin may overtake the institution which formerly furnished them employment at good wages. They also invite the community to further show its patriotism by helping them to some four hundred dollars with which to pay debts incurred after their own resources were all exhausted. And now it is all over what have they gained? Absolutely nothing. And lost six weeks honorable employment: all their savings of months: the respect of the better class of the community, and for most of them the chance to find employment in other industries where they are known. Satisfaction may be a great thing, but the satisfaction derived from wrong-doing can never be looked back upon with any special degree of pride or commendation.

DENVER, with its energetic and broad gauged railway managers, has made so rapid a development in new car tracks in the past few years that it has become thoroughly gridironed. Col. George E. Randolph, manager of the City Cable Company, has formulated a plan in which he is joined by the other companies, and which will soon be presented to the city council for action. The proposed method is to dedicate certain streets and avenues solely for driving purposes, and which shall be forever free from car track rails. One or more main streets would be set aside for this purpose leading out from the center of the city and crossed at proper intervals by connecting cross streets. This, if carried out, would involve numerous changes in the lines of some of the companies, and would also require a new division of territory, but when once accomplished could not fail to be equally serviceable to all concerned. By this arrangement the number of vehicles on track streets would be greatly reduced and enable cars to operate a higher rate of speed with safety. The car track occupies only a few feet of the street, but accommodates many times the number of people which could be cared for by any other means of surface travel, and in fact the greater part of the public by far are benefitted by any arrangement which tends to give an unrestricted right of way to the operation of the street car, for where a carriage carries two passengers the street car carries fifty. The custom is to bemoan what is termed the "giving of streets to railway companies," while in reality in no other way can a city as well provide for the masses as by setting over of a portion of the public streets for railway lines. The Denver plan is a most excellent one and if carried out will be found to be of mutual advantage to everyone.

STREET RAILWAY POST OFFICES.

NO little interest is being awakened throughout the country in the question of making the cable and electric street car systems valuable adjuncts in the work of the postal department. It is well known that in very many places a longer time is required to send a letter from one division of the city to another, perhaps a distance of less than ten miles, than is occupied in transporting the same epistle to some neighboring city that may be a full hundred miles or more away. The time used in dispatching mail between large cities only a few miles apart is all out of proportion to that occupied on long distances and apparently the shorter the mileage the longer the time in transit. The demands of business, however, have already become such that this delay is causing much complaint and hardship. Had it not been for the invention of the telephone, pneumatic tubes would long ere this have connected the main post office with all its branches in every large city. But there is much that can never be sent by telephone. Until that time shall come however, any relief will be most welcomed. Mention was made last month of the plan proposed by the postmaster in St. Louis, for the transmission of sorted mail in pouches which were to be carried by the electric and cable cars from the distributing office to a large number of points of supply where they would be delivered to carriers, thus saving the time now consumed by the carriers returning a long distance to the substations. Arrangements can easily be made for a small space in some suitable and convenient store or office, at which point the man in charge of the mail car could leave the pouch. On the carrier's return from his trip he would there sort his mail just as he would have done at the substation two or three miles away and in a few minutes would be ready to start out on another delivery, and all this in much less time than formerly occupied in the mere and useless return trip to office, which now requires the great majority of carriers to ride twice over a considerable distance before they reach the point where their district begins. In many instances the time required in going after mail and returning is even greater than that spent on the route itself. The outgoing mail which is collected on the trip would be put in the pouch and collected by the agent in charge of the car, and in this way, and at an inconsiderable expense could the service be facilitated in a marked degree. In San Francisco the papers commend the plan most heartily, for, as stated in the *Chronicle*:

"The project of running postal cars on the cable lines may be carried out in San Francisco more successfully than any other city, because nearly all of the principal roads enter that portion of the town where a general post-office would naturally be located. Owing to this peculiarity the use of wagons for transporting the mails could be largely dispensed with, but in many other towns, where roads are operated which never reach the business center, the necessity of an auxiliary wagon service would leave a small margin for gain. It is gratifying, however, to note that the Washington authorities are turning their attention to the improvement of the service rather than its

extension. It will be admitted by all competent judges that our rate of postage is sufficiently low, and that the service, such as it is, is sufficiently far-reaching. But there is a big room for improvement in the expedition of the mails and in delivering. All of the efforts of the department, therefore, should be directed to bettering the service in these particulars. It will be time enough to talk about a further reduction in postage when it is demonstrated that the service is carried on in first class style at the present rate."

The government has taken up the matter in earnest as regards the Minneapolis and St. Paul Inter Urban line, and the proposition now is to establish a regular postal route the same as on steam railways. This would be of inestimable value to the business interests of the two cities, as it is now impossible to send and receive an answer from one to the other within the business hours of one day.

The department wisely goes to great expense in sorting letters on shipboard and by their transmission on the fastest express mail trains across the continent, but the perfection of the service can never be complete as long as the time thus gained is lost after entering the city limits of destination.

The collection of mail by boxes in cars has very many advantages, but no less important than that of pouching to carriers. In most places the trunk lines of all the important roads in the city pass through the business center which means near the post office, and while in some places the plan might be wholly impracticable, in others it would be of the highest value. Managers should study the subject carefully and consult with the local officials, for we believe the mutual advantages to companies and the department are destined in the near future to assume large and important proportions.

PORTLAND POINTS.

PORTLAND, ORE., July 5, 1891.

From our Special Correspondent.

The power house of the Union Power Company is nearing completion, and the Multnomah Street Railway Company were able on the 4th to use power from there for that line. All the electric lines were heavily taxed on that day, but handled the immense traffic with scarcely a break.

The Willamette Bridge Railway Company has had additional franchises granted them on the East side of the river, and has finished double tracking their line through East Portland limits. They will extend the Mt. Tabor line, operated by steam motor about three miles into the suburbs this summer.

The Metropolitan Line has completed the road to River View Cemetery, and has placed a funeral car on their line.

Workmen are busily engaged in setting poles and putting up wires for the Trans Continental Line, recently purchased by the Willamette Bridge Railway Company, Oct. 25th is the time set for changing horse to electricity.

The Willamette Iron Bridge Company has placed an electric motor on the Morrison street bridge for the purpose of operating a 300 foot draw.

ANOTHER SIOUX CITY ELECTRIC.

NOT satisfied with having banished horses from the street car lines in Sioux City, and with electric, cable and elevated roads so numerous and convenient that the people have almost forgotten what it was to walk, the same spirit has taken possession of the



REVERSE CURVE ON RIVERSIDE PARK LINE.

Riverside Park Suburban Line, and the locomotives which formerly snorted along the route have been "fired." The line is 9 miles long and extends from the centre of the city by a delightful route out through valleys and



STATION ON RIVERSIDE PARK LINE.

along a pretty stream to Riverside Park, a famous resort containing some 40 acres and situated on the banks of the Sioux river.

The line has been built at considerable expense, and includes some heavy cuts, embankments, and a trestle 634 feet long, which is noticeable as being built on a 19 degree curve and having a 4 per cent. grade. The power house is a comfortable brick building at Riverside, and the steam plant was equipped by Westinghouse, Church, Kerr & Co., and consists of two 125-horse-power Westinghouse compound engines, which are belted direct to two 100-horse-power generators. Adjoining this building which is 62x95 feet, is the car house with dimensions of 50x150 feet.

The rolling stock was built by the Northern Car Company, each car is 36 feet long, beautifully finished and mounted on McGuire trucks, which are of their latest design and specially adapted to high speed work.

Two motors are placed on each motor car, are of 30-horse-power each, and with the other electrical machinery were furnished by the Westinghouse Electric & Manufacturing Company. A speed of 25 miles an hour is easily attained. The opening of the line was a great success and was witnessed by a large number of visitors, guests of Mr. J. Livingstone Barclay, the western railway manager of the Westinghouse Electric Company.

A special feature of the road is in the overhead work, which was all furnished by the Electric Merchandise Company, who made special devices to meet the requirements of sharp curves in which the line abounds. The overhead work is pronounced as one of the best in the country, and the equipment throughout reflects great credit on all concerned.

As an illustration of how electricity is reaching out and suburban roads of considerable length being thus equipped long before the urban lines have yet completed their metamorphosis, this is a striking example, and makes the endeavor to realize the progress already made, almost as difficult as to guess the development of the future.

AN important appointment in electric railway lines is that whereby Mr. O. B. Osgood, of the railway department of the Chicago office of the Westinghouse Electric & Manufacturing Company, goes to Atlanta, Ga., to become general manager of the railway department for the southeastern district, of the Westinghouse. His territory comprises North and South Carolina, Georgia, Alabama, Florida, Louisiana and Tennessee: the two last named states being added to the district for the first time. The appointment was the result of a request from Mr. D. A. Tompkins, the general district agent, who resides at Charlotte, North Carolina, and whose important personal interests are such that he desired to be relieved of the railway branch of the business. He will continue however to manage the lighting department.

The south and southeast are rapidly becoming important markets for electric railway material and we venture the Westinghouse people could not have made a better selection for the district than in the choice of Mr. Osgood, who will be greatly missed in electrical railway circles here. The street railway men of the South will find him a most pleasant gentleman.

THE OIL AND LAMP ROOM.

BY L. P. FINGST, MASTER MECHANIC, WEST END STREET RAILWAY COMPANY, BOSTON.

STARTING with the lamp room, where the car lamps are filled and trimmed, I would suggest that this should be built on the outside of a building, near the entrance to the car house; or, in other words, just inside of the entrance near the door. It should be constructed either in the manner of a stone vault, with a chimney running to the top of the building, or built of wood, thoroughly tinned inside and outside. The tinning should be lap joints nailed and the nails should be under the lap joints. There should be no oil barrel filled with oil in the lamp room; simply a can such as will be required for a day's requirements; and under no consideration should a person either light a lamp or enter the room with a light. All car lamps should be lighted in car by conductor; where kerosene is used to light a car, never allow a car to be run in the house and be allowed to stand there, unless they turn light down sufficiently low to prevent the heating of the lamp boxes. I have, in my experience, seen lamps explode under these circumstances a number of times. If the room is dark and it is necessary to have a light during the day and night also, it would be well to have a window: just outside the window have a lamp reflector, or gas jet, that the lamp trimmer might have sufficient light to do his work: have this surrounded with a little projection which would be fire proof, that would compel him in order to turn on gas or electric light, to go outside of the room, opening a door to the lamp box, which, when closed, would prevent any fire outside reaching the oil room.

I would not recommend the use of the electric incandescent lamp inside of oil room; only use it as I have described above, outside, and show light through a window.

The storage of the oil should be in a house just outside the building; or in a room just inside of entrance, constructed as I have stated above, with chimney running to the top, which, in case of fire, would act as a furnace—the heat and flame passing off to top of chimney.

The dimensions of the house or room would be best determined by those constructing, for their requirements. I wish to state, in my experience with car, engine and cylinder oils, I find if we purchase a number of barrels and store them there is a great leakage, which thoroughly saturates the floor of the oil house in which we store our oils. Oil, like anything else, has to be handled in the most economical manner. I am about to suggest to our company a new oil house for car, engine and cylinder oils. It is to be a building such as I have spoken of above. I propose to empty the barrels just as soon as I receive them in order to prevent a great waste in leakage.

Our road covers a great number of miles and extends in all directions. We have car repairers at the different points who require oil, which is sent from the main shops. I am going to suggest that we send the oil in sheet iron tanks, similar to the tanks used by Noble and Hawes, in

which they ship their varnish from England. I would make another suggestion:

For a fire fighter and safety, always have from three to six pails of sand, in either the oil or paint stock room, and, just as soon as the flames begin, throw on the sand; as is well known, water is a poor fire fighter where there are oils.

I wish to state my reason for objecting to an electric incandescent lamp inside of oil rooms. Our shop is lighted by incandescent lamps, from a 500-light machine; quite frequently we have a man go around and wipe off the globes in order to get the full benefit of the lights. On several occasions, the men whom we have asked to do this, have so connected their hands, as to produce a short circuit, which was the means of blowing the side of socket out and causing quite an arc, burning men's hands severely.

A person might ask the question, how I propose to take oil from barrels and place same in tank. In reply, will state, our car works has facilities to raise oil to first floor; I propose to have the oil house low, which will enable us to take oil from first floor and run it through pipes to the tank below, by this means, we can drain the barrels thoroughly.

DENVER TRAMWAY CABLES.

Asplendid record in the life of cable ropes is reported by the Denver Tramway Company. On their Broadway line the rope which was taken out on June 18th, had been in daily service, running at a speed of 12 miles an hour, since October 25th, 1889, and making a mileage of 144,000 miles. This was but seven days short of twenty months. The length of cable was over 24,000 feet, and the rope passed around four right angle curves.

On the Colfax line of the same company, a 22,000 foot rope was taken out on June 1st, which had been in constant service for nineteen months lacking four days, making a record of 137,280 miles. This line has a 7 per cent. grade and four right angle curves. Both ropes were of the Roebling make.

THE ELECTRIC MAIL.

SINCE the article in another column was printed information is received that the postal authorities have closed a contract with the St. Paul & Minneapolis Inter Urban Line for letter boxes to be attached to the electric cars of that line, to run each half hour. The railway company receives \$300 the first year, and \$42 per mile of road thereafter. Cars carrying the letter boxes will be distinguished by a flag, and an extra clerk will be detailed at each end to promptly receive and sort the mail. This will be a great advance and we predict the plan thus undertaken will be further expanded and improved as the benefits become more and more apparent.

STREET RAILWAY PARCEL DELIVERY.

THE PRIZE ESSAY—ST. LOUIS ELECTRIC EXPRESS—OTHER NOTES.

In the May issue of this paper we offered a cash prize of \$15 for the best paper on: "The Best Method by which a Street Railway may conduct a Parcel Delivery Service." The successful competitor is Geo. L. Fowler, consulting mechanical engineer, No. 53 Broadway, New York City, whose paper is as follows:

STREET RAILWAY PARCEL SERVICE.

BY GEO. L. FOWLER.

IT is assumed that the parcel delivery service is to be undertaken by a street railway in a town with a population ranging from twenty-five to one hundred thousand, that the parcels to be delivered cover the range of everything that can be readily and conveniently handled by one person. These parcels may include express packages arriving from abroad, the purchases at the stores of the town to be delivered at the residences, telegraph messages, letters for quick delivery, etc., etc.

If the town is a typical one it will have a central or business portion, and a surrounding district of residences that grows thinner towards the suburbs. The street railway lines will radiate from the business portion and the density of traffic will be less as the distance from the centre increases. The railway will be operated by any means at present employed.

The system recommended is that of successive deliveries. First the cars must be run upon time and with the least possible delay or the legitimate passenger traffic will suffer. The system may be partial or complete.

The complete system would involve the delivery of everything within the range of the road, while the partial system embraces only that which may come incidentally to hand.

In the complete system there should be arrangements made with the stores for the delivery of packages within certain limits and at a certain price per package, up to a maximum size. There should be one or more central collecting depots in the central portion of the town, preferably at the terminus of the road, where packages may be left for delivery. From these points collectors should be sent at regular intervals during the day and evening to the several stores with whom delivery arrangements have been made. The parcels so collected should be packed in hampers that can be placed upon the front platform of the car without impeding the motions of the driver or motor man. At various convenient points throughout the town distributing stations should be established. In the thickly settled portions of the town, a man may be employed to board each car as it passes and take all packages intended for his district and to send them out by a delivery boy. As the population decreases it is not probable there would be business enough to warrant the employment of a man, and here arrangements should be made with a store keeper to attend to the reception of parcels that may be left by the driver or conductor leaving the car for a half minute, or by the store keeper send-

ing out his own messenger boy upon the arrival of a car, a previously arranged signal with a whistle or horn having been made.

Distribution from these lesser stations should be made by an errand boy employed by the store keeper with whom the arrangement is made.

Packages should be delivered as most convenient. There may be certain cars designated to carry parcels or they may be put upon any and every car. Where the parcel traffic is heavy, hampers may be filled with parcels at the leading station and sent to the sub-stations at stated intervals. To illustrate: Suppose we divide our stations into three classes:

The first would embrace the collecting stations situated in business centres where the greater bulk of the business is done.

The second class includes those stations in outlying districts where a man is kept in constant attendance and who is assisted by one or more delivery boys.

The third class comprise those stations that are under the control of a store keeper who attends to the delivery.

The accompanying plan shows the street railway facilities of a town of about 45,000. There is one large business centre provided with the collecting stations of the first class A and B; a second smaller business centre two miles distant provided with the single collecting station C. There is also a smaller village centre provided with a single distributing station of the second class *d*. The roads radiate from A as shown and are provided with the distributing stations of the second class *a, b, c, d, e, f,* and *g*, also with stations of the third class *a, b, c, d, e*.

Receipts should be given for every parcel. This had best be in the form of a check, which will be explained later.

Let us now examine the workings of the system as applied to this particular road. Collectors from A have brought in a miscellaneous lot of parcels all of which they have receipted for. The manager at A, checks the receipts and parcels and finds them all right. When they are sorted, however, he finds enough belonging to district *f* to fill a hamper. The hamper is accordingly filled, locked, and placed upon a car going to *f*, and in the hamper is a memorandum of the number of pieces sent out in the hamper and for whom they are intended. At *f*, the hamper is removed by the man in charge and, if any pieces are missing, the matter must be investigated before any distribution is made.

It is also found at A that there are a miscellaneous lot of parcels for the districts of *b, c, e*, and C. They are packed in a hamper, which is removed from the car at *b*. The manager here checks over every package, removes what belongs to his district, checks off on the list what he has taken, receipts for the same, and puts any packages that he may have received for *c, e*, or C into the hamper, adds them to the list and puts the hamper on the next car. The same thing is done at *c* and *e*.

If A puts in a list that tallies with the parcels at b, but c finds something missing, the loss is at once fixed upon b, and so between any two stations.

Collections may be made at either end of the route by the regular express methods.

So much for deliveries from the business centre. Let us take other cases.

A package is to be sent from a to d. It is left with the storekeeper at a, and a receipt taken therefor, charges prepaid or not at the discretion of the sender. The storekeeper puts it in a locked hamper which goes to B. From B it is sent to A, and from A to d in the manner already described. So a package may be sent from b to b, or from b to c as already described.

Suppose now a person living between d and c, which are some distance apart, wishes to send a package to C. He simply stops a car and hands the package to the

ductors unless the person delivering the package becomes a passenger when the money transaction should be made with the conductor. Otherwise the car will be delayed.

Arrangements should be made with the express company for the reception of prepaid express matter at any station.

The expense of such a system as the one outlined would be about as follows:

10 Managers for 1st and 2d class stations at \$10 per week	-	-	-	\$100 00
13 Messenger Boys for 1st and 2d class stations at \$3 per week	-	-	-	39 00
Compensation for 5 3d class stations at \$2 per week	-	-	-	10 00
Rental of 10 floor spaces in stores at \$3 per week	-	-	-	30 00
Total	-	-	-	\$179 00

The last item is put as it is because no parcels are ever stored for any length of time.

Suppose the price of delivery for individuals was placed at 15 cents per package, and for stores with whom contract could be made at 3 cents each. It would be necessary to deliver say 200 private packages and about 5,000 store packages weekly to pay expenses. That this could be done there seems no reason to doubt. This is one package per week to each eight or nine inhabitants. If the prices for store delivery is here placed too high, it can be cut to secure the trade, for there is no doubt but that a street railway can deliver more cheaply than the individual stores can maintain their errand boys and delivery wagons.

* * * *

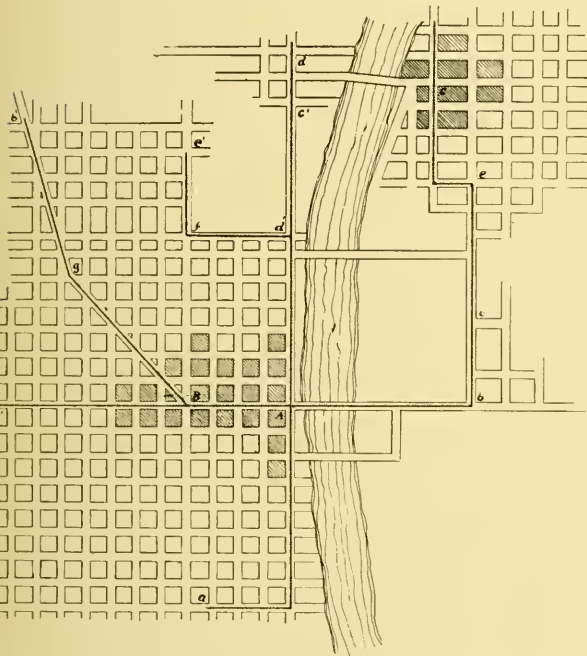
At Seattle, Wash., freight cars for that exclusive purpose are operated on the electric line to Ballard, 6 miles distant. The car has a 19 foot body, is equipped with two 20-horse-power motors, and will carry 15 tons; on which the charges are 12 to 15 cents per hundred. Merchandise is carried out and produce and wood are brought in, and altogether the car pays better than any one passenger car on the line.

* * * *

In a number of small towns, the electric lines are hauling freight from depots; in some places where the railroad is quite a distance from the town. In others, passengers are allowed to have trunks carried on front platform. In one or two places where lines connect two cities, an extra car is attached in which passengers may deposit their bundles and baggage, and take it therefrom at end of line or wherever they leave the car.

* * * *

THE Inter-Urban Line at St. Paul-Minneapolis probably offers one of the finest business chances to be found anywhere for an electric railway parcel service. There ought to be a fortune in it, by reason of the extensive shopping done in each city by residents of the other, and the present inadequate facilities for taking care of this business other than the old express companies, whose rates are high and who do not forward but two or three times daily instead of every half hour, as should be done.



driver who returns a check for the same, acknowledging the receipt of one package. These checks should be made something in this form:

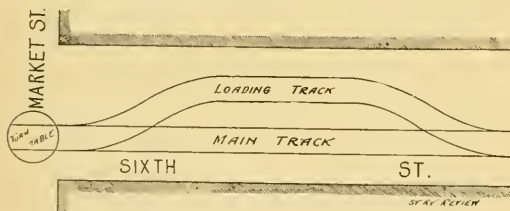
Received by
 The Western Electric Railway,
 1 Package,
 January 10, 1891.
 Driver No. 26.

The date and driver number to be filled in with a pen. The driver on reaching A, receives a check receipt for the package and these check receipts should always be equal in number to the checks he has given out. Suppose fifty of these checks be given to a driver each morning, then on the following day he must return checks and check receipts aggregating fifty before he receives his new supply. No money should be paid to drivers or con-

AN ELECTRIC EXPRESS.

ST. LOUIS enjoys the distinction of the first complete and practical demonstration of the business in a large city, in this country; under the title of the "South St. Louis Electric Express," whose general office is at No. 2 South Sixth street, and which is managed by Mr. W. L. Johnson; a thoroughly experienced street railway manager. The company only opened for business June 1st, last, and without any announcement, the first day's receipts were \$1.50. It was fully anticipated that the initial month would show a heavy loss in operation, but so popular was the arrangement that the loss was but a trifle over \$100. It is now at the end of six weeks doing a good business, is on a self sustaining basis and will soon earn good dividends; and Mr. Johnson is just the man to make it go. The express cars, each of which are in charge of an agent, are attached to one of the electric cars on its regular trips, and hauled the same as any other trail car.

Rates for single packages are 10 cents for anything under fifty pounds, with a proportionate reduction up to five hundred pounds. For packages of the latter weight or over, to the same place, a special rate is made according to the amount of business received from the firm making the shipment. Weight and size of packages are only limited by the capacity of the car, and but a few days since, the company transported two packages that weighed over eight hundred pounds each. The system is fast becoming very popular, both with merchants and

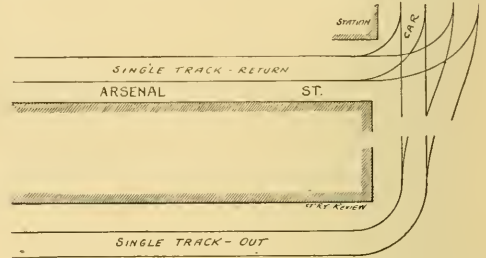


the general public. During the first month, fifty-five business houses became regular daily shippers, with whom a monthly account is kept, and settlement will be made every thirty days. In addition to this, there has been a very large transient trade, such as market baskets, trunks and small packages of every description.

There is a central station where packages may be left in the heart of the city, with a side track as shown herewith for loading. A wagon also makes hourly trips for collection, same as other express companies, and placards are furnished the merchants, which are displayed when it is desired to have the wagon call. Collection are also made by telephone request. Ladies and others who live beyond the limits within which the stores deliver goods, can now make their purchases and after attaching a card with their address, give the matter no further concern. The merchant hangs out his express sign, the wagon calls, the parcel is forwarded by the express company over the electric line, and then delivered to residence by delivery wagons which belong to each sub station.

The distance to the first station from the center of the

city is 3 1/2 miles; and to the depot farthest out 8 miles. Another station with a switch track, which will be run in upon a lot on which the station will stand, will be situated about 7 miles out. At the station which is now located midway, the double track separates and passes around on both sides of the block. At the point of divergence is a double curve, one track of which is not otherwise in use



and is thus made available as a convenient place to load and unload for that depot. This track arrangement will be readily understood from the plan herewith.

The system thus inaugurated will be expanded from time to time as it becomes better known and business warrants. The mutual advantage will be apparent which this service offers to the residents in suburban districts and the city merchants; both of whom by this means are for the first time brought conveniently together for purposes of trade.

Mr. Johnson has taken hold of this matter in earnest, and we predict will be surprised at the magnitude of the business which will have been developed when the service shall have been in existence one year. We wish him all success, for we believe the parcel express on street railway lines is surely destined to become one of the most important adjuncts in the operation of electric and cable railways from this time on, and when it shall have been fully established, managers and patrons alike will wonder how it was they could have possibly gotten along so many years without it.

PARCEL EXPRESS IN DUBLIN.

IN a recent issue we described the system of the parcel service in Dublin, as conducted by the United Tramway Company of that city. Packages are handed either to one of the depots along the line, or during certain hours may be given to drivers on any car, who carry them to the central forwarding station down town, where they are sorted and dispatched to sub stations, from which they are delivered by carriers. A published rate enables the sender to prepay the charges, which is done by affixing a stamp of proper denomination which the company have on sale at convenient points. The system has been in use several years, and is not only profitable to the road but a very great convenience to merchants and the public, as it enables a much more rapid and frequent delivery than could be accomplished in any other manner. A messenger will call for parcels on request by telephone or otherwise. Rates are graduated from 4 cents for seven pounds up, on limited distances.

DETROIT DOINGS.

TWO years ago, Mr. Frank X. Cicott made a persevering effort for eighteen months to introduce the cable system in Detroit, but there was so great opposition at that time to any change in the street car facilities, which had always been operated by horses, that the matter was dropped for a time. The interest which was aroused, however, in this method of traction, has been constantly growing, and now rapid transit bids fair to enter Detroit with flying colors, and to a very considerable extent. The Detroit City Railway has now brought about the issue by asking for an extension of its franchises for the period of thirty years, and offers to introduce cable, electric or other mechanical power, including steam, in lieu of animal power. An exception is made as regards Woodward avenue at the request of the Woodward Avenue Improvement Association, which is composed of the property owners residing along that most beautiful avenue. They prefer the cable system and in the request for extension of time, it is stipulated that cable shall be used on that line. The period named—30 years—is none too short, if the company are to invest a large sum in new appliances, as will be necessary if the contemplated improvements are made. However, the proposition is to equip the Jefferson avenue line with the overhead system, and the Woodward people are to have 6 months in which to judge of the relative merits of the two, and may at the end of that time change their choice from cable to electricity if they so elect. In any event the cable lines, if so decided, must be started by May 1892.

There are a large number of new tracks contemplated, many of short length, but to be used in connecting existing lines and double tracking others, which are now single, so that should the proposed plans be carried out, the change will be a radical and far reaching one. The rate of speed is limited to 20 miles an hour, and in the heart of the city to such speed as will give an average of 10 miles an hour between termini of lines. Detroit is one of the most beautiful residence cities in the country and is the seat of a vast amount of wealth. A surprisingly large proportion of the residences are handsome and imposing, and around each is a magnificent lawn. This scatters the population in such a way that rapid transit is sorely needed to get the people to and from business and entertainments; much more so in fact than in most cities of its population. The width and plan of the streets are exceptionally favorable for the improvement, and the rapid increase in size and number of manufacturing interests during the past 5 years has brought the city to a point where rapid transit can no longer be deferred. The citizens are great pleasure riders, even with the horse car system, and the increase that can be surely counted on from this source when the horses are supplanted by mechanical means will be unusually large. The city purchased some 3 years ago a magnificent island in the centre of the river, which it has improved and beautified until it is fast becoming one of the finest in the country. The Detroit City Railway have rail connection to the bridge 2,000 feet long

leading to this island, and all its other lines of cars connect with this island line. At present, the time consumed in passing from points in more than one-half the city, is so great as to prevent the business reaching the volume it otherwise would. When rapid transit is once secured this will be one of the finest pleasure lines to be found anywhere. We wish the company all success in their new departure, and trust the citizens will see their own best interests will be best served by giving the project all the moral and financial assistance in their power. Detroit has become too large a city to tolerate horses a single day longer than is necessary to make the change wisely and judiciously.

STRIKE IN GALVESTON.

SOON after the electric cars were started in Galveston, which was about a month ago, the citizens petitioned the management to start from the ends of routes fifteen minutes earlier in the morning than had been done under the old mule system. Col. Sinclair, the president, promptly acceded to the request, and ordered the cars out at fifteen minutes before six, instead of at that hour.

When the electric system was opened the working hours were reduced, the wages increased, and the runs arranged so the men worked two days and laid off the third under pay. A few new men who had been hired but a few days worked up a strike, refusing to go out the fifteen minutes earlier, and succeeded in inducing many of the old employes to join them. They threatened all sorts of things, but Col. Sinclair, who is an old soldier, immediately hired new men, and with police protection continued to run his road. Finally the boys came around to arbitrate, but as the colonel had nothing special to arbitrate, and was getting on prosperously, no such deal could be consummated. Three days settled the matter and the old men pleaded to be taken back. The best of them were picked out and reinstated, and the breezes which blow from the Gulf, will not bring tidings of any more such foolishness for some time to come.

LA CLEDE CAR COMPANY.

For some time past the stock of this company has been held by four individuals, but some months ago an unfortunate misunderstanding arose with two of the gentlemen on either side. The result has been that the company have taken very few orders and the works have been run with a small force. This has now been all cleared up and the former president Wm. Sutton and Emil Alexander, have disposed of their interests and have withdrawn from the business. This leaves it in the hands of James P. Keily and Thomas F. Colfer, who will re-organize the company and proceed to re-establishing the works as before.

WHEN the Piedmont Cable Road was built it was given a bonus of \$60,000, of which \$15,000 was in land. The value of property all along the line has more than doubled since the road was built, while prior to that time lots could not be given away.

THE SIOUX CITY ELEVATED RAILWAY.

THIS line was built by the Sioux City Rapid Transit Company to carry their surface motor line trains into the business center of the city, and is about $1\frac{1}{2}$ miles long, double track standard gauge.

The line crosses over nearly all the railways entering the city and several switching yards, and the desire to

40 feet long. The clear height required over street is 16 feet and over railway tracks 22 feet. The post foundations consist of four piles, average length 26 feet, between the heads of which a 12×12 inch oak anchor block is fitted; the anchor bolts set and a concrete base $4\frac{1}{2}$ feet square at the bottom and 7 feet high built around them, and surmounted by a cast cap 3 feet square filled with concrete.



JONES STREET STATION FROM THE STREET.

avoid the danger and delay at these crossings was the deciding factor in favor of an elevated line.

The structure is calculated to carry a rolling load of 1,500 pounds per lineal foot per track, but provision has

The posts are built of Zs, with web plate, and side plates to strengthen against the bending due to wind stresses, the cross girders are 58 inches deep and are built into the posts. The main girders are in two



JONES STREET STATION—CITY TERMINUS.

been made to double the capacity if it is ever found desirable, the cross girders and posts being calculated for the heavier loading.

The structure is built in the center of the street, the posts being 15 feet centers and the spans generally about

lines and have webs $48 \times \frac{3}{8}$ inch and a 40 inch girder has flange Ls, $5 \times 3\frac{1}{2} \times \frac{1}{2}$ inch and weigh 5,200 pounds. Expansion is provided for at every fourth bent. All iron work had one coat of oil at shop and two coats iron oxide paint after erection.

All the timber is Southern yellow pine. The ties are 9 x 9 inch and 18 feet long, spaced 15 inch centers and dapped $\frac{1}{2}$ inch on girder. There are four lines of 6 x 9 inch guard rail bolted to every tie by $\frac{3}{4}$ inch bolts. These guard rails are bolted up solid from end to end and serve to distribute the end thrust of the train in starting or stopping. This floor construction is found since operation to entirely do away with the unpleasant surge at the stations, due to stopping and starting trains quickly.

Besides the regular girder spans, there are three 130 feet truss spans on cylinder piers and about 1,000 feet of pile and timber trestle work approach.

The grade on approach is 1.9 per cent, and grade on the viaduct to get additional height over railway track is 5 per cent. There is one 4 degree curve in approach and

the Northern Car Company, Minneapolis, and two from the Brill Company, Philadelphia, which also furnished two flat cars. Each car has a seating capacity of 48 passengers, but on special occasions has carried 85 persons. Trains are drawn by steam locomotives, which are from both the Grant Locomotive Works and the H. K. Porter Company. Weight, 18 tons. Fare is 5 cents and tickets are collected by conductors on the cars. Trains at present run every 30 minutes. The round house is at the East Morning Side terminus and is on the surface. The portion of road on the surface is laid with 50 pound rail. A speed of from 15 to 25 miles an hour is made. The greatest height of structure from curb stone to rail is 28 feet. At the round house terminus, the road reaches a point 200 feet above its starting point in the city.

The Rapid Transit Company has in addition to the



DIVISION STREET STATION ON 27 DEGREES, 10 FOOT CURVE.

a 27 degree 10 feet curve in viaduct with a total angle of 86 degrees.

The tracks are 10 feet centers and are laid with 35 pound steel rail. On curves, tracks are spread to 11 feet 1 inch, superelevation obtained by means of wedge shaped strips on the ties. Switches used are split switches, No. 5 frogs, and the cross covers are arranged to throw both ends with one lever.

The stations on the elevated line are four in number, and are located above the intersecting streets and at present are built on the north side only of the track. Two stairways lead down to the street surface. The buildings are frame 12 x 18 feet on floor and 9 feet to cornice with wide roof projection.

Cars are run two and three in a train as necessity requires. They are 30 foot bodies and handsomely furnished within and without. Four are from the shops of

elevated line, $3\frac{1}{2}$ miles of surface line. This is to be extended and several branch lines built at once, giving first-class transit facilities to a rapidly growing part of the city.

Mr. E. C. Peters is president of the company, and J. S. Wattles, the general manager. C. F. Loweth, St. Paul, Minn., was chief engineer and prepared all detailed plans for the work. Mr. Wm. Graham was assistant engineer in charge of construction.

The entire work, excepting stations, was built by the King Iron Bridge Company, of Cleveland, Ohio, and stations were built by F. Babue, of Sioux City, Iowa. The elevated system was the only solution for that portion of the city which it now accommodates so excellently, and though involving a large outlay, is of a permanent character and illustrates the confidence and enterprise which has characterized, not only this, but the other street railway companies of this enterprising city of corn palace fame.

HYGIENE AND VETERINARY.

BY F. T. MCMAHON, V. S.

Diseases of the feet of the horse, will no doubt prove interesting to the many readers of the STREET RAILWAY REVIEW. Street car horses suffer greatly from this cause.

A study of the foot of the horse is of the greatest practical importance, but we will not occupy the reader's mind with a lengthy description of the foot, but merely give as practical an idea of the diseases to which a hoof is subject as possible and confine ourselves to that portion of the foot consisting of the wall, sole and frog, known as the hoof.

CORNS.

One of the most common diseases to which the foot is liable is corns. A corn is an extravasation of blood to that part of the foot known as the angle, lying between the wall and bar at the heel of the foot.

The causes of corns are numerous; the most common of which is improper shoeing and cutting the foot too much.

When violent pressure is applied, it produces inflammation and extravasation from the vascular secreting soles and the blood vessels becoming ruptured, make the corn present a red or bloody spot; the vascular secreting sole when once injured by pressure, (unless immediately relieved, and not subject to any pressure whatever, until it is perfectly reinstated,) takes on a permanently diseased state. Always after, instead of perfect horn, a morbid, secretion is deposited, and in some cases pus forms, the parts being very sensitive when pressure is applied.

Corns appear on the inner part of the foot more frequently than the outer. Owing to the conformation of the foot, the internal part is much weaker; the coffin bone not reaching the heel, is the reason why these structures are the seat of corns, for the coffin bone is the active agent in its production.

This bone is moved upward or downwards at either end, as the weight rests upon one extremity or the other of its articular surface: the descent of its wings squeeze the vascular sensitive sole, the shoe in this case being the passive agent.

The most common cause is neglect in removing the shoes at regular intervals. Some times the shoe becomes loose at the heel, and gravel works its way between the shoe and foot, and finally reaches the sensitive sole, and inflammation is the result, which usually terminates in suppuration.

A corn should be followed with a knife to the sensitive part of the foot, for as soon as the portion of the sole (the seat of corns) grows to a level with the surrounding horn, the sensitive parts are bruised again, and the animal goes lame.

TREATMENT.

When a corn first appears, by proper means it can be

removed completely, but when it has existed some time, the injured parts become weakened, and the disease is established.

The first thing is to remove the shoes, then pare with the drawing knife the parts affected, but avoiding the sensitive sole as much as possible. After washing the foot clean, envelop the entire hoof in a warm poultice of linseed meal for one or two days, or longer if the lameness is still present. When the lameness disappears, the shoe may be applied with the surface chambered at the diseased part, so no pressure will be applied to the parts affected.

If the corn should suppurate, make a dependent opening, and allow the pus to escape, when a solution of carbolic acid may be injected with good results. The shoe should be removed every two or three weeks and the corn pared.

As a result of long experience I have found the best results for a horse with corns, to be derived from the use of the Goodenough shoe.

THRUSH OF THE FROG.

A thrush consists of a diseased action of the cleft of the frog, whereby a fetid discharge escapes. It is considered by many as trifling, but a little experience only in the diseases of the feet will show that it is by no means so harmless as supposed.

Various causes produce thrush, the immediate one is always inflammation of the frog. Usually their origin is traced to the application of moisture, as that of urine, for continued soaking of the horny frog in such moisture, penetrates it, and then becomes a source of irritation to the sensitive frog. This accounts for the tendency of thrushes to affect the hind feet; as a rule the fore feet are perfectly free from them.

Navicular disease is a common cause of thrush in the fore feet, though after navicular disease develops the thrush disappears but the small hard frog remains.

TREATMENT.

Cleanliness is very essential in the treatment of thrush. Have the frog thoroughly cleaned with warm water and castile soap, then apply a poultice of linseed meal to the foot for a day or two, followed by a dressing composed of equal parts of calomel and Fuller's earth. Sulphate of copper, chloride of zinc, and common salt, are other good remedies; applied by means of a piece of tow saturated with the solution, if used, by being pressed to the bottom of the cleft. If the powder be used, the parts should be carefully cleaned and the remedy pressed to the bottom of the cleft by means of a knife blade. In severe cases the dressing should be repeated two or three times a day.

(To be continued.)

RAPID TRANSIT IN THE CITY OF BERLIN.

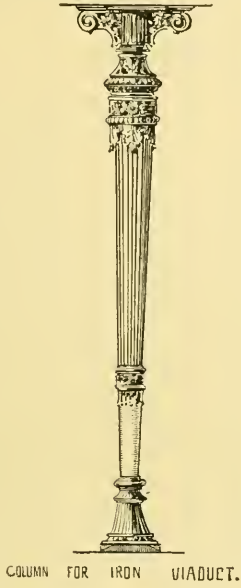
(CONTINUED.)

BY T. GRAHAM GRIBBLE, C. E.

THE general appearance of this viaduct was simple, except at the corners of streets and in the vicinity of parks and squares, where some architectural effect was attempted by the aid of dressed granite and sandstone, otherwise the viaduct was unadorned save by an oversailing course and a plinth on the piers.

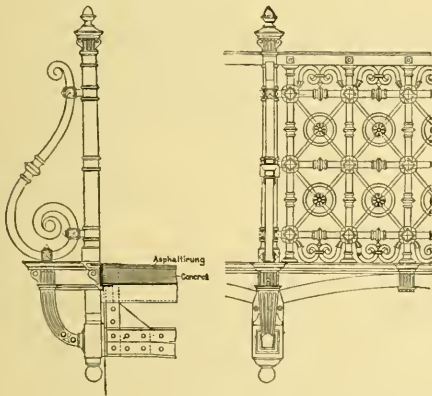
CENTRAL GANGWAY.

A somewhat novel expedient was devised for protecting the line-men from passing trains. Midway between the two central tracks, a depressed, grave-like gangway was constructed by iron trough plates.* It was 2 feet 6 inches wide, and 2 feet 8 inches deep, and completely sheltered a workman. It is remarkable that complaint should have arisen as it did on the part of the men that 2 feet 4 inches was hardly wide enough for the stoutest of them, and 2 feet 8 inches was too great a jar upon their feet when jumping down into it. It reflects great credit upon the way the employes must have been fed by the company.



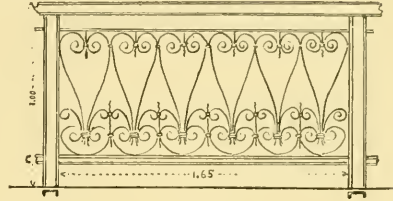
RAILINGS.

The simplest form of railing consisted of cast iron stanchions with angle iron hand rail and lower rails of gas pipe, all of them galvanized. At the crossing of the



Keonigs Graben the railing was very much more handsome, the balusters were ornamental castings, carrying a channel-iron handrail. This rail, also galvanized, cost including erection, \$3.30 per lineal foot. A third type of

railing was formed entirely of cast iron, and cost, including erection, \$1.78 per lineal foot.

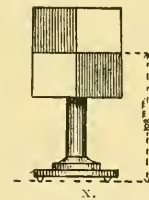


SPANDRIL FILLING AND MORTAR.

The lower spandril filling was of gravel, to provide rapid drainage. Sand was tried first but found too retentive. The mortar was partly hand-mixed and partly machine-mixed; the former was in the proportion of 2 of sand to 1 of lime, and the latter 2 1/2 of sand to 1 of lime. The face work received an addition of 10 to 20 per cent. of cement.

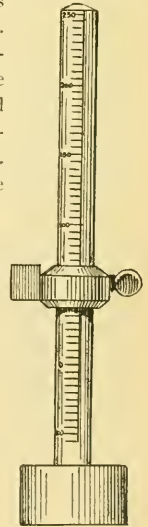
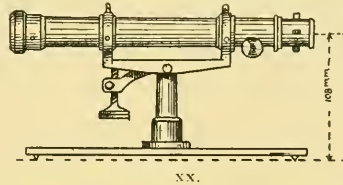
ALIGNMENT AND LEVELING.

The erection of the continuous girders forming the superstructure of the iron viaduct required considerable care,



so as to avoid cross strains over the points of support. A special optical instrument was devised because the ordinary level would not have furnished the required degree of accuracy.

It is an elaboration of the old-fashioned platelayer's "boningstick," and a simple, cheap and efficient little instrument. It is shown on Figs. x, xx, and xxx. Fig. x is the target, and Fig. xx the telescope, and Fig. xxx the index.



They both stand upon small brass plates. The telescope has cross hairs, and the distance from which to the base is the same as that from the center of the target to its base. Consequently whether on the level or upon a gradient, if the telescope and target are set up at the two extremities, and the line of sight directed from the telescope to the target, the index may be placed at any intermediate point and be made to show either the grade at that point or the extent to which the point is above or below it. The instrument gave entire satisfaction, required no note book and only cost \$27.50.

BRIDGES.

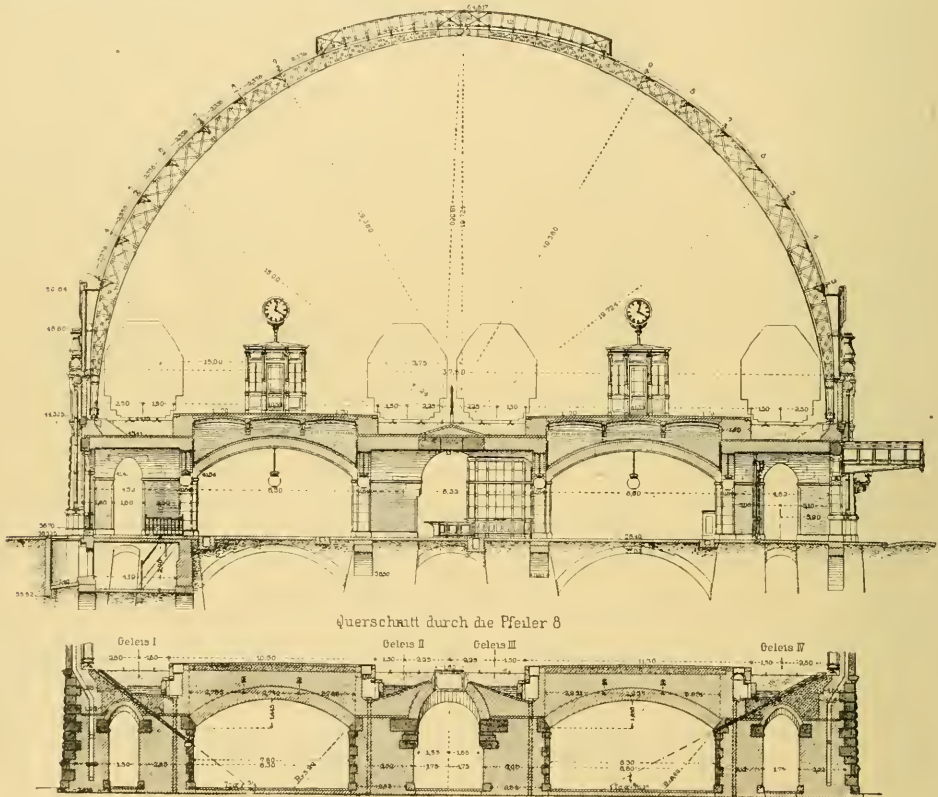
There are six river bridges on the Stadtbahn, three of which are across the Spree, one across the Kupfergraben, one over the Humboldt harbor, and one over the ship canal. The latter and one of the bridges over the Spree were entirely of stone. The rest were iron superstructures upon masonry piers.

STONE BRIDGE OVER THE SPREE.
(Illustrated in our last number).

This is a bridge of two spans with a central pier in the river, and is built upon an angle of 52 degrees of skew, and a curve of 985 feet radius at the axis. The openings

tons on the piers and 4.2 tons on the foundation. The foundations were of cement concrete surrounded by sheet piling. Great care was taken in the setting and striking of the arch centers. Half of the arch ribs were closed at a time and the centers eased one inch. Six days afterwards the centers were removed.

The entire bridge, including the two triangular abutments, covers an area of 13,950 square feet, and contains, inclusive of foundations, 248,500 cubic feet of masonry, or 17.82 cubic feet per square foot of area. The total cost, inclusive of covering, railing, etc., amounted to \$62,500, or \$4.48 per square foot.



ALEXANDER PLACE STATION—CROSS SECTION THROUGH EIGHTH PIER.

are 59 feet 4 inches and 54 feet 9 inches respectively. The width between facia are 59 feet 6 inches at the eastern and 61 feet 6 inches at the western extremity. The arch rings were not helical but offsetted into eleven normal ribs, eight of which are under the four tracks. The others support the sidewalks. Every two ribs are anchored together by two heavy iron dowels. The granite facing is also dowelled with fifteen smaller irons. The dimensions of the bridge were obtained by calculation with the following assumptions: The average weight of the masonry and filling was computed at 112.5 pounds per cubic foot. The maximum stresses under this load and a test load such as will be described later on, amounted to 12 tons per square foot in the arch, 7.5

STONE BRIDGE OVER THE SHIP CANAL.

This is a square bridge on the tangent with a single opening of 80 foot span. The arch is also elliptical. On account of the situation, close to the zoological gardens, the bridge was ornamented with carved work and balustrade railing. The entire bridge, including the land piers, covers an area of 5,375 square feet, and contains about 100,750 cubic feet of masonry including foundations, or 18.72 cubic feet per square foot of area.

The total cost exclusive of ballast was \$27,750 or \$5.15 per square foot. The difference of 67 cents per square foot between it and the bridge over the Spree arose to the extent of 24 cents from the increased amount of material per unit of area, but the remaining difference

of 43 cents was due to the more expensive character of the work.

BRIDGES WITH IRON SUPERSTRUCTURE.

Four bridges were constructed with iron superstructure, two having the form of elastic pivoted arches and two of them girder bridges with parallel flanges.

BRIDGE OVER THE SPREE AT THE SHIPBUILDING YARD.

At the second crossing of the river Spree, an iron arch spans the river and includes side arches over an esplanade on one side and space for an esplanade yet to

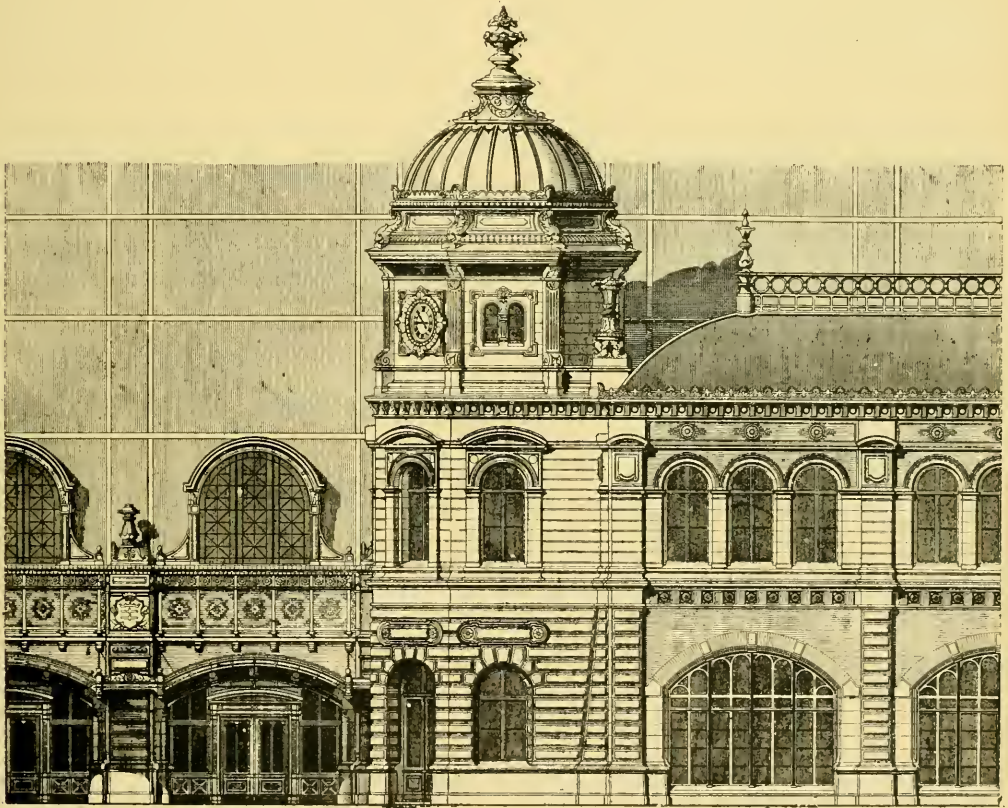
tinuously, and therefore, without increase of material, can be easily made sufficiently stiff to transmit the horizontal forces with greater accuracy to the terminals.

2. The vertical movement is also less. According to Winkler (*Theory of elasticity*, p. 312) it is only 34 per cent of that of arches with pivoted crowns.

3. The construction is throughout simpler, both in the main ribs and the oblique bracing.

With respect to the amount of material, there is not much difference.

The bridge without crown pivots requires about 50 per cent more material, but more than makes up for it in



System der Nordfacade.

ALEXANDER PLACE RAILWAY STATION—ELEVATION FROM THE NORTH.

be built on the other. It is an oblique bridge, making an angle of 72.64 degrees with the river line. The normal span over the river is 147 feet and the axial span 164 feet, pivoted only at the springing; the side spans are 45 feet 9 inches and 57 feet 11 inches respectively. Iron was chosen for the river span on account of the small headway, and the arch was pivoted at the springing in preference to the crown for the following reasons.

1. The horizontal movement in the oblique members is less, because, apart from the greater horizontal stiffness of the arch, the permanent way can be carried forward con-

tinuously, and therefore, without increase of material, can be easily made sufficiently stiff to transmit the horizontal forces with greater accuracy to the terminals.

2. The vertical movement is also less. According to Winkler (*Theory of elasticity*, p. 312) it is only 34 per cent of that of arches with pivoted crowns.

3. The construction is throughout simpler, both in the main ribs and the oblique bracing.

With respect to the amount of material, there is not much difference.

The bridge without crown pivots requires about 50 per cent more material, but more than makes up for it in the saving of oblique attachments. The ribs are braced laterally against wind pressure.

The calculation of the stresses was made graphically by the method given by Mr. Mohr in the *Hannover Zeitschrift* for 1870, p. 389; the live load is assumed to be uniformly distributed and an equivalent of three six-wheeled tender engines on each track, having each a fixed wheel base of 10 feet; a length over all of 28 feet and a weight of 14 tons on the drivers. The remainder of the bridge was supposed to be occupied by cars having each a wheel base of 10 feet, a length over all of 19 feet

8 inches and a weight of 8 tons. The dead load of the bridge, inclusive of ballast, amounted approximately to 1.59 tons per running foot. The material was proportioned by Weyrauch's formula:

$$750 \text{ Kg. } (1 + \frac{1}{2} \frac{\text{Min. } B}{\text{Max. } B}) \text{ per sq. c. m.}$$

or in U. S. Weights:

$$10,670 \text{ lbs. } (1 + \frac{1}{2} \frac{\text{Min. } B}{\text{Max. } B}) \text{ per square inch.}$$

Min. B and Max. B are minima and maxima stresses either of tension or compression when the bar is subjected to only one kind of stress.

When subjected to alternate tension and compression, the formula becomes:

$$10,670 \text{ lbs. } (1 - \frac{1}{2} \frac{\text{Max. } B'}{\text{Max. } B}) \text{ per square inch,}$$

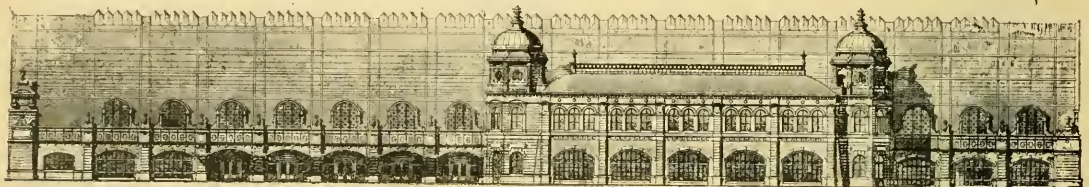
in which Max. B' is the smallest, and Max. B the greatest stress, without regard to its nature.

ers with verticals. The Weyrauch formula was used for computation but on account of a certain degree of ambiguity in the stresses, a limit of 10,000 pounds per square inch was adopted. The cost of the superstructure was \$2.35 per square foot, and that of the entire bridge with abutments was \$3.92 per square foot. The cost per pound of iron work, including erection and painting four oils, was 3.78 cents per pound.

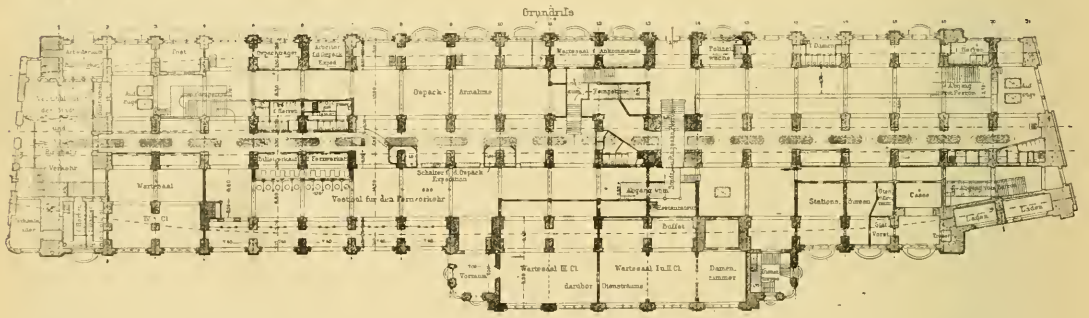
BRIDGE OVER THE SPREE AT BELLEVUE CASTLE PARK.

This is an oblique bridge having an angle of skew of 45 degrees. It has a length over the river, including piers, of 164 feet in three spans, one of 34 feet 7 inches, over a footpath on the left bank, another of 26 feet over a street on the right bank, and another of 66 feet 7 inches over

Berliner Stadt-Eisenbahn
Bahnhof Alexanderplatz



Ansicht



Ernst & Korn Berlin

ALEXANDER PLACE STATION—SIDE AND PLAN VIEW.

Engineers in this country use a less value than 10,670 lbs., having regard to the percussive action of rolling loads, especially upon a well worn track. The figure varies from 6,500 lbs. to 7,500 lbs., according to the quality of the iron. The iron work including wrought and cast iron, erection, and painting four oils, cost 3.65 cents per pound, or \$4.18 per square foot. The complete structure with abutments and accessory works cost \$5.97 per square foot.

BRIDGE OVER HUMBOLDT HARBOR.

This bridge is built upon a curve of 1,000 feet radius. It is, together with the adjacent street crossings, the greatest piece of construction on the railway. It has five openings over the harbor of approximately equal spans (95 to 96 feet). They are formed of open Warren gird-

the adjacent street. The girders are Warren system without verticals. The cost of ironwork, including erection and painting, was 3.78 cents per pound, or \$2.42 per square foot. The cost of the whole bridge including abutments was \$4.09 per square foot.

BRIDGE OVER THE KUPFERGRABEN.

This bridge is a level, square, wrought iron structure resting on stone abutments. It consists of two openings of 86 feet 6 inches each, one over the Kupfergraben and the other over the adjacent street. The rail base is 2 feet 8 inches above the street and twenty-three feet above high water. The construction is an elastic arch pivoted at the springing, as in the bridge over the Spree at the ship canal. The outward appearance is very ornamental. The cost of iron, inclusive as before,

was 4.12 cents per pound. The cost of iron work alone was \$2.76 per square foot and the cost of the whole bridge was \$4.35 per square foot.

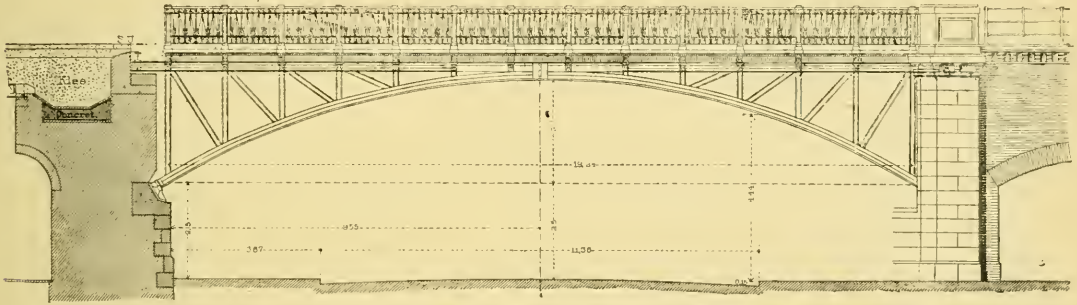
The following table shows a careful analysis of the relative quantity of material and the cost of the four principal iron bridges of the railway. The great variation in the character of the work produces very widely divergent results, most remarkably so in the arch bridge over the Spree. The data are not of sufficient range to form a new formula for similar structures of different sizes, but are of value for estimating on iron bridges closely approximating to those in the table. The total weights are very much in excess of those required for ordinary railway construction, arising mainly from the heavy platform and gravel ballast, instead of the ordinary open work. This expensive method was rendered necessary from the stipulations of the municipal authorities for as noiseless a movement as possible, but it has the further advantages that the track can be repaired without any reference to the bridge structure which is independent of it, also that the shocks of passing trains are so distributed through the ballast as to produce a very much milder effect upon

of cross strains upon them. The continuous girders were anchored by screw bolts to castings in the masonry but provided with liberty for expansion.

PERMANENT WAY.

In order to obtain the noiselessness and imperviousness under the track already alluded to, experiments were made upon the bridges as they were constructed, with regard to the mitigation of sound. In the absence of automatic instruments, recourse was had to the human ear and careful allowances were found necessary for different conditions of wind and weather affecting the aural organs. Numerous experiments on different occasions and by different parties led to the following conclusions:

1. The noise of trains passing iron bridges appears to vary within certain limits, directly as the length of the bridge.
2. It cannot be determined that lattice girders are less noisy than plate girders. The theory that sound is increased by vibration of the plate girder web was not confirmed.
3. Timber rail-supports are somewhat less noisy than



ELEVATION OF BRIDGE OVER LITTLE PRESIDENT STREET.

the iron work than when they are concentrated upon longitudinal railbearers and cross girders as in the open construction.

BRIDGES OVER STREET CROSSINGS.

The bridges crossing thoroughfares were nearly all carried out in iron for the following reasons:

1. There were many very oblique crossings and as such unsuitable for masonry arches.
2. The small headway demanded a clearance which could not be obtained by an arch.

The three chief considerations which influenced the design of the street bridges were:

1. A handsome appearance and one as far as possible in correspondence with its environment but without any increased difficulty of construction.
2. A water-tight platform.
3. A minimum amount of noise from passing trains.

The work is full of interesting detail both to the architect and engineer. The handsome columns illustrated both on the Alt-Moabit viaduct and on an enlarged view, were provided with double pivots, one over the pedestal, and one under the capitol, so as to remove all possibility

of cross strains upon them. In both cases it is immaterial whether the rail supports are transverse or longitudinal.

4. Thick layers of felt or rubber between the rails and rail-supports, slightly lessen the noise whether the latter are of wood or iron.

5. A complete covering of the ironwork with timber planking has no material effect upon the noise.

6. A thin layer of gravel over the ironwork substantially lessens the sound, and a deep bedding of the track in gravel is still more effectual.

7. The condition of the rolling stock made a very great difference. Flattened tires and loose springs or couplings were very noisy. In general, all old stock was much more noisy than new.

The results of the experiments led to the adoption of a type of roadbed which gave great satisfaction. A longitudinal trough-shaped iron sleeper was used throughout, carrying an ordinary flanged rail. The platform was either of buckled plates or trough girders covered with gravel. There was therefore no actual elasticity of track, and a word on this subject may be of some use. Elasticity in the rail itself is of no more value than the same amount of spring when produced in any other way, such as for

instance by the springs of the rolling stock which produce at least thirty times as much resilience as the most elastic rail laid. The real objective points are: First, to diminish the *amount* of the shock by as *smooth* a track as possible. Second, to diminish the *effect* of the shock by *distributing* or *dissipating* it as quickly and thoroughly as possible. A track may be as rigid as possible and yet quite smooth to ride on, or else it may be exceedingly elastic and the car may sway and jump like a ship in a storm. Transition curves, alternating and mitred joints, a firm and uniform rail support, are the cardinal virtues of first class track. Unequal resistance is the radical cause of shock, and the heavy rail sections of modern practice are being adopted chiefly with the view of obtaining a steady, even wear, free from the pit-a-pat action which wears rails into a wave-line and tires into polygons, which unevennesses again augment shock and form contributory causes of wear. It is greatly to be desired that an economy of material should be devised by which the greater part of the material which is put into

on the obtainable area. The ground plan is rectangular, 615 feet long by 130 feet wide. There are two platforms, 34 feet wide for east and west bound traffic, each of them giving access to the express on the outer and the local trains on its inner side. There are subways 25 feet wide under the platforms for carriages, and narrower ones under the tracks for foot passengers. On one side of the building there is a projecting wagon shelter on cantilevers. The depot is roofed with a semi-circular wrought iron arch pivoted both at crown and springing. The calculations of this fine arch were based upon the following assumption:

1. A dead load of 13.32 pounds per square foot of roof covering for the structure below the lanthorn.
2. A dead load of 20.5 lbs. per square foot for the portion covered by the lanthorn.
3. A load of 10.25 pounds per square foot on a horizontal plane for snow.
4. A wind pressure of 27.65 lbs. on a vertical plane. The resultants of the several loads were computed for

COST-SCHEDULE OF THE FOUR PRINCIPAL IRON

No.	Structure.	No. of openings.	Axial span.	Length of iron work over all.	Breadth of iron work over cross-girders.	Superficies of iron work.	No. of main girders per opening.	Description of main girder.	Weight of main girders.		Weight of horizontal and cross bracing.		Weight of cross girders.	
									Total.	Per sq. ft. of iron construction.	Total.	Per lin. ft. of iron construction.	Total.	Per lin. ft. of iron construction.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Bridge over River Spree at ship canal.	1	164	164	105	sq. ft. 17,130	6	Elastic arch pivoted springing.	513	3.121	114.3	0.693	110.4	0.669
2	Bridge over Kupfergraben and adjacent street.	2	87.6	176	52-3	9,075	8	do.	148.5	0.843	19.8	0.112	42.8	0.244
3	Bridge over Humboldt Harbor.	5	99.6 to 102	501	54 to 67-9	30,100	8	Warren Girder.	448.5	0.895	31.00	0.062	82.3	0.164
4	Bridge over River Spree at Bellevue.	3	85-3	256	52-1	13,210	4	do.	176.6	0.690	18.35	0.072	35.2	0.176

these heavy rails to resist deflection as a girder, and is discarded, unworn, when the head is abraded, should be saved. There is no reason why the wearing head and its support should be either of the same quality of steel or in one piece.

TERMINAL STATIONS.

The terminal stations of the Stadtbahn are arranged for the handling of a large volume of business. They are the Charlottenburg station at the west, and the Silesian station at the east end. The line actually continues beyond them, but these stations are arranged with the necessary marshalling sidings for the distribution of the traffic, and were specially designed to meet the possible emergency of using the Stadtbahn for the distribution of troops during war time.

INTERMEDIATE STATIONS.

The Alexander Platz station though not a terminal is of great importance in the operation of the road, and is a handsome structure. It faces the Koenigstrasse and stands upon the site of the former ditch called the Koenigsgraben. It is located in one of the principal points of the city, where several main thoroughfares converge, and was designed to have the greatest possible capacity

amount and direction and applied graphically at every bracing, after which the several curves of bending moment were drawn to show maxima and minima stresses under various combinations of loading. It will be observed from the depth at the haunches, that the ribs might be called upon to act as girders when subjected to oblique forces. For instance, a snowstorm might be supposed to produce on one side the combined effect of normal pressure due to wind, and vertical pressure due to snow and produce a great tendency to buckle at the haunch. The cross sections were designed with working resistances of the iron of 12,900 lbs. per square inch in tension. The total cost of the station was \$1,399,200 including ground. The cost was \$16.36 per superficial foot.

FRIEDRICH STRASSE STATION.

Of all the stations of the Stadtbahn that upon the Friedrich Strasse was the most difficult and expensive to build, and is situated in the most important thoroughfare of the city. The ground alone cost nearly \$1,400,000, and is irregular in shape, having an area of 15,720 square yards. It is built upon a curve, having an axial radius of 935 feet.

The smaller stations cannot be described for want of space. The handling of the traffic was performed on the same principle as on the larger ones. The narrowest platform was 15 feet and when between two tracks they were 30 feet wide.

The total list of stations, from east to west, is as follows:

1. Silesian station (terminus).
2. Jannowitz, Bridge station.
3. Alexander Place, do.
4. Bourse, - do.
5. Frederick Street, do.
6. Lehrter station.
7. Bellevue, do.
8. Thiergarten, do.
9. Zoological Garden do.
10. Charlottenburg (terminus).

OPERATION.

The speed limit prescribed is twenty-eight miles per

furnaces. The second-class coaches have four and the third-class five coupes. Each coupe has ten seats, and an empty coach weighs 11.4 tons. The trains are provided with Hardy's patent vacuum brake. They are run on a ten minute headway, but on holidays every five minutes. The hours of business are from 5 a. m. to midnight.

CABLING BROADWAY.

DURING the war it was no such uncommon occurrence to see 1,500 men "working in the trenches," but seldom if ever since then have 3,000 men found daily employment in such labor. Such, however, is the number now engaged in opening Broadway for the cable conduit. A vivid picture of the scene is thus drawn by Howard in the Boston Sunday *Globe*:

"From the Battery to the extremest limit up town, Broadway and its connections are one vast trench, have been for a year, and will be until December next at least.

A gang of 1,500 men work all day, another gang of

BRIDGES ON THE BERLIN CITY RAILWAY.

Weight of rail leavers.		Description of track.	Description of bridge platform.	Weight of footways and railings.		Weight of entire iron work.			Cost of iron construction including bridge platform and railing.			Total superficies of bridge including abutments.	Cost of entire bridge including abutments, foundation, railings and all accessories except track.			
Total.	Per cu. ft. of iron construction.			Total.	Per lin. ft. of iron construction.	Total.	Per cu. ft. of iron construction.	Per sq. ft. of iron construction.	Total.	Per lin. ft. of iron construction.	Per sq. ft. of iron construction.		Total.	Per lin. ft. of bridge.	Per sq. ft. of bridge.	
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
tons	tons	Continuous longitudinal metallic sleeper.	Buckle plates and gravel ballast.	138.7	0.842	875	5.325	0.0511	\$ 71,680.50	\$ 437.5	\$ 4.18	\$ 0.0366	sq. ft. 17,130	\$ 102,108.00	\$ 622	\$ 5.97
		On Wooden cross-ties.	Creosoted planking.	60.1	0.342	271.3	1.540	0.0299	25,045.00	142.3	2.76	0.0412	11,480	49,800.25	883.0	4.35
217.5	0.433	Trough girders.	Creosoted planking.	58.05	0.116	837.0	1.668	0.0278	70,950.00	111.2	2.35	0.0378	31,700	124,500.00	389.2	3.92
110.8	0.433	Trough girders.	Concave plates with gravel filling.	37.2	0.106	378.0	1.475	0.0286	32,059.75	135.1	2.42	0.0373	13,800	56,387.25	221.0	4.09

hour. The largest trains consist of eight coaches. Between the locomotive and train an empty coupe is preserved as a buffer in case of accident. The public have to open and close the doors for themselves as in the London underground railway. The stoppage of trains at stations is half a minute. The tickets are clipped at the platform before joining the train and delivered up at the destination. The locomotives are coke-burning six-wheeled tender-engines with four wheelscup led and a pair of trailers. The older engines were heavier and furnished with condensers but did not prove very satisfactory and the steam was not found as objectionable as was anticipated. The weight of these engines when running was about forty tons equally distributed over the three axles. The driving wheels were 5 feet 3 inches in diameter and 7 feet 3 inch centers. The trailing wheels were 3 feet 10 inches in diameter and 6 feet centers. The cylinders were 14 inches in diameter. The later engines are lighter and designed especially for local service. They weigh 34½ tons in running order, which is also equally divided over the three axles. Both types of engines work at an absolute pressure of ten atmospheres. The carriages are lighted with gas on the Pintsch system and heated with May and Paper coke

1,500 men work all night. The street is made bright and brilliant by huge flames of burning gas. Through Broadway for miles there runs a ledge of granite. This ledge has to be drilled and filled with explosives and blown into the streets.

The men dig in the broiling sun, they shovel in the noonday heat, they wrestle with water pipes, gas pipes, steam heating pipes, conduits for telegraph wires and telephone wires, and reveal, as they go on block after block, until, as I say, the entire stretch is one vast trench, a medley and intermixture of pipings, wirings and physical conveniences of which nothing but a photograph could convey an idea.

They work lazily I admit, they rest frequently I saw, but the great fact remains that by their united effort they have ripped this town from one end to the other, until it looks like a mining camp in full operation. Their carts are carrying away the surplus rocks and earth, their chisels are digging beneath the little pipes, their crowbars are lifting great weights of stone, their powder flasks are preparing the ledge for explosion, their pickaxes, their ploughs, yes, they absolutely have ploughs in certain sections of the street, four horses drawing the implement of the field at that, are all at work."

STREET RAILWAY LAW.

EDITED BY MR FRANK H. CLARK, ATTORNEY AT LAW, CHICAGO.

Riding on platform of car.

It is not negligence *per se* to ride on the platform of a street car, though there is room within; and an instruction that this will prevent a recovery for an injury to a passenger resulting from the negligence of the street car company, is error.

ON September 17, 1890, in the evening, plaintiff, with his wife and children and some friends, had returned by boat from the exposition grounds landing at the foot of Woodward avenue. A street car was standing there, and many passengers from the boat rushed for the car. Plaintiff and his party went to the front of the car. He entered with the ladies and children of his party, while his friend Mr. Metcalf remained upon the front platform. Some of them secured seats, and the others stood up. After providing for them as well as he could, he returned to the front platform. The car was drawn by horses. Shortly after the car started, it struck a switch, and plaintiff, who was standing with his back against the door, was thrown to the pavement and severely injured. Plaintiff having recovered a verdict, upon this appeal the court say that the defendant's liability must be determined under the fact found by the jury that plaintiff voluntarily left the car when there was room for him to ride within it, and voluntarily stood upon the platform. Upon this point the court says:

Is the company liable under such circumstances for negligently driving its car? Defendant's counsel assert that plaintiff left a place of safety inside the car, and voluntarily chose one of danger upon the platform, and that, as his injury was due in part to the fact that he voluntarily took that position, he cannot recover; and that he took an unnecessary risk is evidenced by the fact that no one who was standing within the car was injured. They also assert that the law recognizes but two excuses for leaving a place of safety for one of danger: (1) Where a party, whether erroneously or not, acted under the reasonable impulse of fear produced by another; and (2) where one has tried to save human life, when such effort did not amount to rashness,—neither of which the plaintiff can of course make. The answer to the question depends entirely, we think, upon whether or not it is negligence *per se* to ride upon the platform of a street car when one may ride within. Whether one leaves the car after entering, to ride upon the platform, or whether he steps upon the platform without entering, is of no consequence. His act is as voluntary in the one case as in the other, and the same rule must govern both. The record is entirely silent as to any regulations on the part of the defendant in this respect. But we cannot denude ourselves of the knowledge, which is alike common to all, that passengers are constantly riding upon these platforms with the tacit assent of the defendant, and without any protest, notice or regulation. We must therefore determine the question with the fact before us that this use of the platforms is permitted by the defendant without objection. It is recognized as dangerous *per se* to ride upon the platform of the ordinary steam railway. This is apparent to any

one, and the difference in danger between riding there and upon the platform of the street car is too obvious to require comment. Authorities discussing the question afford no light in the determination of this. In the presence of the fact that passengers are permitted to ride upon these platforms constantly, can courts hold them to be dangerous *per se*? If the railway companies considered them dangerous places, would they not take some means to notify passengers not to ride there, or to inform them that they did so at their own risk? That they do not consider them dangerous is further apparent from the fact that, when their cars are full, they stop them to take on more passengers, and thus invite them to ride upon the platforms. This appears to be their constant custom. It is evident that the public do not consider these platforms places of danger from the fact of their constant use. It is therefore difficult to see upon what reasons courts can hold that they are dangerous, and that persons who ride there assume all the risk, and thereby relieve such companies from all liability, except for gross, wilful and wanton misconduct. Under the facts shown by this record, the question of the negligence of the plaintiff, as well as the defendant, belonged to the jury to determine, and should have been submitted to them under the proper instructions. Such, in my judgment, is the rule established by the clear weight of authority. This is not in conflict with the case of Downey v. Hendrie, 46 Mich. 498, where the plaintiff went through the car to the front platform and sat upon the driving bar, a thin iron rail not exceeding an inch in thickness, from which he fell under the car. We have no doubt of the correctness of that decision. It is within the power of street railway companies to prohibit passengers from riding upon the platforms, or to give notice that those who ride there must do so at their own risk, or to limit the number of passengers which each car shall carry, and to require them to ride inside the cars. Until they adopt some such regulations, and notify the public, it is but reasonable to hold them liable for injuries resulting from their own negligent acts, to their patrons, who are themselves in the exercise of reasonable care, whether riding upon the platforms or within the cars.

(Sup. Ct. Mich. Upham v. Detroit City Railway Company. 9 Ry. & Corp. L. Jour. 418.)

Municipal Control of Street Railways—Reasonable Regulations—Ordinance Requiring Employment of Person Besides Driver to Assist in Managing Car.

The charter of the city of Trenton confers power upon the common council to pass ordinances necessary and proper for the good government, order, and protection of persons and property: also power to prescribe the manner in which corporations or persons shall exercise any privilege granted to them in the use of any street. Held that under either of these powers, reasonable regulations controlling the running of street cars may be adopted.

An ordinance enacting that it shall not be lawful for any

horse railroad company to run any car without having an agent in addition to the driver, to assist in the control of the car and passengers, and to prevent accidents and disturbances of the good order and security of the streets, is, upon its face, not an unreasonable regulation.

If an ordinance is based upon a general power, and its provisions are more detailed than the expression of power conferred, the court may look into its reasonableness.

The presumption is that it is reasonable, and the burden is upon the party who denies the validity of the ordinance.

A grant to a corporation of the right to own property and transact business affords no immunity from any police control to which a citizen could be subjected.

(Sup. Ct. N. J. Trenton Horse Railway Company v. City of Trenton, 11 L. R. A. 410.)

Charter of Street Railway—Terminal Streets—Extension of Tracks—Consent of Municipality.

A charter to construct a railway on two streets between another street and road, does not authorize the company to lay its tracks on the street or road between which it is authorized to be laid. The word "between" excludes the termini.

Neither can the company use either of the terminal streets as a connecting street.

When a charter requires consent of the municipal authorities to the occupation of the public streets, and a supplement is silent as to consent, and a second supplement is subject to the limitations and restrictions, and with all the privileges granted by the original charter, the company must obtain the consent of the municipal authorities before it extends its tracks.

(Ct. Com. Pls. Phila. City of Philadelphia v. Citizens' Pass. R. Co. 48 Leg. Intel. 220.)

Master and Servant—Latent Dangers of Employment—Negligence of Master.

When a servant is injured in the course of an employment which is apparently safe, but subject, according to his allegation, to certain latent dangers unknown to him at the time of the accident, he cannot fasten any liability upon his employer for not giving notice of the danger, without showing affirmatively that the latter was cognizant of it.

The fact that certain of his fellow servants had known similar accidents to happen is of no importance unless it is shown that they communicated their knowledge to their employer, and, if there is no other evidence of negligence than this, the trial judge is right in withholding the question from the jury.

The mere fact of a servant being injured in the course of his employment raises no presumption of negligence on the part of the master.

(Sup. Ct. Pa. Melchert vs. Robert Smith India Pale Ale Co. 48 Leg. Intel. 241.)

Injury to person occupying Wagon turning out of Street-car Track—Liability of Company.

A street-railway company is not liable where the occupant of a wagon driven from its track is thrown from it by the jolt incident to turning out of the track.

(Sup. Ct. La. Nivette v. New Orleans City & L. R. Co. 8 So. Rep. 581.)

Elevated Railway—Rights of Abutting Owners—Lot extending to Side of Street—Easements—Damages—Delay in bringing Suit.

The owner of a lot on a public street, whether it extends across to the center or only to the side of the street, has incorporeal private rights in the street which are incident to his property, and which may be so impaired as to entitle him to damages.

The owner of a lot which extends to the side of a public street has an easement in the street for light, air and access for the benefit of his abutting property, which constitutes private property within the meaning of the constitutional provision that private property shall not be taken for public use without just compensation.

If an elevated railroad is erected in a city street in front of property which extends to the side of the street in such a manner as to obstruct the light which would otherwise reach such property, and as to cause smoke and cinders from the engines used on the road to enter the buildings on the property, and thereby diminish its value, its owner is entitled to compensation for the damage so inflicted.

The legislature cannot authorize the taking of private property for public use without just compensation.

Delay for five years by the owner of property abutting on a street through which an elevated railroad has been erected before bringing suit for damage inflicted upon his property by such road, and his patronage of the road as a passenger, will not defeat his right to recover such damage.

(N. Y. Ct. Appls. Abendroth v. Manhattan R. Co. 11 L. R. A. 634.)

NOTE.—In the case of Fobes v. Rome, W. & O. R. Co., 8 L. R. A. 453, the New York Court of Appeals held that the construction and operation of a surface railroad along and upon a city street, substantially upon the same grade therewith, under authority from the legislature and by permission of the city, is not a taking of any property of an abutting land owner, who has no title to any portion of the street, which will entitle him to compensation either for interference with any of his easements in the street or for consequential damages to his adjoining property necessarily resulting from a reasonable operation of the road, where the use of the street is not exclusive in its nature and the passage through and across it is left free and unobstructed for the public. The doctrine of this case is distinguished from that of Abendroth v. Manhattan R. Co. *supra* in the opinion in the latter case, in which the court says: "Fobes v. Rome, W. & O. R. Co. does not decide that an abutting owner has not vested rights to light, air and access in a public street, which are incident to his lot, and which are private property within the meaning of the Constitution; but that the operation pursuant to legislative authority by the defendant of its steam railroad on the grade of the street, which was at about the natural surface of the ground, was not an actionable invasion of the abutter's right."—ED.

THE NEW WIGHTMAN RAILWAY MOTOR.

ALTHOUGH the appearance of the gearless motor has awakened wide interest among street railway operators, the single reduction motor seems also to be rapidly gaining favor, judging from the reported sales of manufacturers.

The gearless motor has undoubtedly come to stay, but many prominent authorities are of the opinion that the field of application will be limited to high speed suburban roads. The single reduction motor still continues to occupy the attention of electrical engineers, and we are enabled this month to bring before our readers a description with illustrations of the Wightman motor.

The Wightman Electric Manufacturing Company has been doing much in the line of improvement in electric street railroad apparatus, and among the latest devices which this company has perfected is its slow speed motor and controlling device. Over a year ago this company commenced experiments towards the development of a slow speed, single reduction motor. This work has been under the supervision of Mr. Merle J. Wightman, who



FIG. 1.—FIELD COIL.

was for several years associated with the Thomson-Houston Company, at Lynn, Mass. It will be seen from the engraving Fig. 1, that the "Kennedy" type of field magnet is employed. This form of field magnet has the advantage of almost completely covering the field coils and producing an

"ironclad" motor. It gives a very strong and efficient field, and all four poles are excited by two field windings.

The armature is of the Gramme type, and the commutator is cross connected so that but two brushes are used, placed at 90 degrees and on top of the commutator. The cross connecting of the commutator is accomplished in a remarkably simple way. All the crossing cables are formed symmetrically into a flat disc which is finally bolted to the head of the commutator and becomes an integral part of it. In this way all possibility of vibration and risk of breakage is overcome. The commutator lead wires are all of flexible cable, after the Wightman Company's well known method of armature winding. These lead wires are fastened to the commutator without screws, and in such a way that they can be detached in a few minutes, when it becomes necessary to remove a commutator. The armature is mounted within a strong, continuous frame forming part of the field magnets. The bearings are self oiling and dust proof, and are designed to be used with grease, oil, or both.

Either field winding is removable without disturbing the other or the armature. The removal of two bolts at one end makes it possible to lift out one of the fields, after which the armature can be taken out. The top field pole is hinged at one end for convenience in removing the fields or armature.

The ratio of the reduction of the gearing is 4.4 to 1,

the armature pinion having fifteen teeth and a diameter of 5 inches. This ratio gives about 480 revolutions of armature at a car speed of 10 miles an hour.

The aim of the designer of the Wightman motor has been to attain as great an efficiency as possible with the wide variation of speed and load which are met with in street railway practice. This has been obtained by means of large field magnets of a great number of turns of wire. In fact, speed regulation is obtained without the use of any external resistance above three or four miles an hour. On a level, cars equipped with two 20-horsepower Wightman motors have frequently attained a speed above 25 miles an hour.

Mr. Wightman's experience has led him to the belief that there is no economy in operating motors of small capacity. Many roads are operated in such a way that cars are barely maintained on schedule time by dangerous and

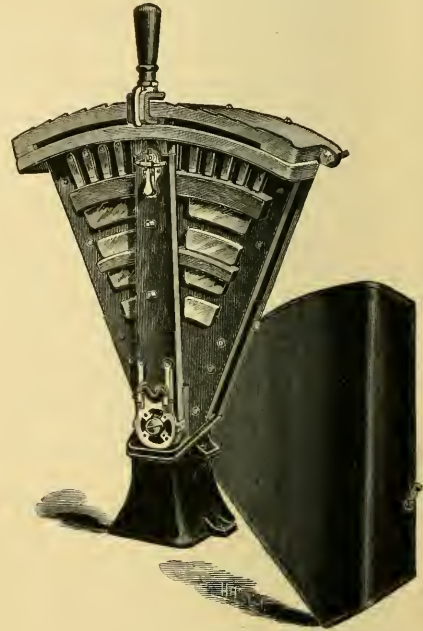


FIG. 2.—WIGHTMAN CONTROLLING DEVICE.

reckless running on down grades. A little calculation will show that by the expenditure of a little more power, grades may be climbed rapidly, and as a result, much more service can be gotten from a given expenditure in wages for conductors and motor-men and interest on plant, and the cost of the extra coal will be comparatively insignificant. It is much safer to climb grades rapidly, rather than to descend, not to mention the greater satisfaction of patrons. When climbing a grade, a stoppage of power and application of brakes will bring a car to a standstill with surprisingly short delay. Since the wear and tear of ample sized motors is obviously less than those overworked, all consideration of economy and safety point to the use of the former.

While in the Wightman motor electrical perfection has not been sought for at the expense of simplicity, durability, mechanical strength, etc., a very high efficiency is

obtained. The armature resistance of the 20-horse-power motor is .75 ohms, and of the main field coils .15, with a load of .40 amperes, or over 26 electrical horse-power, this would give a loss of potential in the motors of 36 volts, or an electrical efficiency of 92.8. Even with this excessive load the commercial efficiency has been found to be as high as 87 per cent. The large field, referred to above, makes possible a high efficiency at low speed and light loads. These qualities are synonymous with powerful torque or starting force. A loaded car equipped with

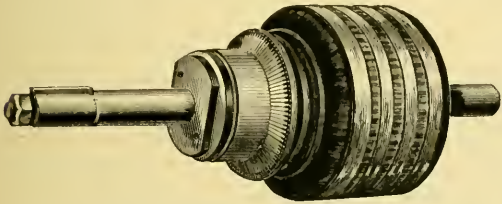


FIG. 3.—WIGHTMAN ARMATURE, 20-HORSE-POWER MOTOR.

Wightman motors, requires from 15 to 20 amperes to start on a level.

Not the least interesting is the controlling device of the Wightman Company. It is shown in perspective in Fig. 2. Here again simplicity and durability has been the aim of the designer. Corresponding points in each controller are connected at each end of the car, and all mechanical contrivances beneath the car, such as reversing switches, rheostat, cables, etc., are done away with. There are five speed contacts on each side of the middle stop. A movement of the controller handle to the left causes the car to go forward, while an opposite movement reverses the direction of motion. The gradation of resistance on the reversing side of the controller is such that a car can be brought either slowly or suddenly to a standstill, without the use of brakes or undue strain on the motors. The control is as absolute and flexible as in the case of a steam locomotive, yet very much more convenient as to operation. The top of the controller is provided with notches, in which a catch on the operating handle engages. This arrangement enables the motor-man to confine his attention to the track ahead, and yet be aware of the position of his controlling lever.

While the Wightman controller is especially adapted for use with the Wightman motor, it is evident from the construction that it is applicable to any of the existing types of motor, and its advantages will undoubtedly commend it to street railway managers.

The Wightman Company has already some of its motors running in Auburn, N. Y., and in Scranton and Easton, Pa. Large orders, from these and other places, necessitate the running of the factory day and night. The great increase of business makes it necessary to build large factories, which will soon be completed.

THE CABLE IN ENGLAND.

CABLE traction has been the subject of much study and discussion throughout the United Kingdom and Europe. Prominent engineers have been sent from nearly all the large cities to visit this country and inspect all the cable roads in operation here. Returning they have reported on the data gathered and the results of their visits has been watched with no little expectancy. The information which has just been received of the decision of the North Metropolitan Tramways Company, of London, to cable 25 miles of their present system, which is a most excellent one comprising 60 miles. The present system as now operated is by horses. It will be one of the best cable roads in the world, and will have the advantage of profiting by the experience of all previous constructions, and will embody every improvement thus far developed, and it is stated that no expense will be spared in its construction. The transformation of the English tram system from animal to mechanical powers has not been rapid, but it is characteristic of the managers in the United Kingdom that when a change of any kind is made it is radical and thorough, and is of a more permanent character than in this country. A number of other large companies are said to have decided to adopt cable, but their decision has not yet been made public.

The Proctor Steel Company.

THE citizens of Johnson City, Tenn., have just finished raising a bonus of \$100,000 to secure the works of the above named company for their city. This plant will make the finest steel direct from the ore, by the use of Col. McCarty's process and will be the

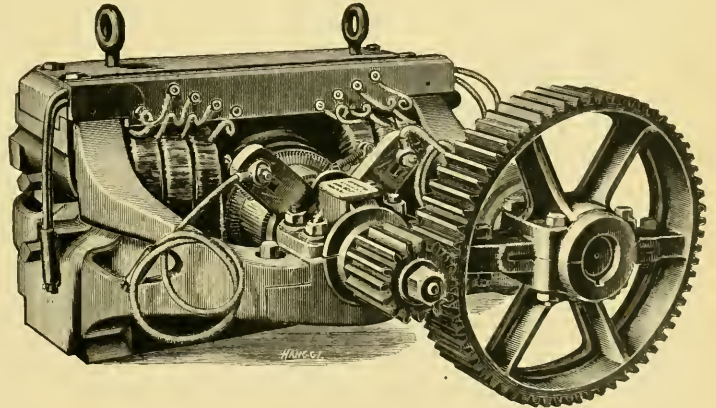


FIG. 4.—20 HORSE POWER WIGHTMAN RAILWAY MOTOR.

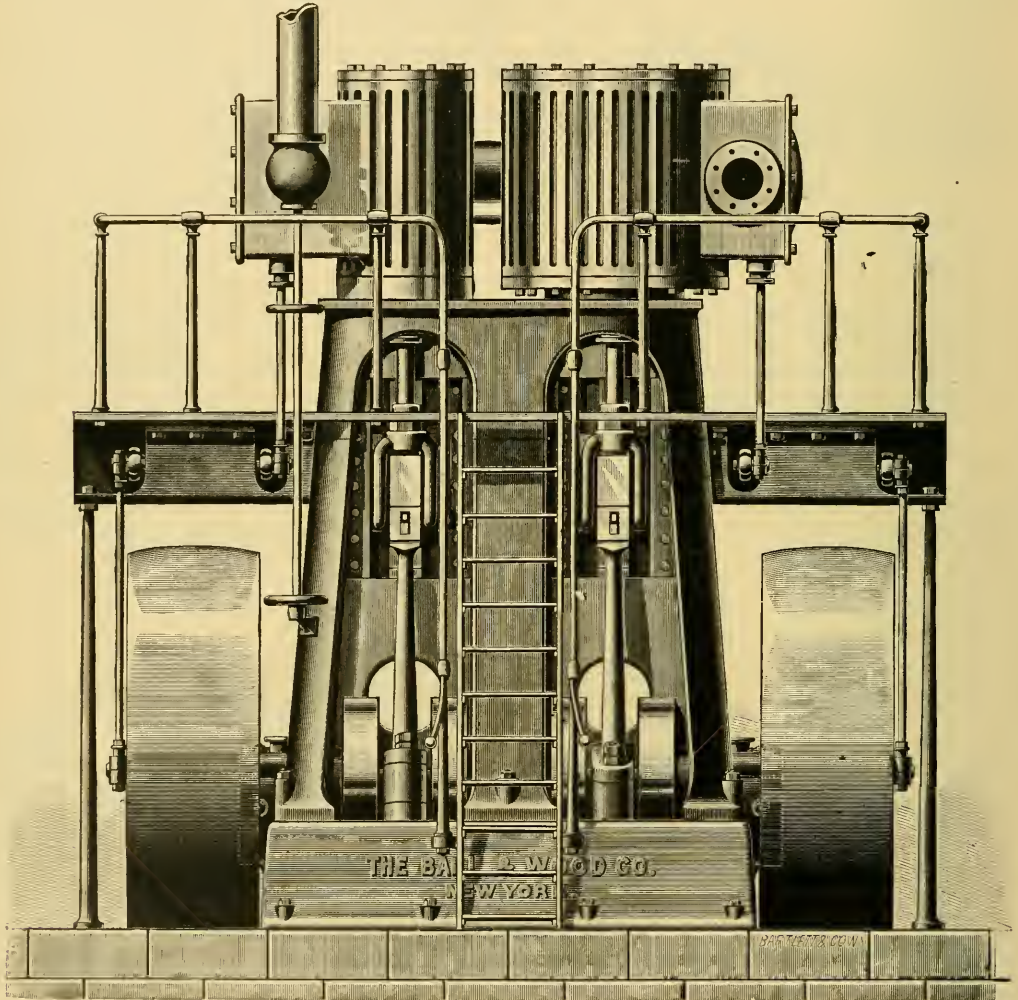
only plant in America manufacturing from this patent. An inexhaustible supply of mineral abounds in that district and the works will have an output of 150 tons daily; converting the ore by one heating direct from its natural state into merchant bar, rail, boiler plate, etc. The ore is known as cranberry metal and is especially adapted to the manufacture of sharp pointed tools and other industries requiring a tough metal. The company is capitalized for \$500,000, and will occupy with its yards and buildings forty acres, and employ 1,500 men.

High Speed Vertical Compound Engines.

ELECTRICITY, in its development, has carried forward in its wake a host of improvements, and given impetus to inventions which, but for it, might never have been brought about, or at least only after a long period of time. Perhaps engine building has shared in this stimulus more than any of the previously existing mechanical industries which were not the direct creation of electrical needs. Before the first dynamo made a revo-

To meet the popular demand for more efficient engines, compound cylinders were applied to high speed engines with the most gratifying results.

It was found that compounding was specially adapted to this class of engines, and thus a wider field for high speed engines was opened. The skepticism at first expressed as to the desirability of non-condensing compounds was quickly answered by practical results. One of the notable cases of this kind is the well known com-



lution the slow speed engine had attained a well-nigh perfected form. The high speed engine was of small horse power, and its use limited; so when they were built for the heavier work of dynamo driving, few changes were made, except in size and weight. But as the business expanded, and assumed proportions and conditions which necessitated economy in every detail, attention was directed to the fact that what was gained in first cost and small space required by the old style high speed engine, was lost in expensive use of steam.

parison of coal consumption per "Ampere Hour," between the station of the Edison Electric Illuminating Company of Brooklyn and the Edison Lighting Stations of New York. In the Brooklyn station non-condensing compounds are used, and the New York stations have single cylinder engines.

The usual form for high speed compounds is the horizontal, whether of the tandem or cross compound type. In Europe the vertical form is extensively used, and it is believed by many that large high speed vertical com-

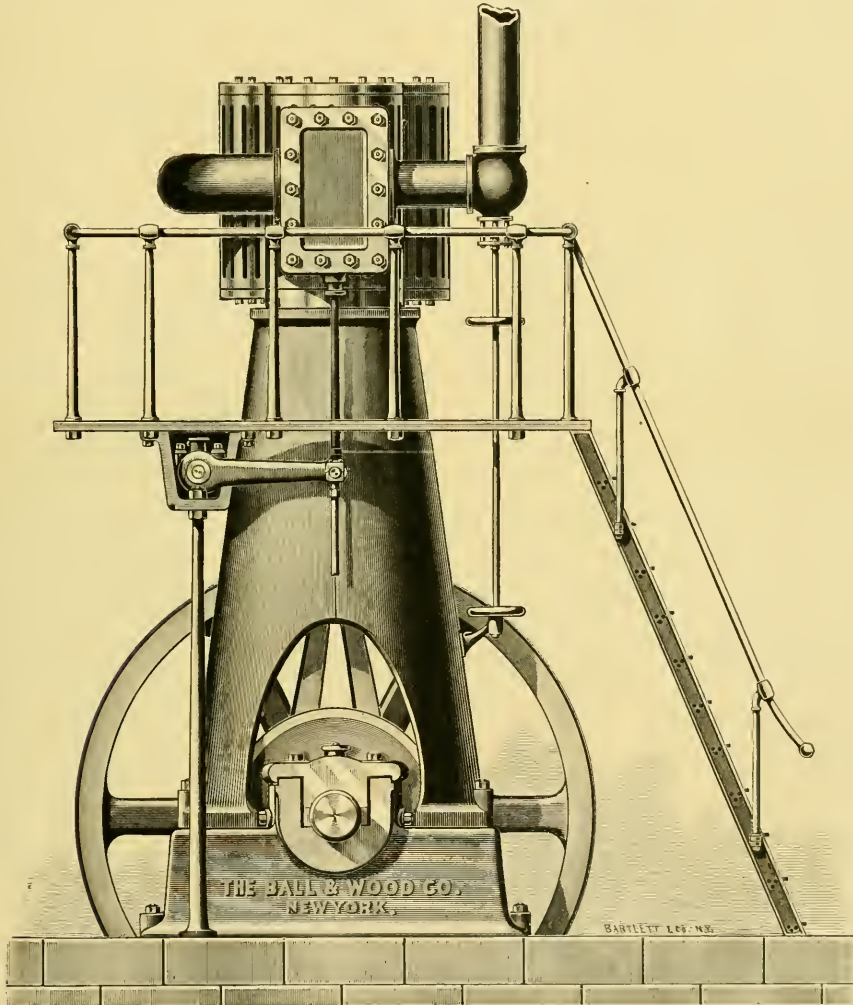
pound engines will come into very general favor here, particularly where floor space is valuable.

The illustrations herewith are of a 500 H. P. engine of this class. The floor space required, including wheels, is about 8x12 feet, thus giving over 5 H. P. per square foot of floor. The vertical height of this engine is about 12 feet above the floor.

The engine here illustrated is built by the Ball & Wood Company, at their Elizabethport shops, and has in its governor, valve, etc., all the characteristic features of the

The rock shafts are carried in adjustable boxes placed in a bracket, one end of which is attached to the frame and the other end supported by a pillar set on the foundation. This bracket is placed under the gallery floor and forms one of its supports at each side of the engine. A movable section of floor permits ready access to the rock shafts for inspection or oiling.

THE cars of the Brooklyn City Railway recently carried 100,000 passengers in a single day.



Ball engines. For convenience of access, the front legs of the frame are arranged to be detached just below the gallery floor and removed entirely, thus allowing the shaft to be rolled out at the front of the engine. The rest of the frame is cast in one piece, except the guides, which are placed on finished seats in the frame. Both valves are driven from crank pins, instead of eccentrics, one being part of the automatic cut-off governor, and the other set in a plate arranged for an adjustable cut-off.

If two small boys in St. Paul, who were playing horse with a leather strap, had dropped a nickel in the company's slot instead of the strap, it would have been better for them. They succeeded in fastening the strap to the moving cable, and the way they sailed up the street was a caution. They couldn't stop and chased themselves nearly two blocks before a bystander came to their assistance and with a sharp knife secured their discharge from street railway connections.

THE BALDWIN LOCOMOTIVE WORKS.

THE Baldwin Locomotive Works of Philadelphia, have in some respects one of the most representative power plants which has thus far been constructed. This company was among the earliest users of single acting engines, and as a consequence suffered from the defects which asserted themselves so unexpectedly and abundantly in connection with their development. After an unfortunate experience with the first two engines purchased, which were of the throttling type, there was a suspension of confidence for two or three years until the single acting engine had worked out its own salvation.

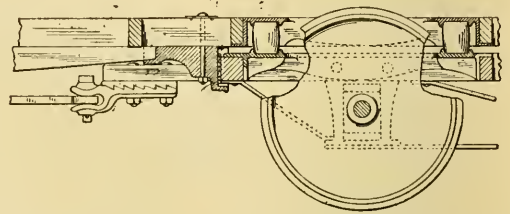
In due time another order was placed with satisfactory results, out of which has grown the following plant of engines: One 300-horse-power, three 150-horse-power, and five 100-horse-power compound engines; one 60-horse-power, one 50-horse-power, five 35-horse-power and three 15-horse-power standard engines. Many of these replace other engines, automatic and otherwise, until the substitution we believe, is at present complete. A remarkable record was made by their superintendent in setting the 300-horse-power compound engine which replaced a standard engine of 200-horse-power. The latter engine was run until 3 o'clock Saturday night, the throttle being closed at whistle time. The engine was then disconnected, taken out, the foundations altered, the 300-horse-power set and steam turned on at 3 o'clock Sunday morning, or nine hours from time of commencing work. This feat was a striking illustration of what can be done with a self contained engine—and the right man to do it.

In their new erecting shop can be seen an example of modern engineering in the shape of a plant of five compound engines of 100-horse-power each, standing side by side and driving a series of electric generators serving a complete system of motors for the portable work of the shop. Several of these motors operate traveling cranes of which there are two, each capable of lifting and carrying 200,000 pounds. One of these cranes recently picked up a locomotive weighing 196,000 pounds, built for the St. Clair Tunnel Company, and carried it across the erecting shop to the shipping track. This by the way is the largest locomotive ever constructed, being capable of developing about 2,000-horse-power. In connection with the engine plant at large, is a complete system of separators and steam loops to take care of the boiler returns. The engines and loops were furnished by Westinghouse, Church, Kerr & Co., and take steam from a battery of Babcock & Wilcox boilers carrying 150 pounds pressure. One of these boilers is frequently cut off and pressure carried much higher for special testing purposes. The above is a very complete example of the subdivision of power, and is especially significant from the fact that the parties contracting are mechanics of the first rank, and capable of fully understanding the problem involved.

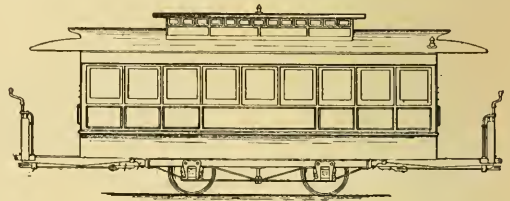
A STREET railway in a Washington town is owned by one man and called by his name, the "Thum Road." Doubtless the patrons find the cars very handy.

A NEW STREET CAR SPRING.

AT the shops of the Chicago City Railway in this city, are being built four cars, from plans prepared by Magnus Ohlson, who has been a car builder here for many years. Mr. Ohlson has taken out a patent on a type of car construction which, it is believed, will not only largely reduce the noise and jar incident to the operation of box cars, especially during the winter months, but will also very materially increase the life of the car itself. By this arrangement strong rubber springs are interposed between the car sill and the truck frame, by means of which the box of the car has no other point



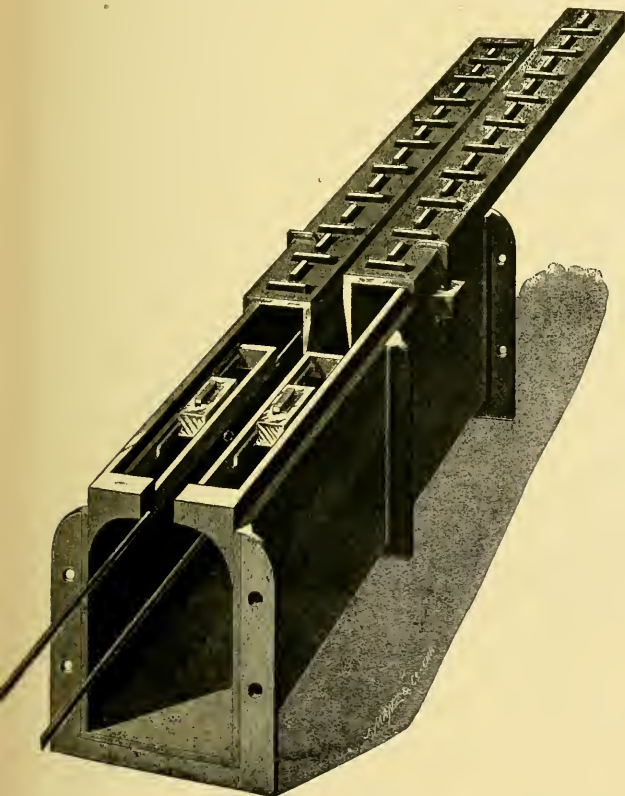
of contact with the truck frame than through these rubber springs. This arrangement, however, does not increase the distance from the street to the car floor. The platforms are made a part of the car body as heretofore, but the draw bars instead of being attached to the car sills, are fastened directly to the truck frame. This arrangement will be found especially desirable where cars are run in trains of two or more, and the jar which is so common when cars are suddenly braked will be obviated. In the first cut will be noticed a space between the truck frame and the car sill, and in the second illustration the rubber cushions are shown. Between the end of the truck frame and the bracket shaped casting, which is bolted to the platform, is placed a piece of elastic facing of leather or some other similar material, which permits of the vertical motion of the truck frame, but prevents the transmission of noise to the car body proper. At the bottom of the bracket is a projection under the truck, which limits its



vertical motion. Bolts which are passed through the platform sill and this bracket as shown in the cut, are the only attaching means used, and connects the truck frame to the car body. It will readily be discerned with what ease the box may be removed from the truck when desired. The rubber cushions are so distributed that there are two for each wheel, one before and one behind it. The construction is by no means expensive, and it is believed will make a very easy riding car. The usual steel springs are retained in the truck, the above described device being in addition thereto. The trial test of the cars now being built will be made in a few weeks.

ELECTRIC RAILWAY CONDUIT FOR CHICAGO.

THE fact that wires of every description in the downtown district of the city have been placed underground, and the desire on the part of the city government that this method shall be extended as rapidly as possible, has effectually placed a bar against any endeavor to secure a franchise for the construction of an overhead electric railway in the city proper. The attempts which have hitherto been made elsewhere for the placing of trolley wires underground, have met with uniform failure, of which San Jose, Cal. and Denver, Col. are very striking illustrations; in both of which places the companies went to very great expense, not only to build a conduit,

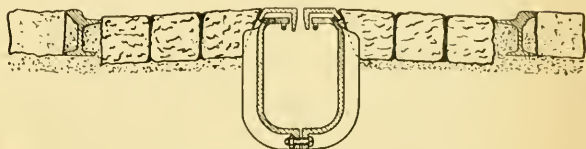


but in their endeavor to make it work after having been laid.

The railway construction firm of Wright & Meysenberg, of this city, have prepared all the plans, and it is expected will proceed at once to construct about one mile of single track, starting from the terminus of the Lincoln avenue cable line and extending on Fullerton, Racine and Webster avenues back to the starting point. The system is that known as the Love Conduit System and the company is officered by some of the best known capitalists in Chicago. The president is P. C. Hanford, John A. Roach, vice-president; J. G. Shortall, treasurer; Albert G. Wheeler, secretary and general manager.

The objection heretofore to roads of this class has been that it was found impossible to secure a proper insulation, but of this system, Prof. John P. Barrett, who is also chief electrician of the World's Fair, is electrical engineer and pronounces it all right.

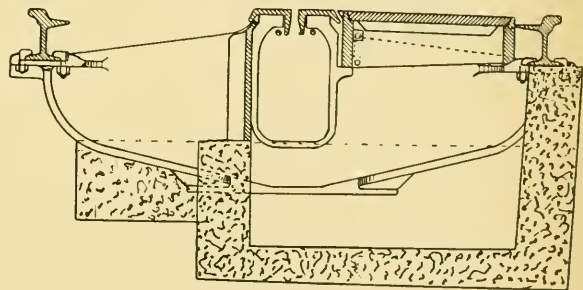
The object of this construction is to demonstrate the practicability of the new system with the expectation of introducing it in all large cities of this country.



ELEVATION BETWEEN YOKES.
SHOWING CAST IRON LINING

The illustrations herewith will convey a very intelligent idea of what the plan is, and it may be added, this construction calls for yokes which are placed 4 feet apart and weigh 225 pounds each. The track rail to be of Johnson Section U 78. The motor which is carried on the forward truck, is visible at all times to the driver by a glass door, through which the mechanism can be easily reached. The trolley has two conduit wheels which are carried underneath the wire. It is proposed to clean the conduit by means of a brush which can be attached to the trolley and deposit the dirt in pits, which will be placed at convenient intervals. The motor is connected with a drive wheel by a side bar similar to a steam locomotive. Power will be furnished from the car shops of the North Chicago Street Railway on Fullerton avenue.

The conduit is 15 inches deep so that the excavation necessary is not great. The conducting or trolley wires are of copper and are supported on block insulators which



SECTION THROUGH MANHOLE

are made of glass, the wire passing through the center. The deep flange of the slot rail will also be noticed and which lends additional protection to the current wire. The trolley has two conduit wheels. President Yerkes of the North Chicago Railway has granted permission to the electric company to lay its system as above described for the purpose of demonstrating its efficiency.

IT WILL PAY THEM.

IN our April number we suggested several plans by which companies might, by a very slight outlay, provide suitable out-door entertainments for their patrons, and thus very materially develop a created travel. Many of the enterprising managers are doing this the present season who have never undertaken the plan before; and those who have tried it are increasing the methods employed last year. The introduction of electricity which enables the use of light where desired, at slight outlay, and the enhanced pleasure of a rapid ride in the cool of the evening has also largely contributed to this end. Among the many who are furnishing inviting places of amusement is the Electric Street Railway at Greensburg, Pa. At considerable expense they have laid out a beautiful park, and on every Saturday evening give a first-class concert which is free. The mothers and children go out in large numbers in the afternoon, and the fathers come out and join in a picnic lunch after which the music is given. The scheme has not only given the road all the business it can handle but has created a general feeling of good-will toward it from the entire community, who rightly consider themselves under many obligations.

At Pensacola, Fla., the company are putting the finishing touches on an extensive park at the terminus of one of its lines, to which further improvements will be added.

At Oakland, Cal., the Piedmont Cable Company have gone to considerable expense in providing a pleasure resort which includes among many other attractions extensive Turkish bath-rooms and an elegant cafe. They also have abundant bath-houses for salt water bathing in addition to the above.

The Portland (Ore.) Cable Railway Company have secured ten acres adjoining the city park, in which they are making the handsomest base ball and recreation grounds on the coast. The venture involves considerable outlay but cannot fail to prove a wise and profitable investment.

The Duquesne Traction Company at Pittsburg have inaugurated a series of free band concerts by the Great Western Band, which are given at Highland Park, on the company's line. The concert draws out immense crowds which makes enormously heavy travel for several hours.

The management of the new electric road at Burlington, Iowa, have just purchased ten acres at a cost of \$6,000 for the purpose of a base ball park.

The Minneapolis road is fortunate in having numerous natural attractions on its lines, prominent among which is Minnehaha Falls. Other lines lead out to the beautiful lakes Calhoun and Harriet. At the latter the company have just received permission to erect a large pavilion, a grant for which extends for ten years and will be erected at a cost of \$10,000. The building will project over the water about 27 feet, and refreshments will be on sale. Free concerts are now given at regular intervals by a brass band stationed on a barge and towed out some distance from the shore. The effect of the music as it floats across the water is most charming and attracts thousands to the place.

JOHN WALKER.

THE portrait on the opposite page will at once be recognized as the well known features of the general Vice President and General Manager, John Walker, of the Walker Manufacturing Company, Cleveland, O. So largely is Mr. Walker interested in the designing and manufacturing of cable machinery that he has found a prominent place in the street railway interests of the country.

The story of Mr. Walker's life is an interesting one. Mr. Walker was born in Middleborough, Yorkshire, England, August 3d, 1847, and is now in his forty-fourth year, and possessed of a vigor and perseverance before which obstacles are rapidly swept away. By a singular coincidence the place of his birth was then and is now known throughout the world as the Cleveland district, famous for the magnitude of its iron and steel industries, and it was around furnaces and pools of liquid metal that the boy found his most attractive playgrounds. His early education included that to be derived from the course afforded at the common school, supplemented by a course of training in a private institution, after which he spent seven and a half years in mastering the various branches of the foundry, machine shop, and engineering departments of the iron works. In this he was very successful, and the value of his services were appreciated and rewarded with a steady promotion, so that before he had completed his apprenticeship, he held a very responsible position. During this time his father was contract moulder for two large iron concerns, and during the Russian War, had the contract for furnishing the English armies with shot and shell, which made him quite famous.

Young Walker was not only proficient in the practical part of his work, but a persistent study of the theory of the same, soon entitled him to membership in the Royal Engineers' Society, of London, of which he is still a member. At the age of twenty-four realizing the possibilities of this country, he crossed the water and actively entered on his life work. At different times he has held responsible positions with several well known iron firms, including Merrick's, of Philadelphia, also Seller's of that city; Wm. Wright, the engine builder of Newburg, N. Y., and Nordyke & Marmon, of Indianapolis. When he left the latter place, in 1882, it was to organize the Walker Manufacturing Company, of Cleveland, which manufacture his patents, over fifty in number, and build special machinery, heavy gears and cable road machinery, including the famous differential drum.

Mr. Walker is a member of the Engineers' Club, of New York, and was one of the early members of the American Society of Mechanical Engineers, and also the Civil Engineers' Club, of Cleveland.

Mr. Walker is an entertaining conversationalist, and a man whose perseverance and energy is proportioned to a splendid physique. To his enterprise and sagacity is due the existence of the magnificent works of the Walker Manufacturing Company, which with its cloud of smoke by day and its pillar of fire by night mark the spot where grand achievements are being worked out.



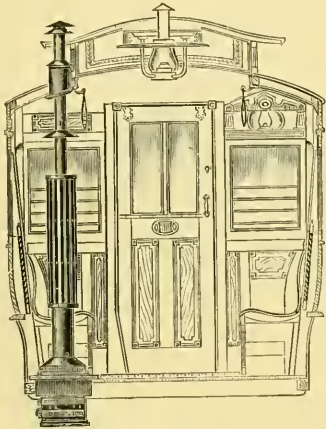
JOHN WALKER,

Vice-President and General Manager Walker Manufacturing Company

CLEVELAND, O.

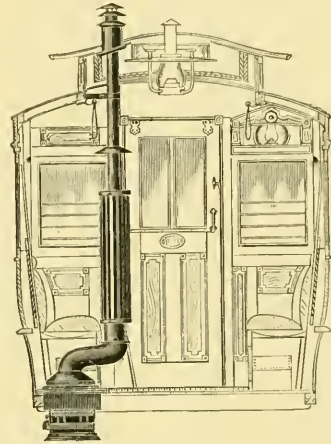
THE CALORIFIC VENTILATING HEATER.

HEATED cannon balls placed under the seats in fire-proof iron boxes, were actually tried some twelve years ago on a line of cars in the city of Chicago as a means of car heating. There was no difficulty in warming the car, however, but the cooling metal burned all the vitality from the air and most people found the blizzard which danced with the driver on the front platform more inviting than the interior. And so after many attempts the scheme was abandoned. No less than 100 devices have been worked out for practical car heating, and of them all only a few have proved really meritorious, and among these few none more so than the heater illustrated herewith. The ratio of cubic feet of air per passenger in the ordinary street car, as compared to the cubic feet per passenger in a railway coach, is nearly as 1 to 3, so it will readily be seen the necessity for the heated air being fresh air, is vastly greater in the



case of the street car. This is effectually accomplished with this heater. The fire pot is independent of the hot air chamber which surrounds it on all sides, so no smoke or gas can possibly enter the car, but is carried to the open air through the roof by means of a Russia iron pipe, fitted with controlling damper. The cold fresh air enters the hot air chamber from below and passes through and into the car. For a distance of 40 inches above the seat the smoke pipe is encased in a second Russia iron pipe, so that the heat thrown off by the smoke pipe does not inconvenience the passenger sitting next it, but is carried up and diffused through the entire car. The ventilator pipe is in turn encased in a handsome wood slat cylinder, bound at top and bottom with nickel bands, and separated by wooden beads, the whole forming an attractive addition to the car. The smoke pipe may be carried in a straight line from heater to the roof, passing through the seat, or where preferred, by using an elbow brought around the seat and passed out through the deck. For a 16 foot car the heater necessitates a floor hole of only $14\frac{1}{4}$ inches square, and for larger cars but $16\frac{1}{4}$ inches. The two sizes, No. 1 and No. 2, are identical in construction. An important feature is that the ashes drop into a pan instead of on the street or car house floor, and it is impossible to

dump the grate except when the ash door has been opened. This door can never open of itself from any cause whatever. The fire pot will contain sufficient fuel for a round trip, and where desired one man at terminus can easily take entire charge of all the heaters, thus relieving conductors from any responsibility other than controlling the damper as desired.



That these heaters have been thoroughly tested it is needless to say more than that 200 were placed in the North and West Chicago cable cars last winter, and the result was an order from each road aggregating in all 1,200 heaters. The heater also gave the very best of satisfaction in Milwaukee, where thirty were placed on the Cream City cars, also the Consolidated of Columbus, O., who used fifty heaters, and the citizens of Springfield where twenty-five were in operation. The expense for fuel and care is very slight, and the increased travel in one season will more than cover the cost of putting them in, while the satisfaction and good will of the public is worth many times the expense. When once in they last for years, and there is practically nothing except the grate to wear out and that can be renewed at an expense of but a few cents and instantly changed. There can be no possible danger to the car or car house as the surrounding wood work is protected with asbestos.

Mr. Garson Meyers, who has so thoroughly and successfully worked out this problem, is general manager of the Calorific Ventilating Heater Company, with headquarters at St Kinzie street, Chicago.

SOME queer objections have been made to the construction of street railways, but here is a man in Bath, Me., who bases his opposition on the ground that a line on his street would tempt him to spend \$25 a year in car fares. For his special protection and that the wheels of progress be not blocked, the management might issue a general order that if he ever attempted to board a car, he be peremptorily and emphatically bounced; or he might wear blinders and then he would not see the cars, and could plod along life's stony path and save his five cents.

Crother's Cable Pulley.

AS with rails, so with the various kinds of curve carrying and depression pulleys used on cable roads—the wear comes almost entirely on certain exposed parts. On these portions the wear is often excessive and severe, and the result is the throwing out

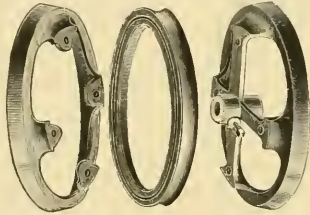


FIG. 1.

often of an entire set of pulleys, which have become so worn and cut in on the groove as to be unsafe, while the balance of the wheel is practically good for years. Mr. John Crowther's patent cover methods which provides for

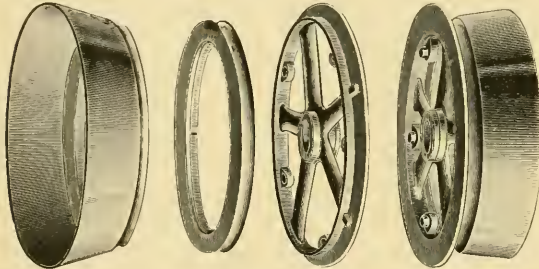


FIG. 2.

combination pulleys, so that the actual wearing portion may be replaced just as often as necessary and without trouble or at least possible cost.

The three styles illustrated are for carrying pulleys, as shown in Fig. 1, depression or guide pulleys as in Fig. 3

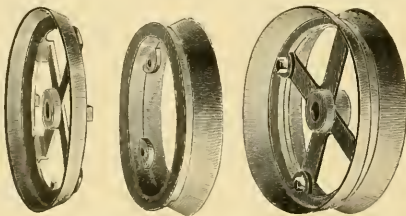


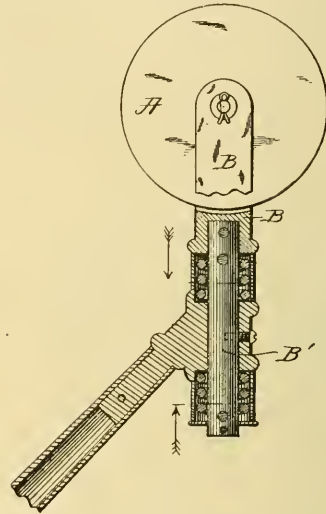
FIG. 3.

and curve pulleys as seen in Fig. 2. In each of these the ring is readily removed. The three-part pulley is filled with a ring made of chilled iron, or wrought iron, as users may prefer. This being the only portion worn on this kind of pulley, it can be taken out and renewed, at one third the cost of original pulley, making practically a new one. The two-part pulley is for the same purpose as the three-part pulley, and is designed for lightness, the wearing or renewable part being hardened by patent process, hardening the metal clear through, and strengthening it; the cost of renewals being one-half cost of original pulley. The rings for curve pulleys are made of chilled cast iron, wrought iron or steel as may be desired.

Trolley Device.

TO allow of a better adjustment of the trolley wheel to the wire, especially in passing round curves and across switches, is the object of a new device patented in April, by Alexander Palmas, of Lynn, Mass.

The illustration requires little explanation other than that the wheel A, is loosely journaled in the forked bearing B, which latter rests in a spindle B, which is free to turn a part of a revolution around its axis; this ability together with the spiral spring is intended to insure contact with the wire under circumstances when otherwise the wheel would leave the wire.



CABLE railway construction is the subject of much study and interest in Europe at the present time, and the next few months will reveal the consummation and plans that have been forming during the past two years. The most important announcement in this connection which has been made is that of the decision of the North Metropolitan Tramway Company, of London, which will proceed to cable twenty-five of their 60 miles.

WHAT with cable construction going on night and day, Broadway, New York, may properly be said to be "wide open" these days.

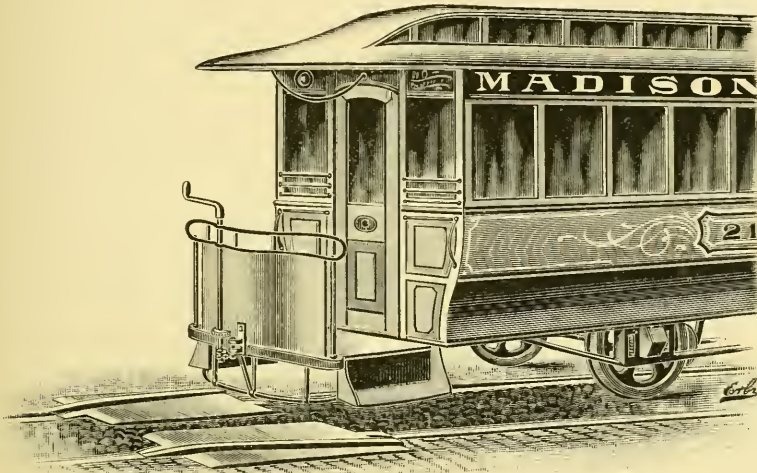
THE Peoria *Transcript* aptly states the case in a good many cities when it says: The city council, after establishing certain fare rates that may be changed, has absolutely nothing to do with the question of whether or not a certain company will make money. This is a question that concerns alone the corporators and stockholders. No street car company goes into the business for health or recreation, and the presumption is that they will make money. And the more money the company makes the better is the good sense and judgment of the council illustrated in granting them the privileges for which they have asked. Earnings depend on the amount of customers, and a large number of people using a road simply shows that this convenience was badly needed.

Car Replacer.

W O. COOKE, of Chicago, has invented a very simple but effective device for replacing derailed cars. They are made in two styles, one for heavy cars running on T rails, and the other as shown herewith for street railway use. The replacers are of malleable iron and are intended to be carried on each car. Actual tests repeatedly made have demonstrated the ability to replace an electric motor car in from one to three minutes. They are conveniently carried under the seats and always ready. On the underside of

The main entrance will be graced with an immense arch, enriched with superb carvings, bas-reliefs, all in gold leaf, which will give the entrance the name of the "Golden Door."

The North London Steam Tramway Company, operating in the suburbs of London, has been refused the renewal of their franchise, and on June 15th ceased the operation of their cars. This will probably result in their adopting the electric or cable system as a motive power.



the replacer a sharp caulk fits between two paving blocks and prevents any slip. For use in cases of blockade of any kind where it is desired to turn cars back without waiting to reach a switch it is very desirable. Cars are easiest replaced by backing onto the plates, upon reaching which the wheels easily and quickly are returned to the rails.

STREET railway men will be specially interested in the Transportation Building in the World's Fair, as it will be



WORLD'S FAIR TRANSPORTATION BUILDING.

the home of the street railway exhibits. The main building will be 960 feet long by 256 wide, the roof in three divisions—the middle being much higher than the others. A cupola in the center rises to 165 feet and is reached by elevators. The annex will cover nine acres, roofed by one story buildings 64 feet wide. A railway track will be placed every 16 feet and long enough to exhibit an entire freight train with its engine.

THE commissioners for the District of Columbia have decided that congress has vested them with authority to make police regulations regarding children jumping on and off the cars, or as more commonly expressed "hitching on." They have therefore proposed a regulation which will soon be a law, which provides a fine of \$5 to \$10 to be paid by the parent of the offending small boy. It is also intended to make the police of the district responsible for the observance of the regulation. There should be such a law in every city where street cars are run, and parents should be more interested in its passage than the street car companies.

THE construction of an electric line upon Seventeenth and Stout streets, Denver, and to West Denver, will not take place. The scheme at present is to construct a cable line upon Seventeenth street, to reach from the union depot to the present Seventeenth Avenue Cable, thereby much increasing and improving the company's service on Capitol hill. The West Denver line is also to be operated by cable. It will be a long one, too, as 30,000 feet of rope will be needed to run it. The cars

of this line will reach the union depot by the same route as at present. By this proposed system Seventeenth and Sixteenth streets, and Seventeenth avenue, the most important thoroughfares in the city, will be given almost perfect service, having cars running regularly every two and a half minutes.

Boston is soon to try the advantages of the double decked street car.

NEW PLANT OF THE COLUMBUS, OHIO, CONSOLIDATED STREET RAILWAY.

WE take pleasure in placing before our readers, an illustration and concise description of the power house and plant now about completed by the "Columbus Consolidated Street Railway Company, Columbus, Ohio," in substituting electricity in place of horse power for propelling their street cars, it being the purpose of this company to eventually apply electricity to their entire system. The arrangement and construction of this plant is of the very best, being fully up to the highest standard of engineering work: great attention having been paid to economy of fuel and convenience of operation.

A study of this plant will be of advantage to those interested in such matters. The brick building enclosing the plant, is 125 feet by 130 feet, and is located on the banks of the Scioto river, the floor level being 20 feet above ordinary water level. During high water the level of the river corresponds to the floor level, making a special arrangement of the exhaust piping necessary. At ordinary water level the plant works as a condensing plant with free atmospheric exhaust pipes for each engine, each controlled by an automatic valve; these atmospheric exhausts discharging into one main exhaust pipe, running the entire length of the building and through the walls, discharging into the river; these atmospheric exhausts being an addition to and independent of the main exhaust from each engine running into the exhaust pipe to the condenser.

The condenser waste discharges into the main atmospheric exhaust pipe running to the river; these free atmospheric exhausts are used in starting the engines, the engines meantime running as high pressure engines until the load is well on, when, by opening a valve in each direct engine exhaust, the automatic valve in the atmosphere closing at the same time, shuts the engine off from the atmosphere and connects it to the condenser, thus converting it into a condensing engine after the load is on. This prevents the possibility of damage to the engine incident to the starting of a condensing engine connected to the condenser without load.

During high water the main atmospheric exhaust pipe is submerged, making it necessary to close the atmospheric exhaust and shut off the condenser. To provide for running these conditions, the main exhaust pipe is equipped with a free atmospheric exhaust near the condenser, this exhaust passing out through the roof of the building; this provides for the uninterrupted operation of the plant under any changes of water level.

The water for condensing is brought from the river by gravity to a well 35 feet deep, located just inside of the power house walls in front of the boilers.

The condenser injection pipe takes the water from this well.

The shape of the lot on which the plant is erected, made it necessary to place two batteries of engines, one on each side of the engine room, placing the generators centrally between the batteries of engines, the generators arranged approximating a circle and leaving sufficient

space for the switch boards in this circle, thus placing the operator in a position to over-look all the generators without moving from his post.

The railroad track running along the river front side of the power house, permits of a convenient discharge and storage of coal in the coal bin in front of the battery of boilers. The iron water tanks for storage of feed water for boilers are placed above the coal bin, and are by proper pipes connected through the feed pumps into the boilers.

The plant proper consists of 5-346-horse-power batteries of Babcock & Wilcox water tube boilers, built to carry a working pressure of 120 pounds steam.

The engines are the well known McIntosh & Seymour, compound tandem condensing type, built specially for railway work, the left hand battery consisting of three of these engines, having cylinders 13 and 23 inch by 17 inch, each to develop 250-horse-power.

These engines, also the generators and boilers, rest on solid masonry foundations 28 feet deep.

Each engine in the left hand battery operates two 80,000 Watt Thomson-Houston railway generators.

The right hand battery of engines are made up of 3-450-horse-power, each having cylinders 16½ and 30 inch by 17 inch.

Each engine operates two 150,000 Watt, railway generators, making a total of 2,200 horse power.

The condensers are of the Blake independent jet type, each battery of engines having its own condenser.

The live steam pipe system, also the live steam jackets and engine receivers, are drained by means of a Blake combined pump and receiver, which forces the water of condensation directly into the boilers at a temperature of nearly 212 degrees.

The exhausts from the feed pumps and condensers, &c., discharge into Stillwell & Bierce feed water heaters and purifiers, which will raise the temperature of the feed water passing through the heater to about 200 degrees.

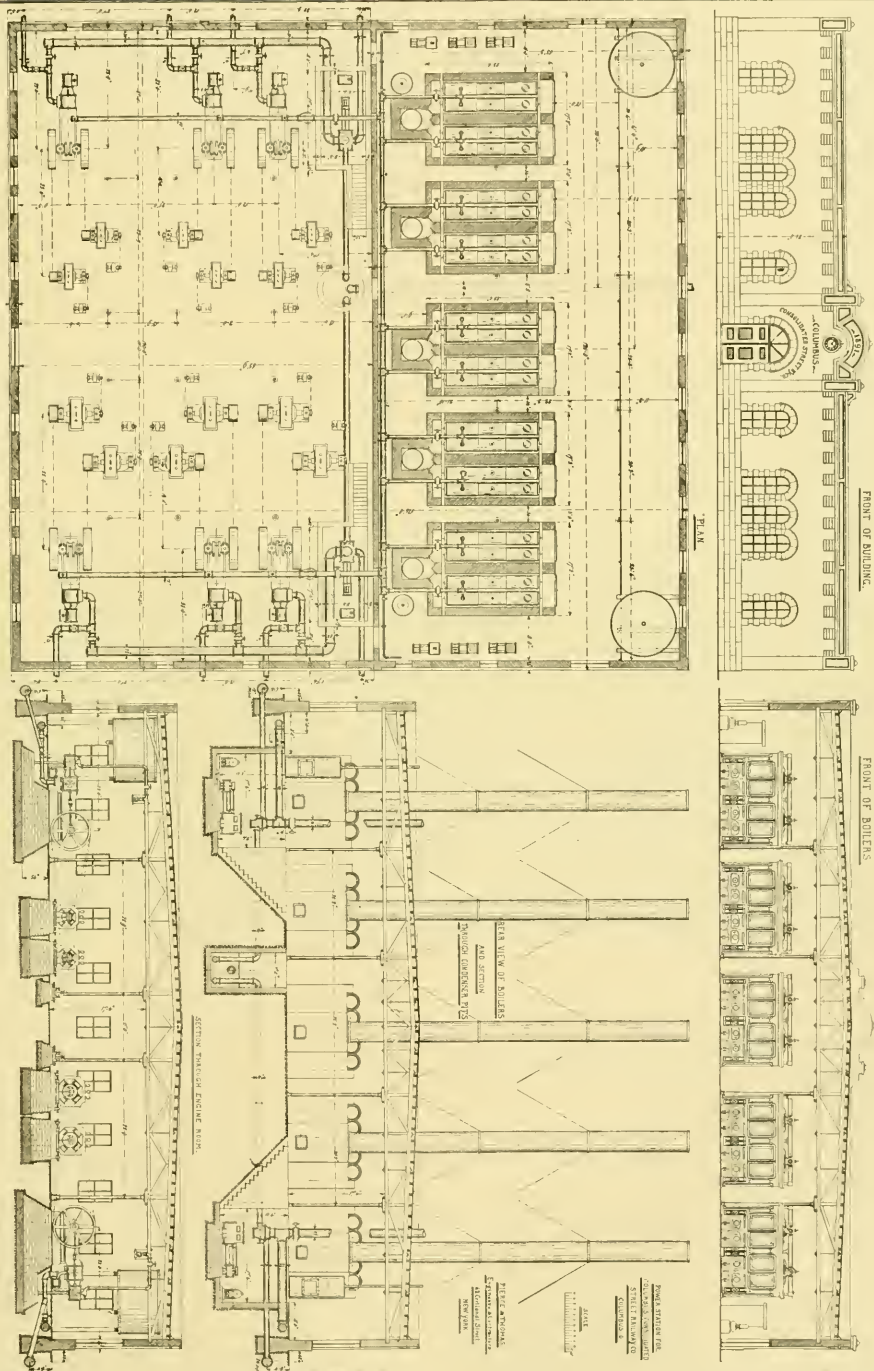
The piping system on this plant is worthy of special study.

The steam from each boiler is discharged into a main header through the pipes of proper size 20 feet centers, each boiler pipe being controlled by a Jenkins gate valve. The Jenkins gate valve is used throughout the plant, as it gives an opening equal to the area of the pipe and the seats being composition and removable, they will remain permanently tight.

The main header is supported by proper hangers leaving it free to move under expansion and contraction, and without causing leaks, due to the long arms made by the 20 feet pipes connecting it into each boiler; at a point near each end of the main boiler header are branch headers for each battery of engines; the engine header is placed centrally over the engines.

From the top of this steam header, branch pipes are run to each engine with 5 foot horizontal centers and 8 foot vertical centers. It will be observed that the

PLAN OF POWER PLANT, COLUMBUS (OHIO) CONSOLIDATED STREET RAILWAY COMPANY.



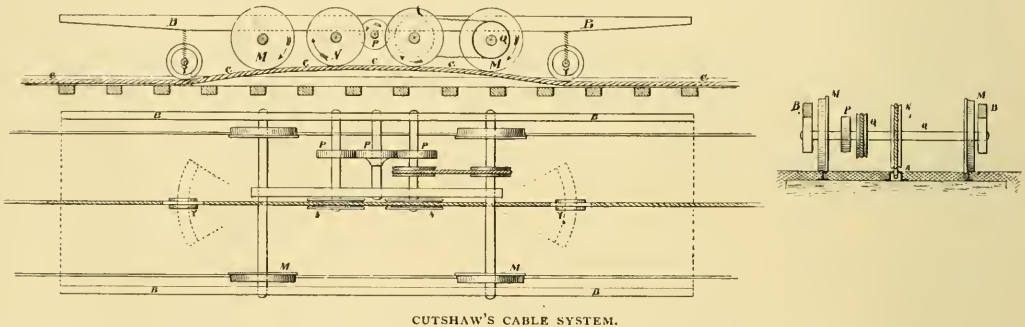
arrangement of these pipes throughout are practically in the shape of the letter "U" which gives ample opportunity for expansion and contraction without loosening the joints.

Separators are placed in each engine header draining into the combined pump and receiver, thus allowing the steam to pass to the engines practically dry.

It is expected that this plant will easily operate on a coal consumption of 2 pounds per horse power, per hour, as the division of the plant is such as to permit of operation with nearly maximum load under all conditions of car service.

A brick stack, 8 feet inside diameter 140 feet high, resting on a solid concrete block 24 feet square, 10 feet deep, is substituted in place of the separate iron stacks shown in illustration, the boilers connected into this stack through a masonry flue.

Pierce & Thomas, Engineers and Contractors, 42 Cortlandt street, New York City, furnished the plan for the building, which together with the stack was built by the Railway Company. The entire plant equipment was



furnished and erected by Pierce & Thomas, under contract, and run by them 30 days. It has been their endeavor to make this a sample railway plant, and as they are somewhat largely engaged in the construction of plants for similar work throughout the entire country, their extensive experience places a high standard upon their work.

The line equipment and line construction was furnished and done by the Thos. Murray Company, Electrical Exchange, New York. Their work shows a thorough understanding of this branch of the railway business, and is a most creditable piece of work throughout.

The Columbus people are to be congratulated on their wise selection of plant and in contracting for their work with experienced, responsible concerns, who make a specialty of first-class construction work.

THE official report of the ninth annual meeting of the American Street Railway Association has just been received. It is very tastefully arranged, and displays the same painstaking care and accuracy which characterizes previous publications by Secretary W. J. Richardson. The steel portrait of President Lowry is a gem.

Cutshaw's Cable System.

LEONARD Cutshaw, of Denver, Colorado, has recently patented a still-cable system—especially adapted to heavy grades, where ordinarily the only solution has been the fastening of the cable to the car and winding the rope around a drum at the top of the incline. By his method a smaller cable may be used than would otherwise be required, as the strain of each car is applied to only short sections of the rope, less than the car headway. The cable remains practically unmoved, except as drawn in or let out by automatic tension according as the number of cars on the line varies. Each car has its own motor. Reference to the letters on the cut will readily explain the method.

The cable C is wound around the drums N N which are made to revolve by any suitable motor—steam—gas—air—or electricity, direct or storage, turning the center shaft P which is geared to the shafts Q carrying N. N. The cable being latched or locked down so that it cannot be drawn towards the car, the car is drawn along the track. These latches are set along the track at proper

distances so that the cable will at no time have the pull of more than one car upon grades, or two upon level tracks.

The endless cable and the movement of the same, carried onward by the movement of the cars, is the distinguishing feature of this device. The great advantage claimed for this system over the traction system is the greater per cent. of power applied direct to the car, enabling the operator to start and stop without shock or jar, upon heavy grades or on level tracks. The inertia of the car is overcome by the cable gradually but surely. A friction clutch connects the motor to the gearing P, causing N N to start gradually, and without shock or jar. No brakes are required, as the cable controls the movement of the cars. The car can never run away even upon the steepest grades, as the cable holds it in place in either direction. For the purpose of moving the cars by traction, when the cable is thrown from the drums N, N a chain gearing Q Q connects the motor to the axle of the car as shown in the cut.

By this means the cars may be operated by traction on the level using the cable only on the grades. Also freight and passenger cars may be taken over unusual grades, and then moved by traction again.

STREET RAILWAY FIRE.

THE disastrous conflagration which was discovered shortly before 10 o'clock on the evening of June 28th, entirely destroyed the car house and barns of the Newburyport and Amesbury Street Railway, which are situated midway between the two cities. The fire apparently originated in the carpenter shop at one end of the building.

The car house was 140x36 feet and contained three box and one open motor cars, nine box and three open cars without motors, three plows, one leveler, one walk-away, one trolley wagon, four miles of trolley wire, twelve new headlights, besides other material that had recently been purchased for the roads, all of which was destroyed.

SIXTH AVENUE (N. Y.) HAS A FIRE.

LIVELY scenes were enacted at high noon on July 8th, when a spark blew in the open window of the three-story horse barn of the Sixth Avenue line, which was located at Sixth Avenue and Forty-third street. In the loft were 4,500 bales of hay, 9,000 bushels of corn and 5,000 bushels of oats. On the second and first floors the horses are stabled, of which at the time of the fire there were 1,120 in the barn. The barnmen, finding themselves unable to extinguish the fire in the hay, promptly turned in an alarm and gave attention to saving the stock. Sixty of the company's employes were on the premises and the animals were rushed out rapidly but regularly. An adjoining livery was filled



AFTER THE FIRE—NEWBURYPORT AND AMESBURY ELECTRIC RAILWAY.

Besides this, the stable, that was 160x30 feet, together with hay, grain, halters, harnesses, etc., was totally destroyed.

At the time of the fire there were thirty horses in the stables, all of which were gotten out and turned loose upon the streets and afterwards recovered. All efforts to remove the cars from the building failed, on account of the intense heat and the rapidity with which the flames spread. The direct loss to the company is \$50,000, which is covered by insurance, but of course no insurance will reimburse them for the loss incident to their inability to operate the line while new cars are being secured. A new car house will be built of brick and work on it will commence at once. President Odell has placed orders for new equipment with instructions to have the same delivered at the earliest possible moment. The fire burned so rapidly that both buildings were destroyed in a little less than one hour. They were built four years ago.

until there was not even "standing room" left, after which a block of street was barricaded at one end and filled up; what were left were taken to a vacant lot near by. An exciting incident occurred when one-third of the animals had been saved. The remaining 800 were on the second floor and were obliged to reach the ground by a runway which had one sharp turn. When a few horses had been brought down one big fellow stalled at the turn and became wholly unmanageable. The passageway behind was crowded full of horses and men and a general stampede became imminent, only there was not much room to stampede in. Without a moment's hesitation the barn foreman drew his pistol, dropped the fractious beast, his dead body was dragged out, and the blockade was raised. With this exception: one which broke a leg and was shot, and a blind veteran in the hospital which refused to stir, and was humanely killed, the entire stable was saved; a

really remarkable feat—for the barn burned rapidly—and reflects great credit on the cool-headed work of the company's men. President Curtis had a pet cow in the barn, which the boys proudly rescued, although it is alleged that the cow did not walk, but had to be carried out bodily. Twenty-five steamers and an immense crowd attended the illumination.

AT 1 o'clock on the morning of June 21st, the Twentieth & Wharton streets stables of the Philadelphia Traction Company were wholly destroyed by fire. There were 126 horses in the barn at the time, and the night watchman barely had time to cut the halters and turn the horses into the street. Most of the cars were saved, but the loss was \$10,000.

STREET CAR PATENTS.

Selected list of patents relating to Street Railway inventions, granted during the past thirty days: reported especially for THE STREET RAILWAY REVIEW, by Munn & Co. Patent Attorneys, 361 Broadway, New York.

ISSUE OF JUNE 9, 1891.

Electric Railway.....John Jones, New York, N. Y., 453,710
 Safety Guard for Street Cars.....Louis J. De Puy, Phoenix, Ari., 453,768
 Street Car Brake.....Sigismund B. Wortmann, New York, N. Y., 453,790
 Street Railway Switch.....Richard Woods, Boston, Mass., 453,825
 Register for Fares.....Leo Ehrlich, St. Louis, Mo., and James
A. Keyes, New York, N. Y., 453,884
 Supporting and Connecting the Driving Motor of Electric Cars
Sidney H. Short, Cleveland, Ohio, 454,008

ISSUE OF JUNE 16, 1891.

Electric Railway Car...Edward M. Bentley, New York, N. Y., 454,020
 Electric Motor Car.....Edward M. Bentley, New York, N. Y., 454,021
 Conduit for Electric Railways.....Edward M. Bentley, New
York, N. Y., 454,022
 Electric Railway.....Francis O. Blackwell, Boston, Mass., 454,023
 Rail and Road Bed for Traction Roads.....John J. Miller, Pitts-
burg, Pa., 454,179
 Sand Box for Cars.....Henry F. Parker, New York, N. Y., 454,182
 Street Car Life Guard.....Tom L. Johnson, Cleveland, Ohio, 454,214
 Cable Railway Grip.....John C. H. Stut, San Francisco, Cal., 454,235
 Fare Register.....John W. Meaker, Chicago, Ill., 454,370

ISSUE OF JUNE 23, 1891.

Brake Mechanism for Street Cars.....Norman C. Bassett,
Lynn, Mass., 454,450
 Trolley Pole Mechanism....Geo. H. Larkin and Jas. Tomkins,
St. Paul, Minn., 454,522
 Sand Apparatus for Street Cars...Lemuel Lakin, St. Louis, Mo., 454,683

ISSUE OF JUNE 30, 1891.

Automatic Safety Stop for Inclined Cable Railways....Elias R.
Duckwall, Bantam, Ohio, 454,858
 Electric Car Motor Jacket...John Stephenson, New York, N. Y., 454,868
 Driving Mechanism for Cable Railways.....John Walker,
Cleveland, Ohio, 454,894
 Fare Register.....Louis C. DeSloovere, Salem, Mass., 454,902
 Convertible Car.....Michael B. Ryan, Denver, Colo., 454,921
 Fare Register.....Charles A. Neuert, Boston, Mass., 455,050
 Electric Railway.....James F. Munsie, Brooklyn, N. Y., 455,233
 Electric Railway.....James E. Munsie, Brooklyn, N. Y., 455,234
 Truck for Street Cars.....Henry F. Shaw, Boston, Mass., 455,265
 Fare Register.....James T. Cowley, Lowell, Mass., 455,276

ISSUE OF JULY 7, 1891.

Conductor for Electric Railways....Walter H. Knight, Cleve-
land, Ohio, 455,339
 Electric Railway.....Walter H. Knight, New York, N. Y., 455,340
 Electric Railway.....Walter H. Knight, New York, N. Y., 455,341
 Electric Railway.....Walter H. Knight, New York, N. Y., 455,342
 Electric Railway Plough...Walter H. Knight, New York, N. Y., 455,343
 Turn Table.....Leonard C. Moise, Houma, La., 455,346
 Conduit for Electric Railways...Wm. Bradley, Ft. Wayne, Ind., 455,447
 Electric Motor Car Truck.....John F. Seiberling, Akron, Ohio, 455,518

A PROMINENT contractor tells of a conversation he recently had with the president of a railroad, which is by no means a bob-tailed affair, and located in a good big city, too. They were talking about which electric system was the most advisable, when the president confidentially asked the other: "Now tell me honestly just what your judgment is on the value of the system patented by Mr. Trolley." When he had recovered from a fit that siezed him just at that particular moment, the contractor pronounced Trolley's patent as all right.

AN inter-national street car line is that of the road at El Paso, Texas, to the courtesy of the superintendant of which, M. F. P. Blunt, we are indebted for a report covering the past four years. The system on this side of the Rio Grande is known as the El Paso Company, and the portion which operates in the land of the cactus, is the Paso del Norte Street Railway. During the high water of last month the company were obliged to construct and use a pontoon bridge 200 feet long. Under Mr. Blunt's excellent management both roads are doing nicely.

THE Electrical Supply Company of this city, after many days of hard work, settled in their new quarters at 102 and 104 Michigan avenue, where they have one of the most complete supply houses to be found in the electric field, each department will be separate with its own management, giving them a better chance to care for their very large business, while Mr. Terry will keep a watchful care over all as of yore. It must be a satisfaction to Mr. Terry, as it certainly is to his friends, to note the phenomenal growth of the business of this company, and which has now attained such magnitude.

THE YELLOWSTONE PARK LINE.

THE NORTHERN PACIFIC WONDERLAND embraces a list of attractions simply unequalled.

The Twin cities of St. Paul and Minneapolis at the head of navigation on the Mississippi, Duluth, Ashland and the Superiors at the head of Lake Superior, to the westward the Lake Park Region of Minnesota, the Red River Valley wheat fields, Valley of the Yellowstone, Yellowstone National Park, Bozeman and the Gallatin Valley, Helena and Butte, Missoula and the Bitter Root Valley, Clark's Fork of the Columbia, Lakes Pend d'Oreille and Coeur d'Alene, Spokane City and Falls, Palouse, Walla Walla, Big Bend and Yakima agricultural districts. Mt. Tacoma and the Cascade Mountains, Tacoma, Seattle, Pnyallup Valley, Snoqualmie Falls, Puget Sound, and Columbia River, Portland and the Willamette Valley, Gray's Harbor and City, Willapa Harbor and City of South Bend, Victoria on Vancouver's Island, Alaska on the north, and California on the south.

THE NORTHERN PACIFIC runs two daily express trains with Dining Car and complete Pullman service between St. Paul and Tacoma and Portland, via Helena and Butte, with through Tourist and Vestibled Pullman sleepers from and to Chicago via the Wisconsin Central, and first class through sleeping car service in connection with the Chicago, Milwaukee & St. Paul Ry.

Passengers from the east leaving St. Louis in the forenoon and Chicago in the afternoon, will make close connections with the morning train out of St. Paul at 9:00 a. m. following day; leaving Chicago at night, connection will be made with Train No. 1, leaving St. Paul 4:15 the next afternoon.

Yellowstone Park Season, June 1st to October 1st.

District Passenger Agents of the Northern Pacific Railroad will take pleasure in supplying information, rates, maps, time tables, etc., or application can be made to CHAS. S. FEE, G. P. A., St. Paul, Minn.

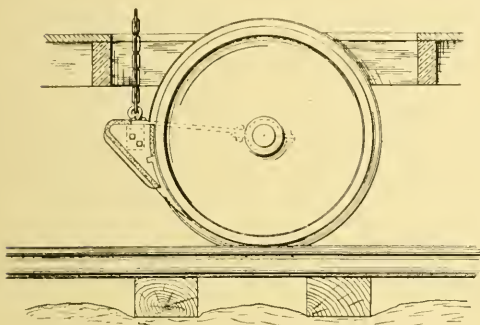
Write to above address for the latest and best map yet published of Alaska—just out.

Brake for Heavy Grades.

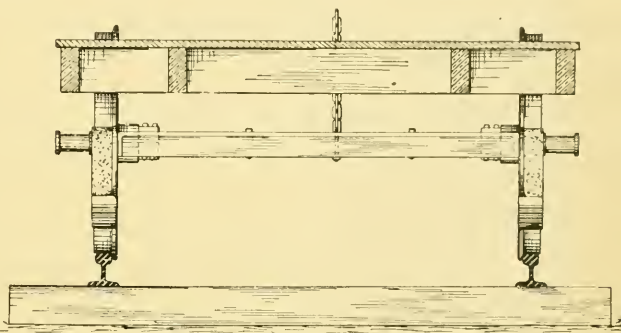
THE illustrations herewith show a new car brake, the invention of W. W. Allen & Co., of St. Paul, and designed expressly for grades and crossings, where the ordinary shoe brake fails to stop the momentum of the car. Its operation will be readily understood and there can be no question as to its ability to stop a car on a steep grade. It is concentric to and adapted to the tread of the wheel on the inside, and eccentric to the tread of the wheel and adapted to the track on the outside; with adjustable cast steel corrugated toes; and in addition, a thick rubber pad, which gives greatly increased frictional surface on the track, bringing the car to an easy stop on any grade.

and brings the car to a quick stop, and without jar. The flanges on the inside of the shoe conform to those of the wheel and rail, making it impossible for the wheels to jump the track. There is also a rubber cushion on the brake shoe, which is protected at the bottom by a steel toe. This prevents any rattle or noise when the brake is applied. The rubber is specially prepared and is durable. The brake may be operated by either brake-staff or lever, as preferred, and when applied works instantly.

INSTEAD of declaring a strike, the employes of the United Tramways Company, Dublin, conferred with General Manager Anderson, requesting a reduction in hours of labor, and the matter was so successfully handled that



ALLEN SAFETY BRAKE—UP.

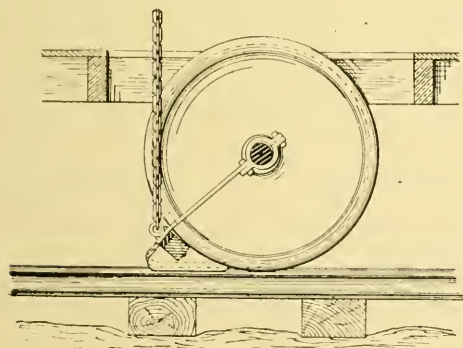


ALLEN SAFETY BRAKE—END VIEW.

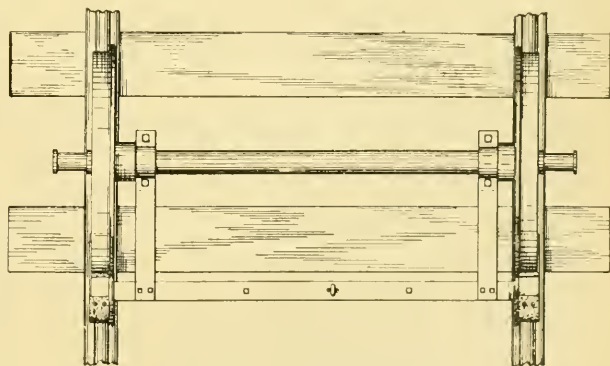
It is simple in its construction and quickly and easily adjusted to any car, and not at all expensive, and as a safety appliance will be appreciated by managers who are operating cars on hills or over crossings where the ability to make a quick stop may be of the utmost importance.

the best of feeling prevails. Working hours of drivers and conductors are reduced to twelve hours per day, with every twelfth day off with full pay.

THE Central Labor Union of Boston have adopted vigorous resolutions against the alleged power of the street



ALLEN SAFETY BRAKE—DOWN.



ALLEN SAFETY BRAKE—PLAN VIEW.

As the patent has just been issued, the brake has not yet become generally known, but recent trials on a motor car in St. Paul proved highly satisfactory. To apply the brake the driver has only to let it fall; immediately the shoes strike the track, and the weight of the car and the rubber pad on the bottom, which is $\frac{5}{8}$ of an inch thick, make a perfect contact on the rail, no matter what the grade, or how slippery may be the condition of the rail,

railway interests, and want the city to assume control of the system. They have not as yet, however, petitioned the city to control the union.

No one has yet appeared to accept the \$50,000 challenge which Frank J. Sprague offers to forfeit in case he fails to successfully operate an underground road in New York City by electricity.

ECHOES FROM THE TRADE.

A. L. IDE & SON have just shipped a 250-horse-power engine to the Salt Lake City Electric Railway.

R. D. NUTTALL COMPANY, is the way the firm now reads, which was formerly R. D. Nuttall & Company.

WM. BARAGWANATH SONS are still building a large number of their heaters, and have one under construction of 1,000 horse power, for Warren Springer, and also one of 800 H. P. for a large mercantile company in this city.

WM. HAZELTON has established headquarters in room 601, Penn Mutual Building, Philadelphia, as agent for that city and immediate territory, for the Short Gearless Motor, which is meeting with such marked success in railway service.

THE RUSSELL CARETTE COMPANY have organized a local company in Orange, N. J. and put the same in operation on July 1st on two lines using seven carettes, which run on ten minute headway. Capital stock of the Orange Company is \$50,000.

THE SHORT ELECTRIC RAILWAY CO. have recently closed contracts for new lines at Battle Creek, Mich., Beatrice, Neb., Dunkirk, N. Y., besides furnishing a number of their motors to roads already partly equipped with this popular system.

ALLEN S. DEXTER, of the firm of Charles D. Dana & Co., Chicago, is constantly adding the names of additional roads to his long list of street railway customers for cylinder and lubricating oils. He also furnishes a large amount of the greases used on cable roads.

LAKE travel is heavier this year than ever before. The attractions of a trip to Mackinac Island via the Detroit & Cleveland Steam Navigation Co. are unsurpassed. It only costs about \$13 from Detroit, or \$18 from Cleveland, for the round trip, including meals and berths.

THE ST. LOUIS CAR COMPANY received an order last week for new cars for the Citizens' Street Railway, at Indianapolis, of sufficient number in the words of President Fowler, "to equip a whole electric line." They will be models of beauty and are to be completed as soon as the works can get them out.

ON the desk of W. W. Willetts, manager of the railway department of the Adams & Westlake Company, is a tiny model in brass, three inches high, of their 22-inch car lamps. It is a charming little study in brass and is one of a set made to send to China on a request from parties there who expect to be buyers in the near future.

THE BROWNELL CAR COMPANY, St. Louis, secured the order from Capt. John Hall for the cars for his new electric line, in Peoria, Ill., The new equipment will be right up to date, and the captain proposes to make people glad that the line, to secure which he has been fighting

several years, has at last been granted. Everything will be first class.

J. H. RANDALL, patentee and manufacturer of "Randall's Rack," reports a very large business, having recently received an order for the equipment of one hundred and fifteen racks for the United States Steam and Street Railway Advertising Co., for new cars, to be placed upon the West and North Chicago lines, besides many smaller orders.

THE JOHN STEPHENSON CO., LIM, are now making a shipment of a large number of open cars to Brazil. A particular feature of this order is the plan of having in the middle a space about square, in which baggage is to be carried, and at either end of which there are three seats. These cars are all taken apart and crated after being finished.

THE J. M. JONES SONS, at West Troy, N. Y., report their shops very full of work. Upon a recent visit to these works, our representative found them putting the finishing touches upon an order of sixty cars for the Minneapolis Street Railway Company, at Minneapolis, in addition to some already delivered there, and also getting out a large number of small orders.

THE HOPPE'S MANUFACTURING COMPANY of Springfield, Ohio, have just completed two steam feed water purifiers, which are among the largest ever built. They are of 1-horse-power capacity, each 68 inches in diameter and 26 feet long. They are to work in connection with the Babcock & Wilcox boilers of 2,000-horse-power, and are for the new electric light station in Louisville.

CALLING recently at the extensive Brownell Car Shops St. Louis, the writer saw an equipment of twenty-five combination cable cars, which are almost ready to deliver, for the North Chicago Cable Road, being similar in construction to those already built for the same line. The cars are very attractive, and no pains have been spared to make them comfortable, while the construction is of a high order.

THE BOSTON TROLLEY, which is manufactured by Albert and J. M. Anderson, at 21 Hamilton street, Boston, and of which the Electrical Supply Co. of Chicago are the western agents, is still meeting with the same success that has marked its use ever since it was brought out. The company have just issued a neat circular containing very complimentary letters from a large number of electric railways who speak very highly of it.

THE ELLIS CAR CO., of Amesbury, Mass., have applied for a patent to cover a new arrangement, whereby three of the seats in the centre of an open electric car can be removed in a few minutes, so the floor can be taken out for the purpose of making any needed repairs to the motors. This will be found to be of much advantage over the old plan, which necessitated the car being run over a pit before the motors could be reached.

A MECHANICAL regulating clutch, now used in an electric car of the Atlantic City Lines, is the manufacture of The Universal Electric Railway Construction Company, whose headquarters are at Room 47 Bullett Building, Philadelphia. It is officered as follows: A. O. Dayton, president; Edward Eldred, First vice-president; Samuel Anderson, second vice-president and W. C. McCurdy, secretary and treasurer. Both Mr. Dayton and Mr. Anderson are officers of the Pennsylvania Railroad. The object of this clutch is to prevent the burning out of armatures, especially in starting a car. The Pennsylvania Road which own the lines at Atlantic City have given an order for the equipment of a number of cars.

THE BALTIMORE CAR WHEEL Co. have brought out a most excellent electric motor truck, also equally well adapted to grip car services, designed to give an easy motion to the car, and relieve track wear. Under ordinary circumstances four end and four center springs carry the load; but in case of excessive loading or oscillation, the four springs on the axle boxes also come into service. The springs act from below as well as above, and thus counteract the bad effects of a car loaded heavily on one end and lighter at the other. The wheels can be removed in thirty minutes, and without disturbing any of the parts, and the whole forms a strong, effective and desirable truck.

THE CONTINENTAL ELECTRIC CONSTRUCTION COMPANY of Chicago, which was organized on April 1st last, with a capital stock of \$250,000, for the construction of electric railways, light and power plants, have made a splendid record in their construction work with the Beatrice, Neb., electric road. The line which is nearly two miles in length, was commenced on the 13th day of June, and was completed and in running order on the 27th, being just thirteen days. The electric equipment is that of the Baxter, both for overhead work and motors. The line has been operated without any delay whatever since it was opened. The office of the Continental Electric Construction Company is in the Chamber of Commerce Building, Chicago.

THE contract for the re-erection and equipment of the plant of the Reading, Pa., Electric Light and Power Company has been awarded to the Cuyahoga Falls Rivet and Machine Company, of Cuyahoga Falls, Ohio. Speaking of this order, the *Times* of that city takes occasion to add: "Mr. Babcock's established reputation as a mechanical engineer, together with that of his company for capacity and responsibility, afford a guarantee that when completed, the equipment of the Reading Electric Station will be what it is proposed to make it, one of the most perfect in the country. The motive power will be supplied by a 1,000 horse-power engine, furnished by the noted Hamilton Corliss Engine Company, of Hamilton, Ohio, than which no handsomer or more perfect stationary steam engine will be found in Reading or elsewhere."

R. D. NUTTALL COMPANY, Allegheny, have very largely increased the capacity of their plant. Among other improvements are ten new gear cutters for electric motor gears, which now makes an investment of \$50,000



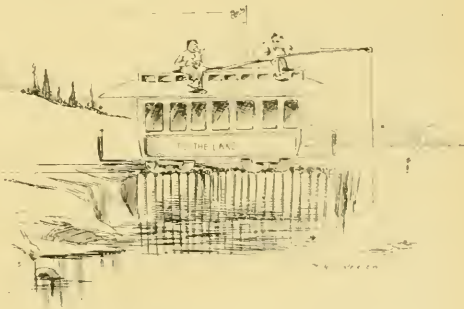
ORDER NO. 1—"Laying time at Lake 15 minutes."

which the company has invested in gear cutters alone. So large is their output in this direction that they consume the entire production of one tannery in the manu-



ORDER NO. 2—"Under no circumstances will conductors or drivers leave their car while at the lake."

facture of their rawhide pinions and gearing. During the past three months over 400 of the Nuttall Trolley springs have been sold, having been adopted among other well-known roads, by the Duquense Traction Co., and Second Avenue Railway Co., Pittsburg. The Electric



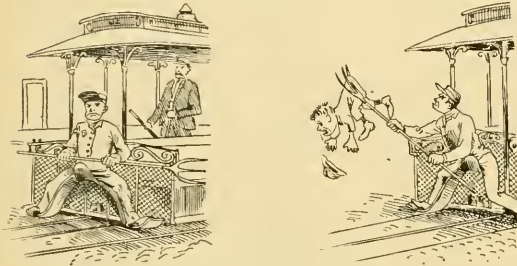
How the boys faithfully observed Orders No 1 and 2.

Railway Specialty Co., in New York, are their general selling agents, and who have opened a new office in Chicago, to take care of a very large and fast-increasing Western trade.

THE TRAMWAY RAIL COMPANY, Pittsburg, furnished the entire track equipment of the new electric line at Columbus, Md. The line is five miles in length, and is now operating five cars. Construction work was not finished so as to permit the running of cars until after midnight on the evening of July 3rd, but notwithstanding, the road was opened on the 4th, and carried 7,000 passengers without a single delay or hitch of any kind.

CALIFORNIA KID CATCHER.

THE San Francisco *Chronicle* has, after lying awake many weary nights, devised a life-saving device suited either to cable or electric cars. The kid



BEFORE AND AFTER TAKING.

catcher is stationed in front on a saddle, with a harpoon—which does the rest. Patent pending.

THE DETROIT ELECTRICAL WORKS have purchased sixteen acres in the city of Detroit, and will proceed at once with the erection of a machine shop, foundry, pattern shops, steam forges, laboratories and everything necessary for one of the most complete manufacturers of electrical supplies in the country. The buildings will cost \$250,000 and are to be ready by January 1st. The manufacture of the Rae system of electric motors will be a prominent feature in these works.

A NEW technical work has just been published simultaneously in London and New York, entitled "Preliminary Survey and Estimates." The author is Theodore Graham Gribble, who has been a recent contributor on rapid transit in New York and the viaduct system of Berlin, to this paper. The work is illustrated, contains 440 pages and represents a vast amount of painstaking study and compilation. It is most highly spoken of and should be in the hands of every engineer. Price, \$2.25.

CHAS. A. SCHIEREN & Co., whose belts are doing their share towards moving the wheels of commerce on so many electric lines, have just received an order for their Perforated Electric Belting for the Columbus Consolidated Street railway, of Columbus, Ohio. They will also furnish belting for the Worcester, Leicester & Spencer Street Railway. For Columbus there are six 13½ in. double belts, and for Worcester one 40 in. and five 12 in. belts. The small orders from old roads are numerous, many of which are trying this belt for the first time.

REED & MCKIBBEN, electrical engineers and contractors, at No. 2 Wall street, New York, have recently contracted for 16 miles of electric road at Allentown, Pa., 4 miles of which they have just completed. They also secured the contract for the entire construction and equipment of the 28 miles of road at Mobile, Ala. In granting the franchise the city council specified that construction work should be done by the above firm, both of these gentlemen having addressed that body several times in the interests of the street railway company.

IT requires push to make a wheelbarrow go, and "The Cleveland Wheelbarrow & Manufacturing Company," which has recently bought out the Cleveland Wheelbarrow & Truck Company, possesses that quality in a large degree. The new deal makes but one important change in management, namely, in the office of secretary and treasurer, the duties of which will now be performed by J. W. Hornsey. The products of this company cover a large range of contractors' and builders' supplies, and have assumed such proportions as to necessitate increased facilities which have just been added.

THE LEWIS & FOWLER GIRDER RAIL CO. have just secured an order from the Sixth Avenue Street Railway Co. of New York City for rail to relay their track from Bleeker to Fourteenth Sts. This is in a part of the city where the traffic from truck teams is very heavy, and speaks well for the rapid advancement this rail is making. They have also recently received orders from the Valley City Street and Cable Railway Co. at Grand Rapids, Mich., the Davenport and Rock Island Street Railway at Davenport, the Albany Street Railway Co. at Albany, N. Y., and a number of others.

THE COLUMBIA INCANDESCENT LAMP COMPANY, of St. Louis, are meeting with very flattering success. Their lamps are especially adapted to street car use. The following unsolicited letter throws additional light on the subject:

Office, Die Westliche Post, Westliche Post Association, Publishers.
ST. LOUIS, June 10th, 1891.

Columbia Incandescent Lamp Company.

GENTLEMEN:—After a very severe test accorded your lamps, we find them to be much more satisfactory than any that we have used from other companies. They last longer and give better light.

Very truly,
EDW. L. PRETORIUS, Business Manager.

THE WENSTRAM CONSOLIDATED DYNAMO AND MOTOR CO., of Baltimore, have just shipped the first of an order for motor cars to the Colorado Springs Rapid Transit Co., which runs from Colorado Springs to Manitou. Two motors of 30-horse power each were placed on each car. The cars and trucks were built by the J. G. Brill Company, the trucks being the heaviest ever yet built for street car service. The motor cars are 17 feet long, and contain a comfortable smoking apartment accommodating 12 persons, and the car complete weighs nine tons. It is intended to make 15 miles an hour, on a grade which for the most of the distance is 4 per cent and draw two trailers.

J. M. HARPER, of Peoria, Ill., has met with the most flattering success with his patent street railway tickets, which are bound in books of either 50 or 100 tickets as desired. They are so compact that they are a veritable "vest pocket series," and the important feature is that in tearing out one or more at a time it is impossible to disturb any more than intended. The book ticket has been on the market less than two years, but are now in use by nearly one hundred roads, among which are: Harrisburg, Pa., (3), San Jose, Cal., Scranton, Pa., (2), Brooklyn, N. Y., Peoria, Ill., (2), Birmingham, Ala., St. Paul, Salt Lake City (2), Ogden, Utah, Pittsburg (6), Seattle, Wash., Chatanooga, Tenn., (3), Rome, Ga., Springfield and St. Joe, Mo., and a large number of others. In all these cities the ticket has become extremely popular with both the public and the management, and everywhere a trial has been made their use has been made permanent. Strip tickets are also made by Mr. Harper for those who prefer that style.

SARGENT & LUNDY is the name of a new firm of consulting mechanical and electrical engineers, whose office is at 339 Rookery building, Chicago, and who are prepared to furnish plans and specifications and contract for complete installations in any kind of electrical work. Both gentlemen are wide and favorably known, having been in electrical work for many years. Mr. Sargent is now electrical engineer for the World's Fair, and has been connected with the E. P. Allis Company, of Milwaukee, Robert Wetherill & Co., Chester, Pa., and later as assistant to engineer-in-chief of the Edison General Electric Company, New York. Mr. Lundy is also an old soldier in electrical matters, having been prominently connected as an electrical engineer from the inauguration of the first electric railway at Richmond, Va., until now. He has been chief engineer with the Sprague Electrical Equipment Company, and also occupied the same position in the Southern District of the Edison General Electric Company. The combination is a very happy and unusually strong one, and is meeting with very gratifying success. The firm are also western agents of the McIntosh & Seymour engines.

AN ODE TO SPRING.

A man once rode on the Bushnell Spring
Although he did not know it,
But so soft and comfortable was the thing
He first would laugh and then he'd sing,
And thus came the "Spring poet."



But he must not be blamed, for if anything conduces to pleasant riding and a comfortable frame of mind growing out of a comfortable position of the body, it is the easy riding seats of a car equipped with the cushions and backs of the E. L. Bushnell Spring Company. The company is "limited" but their ability to furnish durable and even luxurious cushions is not, and the variety of styles are as numerous as spring bonnets on an Easter morning. The frames are of solid ash, and may be covered with any kind of carpet desired or the more expensive and attrac-

tive plush. This spring is in use on many of the largest steam roads in the country and in hundreds of street cars. It is used by a large number of car builders, including the Pullman and Wagner's, and for wearing qualities cannot be beat. Every dollar spent in making a street car attractive and comfortable will yield a good return in travel, for though patrons do not always realize it, they are influenced not a little by inducements of comfort and ease. The man who comes home at night tired from a hard day's work in office or store, will be much more likely to go out to call or to theater if he knows he can reach his destination while riding as comfortably as though he were reclining in an easy chair in his parlor. If he wants to ride on a board seat he can go out and sit on the front steps—they are just as hard: but he don't mind "riding on a rail" when he is separated from it by a good, thick, spring cushion.

This company has been a most prosperous enterprise and have only recently been obliged to add very considerably to their factory to accommodate a business that has steadily and rapidly increased from the outset.

ROBERT POOLE SONS CO.

THIS well-known concern, successors to Poole & Hunt, have completed a new machine shop at Newberry, Md., for the purpose of manufacturing heavy machinery, including heavy cut gears, etc., more especially for cable railway work. The shop in question represents the most advanced plans for handling heavy construction, and is practically the only one in the country of its kind. The machine shop is of a single story, the roof being surmounted by a monitor running the whole length of the shop. The sides of the monitor are of glass and increase the light in the centre of the building to a great degree. A heavy gallery is carried on each side of the shop out to the line of the monitor, leaving the middle of the shop unobstructed and with a clear height from floor to roof beams. The heavy tools which are among the largest of their several kinds are on each side of the shop underneath the galleries, and all the light tools are on the gallery floors. A traveling crane is traversed on tracks in the monitor roof and commands the entire space of the centre of the building, which is reserved for erecting purposes. Three motions of the traveling crane are separately controlled by electric motors.

The power house is at one side of the main shop and detached from it. The power plant in this power house consists of one 50 HP. and one 35 HP. Single-Acting Compound Engine, furnished by Westinghouse, Church, Kerr & Co. The 50 HP. engine belts directly to the line shaft on that side of the shop, and the 35 HP. drives the electric generators both for the motor work and the lighting. A third 50 H. P. engine is underneath the gallery on the opposite side of the shop for furnishing power to that side. Subdivided power was clearly indicated in this plant on account of the natural subdivision of the plant of tools involved in this method of construction, doing away entirely with the quarter turn belts and underground shafting otherwise required, and enabling parts of the shop to run overtime to the best advantage.

PERSONALS.

O. W. MEYSENBURG, of this city, is in Europe.

THOMAS JOHNSON has just returned from a short season in Europe.

J. J. NASH, superintendent of cables, Denver Cable Railway Company, called when in the city a few days since.

GEORGE A. MURCH assumed, on July 1st, his duties as superintendent of the Worcester, Leicester & Spencer Electric Railway.

BEN D. GILMAN has been appointed general superintendent and J. D. Funk assistant of the Consolidated Company, of Louisville, Ky.

CLIFFORD L. PULLEN, who has been representing A. Whitney & Sons, Philadelphia, for some time as traveling agent, severed his connection with that firm on July 1.

WM. E. RICE has been elected president of the Washburn & Moen Manufacturing Co., to fill the vacancy caused by the death of P. L. Moen, and P. W. Moen has been elected treasurer of that company.

JOHN H. MOFFITT has been appointed general manager of the Peoples' Railway Company of Syracuse, N. Y. This road also operates a large number of pleasure boats and two excursion steamers on the lake.

W. J. CLARK, of the Boston office of the Thomson-Houston Company, stopped for a few days at Chicago recently, on his return from California, where he secured the contract for the San Francisco & San Mateo Road.

F. T. McMAHON, V. S., who conducts the veterinary department of this paper, and who is veterinary for the Chicago City Railway Company, has just been appointed city veterinary for Chicago, a position for which he is abundantly qualified.

JOHN STEPHENSON is nothing if not patriotic, and for eighty-two years past has regularly celebrated the Fourth of July by having a birthday on that occasion. For the first time since his recent illness he was able to come down stairs to dine on that day.

JOSEPH EBBSMITH is the new name which royal authority has granted permission to be hereafter used by Joseph Smith, who is president of the Birmingham Tramways system, and who is also general manager for the Sprague Electric Julian Accumulator System.

A. S. CHASE has resigned the presidency of the Duluth Electric Company and has been succeeded by G. G. Hartly. Both these gentlemen will be very pleasantly remembered by the members of the party to whom they showed so many favors on the occasion of the visit to that city of the large delegation of the American Street Railway Association during the convention at Minneapolis.

FRANK X. CICOTT has returned from his European trip and reports the outlook in electrical lines highly encouraging, not only in England but on the continent. The public are beginning to awaken to the necessity of rapid transit, and this with the high price of provender and the inability to renew expiring franchises of lines hitherto operated by steam motors, combine to create a demand for electricity.

WILLIAM SUTTON has sold out his entire interest in the Laclède Car Company of St. Louis, of which he has been for some time past the president, and duly celebrated the glorious Fourth by sailing that day for Europe on the Servia. He intends to make the trip combine both pleasure and business. On his return he will announce plans now almost completed and which will still keep him in the street railway fold.

D. ATWOOD became superintendent of the Galveston, Texas, City Railway on July 1st. He has been actively engaged in street railway work for twenty-seven years, having served seven years as superintendent of the street railway in Minneapolis and afterwards for the same time in Milwaukee. He succeeds W. A. Perratt, who resigned to engage in business for himself, and to whom the employes were much attached.

ARTHUR LEITCHFORD, who has for a long time been prominently connected as secretary and treasurer of the Rochester, New York, Street Railway, has resigned on account of ill health, and will probably take a European trip. On his return he will devote his time to the management of the Central Bank, in which he is largely interested. He has also resigned his position as director of the Buffalo Railway Company, the Rochester Electric Railway, and in all five street railway interests in which he was director.

FIGURES may not lie, but *Truth* departs from its good name when it says: "The cable road on Broadway means collisions, runaways and accidents of all sorts until the horses become accustomed to it and the car drivers learn their business."

A cable car is far more tractable than a team of horses, and a man who cannot drive a horse car can learn in a few days to control the movements of a grip car.

EMPLOYEES in street railway service often think they are held to a more strict account than on railroad lines, but the following recent general order to the employes of the Lake Shore, covers their actions while off duty as well: "No person will be retained in the service of this company who is known to go into a saloon or place of bad resort, or who is known to use intoxicating liquors. Every person in charge of employes is hereby directed to dismiss from the service any who are guilty of these practices, as they will themselves be held personally responsible for having such men in their employ, for such are certain, sooner or later, to cause injury to lives and property. All employes are hereby warned."

American Street Railway Association.

HENRY M. WATSON, President, Buffalo, N. Y.
 W. A. SMITH, First Vice-President, Omaha, Neb.
 CHARLES ODELL, Second Vice-President, Newburyport, Mass.
 A. D. RODGERS, Third Vice-President, Columbus, Ohio.
 WM. J. RICHARDSON, Secretary and Treasurer, Brooklyn, N. Y.
 EXECUTIVE COMMITTEE—THE PRESIDENT, VICE-PRESIDENTS, and THOMAS LOWRY, Minneapolis, Minn.; D. P. HENRY, Pittsburgh, Pa.; ALBERT E. THORNTON, Atlanta, Ga.; H. M. LATTELL, Cincinnati, O. and THOMAS C. KLEPPER, Ogawa, Cal.

Next meeting will be held in Pittsburg, Pa., October 21st, 1891.

Massachusetts Street Railway Association.

President, CHAS. B. PRATT, Salem; Vice-Presidents, H. M. WHITNEY, Boston, AMOS F. BREED, Lynn, FRANK S. STEVENS; Secretary and Treasurer, J. H. EATON, Lawrence.

Meets first Wednesday of each month.

New York Street Railway Association.

President, DANIEL F. LEWIS, Brooklyn; Vice Presidents, JNO. N. BECKLEY Rochester, JOHN S. FOSTER, New York; Secretary and Treasurer, WILLIAM J. RICHARDSON, Brooklyn; Executive Committee, JOHN N. PARTRIDGE, Brooklyn; CHARLES CLEMENSHAW, Troy; C. DENSMORE WYMAN, New York.

Next meeting, Hotel Metropole, New York City, Sept. 15th, 1891.

Ohio State Tramway Association.

JOHN N. STEWART, Ashtabula, President; JOHN HARRIS, Cincinnati, Vice President; J. B. HANNA, Cleveland, Secretary and Treasurer; E. K. STEWART, Columbus, Chairman Executive Committee.

The Street Railway Association of the State of New Jersey.

President, JOHN H. BOSS, Hoboken; Vice President, THOS. C. BARR, Newark; Secretary and Treasurer, CHARLES Y. BAYFORD, Trenton; Executive Committee OFFICERS and C. B. THURSTON, Jersey City; H. ROMAINE, Patterson; LEWIS PERLINE, Jr., Trenton.

ALABAMA.

ANNISTON.—The recent president of the street railway company, Major J. W. Bigsby, has skipped. He built the line on borrowed money, and incurred debts with all the leading merchants in this city. His departure has created no small surprise.

CAPT. SAVAGE will build an electric line to the lake to connect with the Anniston City Railway Line.

SELMA.—There is a good prospect that the negotiations now pending between capitalists in New England and parties in this city, will result in the establishment of an extensive plant for the manufacture of freight and street cars here. It is proposed to commence operations with a paid up capital of \$100,000.

ARKANSAS.

EUREKA SPRINGS.—A company has been incorporated here to furnish electric light and power and operate a street railway.

CALIFORNIA.

AUBURN.—It is proposed to build an electric line here to be operated by water power.

OAKLAND.—Henry Ramsey died recently as the result of over work in placing the electric machinery for the Oakland & Berkeley Rapid Transit Company. His death occurred from brain fever.

The San Francisco Tool Company, have taken the contract for building the extension of the Consolidated Piedmont Cable Road to West Oakland.

The electric line to Haywards now depends upon a bonus of \$10,000 to be raised in this city. The prospect is good that the money will be forthcoming. The road will be 14 miles in length.

REDWOOD CITY.—A franchise has been granted Behrend Joost & J. W. Hartzell for an electric road to Baden. \$50,000 worth of work is to be done the first year, and cars to be running within three years. Fare from this place to San Francisco not to exceed 20 cents, and cars to be run every half hour.

SANTA CRUZ.—The obstacles which have heretofore prevented the completion of the electric road have been removed, and contracts for the construction of road and cars have been let. The line will be 8 miles in length.

SACRAMENTO.—The success of the electric railway here has been so great that residents on a number of streets are petitioning for extensions in various parts of the city.

SAN DIEGO.—The cable railway celebrated the first anniversary of the road by a special entertainment which was largely attended. So far not a single accident has occurred in the operation of the road.

SAN FRANCISCO.—The construction work on the San Francisco & San Mateo Electric Railway, is being prosecuted both night and day, and the excavation work accomplished by a powerful steam plow of 40-horse power, which excavates to a depth of ten inches. Horses were tried but were unable to accomplish anything.

THE Market Street Cable Road have made a radical change and extended the terminus at the end of Market street. Increased facilities are instituted, more powerful machinery and heavier cables, including a twenty ton steel shaft.

SAN JOSE.—W. J. Hartsell has made application for a franchise for an electric road across this county.

CANADA.

OTTAWA.—On June 29th the Ottawa electric railway was opened in the presence of a large number of invited guests, including the members of the Dominion Parliament and other government officials.

TORONTO.—The city still runs the street railway, and the bidders are still in uncertainty as to who, if any, will be successful.

COLORADO.

ASPEN.—The City Railway has leased its plants to F. J. Flynn, who assumed charge July 1st.

DENVER.—The Denver Tramway Company have purchased the tracks, right of way, plant, and a number of valuable franchises not yet built, of the Suburban Railway Company. The consideration is understood to be \$100,000. This will greatly strengthen the territory of the Tramway Company.

PUEBLO.—A runaway car filled with passengers had a narrow escape from going over the viaduct, which it would have done but for a small brick building into which the car ran, completely demolishing it.

DISTRICT OF COLUMBIA.

WASHINGTON.—Night cars have been withdrawn from the Washington & Georgetown Railway on account of want of passengers.

GEORGIA.

AMERICUS.—The street railway has been sold by the receiver and bought by Thomas J. Kenny, of Boston, representing the bond holders. It brought \$35,000. Just what the outcome will be is not yet determined.

SAVANNAH.—The Savannah City & Rural Resort Railway Company filed a mortgage for \$250,000 to raise funds to equip and improve the Belt Line.

IDAHO.

BOISE CITY.—Work on the electric railway is progressing rapidly. Power will be furnished by a water wheel formerly used to drive a mill. The road will be in operation in a few days.

ILLINOIS.

AURORA.—The Electric Railway gave an exhibition of fire works at the terminus of one of their routes on the evening of July 4th, which was the finest ever brought to the city. An expert from the factory accompanied them.

CHICAGO.—The Morgan Park & Pullman Electric Railway has been incorporated for \$25,000.

THE Cicero & Proviso Electric Company have secured right of way and are building a branch on West Twelfth street and another on West Forty-eighth street.

THE South Side Alley Road is having a list of property owners prepared along their proposed route south of Thirty-ninth street and an omnibus suit will be brought against these owners, thus saving a vast amount of time.

ANOTHER elevated road has been incorporated to build on the North Side with a capital stock of \$10,000,000.

A FRANCHISE for extensive electric lines in the Calumet district, to be built by the Calumet Electric Street Railway have been petitioned for. The promoters are N. K. Fairbanks, S. E. Gross, Col. Jacobs, J. D. Harvey and the Calumet Canal & Improvement Company.

THE rights which had been secured by the Northwest Chicago Electric Road have been sold to the Cicero & Proviso Electric Company, who will build upon it at an early date.

DANVILLE.—Additional franchises have been granted for electric lines to the old company, and also the new road, which is represented by James R. Kendall, William Beckwith and others.

JOLIET.—On July 3d, the electric line to Lockport was opened.

LASALLE.—On July 1st, the LaSalle and Peru Electric Railways were merged into one organization and will be managed by E. S. Enyart. The new officers are W. G. Reeve, president; F. X. Killduff, secretary; L. B. Merrifield, treasurer and E. S. Enyart, superintendent. Work is being crowded on the new lines and the power is being doubled. The new arrangement is entire satisfaction to every one.

MATTOON.—The Mattoon & Charleston Electric Street Railway project is being vigorously pushed and has every prospect of going through.

INDIANA.

ANDERSON.—General Newcomer of New York, representing eastern capitalists, is negotiating for the purchase of the railway here, and asks an extension in franchise of twelve years. They propose to expend \$125,000 in an electric system and to extend the tracks four miles.

THE Anderson Electric Street Railway, has been organized with a capital stock of \$200,000 and C. L. Henry, president, and J. C. Morgan, secretary. It is hoped to have the road in operation by September 1st.

INDIANAPOLIS.—The Citizens' Railway Company have let a contract for motor cars to equip the College Avenue Line, track for which is now being laid, and have filed a mortgage with the Illinois Trust & Savings Bank of Chicago, to secure a loan of \$500,000, to be used in new construction work.

LA PORTE.—A franchise has been granted for a projected electric car line between La Porte and Michigan City, similar to the one between Mishawaka and South Bend. Our irrepresible friend and former fellow citizen, Jerry Knight, is in the deal. A similar line is also talked of between Elkhart and Goshen.

MICHIGAN CITY.—The Citizens' Street Railway of this city, has been purchased by Chicago men, and will be changed from animal power to electricity.

NEW ALBANY.—The street railway have completed their amusement hall and park and are having a large excursion travel.

SEYMOUR.—The Steam Dummy Line built by home capital and operated on the principal streets of this place, has just been completed.

IOWA.

DAVENPORT.—The Davenport Electric Railway have petitioned the city council for permission to pipe the streets for the purpose of supplying steam for heating purposes in the business portion of the city, with the intention of extending it later into the residence district.

DUBUQUE.—President Rhombert, of storage battery fame, has surveyed a line to Lake View, which is quite a popular summer resort, and has asked for franchises for tracks to that point.

FORT DODGE.—A company has been organized to build an electric railway. Both local and outside capital is interested.

SIoux CITY.—All the property of the Sioux City Electric Railway has been transferred to the Sioux City Street Railway.

KANSAS.

KANSAS CITY.—The Quindalo Circle Railway Company has been chartered with a capital stock of \$50,000, to build a line to Quindalo Park.

LOUISIANA.

LAKE CHARLES.—The Lake Charles Street Railway has been incorporated and has secured a franchise for fifty years over any street in the city, and will proceed in the near future to construct the road.

MAINE.

PORTLAND.—The Deering Street Electric Line was opened a few days since and everybody treated to a free ride.

MARYLAND.

ANNAPOLIS.—Rights have been granted the Edison Electric Light Company for ten years to construct an electric railway.

BALTIMORE.—W. Bowie is experimenting with a new motor, which it is said can be operated for one dollar a day.

MASSACHUSETTS.

BEVERLY.—The Beverly & Danvers Road has been turned over to the employes until fall to run for what they can get out of it.

BOSTON.—The Railroad Commission have granted the petition of the West End road to issue \$4,500,000 additional capital stock.

GEORGE WRIGHT, a prominent engineer of this city, who has been connected with the Boston Water Works, has been offered the position of expert engineer of the Rapid Transit Commission, with a salary of \$8,000 per year.

THE suit in the United States Circuit Court, Massachusetts, in which the West End Street Railway is sued by the Sprague Electric Railway & Motor Company and the Edison General Electric Company, for alleged infringement of patents will be watched with a great deal of interest.

FALL RIVER.—Surveyors are at work on the route of a proposed electric freight railway.

MEXICO.

CITY OF MEXICO.—No reply has yet been made by the Federal District Street Railway Company to the offer

of an American Company to buy out the whole concern. Mr. Francisco de Castillo, the general manager of the street cars, himself says this is the status of matter just now; the shareholders have not taken any resolution in the matter.

MICHIGAN.

DETROIT.—The employes of the Fort Wayne & Elmwood Company, petitioned for an increase in wages and a reduction in time, which the company have granted. Conductor's pay will be 18 cents, and driver's 17 cents an hour. Barn hostlers \$1.50 per day, and drivers of one-horse cars will receive conductor's wages. Ten hours constitute a day's work for conductors and drivers, to be completed within twelve hours.

The Michigan Avenue Line is being extended to Livernois avenue, which will be a great convenience to west siders.

FENTON.—The street railway line to the lake has been completed and is now in operation.

GRAND RAPIDS.—Superintendent Campbell has sued the editors of the *Morning Press* for \$10,000 damages for statements made by them during a recent strike.

For the past two years there has been a local fight as to the rights of one street car company to put its rails by the side of those of a rival company in the manner that is known as straddling the tracks of the other company. The courts have now ruled that this cannot be done for any considerable distance, and that the rights of the initial company must be protected.

MINNESOTA.

DULUTH.—A two-fifths interest in the Duluth Street Railway has been sold by A. S. Chase and Thomas B. Wilson. Mr. Chase will soon retire from active management of the road.

COLONEL GEGGIE has resigned the management of the Motor Line Improvement Company. L. Mendenhall has been elected secretary and treasurer and will also act as manager.

THE Incline Cable Road which has been talked of for the past three years is now a certainty, and in all probability will be in operation by September 1st. A considerable amount of the structural iron has been received and a large amount of the foundations completed. The power house will be erected at the top of the incline and will be entirely of iron. This will open up for settlement a large district which has hitherto been practically inaccessible. The rise is a very long and heavy grade.

MINNEAPOLIS.—The contract between the Postal Department and the Street Railway Company whereby mail carriers were allowed the privilege of riding on the street cars as often as they wished at the rate of \$2.10 per month per carrier, has expired and the company refuse to renew it, but offer to make a three cent rate to letter carriers on duty.

THE pavilion at Lake Harriet, owned by the Street Railway Company, and which cost \$15,000, has been destroyed by fire. It will be rebuilt at once.

ST. PAUL.—The magnificent brick stack of the electric power plant of the street railway, on Hill Street, and which is 200 feet in height and 14 feet wide at the base sways fully twelve inches in a high wind. It cost \$20,000.

STILLWATER.—A plan is now on foot to construct a dam at Apple River Falls, nine miles from this city, for the purpose of operating an electric railway and other power motors.

WINONA.—The City Railway of this city has now passed into the hands of E. R. Gilman, of St. Paul. Injunction suits have been discontinued and immediate steps will be taken to put in an electric plant.

MISSOURI.

KANSAS CITY.—An electric railway will be constructed along Wyandotte and Seventeenth Streets. It will be double tracked and will involve an expenditure of \$300,000.

A STRIKE was attempted by the drivers on the Kansas City Cable Line, but was a signal failure, as applications for employment ran into the hundreds and the road did not lose a trip.

It is rumored that the L road will lease to a syndicate their tracks from the Union Depot to the Riverside Station, and operate an electric line over it. If this goes into effect the elevated trains will not run east of Riverview and will exchange transfers with the electric line.

SPRINGFIELD.—The electric line has increased its power to 320 H. P.

MONTANA.

BUTTE.—George Gabriel has resigned as superintendent of the Butte Electric Railway to accept a similar position in Tacoma. Probably another trump for Tacoma.

A RECENT storm washed out four hundred feet of track of the Butte City Railway Company.

HELENA.—Receiver Clark has been authorized by the United States Court to sell the Steam Motor Line and equip it with electric power.

NEBRASKA.

BENNETT.—It is proposed to raise sufficient capital to secure an extension of the Lincoln Electric Railway to this place.

EAST OMAHA. On July 1st the East Omaha Motor Line was inaugurated with fitting ceremonies. Cars will operate at intervals of fifteen minutes, and are run in trains of two cars each, the motor cars having an equipment of forty H. P. Power is furnished for the present by the Omaha Street Railway.

OMAHA.—The management of the electric motor line are giving Sunday afternoon band concerts in Fairmont Park, which attract large crowds.

W. H. HOLCOLMB, late vice-president of the Union Pacific Railway, is largely interested in electric railways in Portland, Oregon, and J. S. Cameron, who was chief of construction under Mr. Holcolmb, is a heavy stock holder in electric roads in Salt Lake City, and will make his home there in the future.

PLATTSMOUTH.—The motor line has been repaired, and for the first time in nearly a year cars are running. It is now probable the local company will accept the plant.

NEW JERSEY.

ASBURY PARK.—The power station of the East Shore Electric Railway containing sixteen dynamos and eight engines was destroyed by fire, entailing a loss of \$50,000.

JERSEY CITY.—In the Justice Court here it was ruled that a conductor had no right to eject a passenger because he refused to pay fare, and that if he did so he would be guilty of assault and battery in so doing. It is very doubtful if this opinion would hold in the higher courts.

NEWARK.—W. H. Harman, contracting foreman on the Newark Passenger Railway succumbed to the heat and while in an unconscious condition was robbed of a satchel containing \$840, with which he was paying off employees.

PATTERSON.—The lines are controlled by Pittsburgh capitalists who have decided to convert the road into an electric system, and anticipate the change will cost \$350,000.

NEW HAMPSHIRE.

DOVER.—The Union Street Railway will extend its tracks to Dover Point to connect with a line of steamboats for Isle of Shoals and other points.

NEW MEXICO.

ALBUQUERQUE.—Contract has been let for building the first mile section of the electric road. It must be completed within one year.

NEW YORK.

AMSTERDAM.—Permission has been granted for changing the motive power of the street railway from horse to electricity.

BUFFALO.—One year ago the residents of Niagara were industriously fighting the proposed introduction of the trolley system. On July 1st the trial trip was made with both sides of the street lined with enthusiastic residents to celebrate the occasion with cheers and fire works. President Watson and General Manager Littel with other railway officials and members of the city council, occupied the cars of the first train. The line has worked perfectly ever since and is immensely popular. The two-mile run was made in eight minutes.

GLENN FALLS.—Cars are now running on the electric line to Sandy Hill.

LOCKPORT.—Nearly all of the right of way has been obtained from here to Rochester. It is estimated it will cost \$500,000 to construct the road, and arrangements are now being made to enter the city of Rochester over the lines of the Rochester Railway Company.

NEW YORK CITY.—Cable cars will be run all night on the Brooklyn Bridge in response to a general demand for the same.

OHIO.

CINCINNATI.—It is proposed to build an electric extension to the Mt. Auburn Road, and have the same in operation this year. The necessary signatures have been secured, and the line will undoubtedly be built.

CLEVELAND.—The courts decided that the Cleveland City Cable Company cannot be allowed to enter Wade Park as they proposed to do, over a bridge several hundred feet in length which they offered to construct. This is another instance where the letter of the law is stronger than its spirit, and the masses of the people who would be the most benefited by the privileges are the chief sufferers.

FINDLAY.—The electric railway is now in operation and is one of the finest in the country. President Geo B. Kerper of Cincinnati has spared no expense, and everything is of the very latest and most improved style. The line was opened on June 25th with appropriate ceremonies which concluded with a banquet.

NILES.—A franchise has been granted Al Johnson to construct a single track electric railway through this place. It is a part of the proposed road from Warren to Mineral Ridge, a distance of eight miles.

TOLEDO.—The Robinson lines have placed on sale six tickets for twenty-five cents.

H. S. WALBRIDGE is securing a right of way for an electric line from the City Park to the business centre. It is rumored eastern capitalists are back of the scheme.

TRUMBULL.—The Trumbull Electric Railway Company has been incorporated with a capital stock of \$150,000.

PENNSYLVANIA.

ELMTOWN.—On July 1st, the electric line was opened, and the old horse cars have been entirely withdrawn. The extension to Bethlehem is progressing rapidly.

HARRISBURG.—Work on the lines of the passenger railway is nearing completion and the road will be in operation within a few days. The J. G. Brill Company have furnished the cars.

LANCASTER.—The Electric Railway have leased ten acres of ground and are constructing a pavilion and other

means of amusement, and will put in a large organ to be operated by electricity.

PITTSBURGH.—Suit has been instituted in the United States District Court by the Short Electric Railway Co. of Cleveland, against the Westinghouse Electric Manufacturing Co. of Pittsburgh, in which the latter is charged with infringement of patents relating to gearless electric motors.

POTTSVILLE.—In excavating for the electric line, laborers unearthed at a depth of five feet a lot of wood sills, which had been buried for fully fifty years. They were formerly part of a small tram line running to the mines.

READING.—By a vote of four to nineteen the quarter council defeated the ordinance for overhead wires of the Reading City Passenger Railway.

SOUTH CAROLINA.

CHARLESTON.—An employe named John Black, who has been connected with the street railway here for a great many years, was killed a few days since while alighting from a passenger coach of a steam road, as he was helping his daughter on the car.

GAFFREY.—A line has been surveyed here to the Lime Works, a distance of two miles, and both passengers and lime will be hauled.

SPARTANBURG.—Colonel Leftwich had a close call with his road the other day, as only a few hours remained in which to lay a half-mile of road which would have expired by limitation. The colonel was not left, however, for he finished a half-mile by laying pine scantling instead of rail, and with a twelve-foot car borrowed from a neighboring town, got it over the road, and thus inaugurated the system.

SOUTH DAKOTA.

WATERTOWN.—As a part of the purchase for \$250,000 of 6,000 acres of land by an eastern syndicate is the Nampeska & Watertown motor line, and the franchises for the street railway.

YANKTON.—A syndicate headed by Commodore W. J. Kountz, of Pittsburgh, will commence at once the construction of an electric line here.

TENNESSEE.

ARLINGTON.—The contract has been let for the extension of the electric line from Knoxville to this place. The citizens are raising \$8,000 towards the enterprise.

NASHVILLE.—The Nashville Electric Railway was opened June 20th, and has provided an elegant waiting-room at the down-town terminus.

NORTH KNOXVILLE.—Work will commence at once on the Broadway electric extension, which will be a little more than one mile, and when completed will afford the most delightful ride in the city.

TEXAS.

AUSTIN.—The City Street Railway Company and the Rapid Transit Company of Austin have come to an agreement as to extensions of their respective lines, and have petitioned the territory to be covered so as to prevent competition. The city company will at once change to the electric system, and its first extension will be to the new city cemetery.

UTAH.

SALT LAKE CITY.—The West Side Rapid Transit Company contemplate replacing their steam dummies with the storage battery system; there being considerable objection to the operation of the dummies within the city limits.

VIRGINIA.

NORFOLK.—The City and Suburban Railway and Improvement Co. has been placed in the hands of a receiver, Capt. James W. McCarrick, who has given a bond of \$5,000 and has full authority to continue its operation.

RICHMOND.—The separate street car problem for the exclusive use of white and colored people is causing considerable discussion here.

WASHINGTON.

ABERDEEN.—This place will soon connect with Hoquiam by an electric line, for which the Pacific Wheelless Co. have obtained franchise, and filed bonds in the amount of \$5,000 to complete the same.

SEATTLE.—J. T. Edmiston is desirous of building a street railway.

SPOKANE.—The Spokane and Granite Lake Rapid Transit Co. are considering the construction of an electric line between this place, Cheney and Medical Lake, to be operated by water power at the foot of Silver Lake.

TUMWATER.—A franchise has been granted the Olympia, Tumwater and Brighton Park Railway for an electric line between the two first named cities.

WEST VIRGINIA.

WHEELING.—The subject of placing letter boxes is being discussed, and is very much desired by patrons of the line.

WISCONSIN.

ASHLAND.—Plans are being completed for the construction of a new electric line here, in which eastern capitalists are interested.

MADISON.—It is proposed to dispense with horses in the operation of the street railway here, and substitute instead the Brayton Oil Motor, which operates without any noise or smell, and it is said is very economical.

MILWAUKEE.—A pair of mules drawing a Russell avenue street car balked while crossing a steam railway track and the passengers barely had time to escape before the car was smashed to splinters. Of course the mules were uninjured.

PEOPLE who "are not in it" may laugh, but one of these days when they want to come in on the ground floor, and it is too late, Mr. Keeley will laugh them to scorn. We are not informed, however, that the new motor is exclusively for street railway use. Here is his own simple description of it—just listen at this: "I am making a sympathetic harness for the polar terrestrial force—first, by exciting the sympathetic concordant force that exists in the corpuscular interstitial domain, which is concordant to it; and, second, after the concordant is established, by negatizing the thirds, sixths and ninths of this concordance, thereby inducing high velocities with great power by intermittent negation, as associated with the dominant thirds."

AN electric tramway, the first for this purpose in Canada, will be put in the new Vancouver coal mines at Nanaimo. The plant, of which the first instalment will cost \$20,000, consists of an 80-horse-power generator, and two 30-horse-power electric locomotives, each of which will haul at a speed of 9 miles an hour, 150 loaded coal cars. Besides the electric tramway, other generators will be used to furnish a current for lights in the mines, 600 of which will be used. The same current will also be employed in working electric coal drills and cutters.

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CORRESPONDENCE.

We cordially invite correspondence on all subjects of interest to those engaged in any branch of Street Railway work, and will gratefully appreciate any marked copies of papers or news items our street railway friends may send us, pertaining either to companies or officers. Address:

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AMERICAN STREET RAILWAY ASSOCIATION.

Pittsburg, October 21, 22 and 23.

PAPERS.

"A Perfect Electric Motor."

H. A. Everett, Secretary East Cleveland R. R. Co.

"A Year's Progress of Cable Motive Power."

J. C. Robinson, formerly Vice President Los Angeles Cable Railway.

"Public and State Treatment of Corporations."—No. 3.

G. Hilton Scribner, President Central Park, North and East River R. R.

"The Dependent—Overhead or Underground—System of Electric Motive Power."

Geo. W. Mansfield, Director, Attleboro, Mass.

"The Independent—Storage or Primary Battery—System of Electric Motive Power."

Knight Nefel, Electrician, Lancaster City Ry.

THE sale of the Detroit City Railway for \$5,000,000, is one of the largest transfers in a long time. An Eastern syndicate are the buyers, and will put in electric.

AS we go to press settlement has not been fully made in the Toronto Street Railway case. The Keily-Everett syndicate have complied with all the requirements, and it only wants the Mayor's signature to close the contract and deliver the lines to them.

OUT at Seattle recently an old bear and two cubs wandered into town and meandered down the cable tracks, until chased away by one of the cars. One shareholder became alarmed when the trio made tracks toward a new suburb for fear an attempt was in prospect to bear the stock.

SPECIAL facilities are promised the supply men at convention to accommodate what will undoubtedly be the largest exhibit of street railway appliances ever gathered in the world. The display is highly interesting and alone worth a trip to Pittsburg. The Association is yearly under many obligations to the various manufacturers and dealers for the enterprise displayed by them.

TWO strikes have occurred during the past month, one at Toledo and the other at Newark. At the former the question was that of hours and wages, and the latter that of making a deposit coupled with the discharge of a few old men. In neither case was any damage to property effected, the loss being wholly that of decreased revenue while cars were stopped. Toledo was settled by arbitration; at Newark the manager and men settled it without outside assistance.

THE franchise of a road out in Washington contains an evidently well-meant clause, which provides that "any person willfully destroying said railway shall be punished by a fine not exceeding \$100." In cases of small damage to tracks this would be sufficient, but it also permits the entire destruction of the line at the same priced fine, if only the destructionists are quick enough in their work; and any wooden headed citizen whose objection to the road might be worth \$100 could roll the track up and throw it in the river. Frequently small and unnoticed passages in ordinances turn out to be the body end of the dog.

WALSALL, England, is in a fair way to have an overhead system electric road. The authorities recently sent an expert to this country to investigate the workings of the system in America, and his report recently made was deemed so satisfactory that the council committee, by a vote of fifteen to five, recommended the passage of the necessary measure. One of the objectors was unwilling to make the "experiment" in Walsall, but would be glad to see it tried in other cities. If the road is built, as indications now point, that man will want to stand beside the driver and ring the gong on the opening trip, as he proudly smiles and murmurs, "I told you so all the time."

IN securing new franchises, and in the renewal of old ones, care should be taken to have incorporated all necessary authority from the city, to permit companies to operate a parcel express service and funeral cars. Some roads already possess a franchise sufficiently liberal in character to permit of this, but many do not. Even with city authority many roads cannot so operate under their present charter, and incorporators of new companies will do well to guard these points when making application; for in the near future this branch of street railway business promises to be a most important one. There ought not to be the slightest difficulty in securing these concessions, as the service is of very great advantage to the public.

BOSTON has added to its anxieties by the appointment of a Rapid Transit Commission. The plan was for several members to go abroad to study the rapid transit methods of the slow going lines of the old world. When the appropriation for traveling expenses was cut down from \$15,000 to \$2,500 the commissioners felt like putting on their sack-cloths. John E. Fitzgerald, however, got an early start and with his bride will wander over Switzerland, his native heath, in search of rapid transit. When American engineers cannot tackle the needs of American cities and work out the problem on our own soil, it is something of a comment on American ability. There are but two really rapid transit systems in Europe which differ from methods already in use here. They are the viaduct system of Berlin—which would never be adapted to Boston—and the city and South London underground electric, which is nothing more than an electric line operating in a deep tunnel. The Metropolitan of London—underground steam cars—would never answer in this country, although similar tunnels of considerable length are used by steam roads in several cities here. Where the surface lines of electric and cable systems prove inadequate to the necessities of travel, an elevated electric line will be found to better meet the popular demand than any other. There has been a good deal of sentiment advertised about the glories of riding through a hole in the ground, and of course it is only a question of expense as to the construction of any number of such roads, but where it is possible to build an elevated structure, of the two we believe it will prove much more profitable and satisfactory, and certainly less expensive.

ONLY nine weeks until convention. We cannot refrain from thus early urging the street railway managers of the country to make a special effort this year to attend. It is extremely difficult for many officers to be away from their duties even for the few days during which the convention holds, but no ordinary matters of routine should be allowed to prevent their leaving. It is a duty which the officer owes his company to mingle with other members of the fraternity and give and receive experiences of practical methods; and it is equally as incumbent on the companies to send their representatives. A company cannot invest in any other way so small an amount as the necessary expenses of their delegates, that will yield anything like the returns. It is not a donation to the hard worked manager, it is an expenditure the company cannot afford not to make. Some may say they can read the proceedings when published. This is good as far as it goes, but no book could ever contain the information to be gained and the practical ideas suggested at this meeting. Its benefits extend throughout the year, and he who misses one can never make good his loss.

Some associations have decended to the level of a mere pleasure trip, but be it said to the credit of the American Street Railway Association, its sessions are busy ones, and the same methodical, active characteristics of its delegates are reproduced in the workings of the organization, which is one of the largest representations of capital

in the world. The hours of day and evening sessions devoted to work, and the comparatively little time given to recreation has always evoked surprise in every city where the gatherings have been held.

As the membership of the Association is composed of railway companies, it is to be hoped that those not belonging will send delegates to Pittsburg, and enter their names. The annual dues are nominal and within the reach of every company in the land, while the benefits are manifold.

The attendance this year will exceed any of previous years: the city selected is admirably fitted to demonstrate the respective merits of electric, cable and animal systems; and the papers are all on timely, practical subjects, of vital interest. There will also be a large attendance of ladies whose presence has added so much in former years.

IN this issue is discussed in detail the subject of funeral street cars. Some people will doubtless at first mention, pronounce the plan at once impracticable and monstrous. The funeral street car, however, is neither. Where rapid transit is used, and even on very many lines operated by animal power, the local connection between cemeteries and vast residence districts is such as to afford every facility for the passage of street cars between the two. For years there was no other means of reaching cemeteries than in carriages, but now such conditions are changed there is no more virtue and respect in continuing that custom than there would be in perpetuating many semi-barbarities once considered indispensable to Christian burial. It is a senseless practice and in many cases positive wicked to incur the expense which people seem to think modern funerals require.

Those who most need the relief thus to be offered doubtless would be restrained at first by a false pride, stronger on this point than all others combined, although it is not to be denied that the endeavor to give the departed one "a good burial" in too many cases is secured only at the expense of deprivation and absolute suffering to the living for many succeeding months. The railway company must necessarily consider the question chiefly as an enterprise which will or will not pay sufficient returns to warrant the investment in the necessary rolling stock; and as to whether their respective lines are so situated as to make the undertaking a practical one from an operating standpoint. There are some routes on which it would not be advisable to make the attempt, but we believe such are few. The time at which funerals would use the cars would naturally be at a later hour than the morning rush, and in most cases would move in a direction opposite to that in which travel was heaviest. Returning, the funeral cars would get back before the evening rush began and would not act as a blockade.

Aside from the financial advantages arising to both patrons and stockholders, the sanitary feature is a most important one; for distance would then offer no objection to the locating of cemeteries at a point far out beyond any possible contamination of air or water to the living, and remove a cause of disease which is much more frequent and fatal than is generally supposed.

HOME MADE POWER.

THE inconveniences arising in the operation of electric lines where power is rented was fully demonstrated a few days ago at Lowell, Mass. The line to Lakeview gets its power from an electric lighting company, which latter concern has so increased its consumers that the railway people have been receiving a constantly decreasing supply. At first cars dragged on the grades and then on the levels, and finally scarcely moved on either. A schedule trip of 80 minutes became a painful monotony of two and a half hours. At a recent gathering of a civic society delegates from other cities lost their trains and were obliged to remain away from home over night by reason of the inability of the road to return them from the pleasure grounds where the exercises were held. Others who went out found the trip so long they refused to leave the cars and those who were already on the grounds were very effectually "grounded" there. All this was annoying in the highest degree to managers of the line who did the best they could. The moral is very plain, that every road should absolutely control not only its own power, but a sufficient additional reserve to meet every possible demand or emergency arising either from accident or occasion of unusual business. The Lowell company will claim damages, but the few dollars collectable will not remove the prejudice against the road which was created in the minds of many who were taking their first trip over the line. A power plant owned and operated by the street railway is now to be built; and other roads will do well to "pause to hesitate" before embarking in a boat which may come to anchor on a similar and rocky reef.

STREET RAILWAY WAITING ROOMS.

PASSENGERS who have occasion to use more than one line of cars in making a trip, or who are obliged to wait two or three minutes at the end of the line for a car are very generous in their commendation of the meanness and grasping qualities of a corporation which will allow them to go unprovided. They would, doubtless, like plush chairs and rockers, and a colored gentleman in a full dress suit to bow them in and out with as much pomp as possible. However, many of the companies do provide comfortable depots, but the most do not because they actually cannot afford to maintain them. Especially is this true in cases where a free transfer system is used and which allows the passenger for one fare to have the use of two or more lines in reaching the destination. While a nice waiting room would be a blessing as all concede, it would be difficult to establish them on account of cost. Not only is it often impossible to secure the room, but it must be placed in charge of a competent agent, or rather two of them where cars run from 5 A. M. to 12 P. M., or later. One road in this city has over seventy transfer points, and to maintain a depot at all these places would entail an expense of over \$150,000 per year.

This difficulty has already worked itself out, in a manner which is of equal benefit to road, patrons and the

merchants, who speedily recognized the advantage to himself of having passengers use his store as a temporary resting place. Whatever attracts people inside a store is valuable to the merchants, for once in, and pleased with some article displayed, people become purchasers who, when entering had no idea of buying. Hence it was when the transfer system was established in this city, the company was speedily importuned by all four of the business houses at each intersection asking that they be designated as "waiting rooms." A neat glass sign is furnished by the road, which is hung in the window and reads—"Passengers are invited to step inside while waiting for the car." The road also furnished each place with a few neat but inexpensive chairs. This arrangement has proved very satisfactory all around, for passengers visiting parts of the city where they seldom went, felt free and secure in availing themselves of the comforts of the places thus endorsed and selected by the railway company. It is a plan which might be adopted in many places now unprovided in this respect, and the convenience of patrons largely increased thereby.

THE DUTY OF OWNERSHIP.

A DAILY paper in a New England city of 60,000 inhabitants, comes out in a firm but dignified editorial, taking the local street car management to account for the poor condition of the service rendered. It shows that while other cities of much less pretention have progressed and secured rapid transit, their city still slumbers without indication of any relief from a horse car service which is confessedly poor.

The time tables are still the stereotyped schedules of ten years ago, and no better provision is made now for evening and Sunday riding, which has assumed large proportions, than existed in the days when the city was fully one-third smaller than at present. As the city has grown, rents have steadily advanced and a large population is now forced to reside at such a distance from business as to preclude walking even in pleasant weather.

Meanwhile the citizens having seen no avenue of relief have patiently put up with a service that is termed "simply abominable." The company doubtless labors under the very mistaken idea that there is more profit in the business conducted on the initial basis of a decade since, than in the operation of more modern appliances. Probably the managing board is composed in the majority of the very same men who conducted the affairs and shaped the policy of the road twenty years ago, and who argue to themselves, that what were good business principles then must be now.

There is too often a disposition in the minds of managing directors, especially when they are holders of large blocks of stock, to delay and postpone the adoption of the new and approved methods, from purely selfish motives. Too often they realize as fully as younger and more progressive men that the only right course in the matter is to go boldly at the work and push through to completion at the earliest possible moment rapid transit facilities. But while realizing this at heart, they still thrust away all

petitions for better things with the thin excuse that they are only awaiting the perfection of this, or the further improvement of that method, at which time they will only too gladly make the radical changes. The real secret in not a few cases is, that these men whose years entitle them to all respect, view the problem only from a personal standpoint. They are making fair and satisfactory returns on stock which cost them but a fraction of its present market value. If now, they consent to any change it must be accomplished only at a large expenditure of money, and in the nature of things an output of new bonds on which interest must be paid means a temporary reduction in dividends: or if the construction is made by issue of stock they must pay for it at a much higher figure than that at which they originally purchased. And, being advanced in years, they cannot entertain the idea of waiting five or ten years for what they consider would be the proper return from the investment. And so progress lags, the public suffers, and is not to be greatly blamed when they irreverently express the wish that they could be permitted the pleasure of attending somebody's funeral. Fortunately these cases are not the rule, for some of the brightest, keenest and most progressive men in railway management are well advanced in years and to such all honor be paid. They are giving financial aid and the ripe experience of years to a noble work, and building a more lasting monument to their names than any that could be carved from stone. But there are some whose actions are directed by no better motives than already pictured, and such men are no less than a public calamity. Extreme cautiousness is often the companion of old age, but when a man reaches a point in life where he hesitates to venture because he feels the lack of nerve, he should be willing to step out of the line to allow younger shoulders and more vigorous minds bear a burden he should not attempt to carry.

The street railway is a most thoroughly cosmopolitan institution, and no business can be named which more deserves or has greater need of the best executive talent and liberal-minded policies than it. The day has long since passed when the chief quality in a railway manager was to be a good judge of horseflesh.

The horse and horseman have now assumed a different role. A railway has it in its power to develop and build up one portion of a city to the utter neglect of another district. The change from one business street to another, of the main line in which street cars are operated, has in the largest cities caused a stampede among merchants to leave the scene of former activity and secure quarters in that thoroughfare where the people ride. This has been illustrated repeatedly.

Hence the directing minds in control of large street railways' interests, which are in so many respects the public's interests, should be men who have the welfare of the city at heart, men of broad and liberal views, and who build not alone for the present but for the future. And such men deserve and should everywhere receive the most hearty co-operation and assistance of every citizen.

AMERICAN CAR COMPANY.

ANATIONAL name, of an institution, which promises to interest the street railway men everywhere, is that of the American Car Company, St. Louis. The president is Wm. Sutton and the secretary Emil Alexander, both formerly connected with the Laclède Car Company, and whose experience in car building extends over many years. The company are now putting on the finishing touches to their new shops, which will contain the most modern machinery, and in size will rank among the largest in the world. Their facilities will be unsurpassed, and their experience will place them at the start among the best builders anywhere. The shop covers four acres. The phenomenal growth of street railways, together with the fast increasing tendency of population to live in cities has worked to create a demand for street cars, which is all out of proportion to the ordinary needs of a few years ago.

FULL STOPS IN PASSING STATIONARY CARS

THE sad fatality which recently occurred in Pittsburgh, whereby a young girl lost her life by being struck by a swiftly moving train passing in a direction opposite to the one from which she had alighted, should prove all the warning necessary to managers everywhere. No other source of danger in the operation of cable or electric cars begins to approach that of striking passengers or pedestrians who have alighted, or who in crossing the street have occasion to pass in the rear of a car or train at a standstill. In most places passengers are very properly required to alight from both open and closed cars on the side nearest the sidewalk, which for those who have occasion to pass to the farther side of the street means the crossing of the other track, in the rear of car they are leaving. Passengers at that time are too apt to have their mind on some subject other than an approaching train from the opposite direction, or many are too young or too old, or from defective hearing or eyesight are prevented from exercising the caution the driver may reasonably expect. Rapid transit is too valuable a matter to be hampered and restricted, as it surely will be, unless more care is exercised on this one point, and the manager who neglects to thoroughly enforce a safety rule in such cases must not complain or expect any sympathy if councils and police departments limit the speed to that of the old horse car. It would seem that the selfish motive of keeping the damage account as small as possible would be sufficient; or that the natural pride of a well conducted road should be enough to protect the public in this respect. A few days ago the writer stood on the front platform of a motor car which at full headway passed a standing car. It was on a down grade, and the car was succeeding fairly well in imitating a toboggan, when, within six feet two ladies stepped from behind the other car directly on the track. They seemed spell-bound and unable to do more than give a frantic shriek. Their funeral might not have been largely attended, but it certainly would have occurred but for the presence of mind of a gentleman, who very

unceremoniously siezed them by the arms and jerked them back, the car brushing their clothing as it darted by. In matters of such supreme importance as this, there should be no delay in making a rule to cover the case, in those places where none now exists. It is not safe to leave it to the discretion of the driver. The only safe rule is an absolute one calling for a full stop whenever another car is met that for any reason whatever has stopped, and then advance and pass only at low speed. It is not enough to pass on a slow speed without stopping, for that throws the decision on the driver, even the best of whom sometimes have one idea of "slow speed" in the middle of the day and an entirely different one about the supper trip. Accidents are bound to happen—even if there were no cars and everybody walked—some would then sprain their ankles or step on another's corns, but it is simply suicidal for any company to court disaster. To the railway manager is delegated a solemn trust, and if he had all the passengers of a year, hundreds of thousands and even millions, in his charge for safe transportation at one time, his hair would turn gray from anxiety. The same watchfulness is due the public every hour in the year. We are firmly committed to high speed along the streets of cities, for experience shows it to be safer than slow speed and incomparably better, but only under proper regulations. Whether as good time or not can be made cuts no figure in the subject discussed above: for as against safety time is no object. As a matter of fact, however, the delay in stops of the nature here advocated occurring as they do but a few times in each trip, do not make any appreciable difference. No manager who has once tried the rule will ever want to rescind it.

NO MOTORS, NO FRANCHISE.

THE Leavenworth Street Railway has had its lines cast in unpleasant places lately. The good city fathers, instigated thereunto by the *Kicker*, have written to the officers of the road asking them to declare their intention in regard to promises made over a year ago asking for privileges to turn the system into an electric line.

The road has had an unfortunate though eventful existence of several years. The construction expenses were \$100,000, and the investment unprofitable; \$100,000 worth of bonds were issued and sold for \$95,000; \$60,000 of this was put into an Iowa road with hopes of immediately realizing sufficient to put the Leavenworth line on a firm basis. The Iowa road was a very dead corpse and did not bring anything but trouble. The road was then sold by the sheriff for \$20,000 to a few of the managers of the old road. Now, although the road has good prospects, but for some reason has never made much money. Before rising in arms, each resident should ascertain how much he has done toward the support of the road. Railways cannot be run on wind and fair words; or ill-will cannot save a road against the undertow of heavy and constant expenses. The plan now is to declare the franchise forfeited unless immediate steps are taken to comply with the electric service promises.

BROOKLYN BRIDGE CABLE.

THE supplementary cable system over the East River bridge will soon be in operation when the terminals of the New York and Brooklyn bridge are enlarged accordingly to plan. The contracts have been awarded as follows: Extension of the cable driving plant exclusive of steam engines and friction clutches, R. Poole & Son Company, of Baltimore, \$50,108.80, work to be completed in eight months; steam-engines, Wm. Wright, of Williamsburg, \$12,175, to be done in six months. For the pleasure of evening visitors, settees and chairs are doubled in number on the bridge. A more frequent train service from 9:30 to 10:30 a. m., and a reduction in headway from fifteen to seven and a half minutes from 12:30 to 2:30 a. m. has been made by Col. Wagstaff.

The firms undertaking the above mentioned contracts are well known as business men and competent builders. Some of the largest contracts in the country have been taken by Messrs. Poole & Son. The friction clutches and operating gear will also be furnished by these gentlemen at \$19,035. This firm has been unusually successful in its contract work so far, and it is a significant fact that there were no bids that touched near their price. The additional bridge facilities are greatly needed.

AURORA FLASHES.

NOT among the least uses of the electric street railway systems of the country, can be mentioned the connection of neighboring cities with bands of rapid transit. The latest important move of this kind bids fair to bring together in sisterly affection the two thriving towns of Aurora and Elgin, Illinois. With commendable public spirit and far-seeing sagacity, (which leaves no room for narrow local prejudice) it is proposed to connect these cities and bring into touch with both of them, the lively little places of Batavia, Geneva and St. Charles.

It is thought best to lay the track at the side of the road, thus putting it out of the way of other traffic and teaming, and using the side arm pole for the trolley wires.

The ease with which grades are overcome, (see the Neversink Mountain article in this issue of the REVIEW) and the speed permissible and practical, points to ease, comfort and the other thousand and one benefits, physical and pecuniary, accruing from such a line. The Joliet-Lockport railway is a shining example of such benefits, as is the Minneapolis-St. Paul and a dozen other roads we could mention. Let the Aurora-Elgin road be next. Wm. McQuesten, the electrician of the Aurora road, is the progressive originator of the scheme.

Aurora is the county seat, and the steam road connections are such that one cannot go and return in the same day. Thus to wait several hours each way en route. Then a very heavy freight traffic between the various towns would be secured, and also shipments from the creameries and cheese factories which line the route all the way.

AUGUSTA, GEORGIA, THE ELECTRIC CITY OF THE SOUTH.

THE new South, with its renaissance of business and education, has no more shining example of prosperity and good will than the handsome city of Augusta, Georgia. Under the ray of the Southern sun and beneath the glittering brilliance of the myriad electric lights, man's eye cannot rest upon a fairer scene than the luxuriant shade trees, the broad paved avenues, the strong practical business blocks, the palatial residences and pretty cottages of the Electric City. Nature has done much for it and the hand of man backed by the sagacity and business tact of the citizens have reinforced and extended the benefits so freely given from the liberal lap of the great mother. The Savannah river on its stately career to the sea is stopped here to give of its abundant waters and make for the good people of Augusta manufacturing facilities of 20,000 horse power. This is owned by the city and let to manufacturers and others at a very low rate, making one of the

city. This transformation was brought about within the past year and steady improvement has followed the line of rapid transit. Real estate never before available has blossomed out with cottages and parks. Visitors and conventions of every description can now be handled and every one interested in the welfare of Augusta points with pride at this the crowning achievement in city making. Not long ago the anniversary of the advent of electricity was celebrated and an old mule-power car was run along the track followed by one of the palatial electric motive cars, decorated with flags and bunting. It was apparent to the veriest moss-back that progress had come and he who would not keep up with the procession must be run over.

On the 13th day of February, 1890, the city council of Augusta granted the franchise of operating a line of electric street railway. The capitalists who asked the right were Kansas City men, headed by Col. D. B. Dyer.



AUGUSTA ELECTRIC RAILWAY—POWER AND CAR HOUSES.

cheapest and most efficient motive powers still cheaper and more available. The capital and vim of North and South have united their powers to make Augusta a model city as to industry, convenience and beauty, inviting to the capitalist, the business man and the pleasure seeker.

To every city the question of urban passenger service is of the greatest importance. Dr. Albert Shaw, who has written so much on subjects pertaining to municipal welfare, says in the *July Century*, that this question is of first importance, overtopping the question even of housing of the citizens. Augusta has been asked this question and after trying the mule-drag method has answered magnificently with one of the best equipped electric railways in the United States. Year by year the slow going and long suffering mule plodded along the streets in primitive fashion. Time was no object, and the trips that now take thirty-five minutes then consumed a little more than one hour, while the fare has been reduced on long hauls from fifteen to five cents. Rapid transit has come now and every one can travel cheaply and quickly from one end to the other of the

The principals of the syndicate are Messrs. Samuel M. Jarvis, Roland R. Conklin, R. M. Spivey, Alfred Fryer and Daniel B. Dyer, who own the entire stock of \$300,000. With these gentleman at the helm of affairs it is not surprising to learn that it was scarcely thirty days before dirt was upturned on Broad street, in the presence of his honor the Mayor and the city fathers. Work progressed rapidly under the management of Col. Dyer and on April 3rd, five and a half acres of land was bought at the head of Green street, the principal avenue, where a power station was erected, work beginning May 1st. This station, a handsome brick, is inside of the city and borders upon the canal. The station is eighty-four feet by one hundred and seventy. The main line shaft is eighty feet long, supported by brick pillars and to it the generators are belted direct. Here is found every appliance and convenience for smooth running and quick repairing. In fact throughout the entire five and a half acres of buildings and out works, the practical genius of our electric age is manifest. In addition to the commodious quarters there is now in

process of erection a magnificent building on Broad street, which when completed, will give over the second floor to the offices of the Augusta Street Railway Company. This building is to be completed by October 1st, and will cost \$100,000 in addition to the price, \$55,000, paid for the site. Its proportions are eighty by two hundred feet, and besides the first floor, which will be occupied by stores, there will be one hundred and fifty offices. The company's present offices on the same street are commodious, but do not approach the handsome rooms now in view, as the home of rapid transit and Augustan enterprise. In addition to the mere railway property and plant, the members of the company have the largest faith in the growth and coming prosperity of the Electric City. That Augusta is destined to become one of the largest and most important cities of the South is evidenced by the signs of faith which these far-seeing business men show. Already they have bought real estate on the borders and are steadily making improvements thereon. These homes are sold on monthly payments and show the enterprise of the railway company. Upwards of \$200,000 have already gone into this good work. Among the most notable larger deals

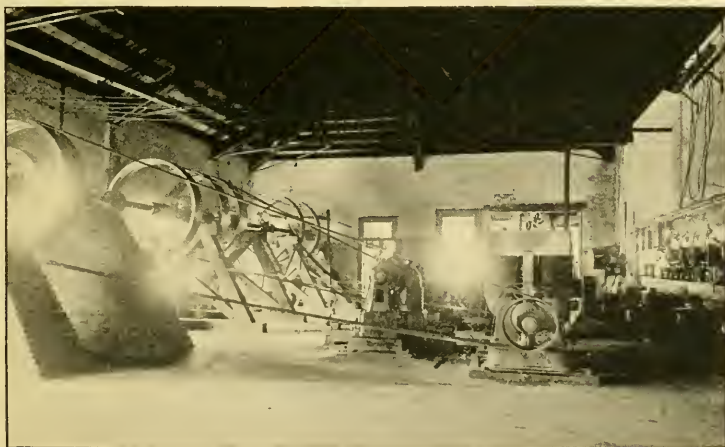
into attractive residence locations. As the lines are extended new portions of this most beautiful part of Georgia will become connected with the city and accessible to business and pleasure. The main line and the five already completed branches carried, during the past year, nearly two million passengers and during a gala day



AUGUSTA ELECTRIC RAILWAY—FEEDER CANAL FOR WATER POWER.

time transported thirty thousand people in two days, using twenty-eight cars. Among other benefits granted by the company, not the least is the transportation of school children at half price. The entire force employed is one hundred and fifty men, with a pay roll of \$5,000 per month.

As to the plant itself, it is complete in every way. Water from the Savannah river via the Augusta canal, is the motive power. At a cost of \$5.50 per horse power per annum the motive cost is reduced to a minimum, as only 250 to 300 horse power is required. Two Victor wheels running horizontally on the same shaft and made by the Stillwell-Bierce Manufacturing Company, of Dayton, Ohio, drive the dynamos. These are the modern, efficient wheels, with a rated capacity of 500 horse power, but capable of developing 600. The remaining 300 unutilized power will soon be used to operate an electric light plant, furnishing power generally and



INTERIOR OF POWER STATION—TAKEN WHILE MACHINERY WAS IN MOTION.

of the syndicate is the beautiful Turpin Hill property, with parks, lake, pavilions, electric light, orchestreon and methods of amusement and recreation. Numbers of new cottages adorn this increasingly popular suburb. Not only in this section, but south and west, we find Monte Sano, LaFayette, Lambert and several other thriving villages which will in the near future develop

running stationary motors. As the plant used steam before the water power was completed they have besides their immense water power a one hundred and fifty horse power New York safety engine, with one Babcock & Wilcox boiler of the same capacity, also a Beek engine, one hundred and twenty-five horse-power and one Taylor boiler of the same capacity. This steam

plant is only used when the water power is shut down for repairs. The coal bill for running the plant by steam was nine hundred dollars per month. This outlay returned one hundred and fifty horse power. Now, by water, two hundred and twenty-five dollars per month buys six hundred horse power and dispenses with two extra men. The equipment of the electrical station consists of three improved Edison generators, of eighty thousand watts and one hundred and ten horse power each; one Thomson-Houston generator of sixty thousand watts and eighty horse power. Besides these are all necessary ampere meters, volt meters, and circuit breakers, all of the most improved make. This equipment is one of the most complete and undoubtedly the most modern in the South.

In the matter of cars the same progressive ideas are in vogue. Three Thomson-Houston two-motor; eight Sprague two-motor; and sixteen Sprague single motor cars, making in all twenty-seven motors, together with twenty-two trail cars, suffice usually to transport the people of Augusta to the various points on the twenty-one miles of track divided into five different lines. There is a double track for sixteen miles of this distance. The track is laid in the middle of the streets with center pole construction. Over this line are carried, on an average, eight thousand people per day.

The most efficient part of the entire plant however is as follows: President and General Manager, D. B. Dyer; Treasurer, R. R. Conklin; Secretary, R. M. Spivey; Auditor, M. B. Freshman; Superintendent of Power Station, A. C. Harrington; Superintending Running Department, T. A. Roberts; Roadmaster, J. M. Benson; Purchasing Agent, W. C. Boykin; Superintendent Real Estate, J. B. Johnson. These are the nerves and brain of the system of urban transportation of Augusta, Georgia. A well known London capitalist, Mr. Alfred Fryer, recently traveling in this country, visited this city, and so charmed was he at the perfection of the road that he expressed himself in this wise:

"Nothing strikes me more forcibly than your perfect electric railway system. There is nothing like it in Paris or London. We reached your city at night and stepped into a small car brilliantly lighted by electricity. Very rapidly we found ourselves flying along your avenues, and finally mounting a stiff incline, landed at your delightful hotel. Electric railroads are not altogether unknown in Europe, but are more common in your country. The happy idea, however, of enslaving the waters of your canal and forcing them to operate turbines, and these in turn to move the dynamos, was nothing less than an inspiration. You are gliding along the length and breadth and around the circumference of your city, without hearing the lash falling on the sides of a poor mule, or having the air poisoned with smoke and sulphur. Surely this approaches perfection. And one naturally speculates on what must be the outcome of this cheap, safe and rapid transport. It will doubtless revolutionize the habits of the inhabitants of your city. The saving of time and the saving of effort are great. The adoption of the electric railway will drive

the inhabitants of even smaller towns in America out into their suburbs to enjoy purer and more abundant air and healthier homes. This tendency will be more marked in large cities like your own."

This clear-headed English capitalist also showed his faith in Augusta by investing in suburban property, and so the electric railway has and is working out a great problem in city life here, just as it has and is doing the same thing in other cities. Like the telegraph and telephone, we soon grow to wonder how it was that animal power was tolerated so long, and then a little later to forget there ever were such institutions as the bob-tailed car and the "swan-necked mule."

STREET CAR EXPRESS.

THE success of the electric express, described in our July issue, has proved so great that on September 1st, additional cars will be put on. Not only this, but the other street railway lines in St. Louis are also considering the adoption of the same system. The only obstacle probably will be the opposition from the existing express and parcel companies, who will offer all the opposition possible, and raise the point as to whether the charters of the several railways permit the carrying of other than passengers and their ordinary baggage. The delay, however, if any, will be only of short duration and within a year or two every street railway in St. Louis will be hauling express cars. The success of the enterprise there should stimulate other companies to take up the subject, with the almost certain result of adopting the system. There are thousands of dollars of good dividends going to waste in every good sized city in the country, which ought to be secured to the treasury of the street railways. In connection with the transportation of parcels, other conveniences, such as payment of gas bills, rents, and the like may be added with no extra expense and to the very great convenience of the public.

BRISTOL ENTERPRISE.

THE thriving town of Bristol, Tennessee, with accustomed zeal, has now in operation a modern line of electric street railway, which began carrying passengers on the 15th of this month. The Bristol Belt Line Railway Company bought out the Bristol Street Railway Company, thus gaining control of the entire street transportation system. The present company, presided over by A. H. Leftwick, with S. L. Nicholson as secretary and superintendent, brings to the use of the people of Bristol the latest improvements in the line of electric locomotion. The steam plant includes a 150-horse-power Phœnix boiler and one 125-horse-power Phœnix engine of the high speed, compound condensing pattern. The generator is an 80,000 Watt-Wenstrom, of the most improved make. The motors are of the Rae type, of 30 and 40-horse-power, operating five Britt cars. This equipment gives sufficient accommodations to the public, until with the extension of the lines the suburban property grows in value and attracts thither residents from the city.

THE LIVERPOOL ELEVATED RAILWAY.

BY J. C. ROBINSON.

LIVERPOOL has long been famed for the magnitude and excellence of its public institutions, but its power of adaptation, energy and push, have rarely been so strikingly manifested as in its broad and vigorous treatment of rapid transit as illustrated in this enterprise. On expressing a desire to make an inspection of the works, the engineers in charge very cordially offered to render me any assistance I might require, and to those gentlemen, and to "Discovery," I am greatly indebted for many valuable details. It will be found that whilst the form of construction adopted approximates closely to that familiar in our own practice, yet from an engineering standpoint, many valuable new features will be observed.

The company has been incorporated by special Act of Parliament, for the purpose of constructing and operating the overhead railways authorized by the Mersey Dock and Harbor Board. The road is a double track passenger line, and when completed will be nearly $6\frac{1}{2}$ miles in length, extending along the line of docks from the

(b). No rent is to be paid to the Dock Board until after the profits of the undertaking amount to 6 per centum upon the cost of the undertaking.

(c). After the profits have exceeded that sum, a rent of £1,000 per annum is to be paid to the Dock Board out of the further profits of the company.

(d). Any further profits are to be equally divided between the Dock Board and the company.

(e). The Dock Board is at liberty to terminate the lease at the end of twenty-five years after the opening of any portion of the railway, or at any subsequent period of seven years.

Should this power be exercised, the Dock Board is to purchase the undertaking at the actual value of the railway, to be ascertained by arbitration, the sum to be so paid not to exceed 50 per cent. above the net cost price, and not to be less than such cost price, after deducting depreciation, if any.

(f). The United Omnibus and Tramway Company's omnibuses, now running on the dock rails, will be precluded



MAP OF LIVERPOOL DOCKS, SHOWING LINE OF ELEVATED ROAD.

extreme limit of the Dock Estate in Bootle, at the north end, to the Harrington dock at the south.

The necessity of direct rapid transit between the north and the south of the city has long been felt. In order to meet this want the Dock Board some years ago obtained powers to construct an elevated road along the docks, and these powers were extended by an Act obtained by the Dock Board in 1887.

With the sanction of Parliament the Dock Board agreed to transfer their powers to the Liverpool Overhead Railway Company, upon terms which the directors considered advantageous, and such as, it is believed, promise to make the undertaking a commercial success.

These terms were embodied in certain heads of agreement, dated the 12th of April, 1888, between the Dock Board and Sir William Bower Forwood, M. P., chairman of the company, which is scheduled to the company's Act, and in an agreement dated the 13th of December, 1888, between the Dock Board and the company. The principal provisions of the agreements are as follows:

(a). The authorized railway and works are, when constructed, to be leased to the company for 999 years from January 1st, 1888.

ded from doing so when the railway is opened for traffic, and no omnibuses will be allowed to run within the dock walls.

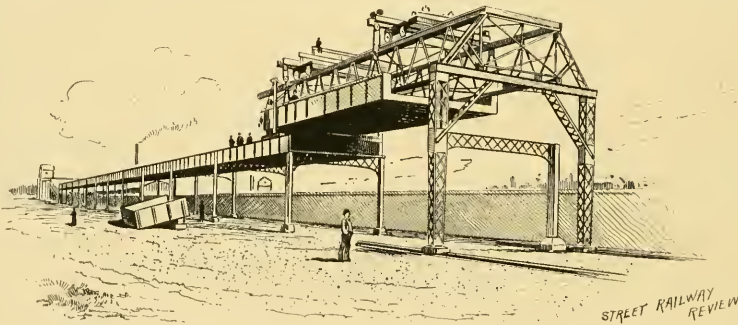
The railway being built almost entirely upon land belonging to the Dock Board, the expenditure in purchasing land, which ordinarily forms so large an outlay in the cost of English railways is thus avoided. No other payment is to be made to the Dock Board by the company, for the concession, beyond the rent referred to.

The road will not interfere with the goods traffic conducted upon the present surface rails, laid within the dock walls, and there being no competing lines of tramways at present, it is claimed strangely enough that the crowded condition of the adjoining thoroughfares will practically prevent their introduction.

Estimates have been furnished by experts as to the probable traffic upon the railway of the existing dock traffic, using the dock omnibuses and other means of conveyance; also of the traffic from the north and south ends of the city, which, it is believed, will find the Overhead Railway the best medium of transportation to the Exchange, Custom House and business portions of the city, en route, and of the traffic from Seaford, Bootle and Toxteth Park, to and from the steamboat ferries. As a

Messrs. Ives & Barker's method of construction is that it enables many processes to be in operation simultaneously, with the result that the various sections reach completion in due consecutive order, thus greatly facilitating the work; and the complete construction of each span in the works, being bodily removed intact to its final site, and the fact that having arrived there each section can readily be affixed in half an hour, obviates the confusion, obstruction and inconvenience inseparable from the construction of a large undertaking employing a small army of workmen. It is claimed that this is the first instance on record of a railroad or viaduct constructed on these general lines. Recently, in sixteen working days, thirty-one spans were completed, which is considerably above contract speed. In the bodily removal of the spans the most difficult problem for solution was the projecting and lowering into place of the spans, as each span runs forward on the viaduct about six feet above the level that it ultimately occupies. This, however, has been very successfully solved by Messrs. Ives & Barker's patent movable gantry, represented in the accompanying illustration, which was specially designed and constructed by them on

This framework, which supports the rear end of the machine on the last completed span, is so constructed as to form an opening or window, through which the new span is launched from the trolley into space, where it hangs from the overhead travelers, which run on the top on rails over the flanges of the longitudinal lattice girders of the "grasshopper." The gantry is sometimes, when obstructions arise, projected forward with these pillars removed, the travelers being run to the rear and attached to the next span on the trolley, which thus acts as a counterpoise, the back frame and its supporting trolley forming the fulcrum. When the span arrives at the front of the viaduct, the bogie carrying it, runs forward close up to the bogie which supports the back frame. The front end of the span, projecting, as it does, fifteen feet over each end of the trolley which carries it, projects about eight or ten feet through the back frame of the "grasshopper." It is then taken hold of and slightly lifted by the front traveling crane of the "grasshopper." Two hydraulic jacks are placed under the rear end of the span, which becomes slightly raised. The trolley being then liberated, is run back about thirty feet, the jacks are



THE "GRASSHOPPER" WITH SPAN READY TO LOWER INTO POSITION.

the site of their present works at Seaforth, before the construction of the viaduct commenced. This machine, which is known to us as the "grasshopper," will lower a span weighing forty tons into position within half an hour of its arrival at the front. In the whole of the machine, in the tackle and the girders, the inventors have allowed a factor of safety of four, so that everything is only strained to one-fourth of its breaking strain. The "grasshopper," in this case, consists of two main lattice girders, 15 feet apart and 86 feet long. In front there is a cross trussed girder spreading out to a width of about twenty-seven feet. This cross-girder is supported by two latticed columns, which are supported by latticed braces, horizontally and vertically. These columns are fitted with rollers at the foot, and travel forward on short interchangeable lengths of rail. About sixty feet from the front there is a fixed lattice cross-girder about four feet deep, the top of which is level with the top of the longitudinal latticed girders. This is about the same width as the front cross girder. This is supported by four wrought iron uprights, which are supported by a four-wheeled bogie, constructed of wrought iron.

eased down, and the trolley once more carries the extreme back end of the span, which is moved forward again bodily, the front end being supported by the traveler and the rear end by the trolley, until it projects into the air a distance of about forty feet. Number two traveler then takes hold of the back end, and the span, which is now hanging on four sets of tackle, is run forward the remaining distance to its destination, when it is lowered down on the piers. The holding down bolts are then secured, and the work of construction becomes complete. Expansion is allowed for by means of slotted holes at one end of each span, the other end being securely fastened as described. The ordinary headway of the viaduct is 16 feet, and 14 feet to the underside of the lattice bracing between the piers. There will be three if not four lift bridges, to permit the free passage of vessel's boilers and other full loads through the viaduct, and already one of these bridges is complete over one of the gateways to Langdon Dock. There will be also a swing bridge over the entrance to Stanley Dock. It is proposed to have stations at intervals of $\frac{1}{2}$ mile with platforms 100 feet long on either side of the line at each, commencing at the

moderate estimate they figure to carry over 5,000,000 passengers per annum.

Reference is made to the elevated railways of New York as affording a wonderful illustration how such additional facilities increase traffic out of all proportion to the increase of population, holding that while the traffic of competing surface street railways suffered no permanent falling off in their earnings, an entirely new traffic, reaching over 160,000,000 passengers per annum, had been created upon the elevated roads.

Upon the estimates and tenders the engineers are satisfied that the cost of construction and equipment will be well within the authorized capital of the company. Calculations based on 5,156,000 first and third class passengers (of which only $7\frac{1}{2}$ per cent. are put down as first class), and at 3d and 2d fares respectively, lead them to the conclusion that stockholders may reasonably look forward to a dividend of 6 per cent., steadily increasing with the future development of the traffic.

No promotion money has been paid, it is stated, in the organization of the company, nor has the capital been underwritten. The preliminary expenses will be limited to the cost of the company's special Act and the necessary legal and administrative expenses.

The overhead railway when completed will extend along the line of docks from the north wall of the Dock Board estate at Scaforth, to the Herculaneum Dock, a distance of about six and a half miles. Regarding its construction, the details may be described as follows: Of wrought iron box columns and ordinary plate girders, with Hobson's patent, closed in, water tight flooring between. A few large spans are of lattice bow-strung girders. When the plates for the flooring arrive at the Phoenix Foundry Company's (of Derby) temporary works, alongside the line, they undergo a scrupulously sedulous examination. Having "passed" successfully, each plate is drawn into a specially constructed furnace, where it is heated to a cherry red. It then passes to a hydraulic press where it is stamped into semicircular trough form between cast-iron blocks (each plate being the whole width of the railroad between the girders), whence it is taken to a cooling frame, where it is cooled in a level position to prevent alteration of shape. It is then removed to a drilling machine (Wilson and Robins' patent) which perforates eighty holes simultaneously along its sides. It is next put on a riveting-frame, wherein curved angle irons for each end of the plate have been previously placed. These are riveted on to the plate by means of specially mounted pneumatic riveters. The angle iron cleats are riveted on the top of each floor plate to which the sleepers of the permanent way are attached. It is noteworthy that every plate is thus made identical and is interchangeable, obviating confusion or complication in attachment, and the result has fully justified the sanguine expectations entertained at the outset, by the originators, as to the utility and advantage of the system. The plates are then stacked, and ultimately transferred into the yard of Messrs. Ives & Barker, the contractors, by means of a two-ton locomotive crane,

which lays them on a specially constructed building-up platform, in sets of ten, with their T iron bases between, representing a length of twenty-five feet of viaduct. Longitudinal trusses are bolted on to each set of plates and T irons, and by means of a transverse truss the entire set is lifted into slings for riveting, where it is riveted up by a highly ingenious pneumatic traveling riveting machine, the entire set of convex plates and T irons forming one length of twenty-five feet, or half a span of flooring. The Pneumatic Riveting-plant, from the Strange-ways Ironworks, Manchester, of De Bergue & Co., was designed specially for riveting together the arched plates composing Hobson's patent flooring. A pneumatic riveter, 12 inches gap by 12 inches wide, is used. This machine, instead of being suspended in the usual way, is carried by a light frame, running on four wheels, upon rails placed at such a height below the flooring that the heading cups are approximately level with the lines of rivets. The riveter itself is supported at its center of gravity by the ends of two levers, which in their turn are pivoted upon the frame. In this way the machine is free to oscillate so as to obtain the necessary clearance before and after each stroke, and the exact height of the heading cups is maintained with ease, as pivoted levers are weighted so as to balance the weight of the machine whilst at work, and at the same time to admit of its being lowered entirely out of the way of the work when desired. To drive the pneumatic rivetter, and supply compressed air for the oil burning rivet heater, or furnace, Messrs. De Bergue & Co. have supplied a small 6-horse-power vertical boiler, and an Allen's patent high speed air compressor with 8-inch steam and air cylinders, which, together with an air receiver of about the same capacity as the boiler, compose a complete portable riveting plant, all mounted upon a traveling bogie truck, running on four wheels, 4 feet $8\frac{1}{2}$ inches in gauge. The boiler carries a steam pressure of about 60 pounds per square inch and easily drives the air compressor so as to maintain a pressure in the air receiver of 65 to 70 pounds per square inch, and at the same pressure provides air for the furnace. The air at this pressure is carried by light India rubber hose, one inch internal diameter, to the riveter. The rivetter has a 10-inch air cylinder, and the pressure upon the piston is so multiplied by the action of the toggle lever arrangement, which constitutes the basis of Allen's patent, that sufficient power is exerted to apply a pressure ample for all ordinary sizes of rivets. The compressed air is admitted to the cylinder at each stroke of the heading ram, by means of a hand lever, and shut off in the same way, the exhaust air passing freely off into the atmosphere. Messrs. Ives & Barker's yard is surmounted by a fifteen-ton overhead traveling steam crane, and after the completion of the riveting process, the combined plates, ten at a time, are elevated to a stage on the track and drawn to destination, a sort of canal boat locomotion, except that the horses are on the leve while the span is aloft, the team doing the journey at the rate of five miles an hour. The great advantage of

north wall at Seaforth, and terminating at the Hercules Dock. The road will consist of 1,200 girders, about 12,000 floor plates and 1,200 pillars. Each of the 50 feet spans weighs about 20 tons, the 75 feet spans weigh 40 tons each and the total weight of iron in the structure will be about 20,000 tons.

The cost of construction, including equipment will not exceed £85,000 or \$425,000 per mile, or a little less than \$3,000,000 for the entire line. The chief engineers are Sir Douglas Fox, M. I. C. E., and I. H. Greathead, M. I. C. E., London.

The work has been in progress about twelve months, during which time 2 miles of track have been laid. It is thought, however, that more rapid work can now be performed, and that the remaining $4\frac{1}{2}$ miles will be completed, and the whole system put into operation by the end of the present year.

The intention at present appears to be in favor of operating the line by electricity, although provision is being made for steam power.

A central power house will be erected from whence the wires will be conducted and laid between the track rails. Motor cars, with one "trailer" attached will be used, each car having a carrying capacity for fifty-six passengers.

The equipment will consist of 22 trains made up in this way, each running on a schedule allowing three minutes headway between trains.

Owing to the absolute block system to be enforced in this road (whereby no train will be allowed to draw out of any station until the preceding train has cleared the station ahead), an average speed of about 10 miles an hour only will therefore be maintained. Success to the Liverpool Overhead Railway.

An English Engineer's Official Report of American Electric Railways.

IN the June issue of the STREET RAILWAY REVIEW, mention was made of a pleasant call from Mr. Frederick Brown, A. I. E. E., of Walsall, England, who had been delegated by the authorities of that city to make an inspection of the electric roads here and report. The fact that the municipal government was willing to go to this expense is quite suggestive of the hold electricity is gaining abroad. Mr. Brown spent some two months in his investigations and his report has just been made. The important feature of the whole affair is that after considering the report the general Purposes Committee of the Walsall Town Council, by a vote of fifteen to five, recommended the granting of permission to place overhead wires and operate electric cars by the trolley system. The report is comprehensive, and coming from so able an electrical engineer as Mr. Brown, will be read with much interest. It will be noted he has been very impartial and candid, and his summary which is taken from the London *Electrical Engineer* is as follows:—

There are three styles of carrying the overhead wire, which is known as the trolley wire.

1st. Where there are two lines of rails, center poles are used with an arm on each side carrying the wire.

These would not be suitable for our streets and roads; though in wide roads they do not look very bad. In our roads they would be in the way, and a dangerous obstruction.

2d. Where the tram lines are laid at the side of the road or street, poles with an arm are used, carrying the trolley wires over the center of the track.

3d. Lighter poles are erected on each side of the street, and a wire called a span wire (which is not used for conveying electricity, but only as a means of support) is stretched across, and the electric or trolley wire is hung from that over the center of the track. This is by far the most convenient; and in the American roads, where trees are planted on each side, is the least unsightly, and is, all things considered, I think the most suitable for use here, as our streets vary in width, thus varying the distances from the rail to the kerb, which would, if the second plan named above be used, necessitate the arms on the poles varying in length, which I fear would look very unsightly. At junctions and corners there is some complication, which is certainly no ornament to the streets, but it is entirely a matter of opinion. I find that the public in America prefer the eyesore of the wires to horse or steam power: the noise and smoke of the latter they much object to.

I submit various photographs for your inspection, and am expecting others.

Other wires than the trolley wire are necessary for bringing the power to the various sections of the trolley wire. These are called feeders, and are carried on insulators attached to the poles that carry the span wires. In important streets I should advise these being put underground, but outside the center of the town they might be run as is usual in America. The speed of the cars is regulated by the city authorities, and varies on different roads from six to twelve miles per hour, though the latter is often much exceeded outside the cities.

The electric cars are safer than the ordinary cable car, as they can be run in either direction at will, and so can back out of danger if necessary, and the danger of the grip getting caught in a broken strand of a cable, and so the driver losing the power of stopping, is avoided.

The speed can be varied at will from a crawl to thirty or more miles per hour. There is complete absence of jerk in starting, the suddenness of the stop of course being in the hands of the driver, who can, if necessary, stop within a car's length when going at full speed.

At first there was some trouble with joints in the trolley wire giving way, but this appears to be a thing of the past, as improved means of jointing have been introduced.

Much of the overhead work in America has been done in a hurried manner, and could be made much neater and safer with more care and time being spent upon it. This point should be insisted upon if the system be allowed here.

I found no complaint from interruption to ordinary traffic from the wires, they being high enough for all

to pass under, excepting some special cars belonging to a circus, the wires preventing the emblematic characters from riding on the top.

In America the wires are carried about 19 feet from the ground. They should be rather higher here to allow of our fire escape passing under. The American escapes are carried horizontally.

In cases of fire the firemen cut the wires down if necessary, the current being cut off from that section—telephones being fixed in the power stations for the purpose of giving notice, or a system of electric signals is used.

I have, for your inspection, a number of reports from various bodies on the subject, among which you will find letters from a number of mayors of cities in which overhead wires are in use.

In reply to the points on which you requested me to obtain special information I beg to state:

1st. Duplicate lines of rails are not necessary unless required by the traffic.

2d. The existing lines of rail will need some alteration—viz.: each rail needs connecting to the next by a strong copper wire riveted into each, and they also need electrical connections across. Earth-plates should also be put in at times, as it tends to lessen the action on the telephone.

3d. Posts may be on one or both sides of the road.

4th. The posts are not complained of.

5th. The posts are about 40 yards or 120 feet apart.

6th. The posts can be used for carrying other wires and for carrying electric lamps, and could be used for sewer ventilation.

7th. The roads are mostly lighted by electricity, some with gas, and some with oil.

8th. The poles are to be so fixed as to be safe, and the wires to be not less than 19 feet high.

9th. No special rule as to distances from kerb. The narrowest street was 20 feet 6 inches wide, and it had a 4 feet 6 inch track in center. This street had two tracks in it, but the tram people altered it, as it delayed their traffic, the cars not being able to pass a standing cart or wagon.

10th. The arms project to center of track.

11th. No objection is raised excepting by circus proprietors.

12th. Horses seem to take no notice. I only saw one case of restiveness.

13th. Cars work either way, and do not need to be turned.

14. A bell has to be rung on nearing a cross road, and head lights are carried. The driver rings the bell with his foot, thus leaving both hands for the brakes if necessary.

15th. The cars passing each other, or passing a crossing, must always sound a bell.

16. Authorities limit the speed from 6 to 12 or more miles per hour. The driver has complete control.

17th. I heard of no complaints, though at times they have them from what they term the abutters—i. e., per-

sons whose property abuts upon the street in which the line of rail are laid.

18th. The width of pavement varies so much that I can give no measurements.

19th. The wires are mostly carried overhead—some are underground.

20th. The wire is fixed to an insulator at the terminus, and is above the heads of the public.

21st. There is no danger to human life.

22d. The posts vary in thickness and material, some being wood, some iron tube, and some lattice work in iron; the base being about 6 inches to 8 inches.

23d. Unless the improved motors are used the noise is objectionable. With the improved motors and gear I heard of complaint of their not making noise enough.

24th. There is at times a little sparking visible which might frighten a horse, but I failed to hear of a case, and as our roads are better than the American, this flashing would be reduced.

25th. The narrowest road I saw was about 20 feet 6 inches. The widest was 120 feet.

26th. There are streets where telegraph, telephone, and electric light wire posts are fixed, with the poles for the cars. They are fixed anyhow that seemed best to the men who put them up, and want some regulations in this respect.

27th. Sign boards and other projections have been allowed, but are being removed pretty fast by the authorities, though many remain.

28th. There are from one to six lines on some of the poles.

29th. The tramways are worked by private companies and not by the authorities.

30th. I found no case in which the authorities had any right to use the tramways for public purposes without paying for such use.

31st. Their fire escapes are run horizontally and they have no trouble, though if a wire is in the way they cut it down.

32d. The maximum potential is in use now, and the usual one is 500 volts.

I may state, in conclusion, that the use of the system is much increasing, there being an order in the works that I visited for some 2,000 motors.

It is not often that street car men strike it rich the first thing, but the San Antonio *Express* brings news that at Monterey, Tex., the workmen on the track to the Saddle mountain brick yard to-day unearthed a pot of ancient silver coins of great historic and intrinsic value.

HAVE you decided to attend the convention? If not, make your plans at once. Few matters during the year are of greater importance and interest to street railway men.

THE drivers of the Copenhagen & Denmark Street Railway work on an average of seventeen hours per day, for which they receive the munificent sum of 80 cents.

STREET RAILWAY FUNERAL CARS.

A New Department in Street Railway Service.

CHAPTER I.

SHALL street railways operate funeral cars? This is a question which is more and more presenting itself to the mind of the careful manager, and throughout the country the daily press discusses the subject with increasing frequency and interest. The writer of this article has always been a strong advocate of street railway companies conducting a funeral car service. In this, circumstances alter cases, and what would be practicable in one city might not answer in another. Then, too, as long as the cars were operated by animal power there would be a much less saving of time over the ordinary carriage and hearse, than if the line was mechanically propelled. But now that almost every city of any size has applied electricity or cable as the means of operating its cars, the subject again presents itself with advantages which commend the plan with stronger claims than ever before.

The burial of the dead is ever a sad and solemn occasion, and should very properly be conducted with a fitting degree of respect and reverence; and yet the duty which must always be paramount to it is the well being of the living. However, it is not the province of this article to moralize, and what follows will be necessarily a consideration of the question in a two fold light, viz.: Its advantages to the relatives of the deceased; and the benefits which will accrue to the company. In both cases the advantage is chiefly a pecuniary one, and in that of the company wholly such. It should not, however, be considered sacrilegious to advocate any suitable means which will reduce the expenses necessarily attendant upon a death in the family. At such times it is perfectly natural that the relatives and friends of the departed should endeavor to do all in their power to indicate their affection and respect at this last opportunity; and the result too frequently is that an expense is incurred entirely beyond that which those who incur it are able to bear, and results in deprivation and sacrifice frequently for months or years after, for an interesting feature of this investigation was the discovery of the fact that the funeral bill contracted by even the poorest are almost always paid, although usually the amount paid each month repre-

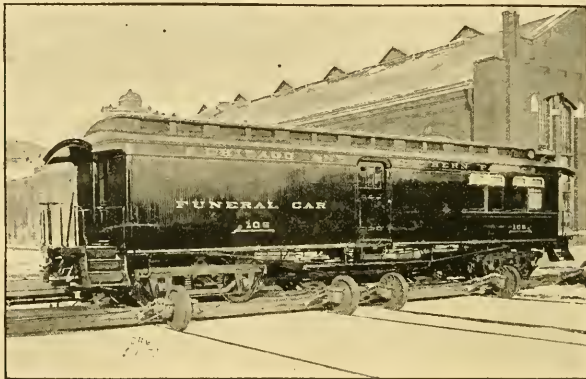
sents savings which can ill be spared. Any plan then, which will tend to relieve this burden should be accepted in good faith, and the street railway which has it in its power to offer facilities which fully meet all the necessities and at a much less cost, is a public benefactor, and the fact that it is paid for its service does not change the conditions or lessen the benefits to those most interested.

In most cities the cemetery, or where there are more than one, each of them are on the line or at the terminus of a street car line. Usually this means a distance of from three to ten miles from the heart of the city. To

get from any portion of the residence districts to the cemetery, via the street car lines, is in most cases a comparatively easy matter. Where more than one company own tracks, an exchange arrangement should easily be made for this service, which would permit the car of one road to run over the tracks of the others, either to reach starting point or destination. This is now done in many places with excursion parties, school pic-

nic, and the like; a special request being made of one company by the other for each specific trip of this kind. It is acknowledged the funeral car would be a greater benefit in large cities than in smaller ones; but it is in the large cities that it is most needed. Here it is that distances are great and cross-lines plentiful, so that in very many places the distance from the nearest car track to thousands of residences would not exceed two or at most, three blocks. The bearers could carry their burden that distance, and

where cars were generally used for the purpose, it would be an inexpensive matter to keep a suitable conveyance at the cemetery to carry the remains to the grave, and permit those in attendance to walk.



STEAM ROAD FUNERAL CAR.



PLAN FOR FUNERAL STREET CAR.

THE FUNERAL CAR.

The funeral car should of course be appropriately arranged, painted and furnished. There are several plans each of which has advantages. A compartment car however is preferable, chiefly for the reason that the coffin would not require an entire car, and that it would not be in accordance with the best sanitary conditions that the living should ride for any considerable distance

with the remains in the confined space afforded by the car. In case the number accompanying the remains was small the car should be divided as indicated in the following diagram: One room with doors at the side, the end of the car being closed, for the casket, which would rest on a low stationary table built for the purpose, and so arranged that neither could slide or fall. The partition extending across the car and to the roof, could be cut with a door into the passenger department, or not, as desired. In that portion of the car for passengers the seats should be cross seats facing each other, and accommodating two persons each, similar to a closed carriage; a centre aisle permitting easy access and egress. The car should be painted black on the outside and a dark finish within. The seats should be upholstered and the windows supplied with spring curtains instead of blinds, and which should roll from the bottom up, so that the inmates could be screened from public gaze without shutting out all light. Or the car may be built to a short length and used for the exclusive purpose of conveying the casket, and the friends occupy one or more other cars which should be drawn behind the hearse car, for this article assumes that the lines are operated by other than animal power. The fact that the train would move at a rapid rate of speed need not cause any comment as incident, for in large cities it is the universal custom for funerals to move at a brisk pace, and necessarily so in order to make the journey and return before dark. It is in this respect that the funeral car would afford a great relief,

for the car can quietly and smoothly make fully double the speed possible with carriages, and without the exposure incident to a long ride in horse-drawn vehicles. Especially during cold weather would this be noticeable, for the cars would be comfortably warmed. Probably if the facts could be known, the number would be startling of the people who every year lose their lives as the direct result of exposure while going and returning from the cemetery. Common prudence and ordinary care dictate that this danger should be removed as far as possible.

RATES FOR CARS.

As it is to lessen the burden, especially to the poor, that the funeral car commends itself, the charges should be placed at such a figure as to place the service within the reach of all. If desired there could be two or three classes of cars, as is the case in the city of Mexico, or

indeed as prevails among undertakers, who will furnish a plain or expensive hearse and carriages, as may be desired. But in the case of the street car service, a hearse car and two passenger cars would comfortably provide for as many people as would require no less than one hearse and twenty carriages, which would cost in no case less than \$5 each, or over \$100. On the other hand, the three cars could be furnished to make the same distance and return at not to exceed \$20 if run in one train. Where the distance to a cemetery is as great as exists in Chicago, the charge for carriages would be more than the figure above named. For the very poor, a combination car could be furnished in most places at a cost of only five or six dollars for transportation of casket and say eight or ten persons, which would be about one-third the amount

which would have to be charged for livery. It is not the belief of the writer that in all places the charges for service of funeral vehicles is greatly in excess of what is just and fair. Usually more or less of bad driving is encountered, the time occupied is great, and practically amounts to a full day's work for man, team and vehicle, which if employed on a number of short calls would earn more money. But the fact that the rates are necessarily high, is precisely the strongest argument why the car service is needed; for the latter requires few men and makes a quick run.

To properly handle a funeral train the crew should include a conductor in charge of train, an assistant conductor and one driver. This is sufficient for a train of three cars. The steps should



INTERIOR FUNERAL CAR, C. & N. P. R. R.

all be provided with adjustable gates which can be quickly closed to prevent others than members of the party from boarding the train. The dashes also should be cut to permit the free passage from one car to the other while train is in motion. Where there promises to be little demand for funeral trains, one hearse car would at first suffice, and regular cars can be attached as trailers. Charges for this service can be estimated either at so much per hour, or at so much per car per mile for the round trip, it being evident that three cars can be furnished at less than three times the cost of one, on account of the saving in drivers. Whether one or more cars are used they should never be attached to and drawn by regular cars, but should, for several reasons, always be operated exclusively by themselves.

ON STEAM ROADS.

The transportation of funeral parties by funeral trains on steam roads has been in vogue for a long time in many large cities both in this country and in England.

In London for a long time there has been a train on one of the steam roads which every night at 12 o'clock departs for one of the largest cemeteries situated some considerable distance from the city. The train is constructed especially for the purpose and carries the dead bodies of people who are to be buried the next day, at which time the friends go out and services are held in a large chapel on the grounds. This train has been in operation for a number of years, and rejoices in the suggestive title of the "Cold Meat Train."

For a number of years, one of the steam roads running out of

BUFFALO, N. Y.,

has operated a funeral train which has been very acceptable, and has even been commended to the Catholic faith by the priesthood there, as effecting a great saving of expense over the old style hearse and long line of carriages.

IN BROOKLYN

considerable discussion has arisen of late over the proposed plan of the elevated road there to put on a funeral service, and run trains for that exclusive purpose. The cemeteries are located at a considerable distance out, although like nearly every other large city, not as far removed from the residence districts as health demands.

The plan is to have elevators at termini and at occasional points midway and a hearse in attendance at the ground to meet the train.

IN CHICAGO

several roads run one or two schedule funeral trains, consisting of one or more "funeral cars" and a necessary number of coaches to accommodate the passengers. They are advertised in the daily papers, leave promptly at certain hours, and are very generally patronized, especially where large parties desire to attend, such as lodges, societies and the like, for whom it would be difficult and expensive to provide a sufficient number of carriages. The cemeteries in question are the principle ones used, and are 10 and 12 miles from the business center of the town. This service is used by the best classes, as well as those who cannot so well afford carriages, on account

of the lessened time required and the increased convenience of making the journey. As an illustration of these railroad funeral trains, that of the Chicago & Northern Pacific will answer. The car in which the bodies are carried, is divided into two compartments, one of which is occupied by the bearers, or guard of honor, and is as expensively furnished as the finest sleepers. The car was built by the Pullman Company, and is the finest of the kind ever constructed in this country. It departs daily at 1 p. m. The charges are 50 cents for the casket, and the same price per passenger for the round trip. At the cemetery, hearses are kept to carry the body to the grave. The passengers occupy comfortable coaches attached behind the funeral car. Where parties desire an exclusive car, it is furnished at \$15 for the round trip. There are never less than three funeral parties a day, and during

certain months, when the roads are muddy, have averaged as high as thirty-eight per day for several weeks. The interior of the "funeral car" proper, has been changed somewhat since the illustration was taken and the tables removed and racks built on both sides, accommodating forty caskets in one car. A special train of the funeral and six cars, sufficient to carry 400 people, may be chartered for \$100. During the past six months there have been thirty of these special trains chartered, and the business on both the daily train and specials is rapidly increasing as people become acquainted with the advantages of the plan. From the above it will readily be



INTERIOR OF ATCHISON FUNERAL CAR.

seen that the expense via railroad is, at most, not more than one-fifth what it would be under the old method, while the comfort and saving of time are not to be compared.

Whatever of prejudice may have existed toward the funeral train has disappeared, and it is but fair to believe a similar result may as confidently be expected in the case of the street railway funeral car. The railroad people find the business a profitable one, and there is every reason to believe that very many street railways are situated so as to make an equally good showing in receipts.

The credit of putting into regular service the first funeral street car in this country doubtless belongs to W. L. Challis, president of the

ATCHISON STREET RAILWAY,

of Atchison, Kansas. One of his lines terminates at Mt.

Vernon Cemetery, and Mr. Challis was a firm believer in the feasibility of the scheme, which was ridiculed by others. He went ahead, however, and in 1889 had constructed a funeral car of his own design. It has proved a great success, and there has been no desire on the part of the company to change the style of construction of the car. The illustrations will give a good idea without further detailed description than that the car is eight feet in length, and is provided with seats on either side extending lengthwise, for the accommodation of the undertaker and the bearers. In the center and also extending the length of the car, is a table fitted with rollers for the casket. At the rear are folding doors opening outward, and one broad step extending across the car. Above the panels are stationary plate glass windows, and at the ends of each seat are movable glass windows of plate. The upper panels of the doors are also of glass. There is no front door, and a small platform for the driver. The car is handsomely and appropriately finished with cherry inside, and black and gold outside, and is altogether a handsome piece of workmanship, and the subject of frequent compliment. As will be seen, it has much the appearance of a hearse. The charges are from \$8 to \$10, according to the length of trip and time consumed, and \$3 to \$5 for each additional passenger car. This is very much less than the cost would be for hearse and carriages. The service has given entire satisfaction and has abundantly demonstrated its sphere of usefulness.

With a view to ascertaining how the plan commends itself to the leading undertakers in the larger cities in the country, inquiries were sent out, and a large number of extremely interesting replies received, which will appear next month in connection with a further description of other funeral car methods here and in the city of Mexico, where the service has been in exclusive use for many years.

(To be continued.)

The mayor of Denver recently refused to sign an ordinance for the Metropolitan Road until its officers had first agreed in writing that the line would never be used for other purposes than transportation of passengers. One of these days he will wish he had been more liberal, when the citizens begin to clamor for street mail, express and funeral cars, and other coming necessities.

LA SALLE ELECTRIC LINE.

THE eventful history of rapid transit at La Salle, Illinois, is at present under the quieting influence of a strong, new management. Nations, individuals and street railways are happiest with no romances, and a final adjustment is always a relief. The final reform in street car matters at La Salle has resulted in an important transfer of railway interests, and brings under one management the properties of the La Salle City Electric Railway Company as the City Electric Railway Company. Heretofore the La Salle and Peru Horse and Dummy Railway has labored under disadvantages manifold. For eight years they (not being able to secure a franchise), have been unable to operate their line to Peru but were mainly useful in transportation in the service of the important zinc works. One passenger car only, was in use to maintain the right of way and as even this arrangement expires next year by limitation it cannot be considered as rapid transit.

The new City Electric Railway Company took possession of the old plant on the 1st of July and immediately began extensive improvements. The company elected officers as follows: President, W. G. Reeves; secretary, F. X. Killduff; treasurer, L. B. Merrifield; superintendent, E. S. Enyart. To the latter named gentleman the popular voice ascribes the main part of the honor



THE ATCHISON FUNERAL CAR.

of organizing the new corporation. His long and varied experience in street railway management fits him pre-eminently for his present duties.

Under the new regime one mile of new track has been put in operation and right of way is nearly ready for another of two miles to be completed by '92. T rail is used in the extension and placed at the side of the street. People can now be transported from any part of the two cities of La Salle or Peru to the important points at a 5 cent fare. A new Edison generator has been installed of 60,000 watts capacity.

With the present equipment 50,000 people were carried on four cars during July, and already the business is outgrowing the means of transportation. A new time card has gone into effect, and the electric bond between La Salle and Peru will be the means of increased prosperity to both cities.

BEGIN to get ready for the convention.

STREET RAILWAY LAW.

EDITED BY MR. FRANK H. CLARK, ATTORNEY AT LAW, CHICAGO.

Imputed Negligence in Case of Injury to Child.

When a child of tender years is injured by the negligence of another, the negligence of his parents cannot be imputed to him so as to support the defense of contributory negligence to his suit for damages.

BAILEY, J. The plaintiff at the time he was injured, was a child only six years of age, and was living with his father and step-mother on the south side of Harmon court, a few feet east of the corner of Wabash avenue. The evidence tends to show that just before the time of his injury he was on the south-west corner of Wabash avenue and Harmon court, playing with two other boys, and that his step-mother had come out of her house and was standing on the corner of the opposite side of Wabash avenue; that as she came out to the corner, the plaintiff called to her and asked her if she wanted him, to which she replied: "No, you can stay there;" that an acquaintance of Mrs. Wilcox's coming along, she conversed with her for a few minutes, and then turned to go back to her house, and as she did so the plaintiff called out: "Mamma, wait, I am coming"; that she thereupon stopped and stood waiting for the plaintiff, and as she did so she saw a train of cable cars approaching from the north and motioned to the plaintiff to wait until it had passed, which he did; that as it passed, the plaintiff walked around the rear end of it, and was immediately struck by another train coming from the south, and received his injury.

The only material question in the case open for consideration here, arises upon the third instruction given to the jury at the instance of the plaintiff. The question is whether the negligence of the plaintiff's parents, even if such negligence is proven, can be imputed to the plaintiff, so as to be available in support of the defense of contributory negligence.

Upon this question the decisions of the courts of the various States are very much in conflict. The leading case among those which hold that the negligence of a parent, custodian, or one *in loco parentis* should be imputed to a child not capable of caring for his own safety, is *Hartfield v. Roper*, 21 Wend. 615, decided by the Supreme Court of New York, in 1839. The Court held that although the child, by reason of his tender age, was incapable of using that ordinary care which is required of a discreet and prudent person, the want of such care on the part of his parents furnished the same answer to an action by the child as would the omission of such care by the plaintiff himself in an action by an adult. The reasoning of the Court embodied in an elaborate opinion by Mr. Justice Cowen, is, in substance, that the custody of the child was confided by law to its parents; that said child could not be exposed, as it was in that case, without gross negligence; that an adult injured by a collision could not recover if he had contributed to the injury; that the same rule was applicable to children and could be enforced only by requiring care from those who have them in custody; that an infant is not *sui juris*, but belongs

to his custodian; that the custodian is his agent, and the custodian's neglect is therefore his neglect. The rule thus established has been adhered to, with slight modifications, by the Courts of New York, and has also been adopted by the Courts of several of the other States, and is usually known as the New York rule.

What is known as the English rule is declared in *Waite v. N. W. Ry. Co.*, 1 El. Bl. & El. 719. In that case the plaintiff, an infant about five years old, was in charge of his grandmother, who purchased tickets for both at a station with the intention of taking a train to another point on said line of railway. In crossing the track to reach a platform, they were run down by a train, under circumstances of concurrent negligence on the part of the grandmother and the servants of the company. The grandmother was killed and the plaintiff seriously injured. The court, in holding that no recovery could be had, repudiated the idea that there was any relation between the plaintiff and his grandmother akin to that of principal and agent, but placed its decision upon the theory that he and she were identified the same as though he had been in her arms. The decision turned upon the legal identity between the infant plaintiff and his custodian, and did not go beyond that class of cases in which the parent or custodian is present and controlling the infant at the time of the injury.

In this country, in many of the states, the rule established by the case of *Hartfield v. Roper* has been seriously criticised and condemned. The leading case in which that rule is repudiated, and in which is established what is sometimes called the Vermont rule, is *Robinson v. Cone*, 22 Vt., 213. In that case, a boy, less than four years of age, was attending school in the country, and as he was returning home, he was amusing himself by riding down hill on his sled. While engaged in this sport he was run upon and injured by the two-horse sleigh of the defendant, who was driving down hill on a smart trot. The court held that, although a child of tender years may be on the highway through the fault or negligence of his parents, yet, if he be injured through the negligence of the defendant, he is not precluded from obtaining his redress: all that is required of the infant plaintiff being, that he exercise care and prudence commensurate with his capacity.

The rule denying the doctrine of imputed negligence is now recognized and enforced by the courts of many of the states, and is supported by the reasoning and authority of text-writers whose opinions are justly entitled to a high degree of consideration.

We are disposed to adopt the rule which seems to us to be most reasonable, and most in conformity with the recognized principles of the common law, viz.: that where a child of tender years is injured by the negligence of another, the negligence of his parents or others standing *in loco parentis* can not be imputed to him so as to support the defense of contributory negligence to his suit for

damages. So far then as this branch of the case now under consideration is concerned, the instruction given contained no error as to which the defendant has any just ground of complaint.

(Sup. Ct. Ill., Chicago City Railway Co. v. Wilcox, 23 Chi. Leg. News, 353.)

Injury to Person Boarding Street-car.—Truck in Street.—Negligence.

The plaintiff was injured while getting upon one of defendant's cars in the city of New York, and he brought this action to recover damages for his injuries, alleging that they were caused by negligence attributable to the defendant. Upon the trial he was the sole witness to prove how the injuries were caused, and upon that point his evidence was as follows: "I waited for the car; I saw the car coming—an open car. * * The car slackened. I stepped on the crosswalk and waited for the car, but the car never stopped; it nearly stopped. I waited for the center of the car, and put my foot on the step and took hold of the stanchion, and I was struck by a truck the other side before I had time to go in the car. The car started and the truck was in the street. I struck the hub of the truck in about a second after the car started with me; the car was moving at the time but had nearly stopped. I was struck about six or seven feet from the crossing where I got on."

Upon these facts we think the plaintiff should have been non-suited. But for the truck in the street he would have entered the car in safety and would have been uninjured. The sole question therefore is whether the defendant ought to have guarded the plaintiff against injury from the truck in the street near its track. It was not bound to know that the truck was temporarily there, so close to its track that there was danger that a person attempting to get into one of its cars might be injured by collision therewith. There was no evidence that the driver or conductor of the car saw the truck or perceived the danger, and it does not appear that the conductor was in a position to see the truck. The plaintiff, when he attempted to get upon the car, was probably nearer the truck than the conductor was, and had a better opportunity to see the truck than the conductor had as it was on the same side of the car with him, near him, in plain sight—in fact, in his immediate presence. It was his duty to see for himself that there was no obstacle in his immediate presence outside of the car and the railway track, which made it dangerous for him to attempt to enter the moving car.

(N. Y. Ct. Appls., Second Ave. R. Co. v. Moylan, 5 N. Y. L. Jour., 806.)

Street Railroads—Right to use each others Track—Compensation—Amendment of Franchise.

After plaintiff, a street railway company, had received its charter and established its road, the legislature granted the city a new charter, which provided that any street railroad company should have the right to run its cars over the track of any other street railroad company, on payment of a just compensation for the use thereof, under such regulations as the city should prescribe, and the city

was required to pass the ordinances necessary to carry the provisions into effect. Plaintiff accepted from the city additional franchises, and agreed to conform to any ordinance then existing, or thereafter to be passed, enforcing the charter. Held, that the plaintiff conceded the right of other street railroad companies to use its tracks on payment of a just compensation, and became subject to any ordinance subsequently passed, providing the mode of ascertaining the compensation.

By the provisions of the law as to compensation, it was intended that the city should prescribe the mode of ascertaining the compensation,

A corporation authorized to construct and operate a street railroad in the streets of a city, holds the streets for the public use and subject to the rights of the legislature, when public necessity requires it, to authorize its tracks to be used by another corporation, on payment of a just compensation for such use.

(Sup. Ct. Mo. St. Louis R. Co. v. Southern Ry. Co. 15 S. W. Rep. 1013.)

Action for Personal Injury—Evidence—Affidavit by Plaintiff as to manner of Injury—Fraud in obtaining Signature—Damages for Loss of Time.

Where in an action for personal injuries defendant reads an affidavit by plaintiff purporting to contain a statement of the accident which shows that plaintiff's injury was caused by his own negligence, plaintiff may show in rebuttal that the statements in the affidavit are not correct, that he signed it without reading it, and that it was misread to him by the person who drew it.

A statement in the charge to the jury that such affidavit was read for the purpose of impeaching plaintiff, though not strictly correct, is not reversible error where another part of the charge instructs the jury that if they believe from the evidence that the accident occurred as stated in the affidavit, then plaintiff cannot recover.

Where the declaration set out the injury received and evidence showed that plaintiff was thereby disabled, it is proper to instruct the jury that in estimating the damages they may consider plaintiff's loss of time.

The giving of a correct instruction on the subject of comparative negligence is not reversible error though there is no evidence to support it.

(Sup. Ct. Ill. Chicago City R. Co. v. Hastings. 26 N. E. Rep. 294.)

In several Pennsylvania towns, the local managers desire to replace the old tee rails with girder or tram, but are prevented from doing so by an ancient ordinance permitting only the former. It seems strange that any difficulty should be experienced in removing tee rails, but one company has had to make numerous concessions to secure the desired improvement.

An Iowa road sold a mule the other day, which had been in the service of the company twenty-one years, for 50 cents. Doubtless the price was all right, but it strikes us that the mule having come to his majority should have been set free.

ELEVATED ROAD VICTORY.

THE Chicago & South Side Rapid Transit Elevated Railway Company, better known as the Alley "L" road, which has constructed some three miles of double track elevated road on the South Side in this city, has just scored a signal victory in an injunction suit brought by property owners along a portion of the uncompleted route. This company was organized under the General Railroad Act of the state, and by its authority condemned a right of way 25 feet wide, along an alley extending from Twelfth street to Thirty-ninth street, and between Wabash avenue and State street. This portion of the road has been built and is one of the finest structures of the kind in existence. When the road reached Twelfth street, it encountered a long line of five or more story buildings, the owners of which expressed themselves as greatly in favor of having the road built in the alley, which is 30 feet in width, rather than accept liberal damages and be deprived of store room from tearing down the buildings. This plan was altogether the wisest one and the city council granted the franchise to continue its line by building through this alley to its down town terminus. A few of the property owners who were desirous of pinching the road for the largest possible amount, endeavored to secure a permanent injunction. The Court, however, has ruled that this cannot be granted, and that the road is therefore free to proceed as rapidly as it desires with the completion of the line.

A movement is on foot by which the Chicago City Railway will secure control of the elevated road, and operate it in connection with its system.

LINCOLN LINES.

WITH a capital of \$2,000,000 what can not be done with a street railway system when all energies and interests are securely bound in one agreement?

The Lincoln Street Railway Company and the Lincoln Electric Company have filed articles of agreement, combining these two lines into one system. The new corporation is to be known as the Lincoln Street Railway Company and holding all rights, franchises and properties of the two old corporations, assumes their indebtedness.

The capital stock is divided into 15,000 shares of common stock at \$100 par and 5,000 preferred at \$100. The company guarantees 7 per cent. cumulative dividend payable semi-annually. Shareholders in the electric line are to receive stock in the new one, or cash, as arbitration shall decide.

The articles are signed by J. A. Macfarland, C. J. Ernst and J. W. Deweese, as directors of the Lincoln Street Railway Company and by C. J. Ernst, F. W. Little, J. A. Macfarland, J. W. Deweese, Joseph Sampson, Charles A. Clark and John C. French, as directors of the Lincoln Electric Railway Company. The agreement, which has just been made public, is dated June 15, 1891. This promises fair for extensions, improvements and better service.

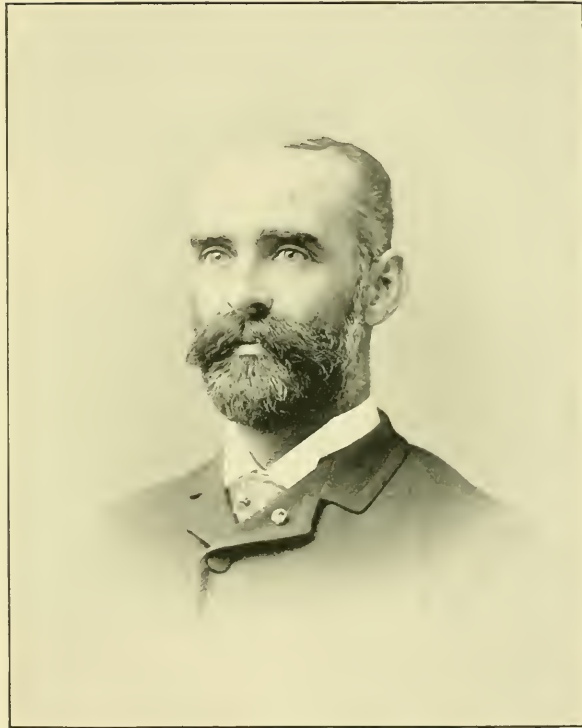
COL. D. B. DYER.

DURING the past two years a considerable number of new names have been added to the list of street railway presidents and managers, and in quite a number of instances the gentlemen thus interested have become so through their railway investments in other cities than their homes. Such was the case with the subject of this sketch, whose portrait appears on the opposite page, and which is that of Col. Daniel Burns Dyer, president and general manager of the Augusta (Georgia) Railway Company.

The life and experience of Col. Dyer have pre-eminently fitted him for his present responsible position, and when to these is added his personal magnetism and his power over men, we have an ideal manager.

Col. Dyer, although he has not divulged the date of his nativity, is still a young man of "something over thirty," who claims Illinois as his native State, having first seen the light of day on a farm near Joliet. A small part of his varied and complete education was acquired at the Illinois State Normal University. Having finished this part of his schooling he went out to the plains in 1869, representing the government among the untutored redmen and trading the comforts of civilization with them for furs. During the early part of his career as Indian agent he induced the savage and belligerent Modocs to settle in houses and turn their scalping knives into plough shares. At this time Col. Dyer had charge of seven other tribes which he governed with but a single outbreak. In 1883 he was placed in charge of the Cheyennes and Arapahoes. Two years later, turning to more peaceful pursuits, Col. Dyer began business in Kansas City, as a broker and real estate agent, where he became acquainted with the great financiers who compose the Jarvis-Conklin syndicate. Always interested in advancement of all enterprises west or south, the hero of this sketch went among the untamed politicians at Washington and here was mainly instrumental in getting the Oklahoma bill passed. Immediately going to the newly opened country he worked for the advancement of its interests, and was forced by the grateful citizens of Guthrie, already a large town, to accept the mayoralty. Here, in a new town of heterogeneous elements, he displayed the greatest tact and executive ability, and in three months left the eighteen thousand people of Guthrie with a fully equipped municipal government.

In December, 1889, Col. Dyer visited the south as far as Georgia, and struck with the thrift and appearance of Augusta, returned in 1890, with the principals of the Jarvis-Conklin syndicate. By February, arrangements had been completed and the franchises granted for the magnificent line of electric railway which facilitate passage through the principal streets of this model southern city. Now, as manager, Col. Dyer holds a high place socially and financially, in Augusta. In all local enterprises Col. Dyer has been ably seconded by his wife, the daughter of N. R. Casey, of Mound City, Illinois. Mrs. Dyer is a southern woman by descent and a charming and accomplished lady.



COL. DANIEL BOONE DYER,

President and General Manager

AUGUSTA (GA.) ELECTRIC RAILWAY.

ELECTRIC LINES IN THE LONE STAR STATE.

THE great and increasingly great, Southwest, whose magnificent plains, mines and manufacturing interests are as yet in their infancy, puts forward the city of Galveston, Texas, as a representative city. There, are gathered together upon the shores of the great gulf of Mexico, nearly 60,000 people, who have built upon an island and the main, the city of Galveston. In 1860, scarcely 7,000 in population, with no public buildings and few adornments besides its situation, to-day, with public works, city, county and federal, with shipping in the harbor flying flags from every nation under the canopy of heaven, and with this the finest seaport on the gulf, capable of all things in commercial progress, this has been the history of the rapid rise of a Southern city. The port, by its ample railway facilities is in touch with the cotton belt, the mining region and the immense cattle plains of the largest State in the Union, a State that occupies one-eleventh of all the land over which floats the flag of the free.

The city itself is finely built and contains the county buildings and United States court house, the finest hospital in the State and twenty churches, among them a Catholic cathedral and school. It is not to be expected that a city so progressive in other matters is behind the times in the methods of urban travel. Nor is it, for here we find a fully equipped line of electric railway. To the citizen of the seaport and the stranger within its gates, the Galveston City Railway Company offer the most rapid and comfortable means of transportation available in this our age of rapidity and comfort, to any point of interest or commercial or social vantage in the Gulf City. Along the entire route of electric construction no legal means have been resorted to in order to stop the car of progress. A few murmured against what they suppose certain death, but no court proceedings marred the progress of the all-conquering motor. The mossback and the mule must surely if slowly retire into the time honored past, to be holden as curiosities of the nineteenth century. The major part of the residents welcome the advent and advantage of rapid transit and court the danger of asphyxia on account of too violent horizontal motion. Among the advantages granted by the new lines involved in the extension of the road, are an increased pay roll, amounting during the construction to \$1,500 per week, the massing of cars before the theatre on opera nights, thus enabling the patrons of Melpomene to reach their homes with despatch and safety from contact with inclem-

ent weather and the improved sightliness of the streets. Altogether, about \$400,000 is the sum representing improvements of a substantial and necessary character.

In reference to this outlay of money, brains and skill, Col. Sinclair, president of the company, says: "The results of the experiments are most encouraging to the company and in evidence of this fact it is only necessary to state that the receipts show a most extraordinary gain over last year, notwithstanding the fact that the road is not operating all of its carrying power yet, and the crowded condition (to the extent of our capacity) shows that the people appreciate the benefits accruing from rapid transit. The earnings of the company show an increase of over \$100

per day ever since the first electric car had buzzed its course down the thoroughfares of our city." This, too, was in the face of the difficulty of not having East and West Broadway in commission a part of the time. The complicated curve work at the intersection of Twenty-first and Market streets alone, cost \$3,000. This enables the cars of all lines to go north or south, east or west, in order to take them to and from their respective lines in and out of the car house on Center street, the only car



POWER HOUSE—GALVESTON CITY RAILWAY.

house on the line. By this means, also, without trouble, cars can be massed in any particularly over-worked line on the road or at any public rendezvous, such as the theatre above mentioned.

The present regular course of the cars are as follows: The cars on Centre street, Beach Hotel and Bath avenue circuit run from the starting hour to 1 o'clock p. m. south on Bath avenue and north on Center, from 1 o'clock p. m. the electrics run the same circuit reversed. The mule car, as assistants to the electrics, run north on Twenty-seventh street and south on Center, until 1 p. m. when their circuit is reversed. The mule cars of the Twenty-third street line run north from the starting time on Thirty-third street and south on Center, and after 1 p. m. the cars will be reversed and run south, starting from Twenty-second street, out Thirty-third street and north on Center. The Market street electric is the most serviceable, starting from Eighth and Market goes west to Thirty-third and Market, south one block on Thirty-third street and west on Church street to Forty-first,

It takes in, en route, the twine factories, rope walks, cotton mills, bagging works, and back on Winnie and Thirty-third streets, north on Thirty-third to Market, thence east to the starting point. This arrangement brings the greatest carrying capacity to bear upon the most crowded parts of the city.

THE PLANT.

The power plant of the Galveston City Railway Company is an ornament to the city and a credit to the company. The car station is in the same set of buildings as represented by the lower structure in the engraving on the preceding page. In the car house are five exits for cars, each exit having its own track and switches, thus immeasurably facilitating the handling and shifting of cars, both as to time and trouble. This car-house has a capacity of ninety cars on the lower or ground floor and an elevator for raising them to the second floor, where we find a complete repair shop, store-room, supply and paint shop, thus obviating the necessity of removing cars to different buildings for the hundreds of little repairs that otherwise might be neglected if it were necessary to move them any considerable distance. Three artesian wells and a private water works system (all owned by the corporation) supply water to the entire plant, and bath tubs, both on the first and second floor minister to the wants of the employes after the day's labor. The higher portion of this pile of buildings represents

THE POWER HOUSE.

Here, as before, the greatest convenience works toward the end of the greatest economy and the largest capacity. The boilers are of the C. & G. Cooper & Co.'s make, of Mt. Vernon, Ohio, and the plant is provided with a battery of four, of 100 horse power each. The battery is equipped with Brighton stokers. The magnificently constructed smoke stack, one hundred and seventy feet high, insures a first class draught, besides being noted as one of the tallest stacks in the South. We have too, the pleasure of presenting an engraving of the great engine, of 400-horse-power, which is the main driver of the plant. It is of the compound Corliss pattern and manufactured by the same company that constructed the boilers, the C. & G. Cooper Company, of Mt. Vernon, Ohio. In addition to the Corliss power, the plant has two Westinghouse compound engines of less power, which are used for early and late service, when the cars first go out in the morning and for night power on the electric lighting

plant. These three engines represent sufficient power to run the road without hitch or difficulty, three hundred and sixty-five days in the year, heating, lighting and electrifying the whole plant. The immense lines of belting used by the various parts of the plant is furnished by the Chicago Belting Company and gives entire satisfaction. The entire space covered by power and car houses is 300 feet east and west by 120 feet north and south, occupying seven city lots.

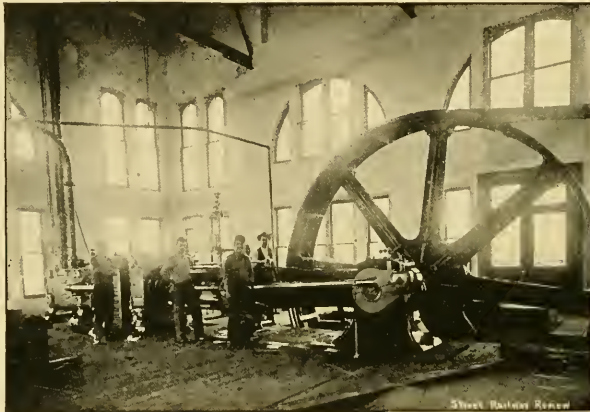
THE ELECTRICAL EQUIPMENT

consists of two 100-horse-power generators from the shops of the Detroit Electrical Works, Detroit, Mich. Another dynamo of 250 horse-power, made by the Edison Company, renders necessary assistance, making in all 450-horse-power available for constant use.

All the shafting in use for the transmission of power is made by the Hill Clutch Works, of Cleveland, Ohio, which firm is too well known throughout the country to say more than that the great advantage of perfect and economical transmission of power, as instanced by this plant thus equipped, is half the battle where a great amount of power is used with constant and unremitting work. Thus, with the latest methods the Galveston City Railway Company has at great expense prepared the power, equipment and roadbed for city transportation.

THE RAILWAY

proper, is 20 miles in length, of 4 feet 8½ inch gauge, T rail, weighing 40 pounds to the yard, made by the Pennsylvania Steel Company. Upon this track run 20 Rae motors, furnished by the Detroit Electrical Company. The cars are 16 feet in length and carry in tow 12-foot trail cars. The new cars were built by the Feigel Car Company and are very convenient and well made. The road passes several pleasure resorts, among them the Beach Hotel Lawn, a beautiful seaside pleasure place, and Woolams' Lake. To these places many are attracted in addition to the regular business



INTERIOR OF POWER HOUSE.

Year.	Months.	Total Pass'ngers.	Daily Av'ge
1887	January 1 to June 30	1,023,408	5,654.
1888	" " "	1,171,780	6,438.
1889	" " "	1,349,765	7,457. •
1890	" " "	1,391,501	7,688.
1891	" " "	1,624,178	8,973.

traffic. The above schedule of increase of traffic shows two things: First, that the people become educated to street cars, and second, that the last six months' record is due to the introduction of rapid transit.

The table shows a very satisfactory gain, particularly for the last six months,—in which period the electric motors were started—as the daily increase over 1890 is greater than the total increase in the three preceding years combined.

The management now thinks that the traffic will steadily increase with the extension of suburban lines and the education of the people in the advantages of rapid transit.

To no one person is due in so large measure the success and progress of the company and the adoption of modern methods, as to the president, Col. Sinclair, who is acknowledged as without a peer among the street railway managers of the South. He has good reason to feel proud of his achievements and the good people of Galveston naturally appreciate what he is doing for them.

One of the most interesting pictures we have to present in this issue is that of the double crossing at Market and Center streets and the first cars along that thoroughfare. The interested throng, the crowded cars, the proud employes and the attractive motors, make a fine picture of progress, while the newspaper building that forms the background, only emphasizes the fact that all enterprises must be backed by the potent agency of printers' ink. Hand in hand the two elements of the press and rapid transit shall build out of the raw materials of people and property, the crowning effort of our present day political economy—a well conducted municipality, until North and South, East and West we shall find more cities like Galveston and more railways as well conducted as the Galveston City Railway.

THE NEWARK SALE.

THE Newark Passenger Railway Company has bought out the Rapid Transit property at the price of \$1,000,000, or at the rate of five for every original dollar put into the stock.

The old road, the Newark Passenger Company, by some miscalculation did not take the franchise offered them along the newer streets and populous avenues of the suburbs. The Rapid Transit Company was organized in 1889, took this part of the city and coined hard money at the expense of the old road. It soon became evident that a buy would be necessary in order to make the older road a profitable affair, so an offer of a

million was made and accepted. The buyers assume also the bonded debt. The purchased road is five miles long, double tracked, and has carried on an average, 16,000 people per diem since the start.

New lines will be built, tapping other populous districts. Shortly after the sale the employes treated the new management to a strike, arising from the discharge of some of the old Rapid Transit men, and a general order requiring a \$20 deposit from conductors. The disturbance was short and the men quickly gave up the fight and returned to work. Greatly increased facilities are now promised in extensions and additional equipment.

STEEL SMOKE STACKS.

EVERY day brings forward some new use for steel. The latest innovation is its application to chimney building for the large mercantile houses now rising to such enormous heights upon every corner. The uses of elevators, steam heat, and the score of other necessary applications of power, compel the building of high chimneys to conduct above a sixteen-story edifice the smoke, gases and cinders. One building, the "Fair," is to have a chimney 250 feet high, of a steel stack $\frac{3}{8}$ inches thick at the bottom, $\frac{5}{8}$ inches at the top and 9 feet 5 inches in outside diameter. It will carry away the volatile refuse of twelve 60-inch boilers. Steel chimneys are lighter, 60 per cent. cheaper and occupy less space than brick. The Leiter building will have



MARKET AND CENTER STREETS, GALVESTON.

a 200-foot chimney, 10 feet in diameter; to be used with nine 72-inch boilers. The Auditorium also has a steel stack. In each case the inside is lined with fire brick to a height of about 100 feet.

WHEN the Columbus & Orinoco, Ohio, electric lines were started, W. M. Graves, a prominent capitalist, paid the first fare by depositing \$250 in gold in the box, as a voluntary bonus to the road. Of all lines this ought to enjoy the distinction of being a "gilt edged" route.

THE Des Moines Railway is giving free concerts each Sunday afternoon at the Zoo, which are attended by thousands. The Iowa State band, one of the best in the State, furnishes the wind.

SCHOOL tickets are sold by the Atchison, Kansas, road for \$1 per month.

UP A MOUNTAIN ON A WIRE.

FOR years the croakers and kickers had prophesied death and destruction along the line of every electric railway. Horrible pictures of mangled bodies and deformed lives arose before their heated imaginations. The first few accidents were hailed with ghoulish glee, and every successful trip and new enterprise drew to even greater length their extended countenances. But electric transit? It kept right on conquering, by worth, its way into the good graces and finally into the necessity of the busy public. Now the only question is, how can we put to larger uses this greatest and most subtle of native powers?

The level road, of every width and narrowness, straightness or crookedness, is an easy task to the electrical engineer. Now to greater difficulties he aspires, and finds a fair field for his ingenuity in mountain climbing. When electrically guided, we shoot over the Rockies and the

switch-back, in the path of the electric motor, follows a grade running from 3.4 to 6.4 per cent. After reaching the top the road winds its serpentine course down on the other side to Klappertal Park, passing on its way numberless other pleasure resorts and picnic grounds, through the beautiful scenery effected by the valley and the lovely Schuylkill river.

The road began traffic during the summer of '90; its equipment consisting of cars run by Edison No. 6, double reduction 15-horse-power street car motors. Since then, in view of the fact that the empty cars weigh 13 tons and often carry 100 passengers, all the new cars have two of the new 25-horse-power single reduction motors, which are giving excellent results.

The Edison people are to be congratulated on the success attained. Now there are in operation six 38 foot cars, each weighing about 13 tons. The cars used are of the Brill double truck pattern.



AT THE SUMMIT—NEVERSINK MOUNTAIN ELECTRIC RAILWAY.

Alps, electrical engineers must seek yet harder diversion. Among the feats of engineering lately accomplished, none ought to arouse greater admiration than electric construction and operation on grades, and electric roads will soon present to the poorer traveling public, sights and scenes reserved now to the rich and leisure-blessed mortals we read about. Among the finest scenery so far rendered accessible, is that disclosed by the route of the Neversink Mountain Electric Railway, running out of Reading, Pennsylvania.

The physical conditions of the route proposed and demanded by travelers was enough to balk any one but a twentieth century engineer. The line under discussion starting from the heart of the great manufacturing center of Reading to the very pinnacle of Neversink. For 12 miles the railway, by a series of curves and only one

Through the excellence of the motors and construction and the special oil boxes there is almost no noise.

The power station is situated on the Schuylkill river, at the extreme end of the line. It consists of two Edison 80-kilowatt generators, driven from counter shafting operated by two turbines. The weight of the cars, the type of rails, and character of the road bed, closely resembles a steam railway line, and indicate that the Edison General Electric Company do not intend to limit their operations to ordinary street car work, and no doubt encouraged by this success, other similar roads will soon be in operation.

The illustration on the opposite page shows the electric car at a point midway up the mountain, with the beautiful panorama of the Schuylkill valley stretching out below in the distance.

KANKAKEE ELECTRIC.

IT would be hard to find a more inviting route on which to build an electric line than that chosen by the Kankakee Electric Railway Company, Kankakee, Ill., which place is fast becoming one of the favorite summer resorts for Chicago people. In addition to a large number of visitors during the summer, the city is a well known manufacturing center, and one of the most prosperous in the state.

The new road, which is a little less than six miles long was opened recently and is running very successfully. The motors were furnished by the Westinghouse Company and are of 20-horse-power each. The gears are encased and run in oil, which renders them practically noiseless.

The officers of the company are T. F. Andrews, president; T. W. Adams, treasurer, and Charles H. Cobb, general manager.

The road was opened July 25th, and a large number of Chicago visitors who are interested in electric railways were present, and were royally entertained by Mr. J. L. Barclay, manager of the Westinghouse Company of Chicago, and Mr. W. R. Mason, general manager of the Electric Merchandise Company. The road is fast developing a profitable local business in addition to the transient travel, and altogether is a system of which the citizens of the place may well feel proud.

The postmaster and railway officials at Milwaukee do not favor the letter-box on the car system.



CLIMBING THE MOUNTAIN—NEVERSINK MOUNTAIN ELECTRIC RAILWAY.

The cars are 16 feet in length and are as pretty as any that have left the Pullman shops in a long time. They run on the new McGuire truck and altogether make very pleasant riding. The track work was all done under contract with the well known builder, C. E. Loss, of Chicago, while the overhead work was furnished by the Electric Merchandise Company of this city. The line extends to the Riverside Hotel, one of the most beautiful spots imaginable, and the travel has been so great it has been found necessary to order additional trailers to take care of the business. The power station is handsomely equipped and driven by a 90-horse-power Paine engine, and the well known Hazelton Tripod boilers. The Western Electric Company, whose generators for railway purposes are proving so satisfactory, furnish the dynamo, which is an 80-horse-power. It is working perfectly and is giving the best of satisfaction. As the electric is the first railway in Kankakee its success is extremely gratifying.

PICKETS FROM THE GOLDEN GATE.

A LIVELY fight occurred with some one hundred workmen on either side as the result of an attempt by the Market street cable line to lay its conduit into the park, the Omnibus company having previously laid a few rails on the surface to hold the ground. The probability is, a compromise will be effected, with double tracks laid for the joint use of both companies.

The completion of the San Francisco & San Mateo Railroad, the new electric line, was celebrated on July 29th with imposing ceremonies, concluding with the driving of a silver spike by President Joost. The road commences at Market and Stewart streets in San Francisco, and is double tracked until it reaches the suburbs, from which point it is single track. The road is 12 miles in length and part of the way climbs a 10 per cent. grade.

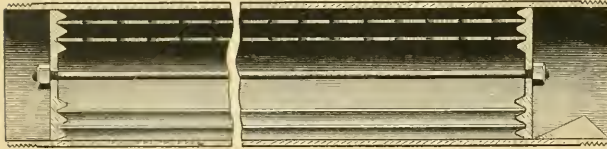
The Cliff House & Ferries Railway Company will extend their cable line at once.

CONSTRUCTION AND EQUIPMENT NOTES.

A Mechanical Feed-Water Purifier for Stationary Boilers.

THE accompanying cut shows the adaptation to a stationary boiler of a mechanical means for collecting and getting rid of the greater part of impurities found in most waters.

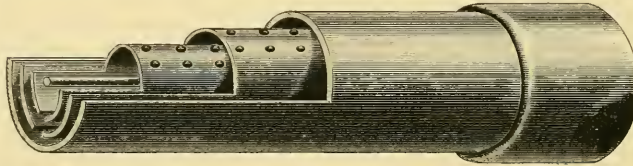
Being placed inside the boiler, it obtains the high heat



SECTIONAL VIEW SHOWING DAM AND METAL SURFACES.



END VIEW SHOWING DAM.

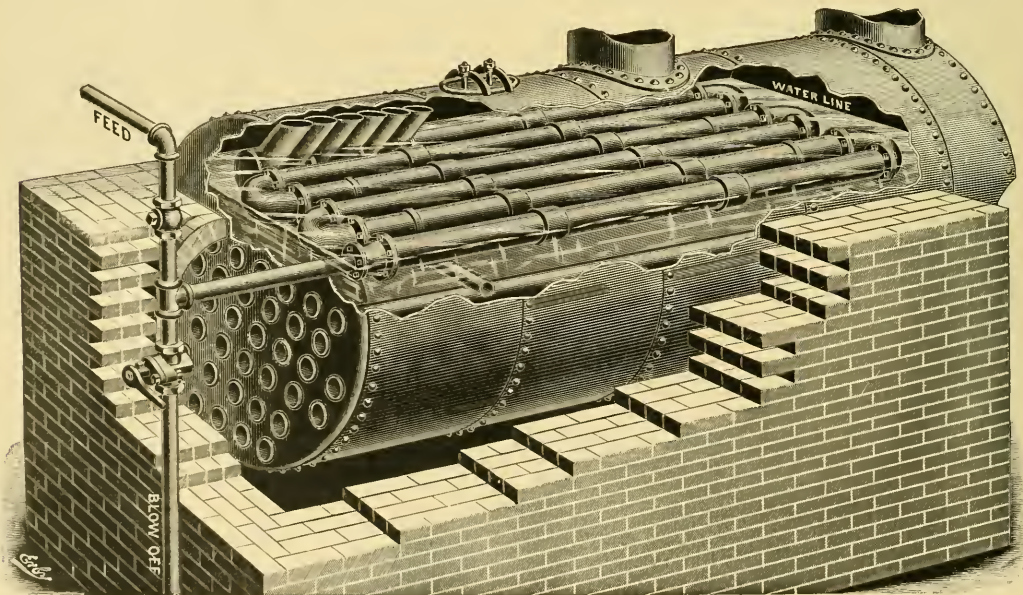


SECTIONAL VIEW SHOWING INTERIOR METAL SURFACES.

requisite to precipitate the carbonates and sulphates of lime, and being submerged in water it avoids the evil effects of baking.

Different from some similar purifiers which blow off with water, thus reducing the water in the boiler, this one

heated above boiling point by the time it reaches three lengths of the purifier, and is then further heated to a sufficient temperature to precipitate the impurities which settle in a moist form and are checked from going into the boiler by the attraction of metal surfaces within the purifier and



FIELD FEED-WATER PURIFIER APPLIED TO STATIONARY BOILER.

blows off with live steam, getting a better scouring effect, and in case of the blow off valve sticking, runs no chance of reducing water in boiler and exposing the flues. Since it is made in sections with right and left threads it does

small dams; so that when the blow off cock is opened, the rapid rush of steam carries them out, thus handling the water in a practical and common sense manner.

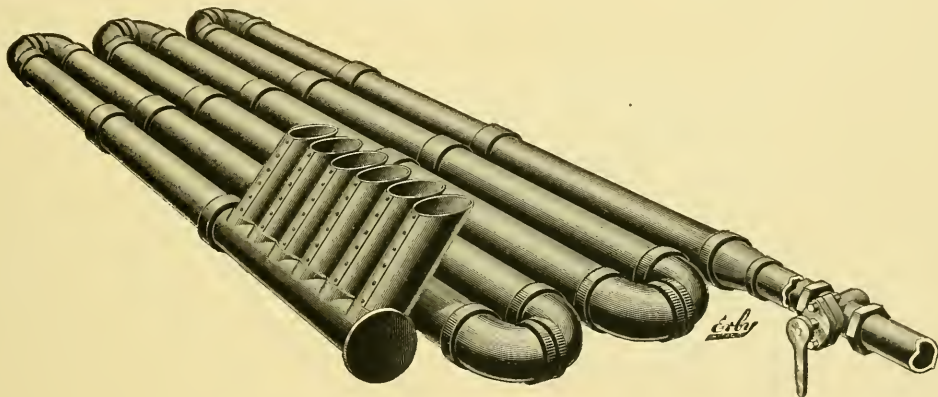
The accompanying cuts show the construction of tubes

and also the interior construction of metal surfaces, made of 24 inch sheet steel so as to present area for deposits.

These Purifiers in actual use have shown an extension in the period between washing out of the boiler of from four to five times as long as for same boilers previously without them.

The same Purifier is in use in locomotives on the Great Northern, Baltimore & Ohio, Southern Pacific and Wisconsin Central Railroads. After a fifteen months' use of one on the latter road, the purifier was examined and found in good condition, not filled up, and the engine had only been washed out twice in five months instead of every two weeks. So far, the other roads express their entire satisfaction with its work.

They are adapted to all horizontal boilers, and in districts where the water is hard are making surprisingly good records. Two have been in use in the large plant of the electric road at Minneapolis, which uses Babcock & Wilcox boilers, and in a seven months' trial have demonstrated the fact of a great saving in washing out.



PURIFIER FOR STATIONARY BOILER.

The American Wire Nail Company, of Anderson, Ind., where the water is very dirty, have had two on trial for five months, and have recently equipped their entire battery of ten boilers with them.

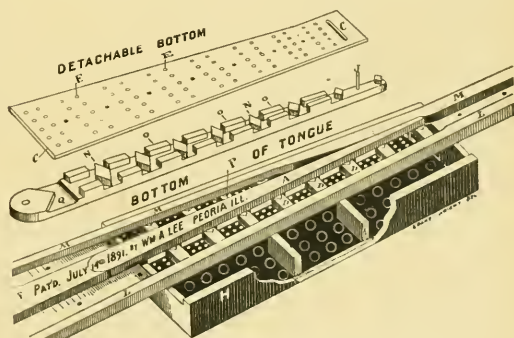
It is not claimed for the purifier that it will absolutely purify all waters, as there are occasional waters where this is impossible, except by methods which are so expensive as to be an actual prohibition on their use, but setting aside the few occasional exceptions of this kind, and which are fully conceded by engineers as phenomenal, these purifiers work with results that are highly satisfactory. By their use it may confidently be expected that the life of the flues will be fully twice that steaming under the same circumstances without them, not to mention the saving in expense of washing. For electric railways, where boilers are under pressure a larger number of hours than in almost any other service, and especially where railway and lighting work is done from the same plant, the saving of time is of the highest importance. Electric railway managers, especially those in districts where the water is giving trouble, will certainly find the subject worthy

of inspection and careful investigation. The fact that a trial is uniformly followed by second orders is very suggestive. The purifier is the invention of and is manufactured by the Field Feed Water Purifier Company, of Chicago, whose general office is at 134 Van Buren street, and in which some of the heaviest capitalists in the city are interested.

Self Cleaning Railway Switch.

A SELF cleaning switch for street railway service has just been patented by Wm. A. Lee, of Peoria, Ills. Its principal will be readily understood from the accompanying cut. The bottom of switch tongue has oblong and diamond shaped lugs, which slide on the metal cross bars "D," and readily cause any dirt which may gather in the switch to drop into an iron box beneath, which may be connected with sewer where desired. It is claimed this reduces the work of track cleaners, as all dirt is cut and easily made to drop into the box below whenever switch is turned. The whole may also be used

in connection with any of the automatic switches. When the box needs cleaning the lid may readily be removed



LEE'S SELF CLEANING SWITCH.

and the contents taken out in a few minutes, though where sewer connection is had the most of the dirt would be carried away by the natural flow of water from rains.

A Stalwart Steel Pole.

N response to the demands for an iron or steel pole for electric street railways, there have been brought into the market many designs. The manufacturer of each hoping that his production had attained all the qualities desired for the purpose for which a pole is required: among and most prominent of these qualities aimed at are strength and cheapness. In the manufacturer's efforts to combine both in one construction, we see how fully has been proven the old axiom, "Better to do one thing well than to do two things poorly," for in the efforts put forth in this line, it too often occurs that the principle of cheapness, if the dominant idea in the construction, is attained at the expense of the mechanical principle of strength, and where the principle of strength has dominated the manufacturer's mind his idea of economy is lost sight of. Therefore it is with great pleasure we note the interblending of economy and strength in the symmetrical and mechanical construction of the steel poles made by the Walton Architectural Iron Company. They manufacture two kinds of poles, one of the flat and girder shape, and the other of tube shape, either of which, to use the statement of a prominent engineer in railway construction, combines in symmetrical and ornamental fullness all the true mechanical principles possible to be gotten into a pole. The Ellison pole meets the wants of those constructionists and railway owners whose minds are fixed on the girder or flat shape and is constructed of angle irons and a steel web as follows:

A steel web tapering in shape, 12 inches at the curb and 4 inches at the top, is securely riveted between two angle irons on each side. The angle iron face being $5\frac{1}{4}$ inches at top and bottom, from curb line to bottom, which is 6 feet, and latticed bars are riveted between the angle irons on each side for the purpose of more securely sustaining the pole in an upright position, when placed in the ground. The full length of the pole is 28 feet. When used as a side pole it is set with the narrow face to the curb, so as to give its greatest possible strength with the strain necessary for poles in side construction. When this pole is used for center construction or for center poles, it may be placed with either the broad or narrow face parallel to the tracks. Double arm brackets are attached for center pole con-

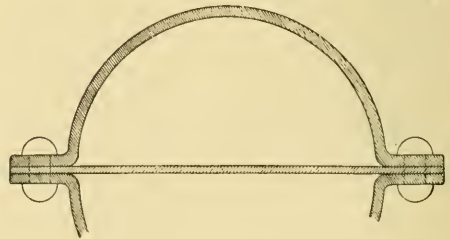
struction, of such length as may be required. Short arms will be attached for the purpose of carrying feed wires or other wires if demanded and at such points as desired.

The Strong's Steel Tubular Pole brings to street railways a tube, that ever desirable shape for making a pole. In this pipe or tube pole, the Walton Architectural Iron

Company has cut off the objectionable features of joints, collars and laps. It is made of two tapering steel plates rolled into semi-tube shape, leaving a flange of $1\frac{1}{2}$ inches on each side. These two half-tube steel plates are then firmly riveted together by hydraulic riveting machines, making a solid steel tubular pole with a diameter of $7\frac{1}{2}$ inches at bottom and $4\frac{1}{2}$ inches at top, there being no joints in the unbroken tapering line from bottom to top. It has a strain resistance much greater than is demanded either in side construction or center construction of street railways, which can be increased to any desired amount by riveting these flanges, steel web-plates running from top to bottom if necessary. For side construction this pole should be set with the flanges at right angles to the curb, so that the strain is across its greatest strength. For center construction it should be set with the flanges parallel to the tracks, so that the smooth surface will be presented to the cars. Brackets and side arms either for center construction or side construction can be attached to meet the various wants of different companies.

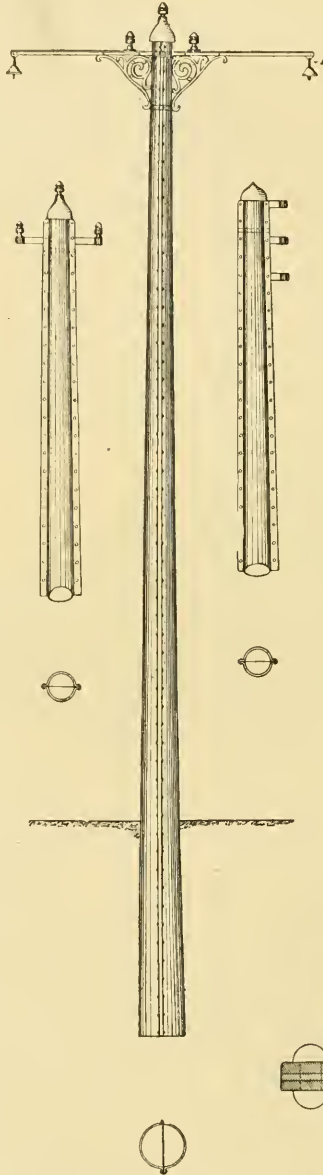
THE VILLARD SYNDICATE.

LATE manifestations in regard to the big street railway combination at Milwaukee, bring to light the fact that the Villard people have gained



CROSS SECTION, WALWORTH POLE.

possession of the last line, the Milwaukee City Company, which has been still operating under a distinct name, and coalesced with its big and dangerous rival, known as the Pfister Company. All the lines will be equipped with electricity from the great Villard plant. This places all the intramural lines under one management and promises good service to the Cream City.



A Mechanical Regulating Clutch.

TAKE two good-sized, ordinary cambric needles, and stick them firmly, one in each end of a pine broomstick. Rest the needles each on the rim of a glass tumbler, with the tumblers on the edge of two chairs which are the length of the broomstick apart. Now strike a sharp quick blow with a dull hatchet or other equally thin implement, at the middle of the broomstick, and the surprising result is the cutting in two of the stick, while the needles and glasses are unharmed. Under a steady weight the stick would sustain many times the strain which would break the needles, but the action of the sudden blow fractures the wood fibers before its force reaches the ends.

This old and simple experiment is not altogether a bad illustration of the blow which strikes the motor armature when the driver turns on the current to start the car. The force thus turned on varies greatly, according to circumstances, and might not be precisely the same at any two times on a whole trip. The inertia also to be overcome by the motor, varies even more often according to load, condition of rail and grade; while the discretion which the driver should use, in turning on current in proportion to his load, can never be counted on with any great degree of certainty. Nor is this undue strain confined solely to the motor armature, but is shared also by the machinery at the power station. To relieve this severe

mechanical stress the Universal Electric Railway Construction Company, of Philadelphia, have brought out a mechanical regulating clutch, which stops and starts a car gradually. It is claimed for this device that its mechanism has been so simplified and perfected that its action is positive to whatever position it is desired to work it, and that by its use the car is started so gradually that only one-fourth the force is allowed to act, which would otherwise enter the motor, and therefore the burning out of an armature is an utter impossibility. Also, that after the car is in motion, the car can be stopped and started without interfering with the electrical energy or increasing it in the slightest degree. The motor runs continuously, and only works when the clutch is thrown into contact.

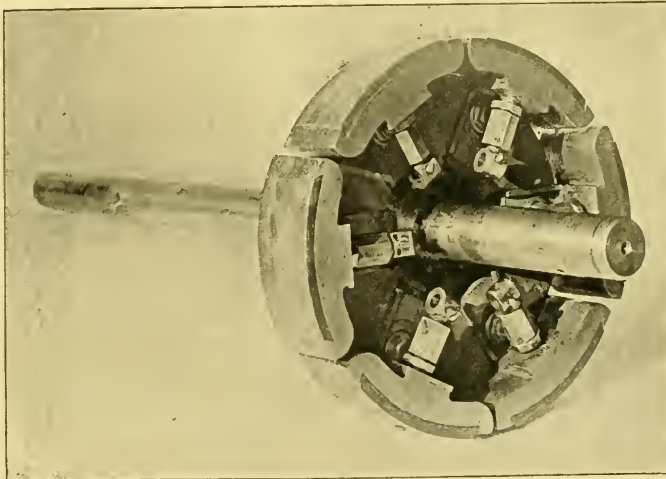
By reference to the illustrations it will be seen that this clutch is so constructed, that in order to start a car, it is only necessary to move the lever which has the effect of permitting the outside wheel of the clutch to revolve freely with the armature. The momentum is thus

obtained by the expenditure of one-fourth the electrical energy otherwise necessary to start a car, the dead weight of which offers so much resistance.

With this regulating clutch, there is but one lever, of very simple form of motion, and by the application of this one motion of lever, to stop a car, the armature is permitted to revolve, while, at the same time, a direct connection is made in the operation of the car brakes.

One of the important movements in connection with this clutch, is the prevention of the wear and tear of armatures, brush commutators, etc., while a car is descending a short or a long grade. This is accomplished by the use of a small shoe connected with the main brake rod, which shoe is gradually pressed onto the inside rim of the armature, thus permitting a car to run down grade while the armature is at a standstill. In order to prevent a driver from starting a car with the use of the maximum quantity of electrical energy by throwing forward the lever quickly, the lever is so constructed that its use com-

pels him to start a car gradually by the application of the minimum quantity of electrical energy. Another important feature is the adjustment of the whole six shoes by only one movement of a small screw on the outside of the clutch. Each clutch is encased with cast iron to exclude dust and dirt, and with the exception of occasionally oiling and adjusting the shoes two or three times a year, the clutch should require no attention whatever. By its use



THE UNIVERSAL CLUTCH—VIEW OF INTERIOR MECHANISM

the power required in generating current at the power station is considerably reduced, it is stated.

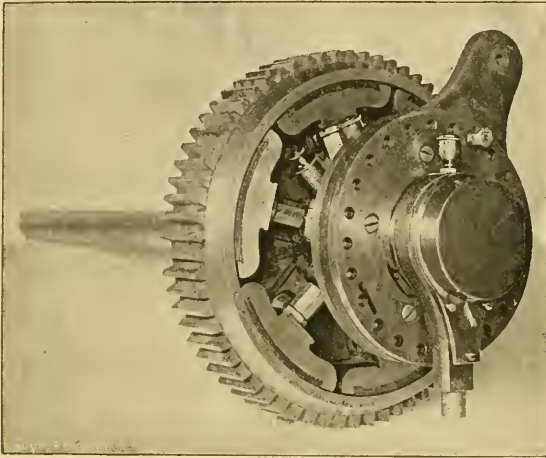
Its use is not confined to electric street railways, but is adapted to mining and factory machinery, and electric light and power stations of every kind. In a plant in which a number of these clutches may be used, any of them can be manipulated by a push-button connection from any central point, or from the superintendent's office.

These regulating clutches are in use on the cars of the Atlantic City Electric Street Railway of the Pennsylvania road, and during the few weeks they have been running there have proved highly satisfactory.

J. F. McLaughlin, electrical manager of the company, thus explains in language not technical, the difference between starting a car with and without the use of the clutch: "In order to start a car on level ground without the regulating clutch, say the use of about forty amperes is required. The instant this electrical current is turned on at the power station, it flashes along the wire, without

being under any control as far as speed is concerned, and hisses into the armature with full forty ampere force, which is necessary to produce sufficient momentum to start the car. This has the effect of shocking the coils on the armature and, in consequence of the violent mechanical stress thrown on the wires, burns them to such an extent, in a short time, as to require recoiling. In other words, the moment the electrical current is released, that moment it goes to its destination like a shot from a cannon; there being no gradual force whatever.

The method of starting a car with the use of the clutch, is explained by the following illustration: If the tail-board of a car were made strong enough to stand the shock of



THE UNIVERSAL CLUTCH—COMPLETE CLUTCH, UNCAPPED.

a ball propelled from a cannon with a force equal to the motive power of forty amperes, the momentum of the car would be gained by the shock of the ball; but the same result can be accomplished by applying considerably less force, (say the pushing of a couple of men) which would start the car gradually and thus obviate the necessity of shocking the car with the cannon-ball. In short, the regulating clutch has complete control of the application of the current to the armature, and, by the manipulation of the clutch, the current is applied gradually until the momentum is attained and the burning-out of the coils is an impossibility."

The factory of the Universal Electric Railway Construction Company is in Philadelphia, and the general office in the Bullitt building. The officers are A. O. Dayton, president; Edward Eldred, vice-president, and W. C. McCurdy, secretary and treasurer.

HARRY J. GOODMAN, superintendent of construction of the Detroit City Railway, died in that city July 30th, of typhoid fever.

MR. KERPER denies the rumor and statements of the Indianapolis papers that he has become interested in the Broad Ripple Rapid Transit Company of that city.

The Patton Motor.

FOR a number of months past W. H. Patton has persevered in his experiments at Pullman, with an electric car, which should combine in one, power plant, generator, storage battery and street car motor. For the last three weeks the Patton motor has been running every day on the street car tracks of Pullman, and no less an authority than General Manager Sessions pronounces it a thoroughly practical machine. The driving plant, which is placed in the center of the car and occupies a space the width of the car and about seven feet long, consists of a 10 H. P. gas engine which runs continuously and drives a generator, the wires of which lead to both the motor—which is placed upon the car trucks in the usual manner—and to a series of storage batteries which are underneath the seats and out of sight. It is well known that four times the amount of power is required to start a car under ordinary circumstances that is necessary to propel it after once in motion. When the Patton car has started, the gas engine is able to generate sufficient electricity to drive the motor; and while the car is at a standstill, coming to a stop or on the down grade, the power generated in excess of what is actually used in propelling the car is stored in the batteries for future use. In starting the car no perceptible deviation can be noticed in the action of the gas engine, as the increased force expended in overcoming the inertia of the car is taken from the storage batteries.

A speed of ten miles an hour has been attained and the motor has had no difficulty in drawing a large trailer fully loaded with passengers over the Pullman tracks, which are three and three-fourths miles in length, and purposely built for testing purposes with twenty-five severe curves, some of which are less than twenty-three feet radius. The gas engine when started requires no further attention, but is entirely automatic, and will run continuously until the supply of oil has been exhausted.



THE UNIVERSAL CLUTCH—NON-ROTATING SCREW.

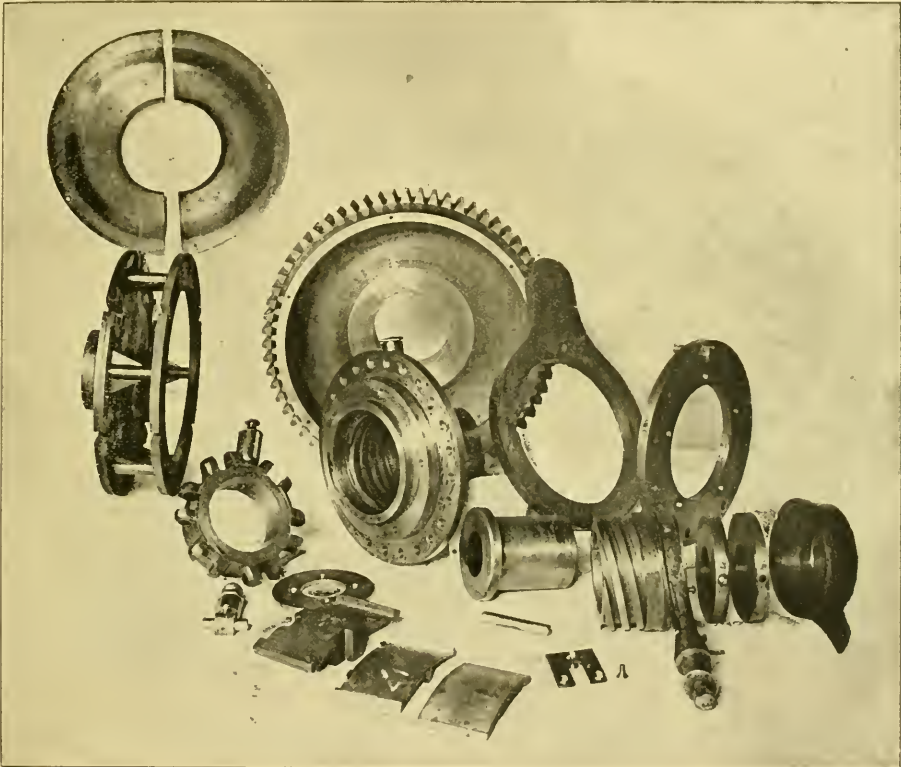
Its operation obviously is quite inexpensive and is but a few cents per hour. No skilled labor is required to operate the car, as the driver who has had sole charge of it for the past three weeks had never had any previous experience with electric cars. The current is turned on

and off by a simple lever motion, and the flow of current from the batteries when a greater power is required than furnished by the generator, is entirely automatic. In fact the driver has nothing whatever to do but turn the lever in one direction to go ahead and in the reverse to back up.

This system is intended to obviate the special track and overhead construction, while the wear on the batteries is said to be almost nothing as compared with what has been known as storage battery system for street cars, as there are no such wide ranges of charging and discharging as in them.

SHORT OF WIND.

THE Judson Pneumatic Railroad Company, which exhibited a model at the Minneapolis convention, and later constructed a line in Washington, D. C., to demonstrate its advantages, has struck a snag. Power was to be communicated to cars by means of a system of side rollers brought into contact with a shaft revolving in a conduit: the shaft being driven by engines at frequent intervals, propelled by compressed air at a central station. The model was an extremely ingenious affair and the promoters pleasant and competent gentlemen, but the road in Washington, built several months since, has not yet



INDIVIDUAL PARTS OF THE UNIVERSAL CLUTCH.

The president of the company is Mr. A. B. Pullman, whose office is at 45 Lakeside building, in this city, and the motor is being visited daily by interested electricians and railway managers.

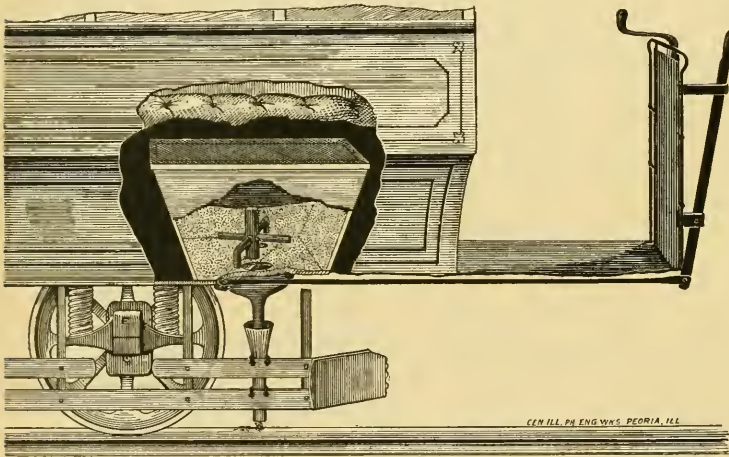
THE ATLANTIC AID ASSOCIATION, whose president and originator is W. J. Richardson, secretary of the Atlantic Avenue Railway, of Brooklyn, held its second annual picnic on July 11th, at Rockaway Beach. The attendance was very large and nothing was left undone in the way of entertainment, which consisted of music, games and dancing. The association has already paid out in sick and death benefits some \$6,000 and is in a highly prosperous condition.

been operated, and a few days ago an order of court directed that the real estate and buildings be sold to satisfy clamorous creditors. A vast amount of money has been spent and it is to be regretted that the line appears to be more rheumatic than pneumatic; but there can hardly be much hope for a system which costs more to build than a cable road, and more to operate than either cable or electricity. We are convinced the system can be made to work, but as firmly of opinion that it cannot be operated at a cost which will not prove a practical prohibition on its adoption.

THE Madison, Wisconsin, lines have been sold by C. B. Holmes to the Thompson-Houston Company.

Harper's Sand Box.

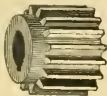
A SAND BOX has been put on the market by the inventor, J. M. Harper, of Peoria, which presents several new and desirable features. The box is placed within the car and under the seat where it is out of the way, and if desired may be hid by a panel. To fill the box the seat is lifted and the sand poured in. On the top of the box a wire net is stretched, which prevents any pebbles, which may have escaped in screening, from entering the box. At the bottom and in the center is the port which is regulated by the lever at the dash. It may be opened as much or little as required, and allows the sand to pass through into an iron funnel which delivers into a vertical pipe directly over and extending almost to the rail. The port is round and divided into four segments. Directly over it, and automatically turned with every opening or closing of the port, is an agitation of four pins, which stirs the sand; so no matter how packed it may have become when sand is wanted, it is sure to drop. One or more



HARPER'S SAND BOX.

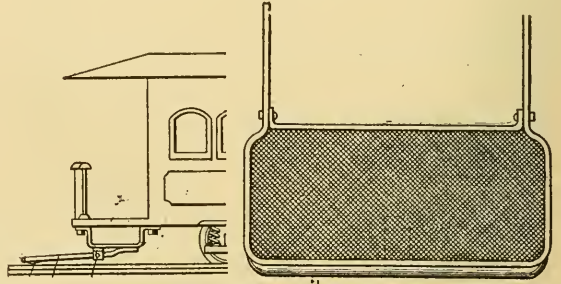
boxes may be placed on each car as desired, and all worked simultaneously or in series, and from one lever at either or at both ends of the car. The fulcrum point is so placed that it is necessary to throw the lever only three inches to secure the full flow of sand. The box is extremely simple in design, and not expensive, and has been pronounced a thoroughly practical device by competent railway men. It has been in use on the electric cars in Peoria for some time with highly satisfactory results.

Mr. Harper has also patented a new cast iron pinion for electric motors, which run in mesh with steel pinions and trials have proved so satisfactory on the Peoria lines that they have been adopted on all the cars there. President Woodward, of the Central Railway Company, Peoria, speaks very highly of them. The teeth are so bevelled that the point of greatest strain is greatly strengthened and the life of the pinion is that of natural wear only.



Life Guard.

A LIFE GUARD specially designed for cable and electric roads, but adapted to street cars of every kind, has been patented by that well known railway manager, Tom L. Johnson, of Cleveland, and of



which he says: "I have devised an improved life guard in the form of a platform projecting from the ends of the car over the track, and on which a person may fall and be carried along without injury until the car can be stopped or until the party has so far recovered his wits as to be able to help himself." This guard is intended to "rescue the fallen" by carrying rather than tumbling them, and combines lightness and strength. Water and snow will not accumulate on its surface, which is sufficiently flat and yielding as not to bruise a person falling thereon, and yet so shaped that he would not easily fall off before the car could be stopped. The guard is carried in advance of the car and about three inches above the pavement, by two iron arms secured to the car step, in a pivotal manner, so that any rocking of the car will allow the guard to slide along the pavement on a smooth metal shoe beneath and at the forward end of the guard. Where trail cars are equipped with guards they need not ride as near the pavement as on motor cars, being designed to catch passengers who might fall between rather than in front of such cars. The guard is of wire net stretched on an iron frame.

MORE CABLE AT DENVER.

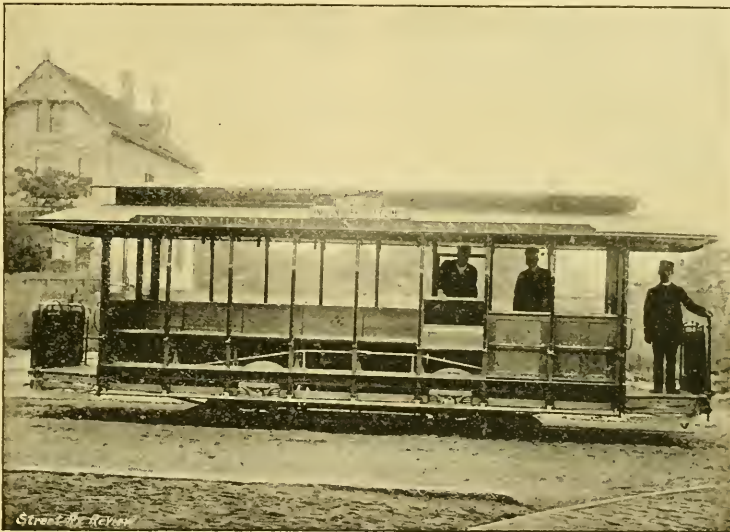
THE City Cable Company of Denver has decided to make its extension on Curtis and Seventeenth streets, cable instead of electric as currently reported and as at first intended. The new line will connect at Broadway with the present line on Seventeenth street, and cars of the new line will go down over old track which will give a headway on that portion of the road of two and one-half minutes—just half that at present. The new ropes will be driven from the present power house, and work will be commenced at once on the conduit work.

Low's Adjustable Car.

THE cable system was born in San Francisco and growing stronger as it grew older, found its way as far to the east as Great Britain. Another invention which promises to prove of great value to street railways was also inaugurated in the city of the Golden Gate, and Mr. J. B. Low is the inventor. As the otherwise insurmountable grades of San Francisco suggested cable, so to meet the needs of quickly changing weather at certain seasons, led Mr. Low to work out his combination car. For the past year a dozen or more of these cars have been in constant service in San Francisco and Portland, and so satisfactory have they proved, an additional equipment of fifty cars is now being built there. For several weeks one of these cars has been running in daily service on the Lincoln Park Cable Line of the North Chicago Street Railroad, a line which handles a traffic exceeded by few in the country. The seats are reversible, the back becoming the outside panel of the closed car and containing the window which is held automatically and can neither fall out or rattle. This window when raised extends from the top of panel to the upper sill, and both panel and sash fit tightly the post. When the car is open a convenient aisle is left through which

the conductor passes for collections, which also connects the front and rear platforms. When the car is entirely open passengers sit facing the side of the street. This enables a saving of fully one-fourth the time usually spent in receiving and discharging loads, as every passenger can alight at the same moment and there is no waiting on one another. This is a most important feature as stops generally consume one half the time scheduled for a trip. When the car is closed the passenger would not notice any difference from the standard box car. In winter a heater occupies the space of one seat. The illustration is itself a good description. At one end two sections have been closed, and the conductor is in the act of reversing the seat to close another section while the balance of the car remains open. Of course this type of car can be built to any desired size, but the dimensions of this are as follows: length of box 20 feet; length over all 28 feet; height, same as other cars on the line, but less wide by one foot, as the stanchions are straight, and space which would otherwise be lost in the bulge is saved. This not

only gives additional room between passing cars and without decreasing the width of the seat and aisle, but is of the greatest value in passing through the tunnel under the Chicago river where only a few inches exist between car and wall. There is plenty of room between posts and seats when car is open, and passenger's knees do not come within six inches of the post line. The seats in either case are continuous, the car seating 32 passengers, though seats can be carpeted, and one seat removed to make room for the heater. The operation of converting the car from all open to entirely closed can be performed by an ordinary conductor in four minutes, and at any point on the line, there being no necessity whatever for tools or assistance. In fact the practice in San Francisco, when a sudden shower comes up, is for the passengers to each turn their own section, draw the window up and they are snugly protected in a box car. Roller curtains pull from the top and are available at all times. But there are other combinations than the all-open or all-closed car. The car as used the past few weeks on the North Side Cable Line has been with the outside half open and the side next the opposite track closed; so that passengers enter at either platform and find a wide aisle leading to a continuous side seat, and facing in the same direc-



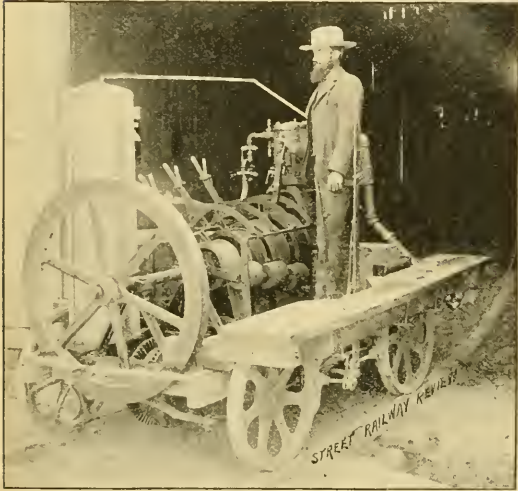
THE LOW ADJUSTABLE CAR.

tion as the open seats. At the forward end the windows are raised, thus affording winter car protection for invalids and elderly people who seek that corner; the other and inside half has windows down, being the same as any box car with open windows, while the outside seat is genuine open car. The chronic kicker who never finds the class of car to suit his idea of the weather, loses his occupation here.

The car has safety gates on platforms, and gutters on roof and hood discharge all rain water through pipes to the street—the conductor pipes also serving as hand rails and their double province would never be suspected. The car is no heavier than the ordinary box car—if anything somewhat lighter—and is at once attractive, practical and popular—so much so that President Yerkes has purchased the right for fifty cars which will be built at once for the North Chicago Street Cable Lines. The car described is very handsomely decorated within, and was built for Mr. Low by the Brownell Car Company, St. Louis.

Painter's Naptha Motor.

NAPHTHA engines have been successfully used for some time as a motive power for light launches, but have never as yet been adopted by any street railway. A motor which would behave very satisfactorily in propelling a boat, might utterly fail to meet the exacting and multifarious demands of street car service. Experiments have been made repeatedly during the past five years, and one of the most recent of which is that of A. J. Painter, of Pasadena, California.



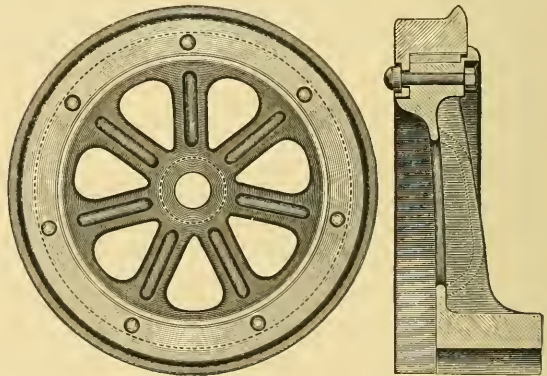
PAINTER'S NAPHTHA MOTOR.

His experimental motor makes no pretense of being ornamental having been built solely to demonstrate the inventor's plans, and labors under several disadvantages which would not exist in a perfectly built car. However, it is said the motor has proven itself capable of starting, and rounding sharp curves under heavy loads, and to have attained a high speed on the car tracks of Pasadena. The gas is generated in two tanks by passing a current of air over gasoline. The gas is exploded in two cylinders by an electric spark supplied from a battery. The power is directed to turning a main driving-shaft running lengthwise through the car. A series of speed pulleys are connected with the shaft, carrying similar pulleys, by means of loose belts. A secondary shaft is in turn geared to both axles by means of pinions and bevel gears. The desired speed is obtained by applying a tightener to one of the belts on the series of speed pulleys, thus varying the speed at will from two to nine miles an hour. There is a small tank of water carried for keeping the cylinders cool. The car has pulled a load of seven and a half tons up a grade of 240 feet to the mile. As in other gas motors the machinery runs continually while in service, and moves the car only when the belts are tightened. The cost however is very slight, consuming, as it does, only about one gallon per hour.

Rubber Cushion Wheel.

IN our June issue we illustrated a new wheel, which the Cushion Car Wheel Company, of Indianapolis, had patented for use on steam roads, and stated that a wheel built on the same principle and embodying all its advantages was being constructed for the street railway service. Such a wheel is now shown herewith and will be readily understood and appreciated by every manager.

All our readers are sufficiently, and to their sorrow, aware of the unpleasant noise and jar noticed when riding in a closed car, particularly when frost is in the ground. The tee rail of steam roads is free from dirt and gravel, but a track laid in the street, where teams are constantly crossing and where every wind blows bits of stone and other hard obstacles on the rail, it is impossible to avoid running over them, and in the winter-time the car becomes a sort of sounding board or like an immense drum, so that every blow made by the wheels as they pass over these obstructions, causes the sound to be intensely multiplied until often one can scarcely converse with the passenger sitting next to him, except by a great exertion. Numerous attempts have been made to stop this noise by placing non-conducting materials between truck frame or pedestals and the car sill, but with partial success. The cushion car wheel, however, gets more closely to the root of the matter and in fact as nearly so as is possible except a rubber tire be used. Between the wheel proper and the tire, a rubber cushion or ring is placed extending entirely around the wheel, so that the noise and jar gets no further than the tire. This not only lessens the noise within and without, of the moving car, but lends increased life to car, crossings, and that no less important feature—the rail joint. It is well recognized that the same car when drawn at a horse-car pace makes much less noise than when rapidly propelled, as by



RUBBER CUSHION WHEEL.

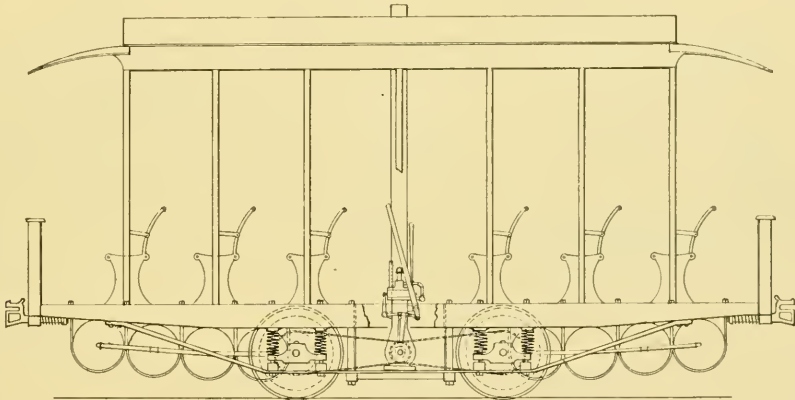
mechanical powers; and the advent of rapid transit has greatly increased the need, as it has in a large measure created it. The wheel is the invention of and is manufactured by practical railroad men of long experience, who fully appreciate its merits and requirements. While the wear on this wheel is said to be much less than that

of the standard solid wheel, an additional advantage is offered in the ability to remove the tire when it becomes so thin as to admit of no further "turning down," and by replacing the worn tire with a new one, the user has a new wheel, for the tire practically suffers all the wear. Not only this, but the life of the axles is many times extended. Axles break chiefly from crystallization which is the result of jar; and whatever decreases the jar increases the durability of the axle in that proportion. On several steam roads where these wheels are running they are making splendid records, and among the recent companies to investigate and try them is the Wagner Company. The Citizens' Road of Indianapolis have placed two sets on their electric lines, and though in use but a short time are much pleased with the results. Their trial order was for four 30-inch and four 36-inch wheels. The Indiana, Illinois and Iowa roads have placed a set of four under one of their locomotives with excellent results, though of course the most severe wear and strain which could ever come to a street car would not begin to approach that which

Compressed Air Motor.

ALTHOUGH millions of horse-power are daily going to waste in the winds which blow, all efforts thus far to drive street cars by air motors have failed when weighed in the balance of economy, but at the present time there are several inventors still working at the problem, the solution of which has perseveringly been studied by some of them for many years past.

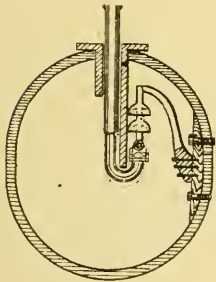
A compressed air motor which in some respects differs from those which have appeared heretofore is now being built by S. J. Webb, of York, Pa. The cut will give a very fair idea of its general construction. The air tanks are carried beneath the car, having been charged at the central station until a pressure of 480 pounds is secured. Three tanks are worked, the others being reserved for long runs, or at points which by reason of heavy grades or loads, require extra power. Instead of a brake the car is stopped by the motor, which at the turn of a lever is changed to a compressor, and in stopping, or on down grades, may be made to pump air into the reservoirs



SIDE VIEW WEBB'S COMPRESSED AIR MOTOR.

occurs under a heavy engine at high speed. Trial orders have also been placed by each of the three cable roads in Chicago. The general office and manufactory is in Indianapolis, Ind.

Conduit for Railway Wires.



FTHE many recent patents taken out for conduits for trolley wires, one is that of John J. Miller, of Pittsburg. A bracket at one side suspends the wire, which is protected by a depending flange of the slot rail, the trolley wheel contact is made by placing the wheel at the top of a hook which passes under

the flange. It is claimed for this device that it is protected from all moisture from above, and is hung so high that water would not reach it from below.

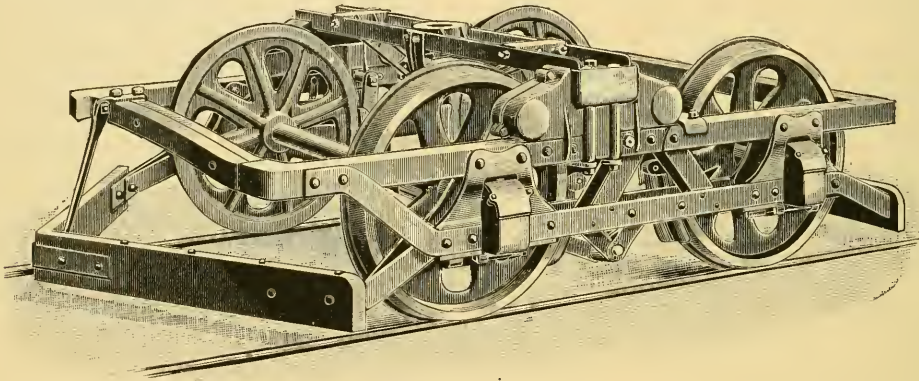
through check-valves. The direction of the car is decided by a forward or backward motion of one lever, while the speed at which the motor works is controlled by another. The motor, placed in the center of the car is of the double cylinder type, and is connected to the axles by chain belts and sprocket wheels. The arrangement of the valves is such that the air may be cut off at any desired point of the stroke and expanded to atmospheric pressure before making the exhaust, which is noiseless. The air in passing from the reservoirs to the cylinders is heated in a coil, by an atomizing petroleum burner. A charge should last an ordinary sized car about one hour, and the car thus equipped would weigh four tons.

PRESIDENT YERKES, of the North Chicago Street Railway, has ordered a fine statue of General Sheridan for Lincoln park. It will be made of bronze, in Paris, and erected next year.

THE Electric Railway, at Burlington, Iowa, carries letter carriers on duty for \$1 per month.

The Bickford Radial Truck.

PERHAPS no feature of the large cars which electric power has called into use has undergone more change in the last two years, than that of motor trucks, so that the improved truck of the present bears much the same relation to the earlier devices, that the handsomely finished cars now in use, bear to the best efforts of horse car days. The R. D. Nuttall Company, Alleghany, Pa., and who at 29 Broadway, New York, are successors to the Electric Railway Specialty Company, have just brought out a new four wheel truck, especially designed for use on eight wheel electric cars. The intention is to carry the motor outside the wheel base, and which permits of easy access. Between-wheel breaking is employed, which permits of the toggle joint working in such a manner as will compel the driving wheels to receive the greatest brake pressure. The throwing of mud and water upon the motor is also considerably lessened by this arrangement. The wheel base



THE BICKFORD RADIAL TRUCK.

is short and adapted to sharp curves. The body of the car is supported on the axle by a link method, which allows a free lateral motion of the whole truck on the wheels, and the frame is light, yet strong.

STORAGE BATTERY VOLTS.

THE recent decision in the storage battery case seems to have given a tremendous impetus to storage battery experiment.

At Freeport, Illinois, a syndicate is negotiating for a set of batteries to operate a road.

The storage-battery line at Dubuque has extended its line 800 feet to the fair grounds.

At Sioux Falls, Dakota, experiments are being made with alleged, a new battery, which is said to hail from Minneapolis.

J. R. Bradbury is endeavoring to demonstrate the storage battery system for street cars with the companies of Sioux City.

The Woodland Avenue & West Side Railway of Cleveland, has had a car shipped from Philadelphia, and will give it a trial, although the company do not express a great deal of confidence in the practicability of the same.

CHICAGO NOTES.

AN attempt is being made to resurrect the Lake Street Elevated Road, a mile of which has stood as a tombstone to its own memory for the last two years. It was built to sell to one of the surface lines, but they failed to bite.

The rumor that President Yerkes of the West and North Side systems was to retire is absolutely false.

An organization has been completed including the conductors, drivers and gripmen of all the lines in the city.

The Chicago City Railway will increase its capital stock on October 1st in the sum of \$1,000,000, which will make their stock \$7,000,000.

A large delegation of the city council has gone east to inspect elevated roads.

The cable difficulties are settled and the West Side loop is to be extended to State street. The South Side Cable will build a new down-town loop for Cottage Grove cars to extend to Michigan avenue.

The very latest is a great subway scheme with four steel tracks under Wabash avenue. The incorporators place the stock at \$10,000,000, as a starter, and Geo. E. Cole, Maria Beasley and Pleasant Amick are the promoters. George's name does not appear in the city directory, but it may be he lives out at Goose Island. Maria and Pleasant are not widely known, as yet, as engineers or capitalists, but surely will be when the road is finished, which we predict will be about 1999, if the weather and crops turn out well in the meantime.

To ACCOMMODATE delegates to the Pittsburg convention Oct. 21st, the Baltimore & Ohio will put on special sleeping cars for the exclusive use of the members. As this is the direct line to Pittsburg and passes through one of the most attractive routes in the country, it will be a favorite line with the street railway men and their families. The rates have not yet been named by the traffic association, but the Baltimore & Ohio will make reduced rates.

THE GREAT WESTERN ELECTRICAL SUPPLY COMPANY have received the contract for supplying the poles for all the extensions of the Citizens' Street Railway Company, of Indianapolis, Indiana.

HYGIENE AND VETERINARY.

BY F. T. M'MAHON, VETERINARY SURGEON CHICAGO CITY RAILWAY.

Diseases of the Feet.

Continued.

LAMINITIS, or inflammation of the feet, may be characterized as an acute inflammatory attack on the vascular parts of the foot generally, but on the sensitive laminae more particularly. When we consider the extent of secreting surface engaged in the formation of horn, we cannot be surprised that these organs should become the subject of extensive inflammation.

Primary inflammation takes place in them from different causes, as from the alternation of heat with cold, exactly in the same manner as it occasions other great inflammations; but more particularly here, when extraordinary exertions have already extended the vessels. It is therefore not unfrequently seen consequent upon any great exertions, as fast driving or riding for many hours in succession; acute laminitis is sometimes not a primary affection, but is too frequently the result of metastasis. The feet frequently attain this morbid state from translation of inflammation from many of the organs, but it is most frequently seen as the result of pneumonia or acute indigestion. There is no acute attack but what may be translated to the feet. It may be confined to one, two, or the whole four feet, but is most common to the two front feet.

SYMPTOMS.

When a horse labors under this complaint the attendants are usually unconscious of the real nature of the disease; and it is not infrequent that even the veterinary surgeon, when called in, does not immediately detect it, unless specially familiar with these cases; for he finds the animal heaving at his flanks, and on inquiry he learns that the attack commenced with a rigor or shivering fit; that the animal has been lying down and getting up frequently, groaning with acute pain, and occasionally breaking out into cold and profuse sweats; in such a case, unless he be informed that the horse has been driven with violence, and afterwards exposed to cold or draughts, or, unless his eye catches the particular disinclination to remain on his feet, or his hand detect their extreme heat, he is often at a loss whether to consider it an attack on the bowels, kidneys, or lungs, or an inflammatory or rheumatic fever. An experienced practitioner, however, even when called in will at first observe that though the horse appears to suffer much pain, and to be down and rise frequently, yet that he neither attempts to roll or paw with his feet, nor look at his flanks, or kick at his abdomen; and that even early in the complaint he betrays a peculiar manner of shifting and lifting up his legs, or of placing them so as to relieve the superincumbent pressure: either drawing his hinder much under him to ease the fore feet, or placing the front ones under the chest to relieve the hind ones, according as one or the other are

the principal seat of inflammation; or by a marked disinclination to remain long up when all four feet are affected. When inflammation exists in all four of them the horse usually lies almost wholly on the ground; this disposition is, however, not invariable. We need hardly give any signs to prevent it being considered as an affection of the loins, rheumatic or accidental; for as soon as the complaint has fully seized on the feet, they will become intensely hot and the planter arteries will be found pulsating very strongly. There is sometimes a little tumefaction around the fetlocks, and where one foot is held up for examination it gives so much pain to the other that the horse is in danger of falling, at which times the slightest tap on the foot with anything hard gives evidently extreme pain, and is flinched from most sensitively. If the horse be attempted to be taken out of the stable, his disinclination for motion at once shows the feet to be the seat of evil; in his taking each limb up and setting it down there is something so truly characteristic of the intensity of the anguish felt in them as will not easily be forgotten. He appears to walk, as it were, upon his heels and to allow no other part of the foot to touch the ground. The course of the disease is various, it may end in resolution, in which case the symptoms all relax, the remains of congestion becomes absorbed, and the parts reinstate themselves perfectly. In other cases, the laminae, throwing out impure pus, the coffin bone parts from its attachments and by the weight of the animal is forced down; the pressure of the fallen bone partly destroys the concavity of the sole, which becomes partially convex, or is forced outward, and leaves a large space between the coffin bone and the horny toe, filled with a semi-cartilaginous mass. When the inflammation proceeds to copious supuration and the symptoms have raged with much intensity for five or six days, a slight separation of the hoof from the soft parts may be observed, commencing around the coronet; the purulent secretion soon becomes established, and totally dissolving the union between the soft masses of the feet and the hoofs, they fall off, when of course the animal is of necessity destroyed, as a perfect hoof will never be renewed.

TREATMENT.

As soon as the disease is discovered, if you are able to do so, proceed to remove the shoes: and, while the animal can yet stand, thin the sole and wall around, allowing him to momentarily respire, or he may fall on the operator. Then envelope the feet in poultices of linseed meal or bran or place flannel swabs around his feet. Wring out from cold water, which are to be wet every hour, then give the horse a comfortable bedding to encourage him to lie down, so as to keep the weight from the diseased parts as much as possible; the application of cold water is peculiarly indicated in these cases for the following reasons: first, our great fear being that effusion will result, it is

necessary to repel, if possible, the inflammation. Second, the pain is more likely to be relieved, for it is evident that if warm applications are used, the relaxation of the hoof will not be in proportion to that to which the softer laminae would extend, provided room was allowed, and consequently pressure must result; the horn will be rendered soft and yielding to a certain extent by the moisture only.

The constitutional treatment should be that prescribed for diffused inflammation, benefit will be derived from a purgative, consisting of eight drachms of aloes followed by tinct. of aconite, in small and repeated doses, ten drops every hour or two. The animal should be allowed plenty of cold water to drink, and the first day, two drachms of nitrate of potash may be placed in each pail of water with good results, when the active symptoms have passed off, and there is still some inflammation, a blister around the coronet is beneficial. There is much difference of opinion with regard to the propriety of blistering in this affection, and it is most prudent to avoid it in the early stage of the disease, but it always proves beneficial in the latter stages.

PUMICED FEET

are produced by a slow chronic inflammation: the front of the hoof always enlarges, and the sole therefore becomes more than flat, the horse begins to falter and is sometimes very lame; at others he can move moderately well. The foot when shod presents no acquisition of horn; on the contrary, the sole becomes thinner and thinner and at last bulges out into a surface more or less convex, as the internal derangement is greater or less. Horses with large, wide feet are more prone to this evil, not being able to resist the weakening or irritating effect of battering on the stone roads.

The treatment of these feet can be only palliative, as a removal of the deformity has never taken place. Some benefit has been experienced from blistering the coronet in early stages: this has stimulated the part to an increased secretion of horn. Every means must be taken to avoid pressure on the sole, which is not only painful, but actually aggravates the disease. Pumiced feet should not be kept too moist, nor can they ever be cured by turning out without shoes, but they may be properly dressed every day, both soles and walls, with a mixture of tar and soft soap which proves extremely beneficial. The shoe in use for these feet is sufficiently known, being formed with a very wide web, and being made so thick as to allow of being bevelled away on the inner surface to receive the convexity of the sole without pressing on it: this is called a dish shoe. From the outer crust of the foot being thin and brittle, no rule can be laid down as to the particular part through which the nail should be driven, but the smith, in these cases, must get a hold where he can. This is often a very trying matter. It requires no little judgment and patience to shoe a pumiced foot. The sole, however, should, every time the shoe is taken off, be stimulated with a hot iron, which also hardens it. There is no cure for a foot so diseased, neither can any

one palliate the disorder except the shoeing smith. Standing upon a level pavement, when the shoes are off, has been recommended; but this invention of a mechanical mind has done more harm than good. The measures which have been attended with the greatest advantage is shoeing with a wide webbed shoe, having a leather sole, for the purpose of protecting the seat of the disease, and being rather higher at the toe than at the heel; because of a prominent healthy frog is found an accompaniment to a pumiced foot, and a horse can bear upon the frog when he dreads to let the sole touch the ground. Soaking and poulticing the foot occasionally has proved beneficial. Proper shoeing is all that can be done for the relief of this ailment.

ECHOES FROM PUGET SOUND.

(From our own correspondent.)

SEATTLE, Wash., August 10, 1891.

The past month has been one of unusual importance to the street railways of this city and vicinity. A number of extensions of existing lines have been completed, new extensions decided upon and new roads projected.

The Front Street Cable Road, one of the oldest in the city, has just begun running cars on an extension, double tracked for a mile, and reaching a high hill north of the city. The work has been under construction for six months, but delay has been caused by failure of material to arrive from the East. This extension will give the road what may be called a terminus and the expectation is that hereafter operations will be much more profitable.

The Commercial Street Line, operated by small steam motors, has added about 3,000 feet to its southern end, and will in the near future extend still further in that direction.

Something of the condition of the city is necessary to understand the operations of the other lines here. Seattle lies on high ground—a strip three miles wide between Puget Sound and Lake Washington. Two cable lines, the Madison street and the Yesler avenue, run from the water front to the lake. The new Union Trunk Line has a cable from the Sound to the top of the hill, and from a junction there three electric lines run to the south limit of the city, to the north, and to the lake. The line to the south limit was finished in June, though they are now still busy ballasting; the north line was completed last month; and the east line—that to the lake—is done about half way. A franchise for the remaining distance has been obtained, and the work of construction will go steadily forward. The Union Trunk system has one power-house at which the cables and dynamos are run. A car shop has just been started, at which all the cars are to be built. Three or four very good ones have already been turned out. The consolidated electric roads of the city also have a car shop.

One of the new electric roads, the Rainier Avenue, starts at the top of the hill above the Sound and runs $6\frac{1}{2}$ miles southeast, striking Lake Washington 4 or 5 miles below the city. J. K. Edmiston, the owner, is now build-

ing from the top of the hill down to the water front. The cars can easily climb all the grades, except a steep pitch of three blocks. There a sort of compensation elevator will be put in, by which the weight of one car going down will offset another coming up. This elevator is now being constructed.

Fred. E. Sander, the builder of the Yesler Avenue Cable, has obtained a franchise for an electric road running south along the edge of the harbor to the race track, some three miles away. He expects to begin construction this month. In connection with this road L. H. Griffith, president of the consolidated electric lines, is working for an electric road through the White River Valley to Tacoma, 40 miles away. Mr. Griffith will begin at the race track and build to the south. For this purpose a Seattle & White River Valley Electric Railway Company, with a capital of \$1,200,000 has been started. Over a year ago, C. H. French, a banker of Slaughter—one of the towns in the valley—proposed such a line; there was some discussion, but the matter ended there. This summer the project has been taken up, apparently in earnest, by the farmers along the line, who wish to build the road and have it equipped as quickly as possible. Several enthusiastic meetings have been held in the towns of the valley. The farmers are generally well-to-do, for the land is very productive. Associated with Mr. Griffith are several capitalists of Seattle, B. F. Shaubut, J. H. Rengstorff, Terence O'Brien, Julius Mees, and some of the richest men in the White River Valley, T. M. Alvord and Mr. Nelson, of Kent; C. H. French, of Slaughter; William Cochrane, Patrick Hayes, D. A. Neeley, W. W. Corbett and others.

They all represent large amounts of land or money, or both, and will make a strong corporation. They have applied to the county commissioners for a franchise. No formal action has been taken on the request, but there is little doubt that permission will be given to build along the county road between here and Sumner.

The scheme so far as outlined provides for a regular electric railroad running along the county road between here and Sumner, to join there with R. F. Radebaugh's road which is now constructed as far as Puyallup. This line is operated by a motor, but an electric equipment is being put in for it. The power-house will be about half way between here and Sumner. There will be a fast passenger service between Seattle and Tacoma, and since there are no grades, it is hoped that the distance may be covered in an hour, and the fare put considerably below the rates now charged by the Northern Pacific Railroad or the boats. The gauge will be standard; but the cars will be double trucked and considerably larger than those now run on the city electric roads, and the motors more powerful. A large part of the road's traffic will be freight, vegetables, milk, and all sorts of produce for Seattle and Tacoma, for the valley is a large feeder to both cities. The larger producers will have side tracks run to their places, and will there load their cars with milk or other stuff. It is believed that in this way Seattle and Tacoma's food supplies can be laid down more quickly

and cheaply, and at the same time the farming interests of the valley developed and stimulated.

One or two electric companies have already offered to equip this road and take a large part of the pay in stock. Subsidies of land, material and money will also be given by those along the line.

The cable road has at last been finished up the hill from the Tacoma water front. This is Tacoma's first cable. It runs from A street up Eleventh to K, across to Thirteenth and then down the hill again. At K it connects with an electric line.

A company with \$100,000 capital has been incorporated for building an electric road from Port Gardner, 35 miles north of here on the Sound, to Snohomish, a town eight miles back of it.

An electric street car franchise has been granted from Whatcom to Whatcom Lake, and H. E. Waity, prime mover in the scheme, says it will be completed within one year, work to begin immediately. It is said that the company has secured land subsidies enough to pay for the road. Another similar street car line is projected to Lummi, six miles west of Whatcom.

All previous records in street car time were beaten in this city on the morning of July 21. The Union Trunk Line operates its cable up a steep hill on Jones street, between Second and Thirteenth, where the power house stands. At about 5 o'clock a newspaper carrier saw on the track in front of the power house one of the small grip cars. The slope is gentle at that point, and the boy thought he would give the car a shove, and see it run a block or two. Since the grip had been taken out over night there was nothing to prevent good time along the even and well ballasted track. The wheels turned easily, and on a level bend between Tenth and Ninth street the speed from the momentum was at least 10 miles an hour. There the boy jumped off, and was rolled head over heels in the dust. The grade on the three blocks between Ninth and Sixth is seventeen per cent and the car plunged down with a rattle and grinding of the wheels that startled the people in the street and brought eager heads to the windows. On the dummy went, faster and faster, still gaining speed on the ten per cent grade from Sixth to Fourth. Another pitch to a thirteen per cent grade between Fourth and Third made the car go at such a rate that it seemed but a flash along the dusty thoroughfare. From Third to Second street there is a steep declivity of twenty-two per cent grade. At the top of this precipitous hill the speed was estimated at over 100 miles an hour. The short level piece of crossing at Third street gave the car a horizontal direction, and it shot off into the air 60 feet, and then dropped, landing with a terrible crash square on the track. The car rebounded, but this time fell off by the sidewalk well down toward Second street. There it struck a telegraph pole over a foot in diameter and cut it clean off. The shock was so sharp that a twelve foot piece was shivered from the top of the pole. The wood work of the car was demolished, but the iron body was so well made that it can be used again.

American Street Railway Association.

HENRY M. WATSON, PRESIDENT, Buffalo, N. Y.
 W. A. SMITH, FIRST VICE-PRESIDENT, Omaha, Neb.
 CHARLES ODELL, SECOND VICE-PRESIDENT, Newburyport, Mass.
 A. D. RODGERS, THIRD VICE-PRESIDENT, Columbus, Ohio.
 WM. J. RICHARDSON, SECRETARY AND TREASURER, Brooklyn, N. Y.
 EXECUTIVE COMMITTEE—THE PRESIDENT, VICE-PRESIDENTS, and THOMAS
 LOWRY, Minneapolis, Minn.; D. F. HENRY, Pittsburgh, Pa.; ALBERT E. THORNTON,
 Atlanta, Ga.; H. M. LITTELL, Cincinnati, O. and THOMAS C. KEEFER,
 Ottawa, Can.

Next meeting will be held in Pittsburg, Pa., October 21st, 1891.

Massachusetts Street Railway Association.

PRESIDENT, CHAS. B. PRATT, Salem; VICE-PRESIDENTS, H. M. WRITNEY, Boston,
 AMOS F. BREED, Lynn, FRANK S. STEVENS; SECRETARY AND TREASURER, J. H. EATON,
 Lawrence.
 Meets first Wednesday of each month.

New York Street Railway Association.

PRESIDENT, DANIEL F. LEWIS, Brooklyn; VICE PRESIDENTS, JNO. N. BECKLEY
 Rochester, JOHN S. FOSTER, New York; SECRETARY AND TREASURER, WILLIAM J. RICH-
 ARDSON, Brooklyn; EXECUTIVE COMMITTEE, JOHN N. PARTRIDGE, Brooklyn; CHARLES
 CLEMENSBAW, Troy; C. DENSMORE WYMAN, New York.
 Next meeting, Hotel Metropole, New York City, Sept. 15th, 1891.

Ohio State Tramway Association.

JOHN N. STEWART, Ashtabula, President; JOHN HARRIS, Cincinnati, Vice Presi-
 dent; J. B. HANNA, Cleveland, Secretary and Treasurer; E. K. STEWART, Columbus,
 Chairman Executive Committee.

The Street Railway Association of the State of New Jersey.

PRESIDENT, JOHN H. BONN, Hoboken; VICE PRESIDENT, THOS. C. BARR, Newark,
 Secretary and Treasurer, CHARLES Y. HAMFORD, Trenton; EXECUTIVE COMMITTEE,
 OFFICERS and C. B. THURSTON, Jersey City; H. ROMAINE, Patterson; LEWIS PER-
 RINE, JR., Trenton.

ARKANSAS.

LITTLE ROCK.—Grading and reconstruction is in progress for the introduction of electric cars. The gauge is changed to standard and 18 miles are to be changed.

BRITISH COLUMBIA.

VANCOUVER.—1,100 tons of steel rails have arrived for the Westminster and Vancouver electric tramway.

CALIFORNIA.

LONE CITY.—Articles of incorporation have been filed by the Amador Electric Railway & Light Company. The road proposed is from here easterly, via Sutter Creek, to Plymouth. Sutter Creek is to be headquarters. Both freight and passengers are to be carried. The capital is \$500,000 and the directors are, E. C. Voorhies, R. C. Downs, S. W. Knight, H. H. Towns, Thomas Boyesen, Frank Frater and George Allen.

OAKLAND.—It is reported that John W. Hearst, who applied to the city council for an electric road franchise in East Oakland, is really backed by San Francisco and Oakland capitalists, who propose to build a long-circuit electric road from Twenty-third avenue station to East Sixteenth street, thence east on the old county road, then to the Redwood road, and along that road to a point where it branches to the foothills east and to the rear of Mills College, skirting the foot hills to Haywards.

OAKLAND Consolidated Street Railway Company filed a certificate of a creation of a bonded indebtedness in the

sum of \$500,000. They are to run for twenty years at 6 per cent. The company comprises the Berkeley Rapid Transit Electric Road, and the road to be built from West Oakland to Twenty-third avenue. The money raised will be used to build the latter road.

JNO. W. HURSTS' proposed electric road, will be the longest in Alameda county and will run along the foot hills back of Oakland through marvelously beautiful scenery.

SACRAMENTO.—R. S. Carey's road here will soon be operated by electricity.

SAN FRANCISCO.—The Cliff-Ferries House Railway Company is at work on a new extension and proposes to abandon the old Clay street branch, and at the cost of at least \$250,000 to run cars directly from the ferries out on Sacramento street to Walnut street. Superintendent Lynch says the work can be completed by November.

SAN JOSE.—The proposed new electric railway between this city and San Francisco is meeting with popular favor.

SANTA ROSA.—J. W. Warboys, of the new street railway company, says that at the last meeting of the company the proper committees were instructed to purchase material at once.

COLORADO.

DENVER.—Under franchise agreement steam cars cannot be run after Nov. 4, when either electricity or mules must move the cars.

THE Metropolitan Street Railway Company is making a survey along Sixth avenue for a new electric road. The horse car line operated by the city company will be abandoned as soon as the new road is completed.

COL. FISK, the Denver promotor of Broadway Gardens, is trying to induce the Tramway Company to extend its lines to those grounds. He is likely to succeed.

THE Grand Junction Street Railway Company has filed articles of incorporation with the Secretary of State. The capital stock of the company is \$100,000; incorporators, Benton Canon, Orson Adams, Jr., T. B. Crawford, B. K. Kennedy and W. H. Crawford, Jr.

ELYRIA.—Elyria citizens held a meeting and appointed a committee to look over the ground for railway connection with Denver.

PUEBLO.—The power house for the Citizens' Electric Company is completed.

DAKOTA.

RAPID CITY.—The new motor line here will be four miles in length and take in on its route the depots and the new pleasure resort, Canyon Lake. Storage batteries will be used on standard gauge tracks.

ILLINOIS.

BLOOMINGTON.—It is attempted to put another railway here and at Normal. Mayor Foster, John Eddy and others back the scheme, which will cost \$150,000 if run with electricity.

CHILLICOTIE.—Considerable talking is done by street railway people pointing to an extension south to the grove.

DANVILLE.—J. R. Kendall and associates have filed with the Secretary of State articles of incorporation of the Citizens' Gas and Electric Railway Company of Danville, Ill., with a capital stock of \$200,000.

JOLIET.—Petitions are freely signed for a new railway on Bluff street, from the National House to the Mound, about a mile. Adler & Theiler are the movers.

A SITE has been selected for the new street car factory, about a mile and a half south of the city. Joliet gentlemen have bought stock; one \$5,000 worth.

THE Street Car Company has increased its capital \$100,000, now making it \$250,000. Mileage will be increased.

MATTOON.—The city fathers have at last granted the electric street railway ordinance.

INDIANA.

ANDERSON.—A 30 years franchise has been granted to the Anderson Electric Railway Company. The company must build and operate 4 miles in 6 months, 8 miles in one year and 2 miles each year, as the council may direct.

FORT WAYNE.—The Fort Wayne Street Railway Company has begun the construction of a long extension of its lines to the east end of the city.

INDIANAPOLIS.—The Citizens' Company track is now complete from Illinois street to Michigan avenue, on Twelfth street, and on Michigan to Shoemaker street.

VINCENNES.—The Citizens' Railway has taken up the old flat rail and relaid the entire line with new steel girder and T rail. The intention is to equip soon with electricity.

IOWA.

CEDAR FALLS.—The Street Railway Company has incorporated: Capital \$20,000; directors: N. H. Harris, C. A. Wise, C. C. Knapp, J. J. Tollerton, S. A. Rockwell, M. N. Dayton and C. J. Fields.

DUBUQUE.—Motorneers and conductors on the electric street railway will be uniformed.

SIoux CITY.—Franchise is asked for a railway from the elevated railway and Morning side crossing through the Greenwood addition. D. T. Hedges prays for the ordinance.

KANSAS.

LEAVENWORTH.—A meeting of citizens was held at the Board of Trade to meet Mr. Earle, secretary of the Judson Pneumatic Railway Company, who made a proposition to construct 10 miles, providing a bonus of \$250,000 worth of land was given. In addition to passenger business, coal would be handled at night, to the various manufactories.

TOPEKA.—The East Side Circle Railway has been sold to G. R. Williamson, trustee of Cornell University, for \$30,334, to satisfy a mortgage held by the University for construction debts. Lots belonging to the property were sold to H. W. Sage for \$6,751.

LOUISIANA.

LAKE CHARLES.—Our street railway stock is already at a premium and work on construction begins immediately. Cars will run by September 1st.

MARYLAND.

BALTIMORE.—Broadway business men appointed a committee to try and induce Governor Bowie to change his scheme of running the cable line down Broadway through the market.

THE electric railway extension from Brattle Square, Cambridge, to Watertown, will build through Mt. Auburn street to the cemetery gate.

FREDERICK.—The electric street railway is now in construction. Three miles of track will be laid. J. B. Wilson is president of the road.

MASSACHUSETTS.

NEW BEDFORD.—Within a month surveys will be made for a railway line, with electric motor power, to start from Cottage City, pass to Lagoon Heights, around the head of the pond to Oklahoma, Vineyard Haven, Tashmoo or West Chop, and thence in the direction of Gay Head.

WORCESTER.—The Worcester & Shrewsbury Street Railway Company has been organized, capital \$20,000, with the purpose of running cars on Main street. Chas. S. Turner, G. A. Stevens, Lambert Bigelow and others are directors.

MICHIGAN.

DETROIT.—A railway electric is talked of to run from Detroit to Mt. Clemens, over the plank road.

A FRANCHISE has already been granted for an electric road connecting Wyandotte with Detroit.

THE Shawhan Storage Battery Company has been resuscitated. Geo. H. Gale is prime mover and all the stockholders are enthusiastically sanguine of success of it and the motive power thereof.

EAST SAGINAW.—W. J. Hart, the new and highly efficient manager of the Union Line, has taken hold to rush the improvements. \$75,000 will be spent besides equipping part of the road with electricity.

GRAND RAPIDS.—The Consolidated line has bought property on First street to erect depots and barn, 50x250, at a cost of \$38,000 for site and building.

THE two street car lines here are now one, captioned the Consolidated Street Railway Company. President, A. J. Bowne; vice and superintendent, J. R. Chapman; secretary and treasurer, J. M. Hagar; directors, Messrs. O'Dell, Martin, Hagar, Chicago, and Bowne, Blair, Blodgett and Chapman of Grand Rapids.

ISHPEMING.—Ishpeming people subscribed \$12,700 for the stock of the proposed Ishpeming & Negaunee Street Railway, in the first 12 hours that the books were open.

LANSING.—Mr. Jarvis, the brilliant inventor, now superintendent of the Lansing Iron & Engine works, will soon bring his new compressed air motor to a test. He is sanguine of success, and thinks that perhaps his machine can catch its breath on the fly.

MARINETTE.—Our street car line is a great success. A good track, St. Louis Car Company cars and electric transit together, give the public the best of service.

MENOMINEE.—K. Gochnauer, contractor, has begun laying the street railway track here.

OWOSSO.—The street railway between Owosso and Corunna is now considered a sure thing.

MINNESOTA.

MINNEAPOLIS.—City council committee recommend that permission be granted for an electric line on Washington street and another on Twenty-ninth. The Pennsylvania Avenue Line will be extended, and a new line is proposed from St. Louis Park to city limits.

MONTANA.

GREAT FALLS.—Work on the power house for the Electric Railway and Electric Light Company has begun. J. Cornelius has the contract and expects to complete the building by October 1st.

THE Great Falls Street Railway Company was incorporated yesterday. The stockholders are Albert S. Bigelow, Clarence H. Bissell and Chas. S. Parsons, of Boston; Edgar Buffum, of Newark, and Lewis Hart of New York. The capital stock is \$200,000, and the principal office at Great Falls.

HELENA.—C. K. Wells succeeds C. W. Cannon as president of the railway line. The other officers are: vice-president, W. A. Chessman; secretary and treasurer, H. L. Walker. The new road consists of the above and C. A. Broadwater, C. W. Cannon, A. M. Holter, L. G. Phelps and H. M. Parchen.

NEBRASKA.

HASTINGS.—Dr. J. E. Holts, of the Queen City Land Company, bought an option on one line of the street railway. This means an electric motor line in the near future.

LINCOLN.—The street railway people have now on sale books of 125 fares for \$5, or 22 fares for \$1.

OMAHA.—The Upper Broadway Line was stopped August 1st, by the flood undermining the track.

THE only horse car line that will be left in the city by September 1st, will be St. Mary's avenue. The Thirtieth Street Line is now nearly ready for the motors.

PLATTSMOUTH.—The Plattsmouth Electric Motor Line has been leased by E. G. Vanatta, who will add four miles of track and put on six cars, giving 15-minute service to all parts of the city.

NEW JERSEY.

NEWARK.—The Newark Passenger Company has bought out the Rapid Transit Street Railway Company for \$1,000,000, on the basis of five to one, and assuming also the bonded indebtedness.

NEW YORK.

ELMIRA.—The East Side Railroad Company of Elmira is incorporated with a capital of \$50,000. The road is to be five miles long from points in Sullivan and East Water street to Washington avenue. The West Side Company, capital \$100,000, is also incorporated, with plans for a ten mile road from Pennsylvania avenue to Eldridge Park.

NEW YORK.—The Sixth Avenue Railroad Company, backed by the petition of two hundred residents, asks to be allowed cables on its line. The company also asks to extend its line to the North river through Clarkson and Water streets.

THE suit of the Sixth Avenue Railroad Company to enjoin the Broadway and Seventh Avenue Railroad Company from tearing up its tracks at Sixth avenue and Thirty-Fourth street, in laying the new cable, was heard before Judge Barrett, of the Supreme Court. Judge Truax, prior to his departure for Europe, granted a temporary injunction, stopping the work at Sixth avenue and Thirty-fourth street. John E. Burrill, counsel for the Sixth Ave. road, asked the judge to continue the injunction. Elihu Root, counsel for the Broadway road, said that the plaintiff should have made the objection before his clients had expended \$600,000 on the work. Judge Barrett, at the close of the argument, decided to dissolve the injunction "as there was no necessity for it."

JAMESTOWN.—The Jamestown Street Railway are contemplating continuing the electric railway to Falconer as soon as the Lakewood division is completed.

NIAGARA.—The owners of the Devil's Hole, N. Y., property, plan to construct an electric railway from the suspension bridge to their resort.

NEW YORK.—By the bursting of water taps the road was broken up at Fourth and Green streets so that it caved in to the extent of 500 cubic feet right under the horse car tracks. Broadway cars then ran all over town.

RESIDENTS along Amsterdam Avenue will fight the Forty-second street and Manhattanville railway. The charter was obtained years ago, but traffic never warranted the building until this year.

ROCHESTER.—Circus day the street railway carried 60,000 people on 150 cars at a total receipt of \$2,900.

OHIO.

BROOKLYN VILLAGE.—The Village Clerk advertises for bid for carrying passengers on the lately completed street railway, number of tickets for \$1, 50 cents, 25 cents, must be specified.

CINCINNATI.—The Mt. Auburn Electric is charging a 15 cent fare from its extension to the agricultural district of Elmwood, and the C. H. & D. steam road is getting engines and cars ready to compete for the business. The war between steam and electricity will be interesting, but there can be no doubt as to the result, the steam horse will get struck by lightning.

COLUMBUS.—Bullit Park, the new suburb, will soon have rapid transit connections with the city. The Park syndicate proposed to build the new track. The consolidated railway men will run their cars over the new track. The track will cost \$5,000.

THE city authorities have agreed with the electric railway. The property owners who pave will have to conform to this grade. The new connections will be in operation by September 30. Chariots will be used to transfer ad interim.

GALLIPOLIS.—The street railway is booming. Mr. Mohr is a rusher and is putting the track through on time. By September 1st, it will be all laid, taking in the fair grounds, with a fine trestle over Mill Creek and lime stone ballast. Johnson Company sold the iron for the road.

HASELTON.—A petition asks the street railway company to extend their line down as far as the cross road, when they extend it to Haselton.

LANCASTER.—The street car company have decided to try electricity: \$5,000 has been subscribed toward a \$30,000 purse to further the purpose.

NILES.—A charter has been granted for a railway to connect Niles and Warren. Electricity will be the power and it will open up valuable connections with other towns.

SPRINGFIELD.—It is talked of to construct an electric railway from Wilmington to Springfield. Water power at Clifton is expected to furnish power.

STIEBENVILLE.—The reorganized Electric Street Car Company, will either put on new cars or thoroughly equip the old ones with a new system of electric motors.

WARRENTOWN.—The Edison people have offered to build the proposed electric road and equip three cars for \$40,000.

YOUNGSTOWN.—Attorney J. S. Sullivan is authority for the statement that a railway line from Leavittsburg to Warren will surely be built, and then perhaps to Niles and on to our city. This will make 25 miles of track.

ZANESVILLE.—Not much confidence is placed in the report here that \$500,000 had been subscribed for the construction of an electric line between Zanesville and Columbus.

OREGON.

PORTLAND.—Another extension to the street car line at Corvallis will likely be built this fall, to run to the agricultural college.

SALEM.—The Capital City Railway Company asks right of way for an extension to the passenger depot on Winter, Ferry and Mill streets.

PENNSYLVANIA.

ALLENTOWN.—The Allentown & Bethlehem Rapid Transit Company has been running a month, to the satisfaction of thousands of people: no accidents, no noise and all praise for the electric motor.

BRADDOCK.—The Braddock & Turtle Creek Street Railway was inaugurated by a grand free ride. The road is two miles long and electrically supplied by an 80-horse-power Thomson-Houston dynamo. Supt. Stamets is a thoroughly practical railway man and will bring the road up to a first place. Cheap tickets are sold and local real estate men predict great things for Braddock.

DU BOIS.—A street railway will be in operation before September 1st, at least between depots and to the fair grounds. J. A. Terpe, a moving spirit, says that this much will be done immediately, and more as soon as possible.

EASTON.—One thousand taxpayers ask for the repeal of the T rail ordinance.

KINGSTON.—Much legality doth hedge the Wilkes-Barre & West Side Railroad. A 6-mile gait is granted, and paving for 3 feet on each side is demanded.

LOCKHAVEN.—There is talk of a railway from here to Mill Hall, about 8 miles, to cost \$100,000. This will mean thousands of dollars advantage to both places.

PITTSBURGH.—A company asks for a charter to construct an incline to open up to passenger and freight traffic the retreats of Spring Hill. Jos. W. Friedman, Esq., is the solicitor for the new company.

THE CITIZENS' electric cars can now cross the Sharpsburg and Lawrenceville bridge. This change will cost the bridge directors \$8,000, and toll will be charged for cars. The power-house building is delayed by labor troubles.

PHILADELPHIA.—The Second & Third Street Passenger Railway Company is about to extend its line on Second street to the Reading Railroad, and on Richmond street. The night line will be run from the depot from 11:45 p. m. until 4 a. m., when day cars begin to run, at half hour intervals.

TENNESSEE.

LONSDALE.—Rumor has it that Lonsdale is soon to have an electric car line extending at least as far as the mills.

MOSSY CREEK.—There is some talk of an electric car line being built from this place to the noted Lithia Springs, 2 miles north of here.

TEXAS.

BONHAM.—The motor line will be in operation here by September 1st.

CORPUS CHRISTI.—The charter of the Gussett Street Railway Company has been filed at Austin, and the directors of the company are: N. Gussett, G. R. Scott and Andrew Dove.

FORT WORTH.—The sale of the Fort Worth Land and Street Railway Company's property for \$75,000 has been confirmed. A new company will be organized. Five to seven miles of new track will be laid by the buyers, which, with new connections and rolling stock, will make Fort Worth up to the times in rapid transit.

HOUSTON.—Mr. E. S. Mason, who came to Houston a few months ago and assisted in the superintendency of the construction of the electric street railway, is lying very low with consumption.

SAN ANTONIO.—The Alamo Heights Electric Street Railway now has several miles of track laid.

UTAH.

SALT LAKE CITY.—The new line across Jordan and 2 3/4 miles long has been successfully tried.

VIRGINIA.

NEW HAMPTON.—J. S. Darling owning a majority of the street railway stock is expected by the Newport News people to extend the railway to that village.

RICHMOND.—Cars will soon be run into Manchester across the bridge. Wires are already up and citizens are interesting themselves in the repeal of obnoxious city regulations.

WISCONSIN.

FOND DU LAC.—F. E. Adams, representative of a Boston syndicate which is buying different street railway lines and operating them electrically, is here looking the ground over.

MARINETTE.—The electric street railway line began operation August 1st.

SUPERIOR.—Pres. Norvell says that his road will double track the paved streets and put on more cars.

WYOMING.

CHEYENNE.—T. O. Kent, lessee of the railway here, has finished work on the South Side extension, and the cars now run south to Tenth street, and east on Tenth to Evans.

LARAMIE.—The Laramie Tramway Company (F. M. McHale, Denver, president), has obtained exclusive franchise for ten years, eight miles of track at \$80,000 cost, are to be built by July 1, 1892.

Selected list of patents relating to street railway inventions, granted during the past thirty days, reported especially for the STREET RAILWAY REVIEW by Munn & Co., Patent Attorneys, 361 Broadway, New York.

ISSUE OF JULY 14, 1891.

Subway and Connection for Electric Railways, Wm. Osner, Chicago, Ill.	455,763
Cable Car, John Stephenson, New York, N. Y.	455,774
Electric Railway, Rudolph M. Hunter, Philadelphia, Pa.	455,796
Trolley for Electric Cars, Walter H. Knight, Newton, Mass. .	455,798
Street Car, F. W. Smith, Jr. and S. S. Williamson, Bridgeport, Conn.	455,842
Fare Box, John L. Kull, Chicago, Ill.	455,881
Electric Railway System, S. P. Wilcox, Elkhart, Ind. and J. D. Partello, Rochester, Mich.	455,956
Railway Car Gate, Francis C. Cash, Lynn, Mass.	456,017

ISSUE OF JULY 21, 1891.

(Street) Car Brake, W. L. Antrim and E. A. Antrim, Davenport, Ia.	456,130
Trolley, J. E. Kinney, J. H. Brown and C. G. Wade, Chicago, Ill.	456,148
Brake for Street Cars, John M. Cropp, Wilmington, Del.	456,195
Connector and Support of Trolley Wires, Sidney H. Short, Cleveland, Ohio.	456,252
Switch for Electric Car Motors, Sidney H. Short, Cleveland, Ohio.	456,254
Crossing for Conduit Railways, Edward Samuel, Philadelphia, Pa.	456,434
Electric Railway, Rudolph M. Hunter, Philadelphia, Pa.	456,513
Electric Railway, Rudolph M. Hunter, Philadelphia, Pa.	456,514

ISSUE OF JULY 28, 1891.

Brake Mechanism for Cars, Allen J. Wright, Cleveland, Ohio. .	456,668
Brake Mechanism for Cars, Allen J. Wright, Cleveland, Ohio. .	456,609
Car Mileage Register, C. C. Gale, R. Cowles and A. W. Davies, Cleveland, Ohio.	456,650
Car Brake, Frederick Meyer, Chicago, Ill.	456,674
Car Starter, Patrick Flood, Albany, N. Y.	456,762
Car Body, John Turner, New York, N. Y.	456,864

ISSUE OF AUGUST 1, 1891.

Car Propelled by Electricity, Sidney H. Short, Cleveland, O. .	456,970
Trolley for Electric Railways, Sidney H. Short, Cleveland, O. .	457,015
Electric Motors for Street Cars, E. Thomson of Swampscott and E. W. Rice, Jr., of Lynn, Mass.	457,036
Electric Railway Motor, Norman C. Basset, Lynn, Mass.	457,102
Electric Railway, S. E. Wheatley and J. W. Schlosser, Washington, D. C.	457,240
Sanding Device for Street Cars, Nelson Newman, Springfield, Ill.	457,325
Rotary Track Cleaner, Nelson Newman, Springfield, Ill.	457,324

THERE have never before been as many people carried on street car lines of Boston as during the present summer; and need it be added—with as many comforts.

THE FINEST IN THE LAND.

THE first street car track in Chicago was laid in 1859, by the Chicago City Railway Company.

Owing to the fact that at that time the streets were in little better condition than the other portions of the bog on which the city now stands, the track, which was the light T rail, speedily assumed a gentle undulating surface, quite similar to the rolling prairie which stretched away for an indefinite distance. From this small beginning of less than two miles the company has steadily progressed, until now it has become one of the strongest in the country, and is famed far and near for the excellence of its cable system. The rapid growth of the city necessitated each year the construction of new lines and additional cars, so that until now the question of suitable office quarters for the general officers of the company has been repeatedly deferred, owing to the press of more important matters. In the meantime the company had grown to 36

handsome stone arched door, which opens into a vestibule 13 feet wide, and leads the way to the main entrance hall 50 feet in length. From this hall a large stairway leads on to the right to the floors above, and in front of it is a passenger elevator which is operated by steam. At the left of the hall and fronting on the street are two large offices, one of which is for the cashier, the other is the treasurer's private office. The latter opens into a large vault 9x12 feet, and is also connected by a passage way with a room further towards the rear, which is 20x35 feet in size and is occupied by the treasurer's clerks.

In the center of the building and extending to the roof, where it is covered with glass, is a light court 18x21 feet. The other rooms on the first floor consist of a large one in the rear the width of the building, and 20 feet deep, in which is the store room, and the department devoted to lost articles, the arrangement of which is one of the



CHICAGO CITY RAILWAY—GENERAL OFFICES.

miles of cable system, 125 miles of horse car lines, operating thereon nearly a 1,000 cars daily, and carrying enough passengers in 24 hours to populate a big city.

One of the first official acts of the new directory elected last January, was to decide on plans for a new office building, which stands at the north end of the main power station at 2,020 State street. The arrangement of the building was left to the treasurer, T. C. Pennington, who had the plans drawn by Beman & Parmatier. It has been constructed with a view to making it a permanent and convenient office building, and nothing has been spared make it as complete as possible in these days of comfortable offices. As will be seen by the illustration, the building is an imposing structure of pressed brick and red stone trimmings. It is three stories in height and occupies a space of 53 feet frontage and is 85 feet deep. The entrance is at the right of the building through a

best to be found anywhere. The private telephone exchange, connecting all the barns of the company, and the public telephone service, can be connected with every office in the building, and is also located on the first floor.

On the second floor, the three large rooms fronting on the street are occupied by President Wheeler, with his own room in the center, his general reception room on one side, the directors' room on the other. On this floor also are found the superintendent and auditor and the large room for the use of the supervisors, in which every morning the supervisors meet to pass on the short comings, if any, of the men. It is a handsome room, but somehow the conductors and drivers do not seem to be attracted by it.

On the the third floor the secretary, attorney, claim agent and track foreman are distributed, as will be seen by reference to the plan of the building shown herewith.

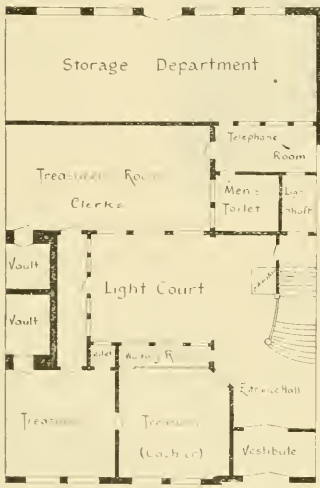
The floors throughout are of oak and the wainscoting is of either marble or oak, and all the furniture and wood trimmings everywhere are also of hard wood. The vault arrangement is especially good, containing two large

brass trimmings and a row of incandescent lights around the entire distance, so that at night the effect is extremely pretty. The company have their own lighting plant. The rooms are of good height and every room in

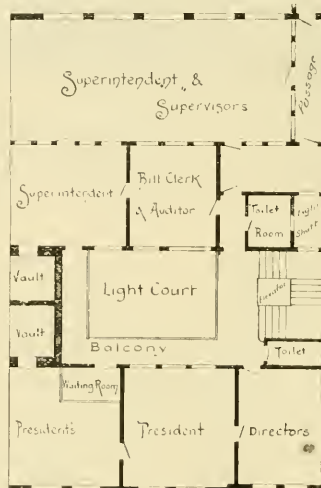


apartments on each floor, and so arranged that every officer has exclusive use of his own vault. The light court, which is covered with prismatic glass, makes the

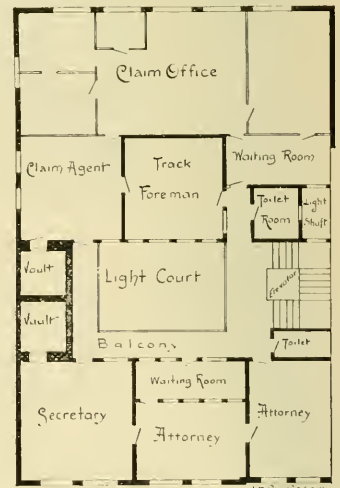
the building has an abundance of natural light, besides being supplied with innumerable incandescent lamps. A novel system of speaking tubes in connection with electric



PLAN OF 1st FLOOR



PLAN OF 2nd FLOOR.



PLAN OF 3rd FLOOR.

interior of the building fully as light as those rooms fronting on the street, and the balcony extending entirely around it on each floor is a very handsome affair, with

bells so arranged that the occupant of any office may converse with every room in the building, and this is accomplished with the use of but one set of tubes. The

washrooms are all wainscoted with marble and the sinks are of the same material, and the fixtures nickel plated throughout. The building is heated by steam from handsome radiators placed in every room and hall. The building is protected by heavy fire walls on every side and is absolutely fire-proof. It connects in the rear by bridges at each floor, with the shops, which are among the largest operated by any street railway in the country.

New furniture and office desks have been purchased for the entire building, and are superb specimens of the best that could be found. The desks are extra large size, of oak finished in oil, while the desk and visitor's chairs are of material to match, and handsomely upholstered in Russia leather. The entire order, and all the bronze grating for the treasurer's office was supplied by



CHICAGO CITY RAILWAY BUILDING—MAIN ENTRANCE.

A. H. Andrews & Co., Chicago, whose fame for office furniture and fixtures has long since filled the land. The desks and vaults are all fitted with an improved system of boxes for filing papers of record, and are so arranged that any paper can be reached at a moment's notice.

The building, both from the exterior and interior, presents a most attractive appearance, and is without question the finest street railway office building in the country, if not in the world. The Chicago City Railway are certainly to be congratulated on their new quarters, which are in every way worthy of the company, and deserve the title of the "finest in the land."

WAR AT DANVILLE.

LIVELY times were witnessed at Danville, Illinois, during the past week, but the company held its own and came out best in the fight. The city ordinance to the company, in effect July 19th, 1891, provides that the tracks shall be constructed in conformity with the surface of the street existing at the time of construction, that the cross-ties, framework and superstructure shall be imbedded below the surface of the street.

Another section provides that at any time the city shall improve any of the streets upon which said company has laid any of its tracks, by paving the same, the company shall at the same time and in the same manner pave the right of way granted, at its own expense.

In April last the city passed a paving ordinance providing for eleven inches excavation on Main street, the rolling of the sub-grade, the placing of eight inches of crushed stone thereon, to be rolled to six inches, two inches of sand on that, and four-inch paving block on that, set edgewise, and is now paving.

The company placed its ties on the sub-grade and placed the crushed stone between its ties, tamping the same to six inches, placed two inches of sand over stone and ties, and on that surface put the paving blocks, as it was impossible to literally comply with the paving ordinance and construct its track; and that such paving and construction of track complied with all the ordinances.

The city claimed the company should place its ties below the stone, making an excavation of seventeen inches instead of eleven, and use an eight-inch chair to support the rail, and on the company refusing so to do, the mayor assembled several hundred men, at 3 o'clock in the morning, to tear up the track and construction, without a hearing in the courts. But the company was not behind, and served an injunction on his honor, who was obliged to take a back seat and recall the forces and engines of war. Since then the company has been upheld and is proceeding with its work, while the over-officious mayor looks out of his window, and as the work goes gayly on, ponders on the disappointments of official life.

THE TORONTO TRADE.

AS we go to press the Toronto matter has not been entirely closed. The Keily-Everett Syndicate however, will undoubtedly secure the road, having made the highest bid and their tender having been accepted by the city council. The syndicate deposited last May \$30,000 as a forfeit and evidence of good faith, and the council authorized the drawing up of the contract which only lacks the signature of the mayor to authorize the turning over of the road to the syndicate. On the signing of the contract there will be paid in cash \$500,000 as a first payment. Under this arrangement the lessees pay a per centage of the gross receipts, and also an annual rental of \$800 per mile of single track for every mile in use, and are relieved from doing any paving, and the city is to do all the track repairs. The syndicate however, furnish all rolling stock, and in case of extensions, the new rail. The contract extends for thirty years.

FINDLAY ELECTRIC LINE.

A WESTERN manufacturing city is always a good street car town, and of the many in the West probably none makes a better showing in this respect than the bustling, enterprising city of Findlay, Ohio, which now has a population of over 25,000. The improvements in new factories, public improvements and buildings have amounted to nearly \$15,000,000 in the remarkably short period of eighteen months.

The main street is 65 feet wide from curb to curb, and is the only street that runs north and south through the entire length of the city. The street railways owned by the Findlay Street Railway Company, are the Main street line (which is $4\frac{1}{2}$ miles long and is double tracked), the Tiffin avenue line, and the West Park line. These two lines are about $\frac{1}{4}$ miles in length, and are operated now as one continuous line. The line is a single track with turn-outs, except about 1 mile on Main street, which is double track. These lines run an equal distance in each direction from the business center of the city, so that they carry passengers to business and take them from same in both directions, making them both double lines, and with short hauls. The business center of the city is a little south of the bridge over the Blanchard river. This bridge is an iron structure 100 feet in with, with special roadways for the street car tracks. The only other point that the north and south end of the end of the city is connected across the river is full three quarters of a mile west of Main street. There can be no parallel line built to compete with the Main street line from this fact and that the population extends along and close to Main street. This line does a business equal to many lines in cities twice the size of Findlay. The lines since their construction in 1888 and 1889, have been operated with single horse. In 1890, owing to the increase of business, the Main street line was changed from single horse to two mules to each car, and on July 1, 1861, the company began operating the Main street line with electricity. For this was purchased a new equipment of thirteen cars—eight closed and five open—ten of them being mounted with motors. The motors are single reduction gear, slow speed, made by the Westinghouse Company. They are capable of pulling heavy loads, and attain a speed of 15 miles an hour without any perceptible noise.

The power station is a commodious building 60x90 feet, and so arranged that additional generating machinery can be added at any time. At present there are two engines 12x21 inches, of 100-horse-power each, and two boilers 18 feet long and 72 inches diameter. The Hoppis Manufacturing Company furnished the heaters. The station is as complete as can be desired, and is maintained in excellent condition. There are two 80-horse-power dynamos which gives a duplicate equipment, as one set of engines, boilers and generators are sufficient to operate the line, which is double-track, $4\frac{1}{2}$ miles in length. The Tiffin avenue and West Park lines now operated with horses, are $\frac{1}{4}$ miles in length and will shortly be changed to electric lines by wiring same at an outlay of less than

\$5,000, there being ample power and equipment to operate all the lines.

The city controls and owns the natural gas plant, and owns most of the territory within a radius of 10 miles, none of which is permitted to be piped away.

Not over 10 per cent of the territory owned by the city has as yet been developed, and the daily consumption is 60,000,000 feet per day; the present wells from which the gas is drawn are of sufficient capacity to supply over 100,000,000 cubic feet daily. The factories are all substantial structures, and the manufacturers are prosperous. Nearly all have greatly enlarged their plants since locating here. The city is forty miles distant from Toledo, and is located in the richest agricultural district of the state. The rates of gas were fixed to the pioneer manufacturer in 1887 at \$200 per annum for a period of five years. Private consumers pay a rate equal to 10 cents per 1,000. The rates fixed for new comers beginning 1891, is as follows:

10-pot Glass Factory, per annum,	-	-	\$1,350
Same at Pittsburgh,	"	-	9,000
Findlay St. R. R. Co., 200-H.-P., per annum,			600

These rates are satisfactory, as they give the city an increased revenue, which enables them to extend their mains, maintain and increase the territory and drill additional wells. The business portion of the city has a large number of fine substantial business buildings, and the residences compare favorably with those in any other city in Ohio of twice its size. The Agricultural Society have just purchased new fair grounds on the south end of the Main street line. They will open October 7th.

The road is owned by Mr. George B. Kerper, one of the best known street railway managers in the country; the superintendent is Mr. Charles Smith, who was formerly with Mr. Kerper on his Cincinnati lines. No pains or expense have been spared to make the line and equipment in every way a model road, and the popularity which the enterprise enjoys both with the public and city officials speaks volumes for the liberal policy adopted.

THE SESSIONS SIDE SEAT CARS, which were recently built by the Pullman Company, have been put into service by the Fruit Vale Railway, at Oakland, Cal., and have at once become extremely popular. So much so that other companies on the Pacific coast are taking up the matter of adopting the same.

THE WALTON ARCHITECTURAL IRON COMPANY, Chicago, reports orders for brackets coming, inadequate to their present capacity for manufacturing, but the late additions to their works increase their ability to supply the demands. They make both angle iron and pipe brackets of standard or special lengths for iron and wood poles, and in addition to manufacturing iron and steel poles and iron brackets, they are ready to make estimates on all kinds of iron construction promptly, making prices on all plans or diagrams sent to them at 386 and 388 Throop street, Chicago.

THE COLUMBIAN COACH.

AMONG the modes of transit to be at the service of the people of the world who shall attend the great Columbian Fair, one of the most unique will be that of the one whose name heads this article.

Mr. James L. Dyer, of 230 LaSalle street, is the author of this new system. His scheme is a light open coach of 2,200 pounds, upholstered and curtained in handsome style with a seating capacity about the same as a street car. The illustration shows the coach as modeled, but without the seat-backs and curtains, which will be put in those hereafter built. At present horses furnish the motive power, but a storage battery will be tried; an electrician is now working on that feature of the vehicle.

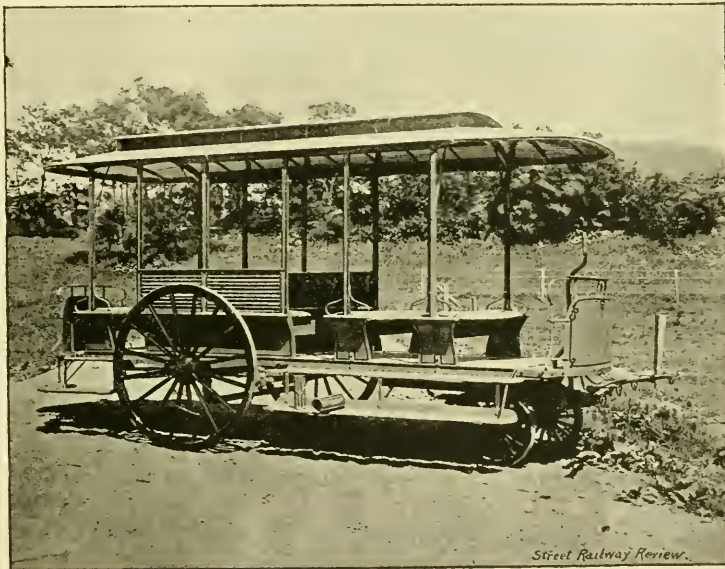
The draught is very light, about one-half the ordinary pull of road vehicles, on account of the new anti-friction spindle, also an invention of Mr. Dyer. This bearing

will enable the managers to evade the law, forbidding such vehicles on the boulevards, except when a lady is one of the occupants. Applications for the position of conductors are being rapidly filled at the office. One young lady practically speaks of her desire to collect nickels by stating:

"I see nothing against the idea of women conductors. We are already in other walks of life and as Mr. Dyer remarks more apt to be honest than men. I much prefer such a life to the drudgery of a seamstress' weary existence."

The chief value of the coach will be as a boulevard traveler and as a feeder to the adjacent street car lines.

A factory is planned at Momence, Ill., for construction, and the Columbian Coach Company is fully organized, and we may expect soon to see it making regular trips with lady conductors, not rack, electric light and all.



requires little or no oiling, as it is on the ball-bearing plan or rather a combination of ball-bearings and loosely fitting steel rods. The entire coach with a number of passengers was run several blocks with a motive power of two small boys (*gamin Chicagouis*) or one small pony-power. The vehicle is 18 feet long, 8 feet wide, with a seating capacity of over thirty; and eight feet high from the floor to the deck. The front wheels run under the body being only $2\frac{1}{2}$ feet high; the rear wheels are $5\frac{1}{2}$ feet in diameter. The tires are very broad and as no track is required, the driver must be able to turn out for other vehicles and around corners. This is possible on account of the small front wheels; and the "fifth wheel" arrangement also a ball-bearer. The coach will be illuminated by storage battery light.

The crowning effort at the novel and remarkable is the determination to have lady conductors, which it is expected

THE STORAGE BATTERY SUIT.

ELECTRICIANS have waited with much interest the decision in the now celebrated storage battery case, which has extended through a weary fight of five years. Judge Coxe, of the United States Circuit Court, epitomizes his decision in the words, "Mr. Brush was the first in this country to make the broad invention, and is entitled to the fruits of his invention. It is the policy of the law to reward him." Now, unhampered by the fear of infringement, the storage battery will be free to demonstrate its greatest possible usefulness. The patent has yet twelve years to run, and will enjoy a practical monopoly of the business in this country for that period.

GEORGE B. KERPER and Mrs. Kerper are spending the summer at Atlantic City.

ECHOES FROM THE TRADE.

THE KEY WEST ELECTRIC LIGHT COMPANY will build one of the most complete plants in the South.

THE J. G. BRILL COMPANY have just delivered new combination cars, twenty-nine feet in length, for the new electric line at Spokane, Washington.

THE SIOUX CITY ENGINE WORKS has an order for a 150-horse power Corliss to drive the plant of the Rohmberg Storage Battery Railway of Dubuque.

ALBERT & J. M. ANDERSON, manufacturers of the Boston trolley, report sales very satisfactory, having several thousands already in use. This company also manufacture a full line of electrical supplies.

THE BALL ENGINE CO., of Erie, Pa., shipped on the 8th, inst., eight car loads of machinery to the Key West Gas & Electric Light Co., of Key West, Fla., consisting of three large engines, two boilers, pumps, heaters, condensers, etc.

THE ECLIPSE CLUTCH WORKS, of Beloit, Wisconsin, have recently received the contract for the entire clutch and pulley work, besides furnishing two of the well-known Williams engines for the electric road at Battle Creek, Michigan.

THE SHORT ELECTRIC RAILWAY COMPANY, through their Chicago selling agent, Mr. Wilson, are rapidly completing their new line at Battle Creek, Mich. This is to be a model line, as it is to be run to a very successful summer resort.

THE CALORIFIC VENTILATING & HEATER COMPANY are now finishing equipping with their heaters all of the closed cars for the North and West side lines of Chicago. They also report sales increasing in all parts of the country for this popular heater.

WM. BARAGWANATH & SON, of Chicago, have recently built a steam jacket feed water heater of 1,300-horse-power capacity for the new power-station of the Davenport, Rock Island & Milan Railway. This is one of the largest heaters ever built for this purpose.

THE LIMA REGISTER COMPANY, of Lima, Ohio, who have recently placed a new register on the market, report an increasing demand for their goods, having recently received orders from sixteen railways, many of which have entirely equipped their lines with this register.

THE ELECTRIC MERCHANDISE COMPANY, Chicago, commence a new department again this month, namely that of the Pratt Patent Register, for which they have the exclusive agency. The registers are small and neat, register to 100 on the face and to 10,000 on the back, both automatically returning to zero. The registers have never been pushed but will be now, several orders having been received already.

THE STRATTON SEPARATOR, general office 32 Cortlandt street, New York, is giving excellent satisfaction, and manufacturers and steam users generally will be interested in the following communication.

R. T. WHITE has the contract for entire construction work and supplying material for the new electric line at Altoona, Pa. White's specialties of chairs, rails and switches will be used throughout. Edison Company will furnish the electrical equipment.

THE AMERICAN ELECTRICAL WORKS, Providence, gave their thirteenth annual Rhode Island clam dinner to the electrical fraternity on August 8th. The attendance and clams were both large, and the celebration an event of unusual interest and pleasure.

R. D. NUTTALL COMPANY, with factory at Allegheny, Pennsylvania, are successors to the Electric Railway Specialty Company, of 29 Broadway, New York, and will hereafter conduct that house as an eastern selling branch for their very extensive lines.

THE HAZARD MANUFACTURING COMPANY, Wilkesbarre, Pa., have delivered the Citizens' Cable Road, in St. Louis, a steel wire cable nearly 6 miles long and weighing 90,000 pounds. It is $1\frac{1}{4}$ inches in diameter, and possesses an unusually high breaking strain.

THE PHILADELPHIA office of the Babcock & Wilcox Company has changed hands, and W. C. Temple and Henry F. DePuy have been appointed agents, to whom all communications for that district should be addressed. The office remains at the same number, 32 North Fifth street.

THE GENETT AIR BRAKES, being tried on the electric cars of the Pittsburg & Birmingham line, are proving so successful, they will probably be adopted for the entire car equipment. Owing to severe grades and heavy cars, great difficulty has been experienced in holding trains, although several different brakes have already been tried.

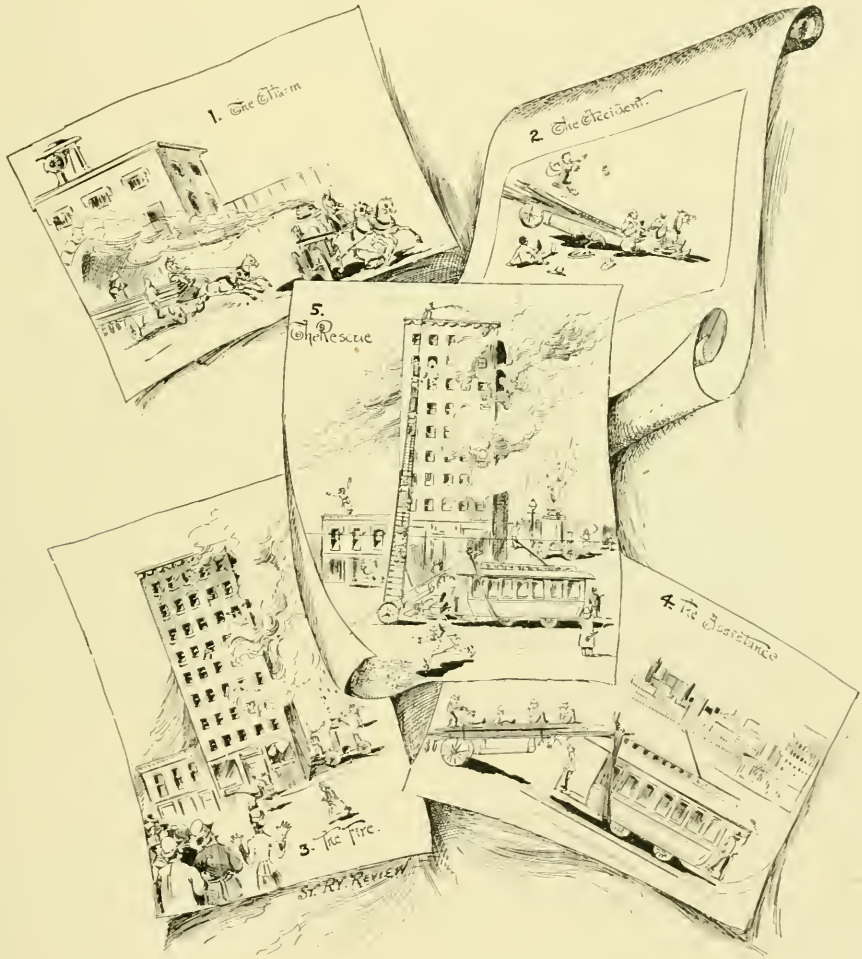
THE BROWNELL CAR COMPANY, of St. Louis, besides receiving many small orders from different parts of the country, have recently taken an order for fifty electric cars for the consolidated lines at Milwaukee, which will be finished in an elaborate style, and will cause the eyes of the residents of the Cream City to gaze in wonder and admiration.

THE GREAT WESTERN ELECTRIC SUPPLY COMPANY has removed its large and still increasing business from 190-192 Fifth avenue, to 201-203-205-207 Canal street, where the quarters are more nearly adequate to the wants of their immense business. Their old friends and any prospective buyers will be greatly interested by an inspection of their several floors of electrical supplies, and among which the railway department is given an important place.

THE BALL ENGINE COMPANY, of Erie, Pa., has issued a new catalogue setting forth the numerous points in favor of the well known engines of that name. The great increase of business and the late improvements in the various lines of their trade speak well for the enterprise of the managers and the excellence of their manufactures. One of their specialties is engines for electric railways, and the array of prominent electric roads north, south, east and west using them, is a very strong recommendation for the same. Their foreign trade has greatly increased in this line.

THE ELECTRICAL SUPPLY COMPANY, Chicago, who in the dissemination of unique advertising matter are fairly entitled to the title of art publishers, have just mailed their friends a tasty little leaflet illustrating their new quarters on Michigan avenue—"The largest building devoted to the sale of electrical supplies in the world."

THE H. W. JOHNS MANUFACTURING COMPANY is the style of the new corporation combining the old firm of the same name, and the Chalmers-Spence Company, New York; the Asbestos Packing Company and Chas.



THE SHULTZ BELTING COMPANY has done a rushing business this season. Among some of their shipments are two 48 inch belts, one 123 feet long to Clinton, Mass., and one 120 feet long to Beaver Falls, Pa. Besides this evidence of business, other large orders count in 450 feet of 30 inch and nineteen 10 inch and 14 inch belts to New York City, also 11,500 feet of belting have been shipped to Liverpool, Eng., during the past month, and they are now completing 310 feet of 72 inch heavy double for the St. Louis & Suburban Railway Company.

W. Trainor & Company, Boston; and the Shields & Brown Company, Chicago. This firm will control almost the entire asbestos trade in America. They intend to cheapen products by reducing expenses. H. W. Johns is President, and G. P. Erhard, Secretary.

THE NORTHERN CAR COMPANY is evidently not without honor in its own country, for the Minneapolis Street Railway have just put in service twenty new 18-foot cars built for use on the electric lines. The interiors are in

light wood, are lighted with electricity and each contain two handsome plate glass windows. The bodies are a bright orange and the metal work dark. In speaking of the Northern Car Company's very creditable handiwork, a gentleman connected with the street railway remarked: "They are in every way equal to those turned out by the most successful car companies, and Minneapolis has reason to be proud of an establishment which has shown so much skill.

PUDUE UNIVERSITY, LaFayette, Ind.

THE STRATTON SEPARATOR Co.,
32 Cortlandt street, New York.

GENTLEMEN: We have been using for about a year one of your 4-inch separators in connection with the compound engine in our engineering laboratory.

Steam for this engine is supplied by boilers located 580 feet away, and notwithstanding the long length of pipe through which it is thus required to pass, it was never found, by repeated calorimeter tests, to contain as much as 3 per cent of moisture when it passes out of the separator, regardless of the amount of water previously held by the steam.

Very Truly Yours,
WM. F. M. GOSS,
Professor Experimental Engineering.

STREET RAILWAY accident insurance is made a specialty by the American Casualty Insurance & Security Company, of Baltimore, of which Beecher, Schenk & Benedict are the general agents. By this plan, the railway pays a fixed amount yearly, and the insurance company assumes the settlement and payment of all the damage claims against the road arising from accidents of every nature. That so conservative a road as the West End of Boston, the largest in the world, should endorse the plan, as they have by adopting it, is very significant. Other roads that have never seriously considered the question, would do well to canvass the matter and become familiar with its workings and advantages which are manifold. When a company pays the annual charges, it has no further bother or expense, but simply refers all claimants to the agent of the insurance company who does the rest. The West End road believes the arrangement will save them largely in expense, to say nothing of annoyance.

THE horse must go off the Woodland avenue and West Side Street Railway Line, at Cleveland. The event hoped for at last has come to the patrons of the road, and another line will be numbered among the electrics. Seven out of the nine directors of the road voted for the change and the overhead system of electric traction. To meet the extra expense, the secretary of the board was instructed to call a meeting for the purpose of increasing the capital to \$2,000,000. This will be done September 4. The road will begin immediately its new equipment of rails, and wiring for which bids are coming in. This leaves but one more horse railway in the city of Cleveland.

THE WIGHTMAN ELECTRIC MFG. CO., of Scranton, Pa., report a steady increase in their business, and they have lately published a catalogue of general electric railway supplies. Their speed controllers and single reduction motors are meeting with great favor, as is shown by the following letter:

AUBURN CITY RAILWAY Co.,
Auburn, N. Y., June 29, 1891.
THE WIGHTMAN ELECTRIC MFG. Co.,
Scranton, Pa.

GENTLEMEN: We ran your car yesterday with heavy loads and are more than pleased with it. It is very fast and makes no noise whatever, and seems about as near perfection as anything can be.

Very truly yours,
AUBURN CITY RAILWAY Co.,
G. F. Wells, Supt.

SUMMER RESORTS NOW OPEN.

Excursion tickets now on sale. The following list (with ticket rates for the round trip from Chicago) represents but a few of the choice spots of the creation reached best via the Chicago, Milwaukee & St. Paul Railway and Milwaukee & Northern Railroad.

Delavan, Wis.....	\$ 3.75
Oconomowoc, Wis.....	5.50
Waukesha, Wis.....	5.00
Palmyra, Wis.....	5.50
Madison, Wis.....	6.50
Kilbourn (Wisconsin Dells).....	8.85
Tomahawk Lake (Minocqua).....	15.70
Elkhart Lake, Wis.....	7.50
Marquette, Mich.....	17.40
Mackinac, Mich.....	21.25
St. Paul and Minneapolis.....	20.00
Lake Minnetonka.....	20.75
Duluth.....	24.00
Yellowstone Park (Grand Tour).....	130.00

Special reduced rates on Friday and Saturday of each week to various Wisconsin resorts.

For further particulars apply at City Ticket office, 207 Clark street, or Address F. A. Miller, Assistant General Passenger Agent, Chicago.

NEW PUBLICATIONS.

THE announcement is made of the forthcoming publication in November, at London, of the *Tramway and Railway World*, a monthly review of current progress in steam, electric, cable, and other traction. The office of publication is at 16 St. Helen's Place, Bishopgate, and the American branch is at No. 11 Adams street, Chicago. As there is nothing of the kind in existence on the other side of the water, and as the interest there in modern railway methods is rapidly growing, there should be no question as to the success of the venture, which it is announced will be conducted on the "American plan," with Mr. Frank X. Cicott, of Chicago, as chairman. Wishing the new paper all possible success we trust their world may be a large and happy sphere.

* * * * *

THE ELECTRICAL PUBLISHING COMPANY, Lakeside Building, Chicago, have just issued, in very handy size, a convenient little work entitled, "Electric Transmission Hand Book," containing 100 pages, 22 illustrations and 27 tables. The author is F. B. Badt, late First Lieutenant, Royal Prussian Artillery, and a frequent writer on elec-

trical subjects. The handbook will be found very useful and will be mailed by the publishers to any address. Price \$1.

* * * * *

THE Wightman Electric Manufacturing Company, of Erie, are mailing their new catalogue, which is resplendent in a bright yellow cover. It contains descriptions and illustrations of their many specialties for street railway lines.

* * * * *

A UNIQUE cover and attractive illustrated contents, printed on coated paper, characterizes the Ball & Wood Company's new catalogue, which contains an interesting history of high speed engines.

* * * * *

THE development in electrical lines is being fully kept pace with by weekly and monthly publications devoted

Brand Moisture-Proof wire, and such bulky material, for immediate shipment to any point. We herewith present a representation of the exterior of this large concern, but the quiet repose of the outside is no indication of the dizzy rush of business within the gates. On the first floor are found the displays of general electric goods. There is hardly to be found a single meritorious article of electrical use which cannot be obtained here. The display is an epitome of electrical inventive genius. Any visitor in the city with electrical enterprise in view has not done his duty until he has inspected thoroughly the display here made. Here, also, is the newly organized shipping department, with the utmost facilities for quick and accurate shipments of any quantity of goods. On the second floor is concentrated the business management, under their respective and appropriate heads. Here, amid the clatter of a score of type-writers, the manager, assistant manager and managers of the railway department, light and



to the science. The very latest is *Electricity*, published weekly in this city. It is handsomely printed and full of interesting matter. We wish the new candidate all possible success.

ELECTRICAL SUPPLY CO.'S NEW HOME.

ONE of the first things that strikes the attention of the pedestrian as he goes north along Michigan avenue and Randolph street, is the huge five-story brick at the corner, surmounted by a wire sign of generous dimensions bearing the magic title, "Electrical Supply Company." For several years the crowded condition of their former quarters at 171 Randolph foreboded their present commodious quarters. The trouble and loss of time incidental to removing their large stock has been amply requited by the increased facilities enjoyed in the present expanse of floor-room and sky-room. Now they can accommodate shipments from their factory at Ansonia, Conn., no matter of how many details or what quantity, and can store away large quantities of Shield

power house goods, telegraph and telephone offices drive the immense business that increases and demands more attention every day. Here, too, the advertisers, the mailers, the accountants and their assistants keep up their various functions. The third and fourth floors are stored with goods of lighter weight, principally the specialties and the lines constantly added to their large stock to keep it abreast of the times. Within the four walls of this immense building can be found complete equipment for electric light and power companies, electric railway systems, telegraph companies, telephone companies, district messenger service, and the thousand and one conveniences now supplied to the household by means of electricity. Original plans and specialties, besides the control of many lines of goods and the ownership of others, makes the Electrical Supply Company sufficient within itself to cope with whatever order of whatever size may be brought to them. All this success they deserve and it has placed the Electrical Supply Company in the front rank of such organizations.

PERSONALS.

W. W. WILLITTS, manager of the railway department of the Adams-Westlake Company, is away on an extensive western trip.

A. G. STARR was elected purchasing agent of the Cincinnati Street Railway Company in place of Mr. Phythian, resigned.

JOHN I. BEGGS, manager of the Chicago office of the Edison General Electric Company, is in New York attending the Edison Convention.

J. W. MCFARLANE, formerly with the Winston & Salem road, has become superintendent of the new electric railway, at Savannah, Georgia.

CHARLES A. SCHIEREN, the well known belt manufacturer, has been elected vice-president of the new Hide and Leather National Bank, in New York.

JOHN P. FRENZEL, president of a bank and director in several corporations in that city, has been elected president of the Citizens' Railway, of Indianapolis.

THOMAS LOWRY, president of the street railway of Minneapolis and St. Paul, was recently elected president of the "Soo" road, which office he held two years ago.

C. J. MAYER, general traveling agent of R. D. Nuttall & Co., Alleghany, Pa., was a caller at this office, on his western trip, which he reports as a highly satisfactory one.

CHAS. HATHAWAY, of Cleveland, whose practical experiences and ideas in street railroading would be worth a fortune to any beginner, made us a pleasant call a few days ago.

JAS. A. MIDDLETON, manager of the railway department of the Eastern Electric Supply Company, Boston, is on his semi-annual trip through the Western and Middle States.

W. R. MASON, general manager of the Electrical Merchandise Company, and also president of the Burton Heating Company, is in Richmond attending a meeting of the directors of the last named company.

WM. RICHARDSON, the venerable president of the Atlantic Avenue Road, Brooklyn, is in Europe enjoying a flying trip to all the principal points of interest on the continent. Mrs. Richardson accompanies him.

C. E. LOSS, the street railway contractor, is in Europe, and is succeeding nicely in search of health. Mr. Loss had a nearly fatal attack of la grippe last winter, and his friends will be pleased to learn of his much improved health.

EDWARD J. LAWLESS has again entered the street railway fraternity, and is now general manager of the Pat-

terson Railway Company, Patterson, New Jersey. His many friends will be glad to welcome him back to the fold. Cement is made to stick, but it takes something stronger to keep Mr. Lawless long out of street railway interests.

C. J. ERNST, recently secretary and treasurer of the Lincoln, Nebraska, Street Railway Company, has returned to the land department of the Burlington & Missouri River Railroad, to accept the office of Assistant Land Commissioner at a handsome salary. He will continue to reside in Lincoln, and still retain an interest in the lines there.

M. L. BOWEN, late superintendent of the Kansas City Cable Company, has, according to the *Star* of that city, accepted a position with the *Street Railway Journal*, of New York. Mr. Bowen will combine in his new field the practical experience of street railway work with literary tastes, which should make him one of the most acceptable writers on railway subjects. We welcome him to the fraternity.

W. H. PATTON, the inventor of the Patton Motor, while endeavoring to board a moving steam train at Pullman a few days ago, slipped and fell and fractured his arm. The accident is particularly hard to bear, coming, as it does just at the time when Mr. Patton had completed his motor and was ready to show it to the world.

DETROIT CITY RAILWAY SOLD.

THE entire plant of the Detroit City Railway, which was almost wholly owned and entirely controlled by the Hendries, having been in their possession for a great many years, has been sold to a syndicate of New York and Boston capitalists, headed by Governor Waller of Connecticut and Wm. W. Cook, of the law firm of Waller, Cook & Wagner, New York City. The sale is one of the most important, as it is one of the largest which has occurred in a long time. The road at present comprises some 80 miles of track, about 300 cars and some 2,000 horses. The reason given by Mr. Geo. Hendrie, president of the company, for disposing of the property is, that his health has been very poor for several years and he did not feel like undertaking the responsibility of supplanting the animal system with that of mechanical power, and the offer being a good one he was induced to accept it. The price paid is not definitely known, but is understood to be \$5,000,000. An important fact of the sale to the Detroit people and its interest to railway men, lies chiefly in the fact that the purchasers announce their intention to put in the overhead electric system on all principal lines as soon as the citizens declare themselves in favor of the same. This is only one way of saying that electricity will be substituted immediately, an engineer, in fact, having already prepared a considerable portion of the necessary plans for this transformation. As the sale includes not only the City Railway, but the Grand River Company, a new

organization has been formed, known as the Citizens' Railway Company of Detroit. The new board of directors includes ex-Governor Waller, of Connecticut, who was Consul-General to Great Britain during the Cleveland administration; W. B. Ferguson, of Springfield, Massachusetts, a manufacturer of electrical appliances; Mills W. Barse, a banker of Buffalo; and W. W. Cook, a young lawyer who graduated a few years ago at Ann Arbor, and whose home is in New York. Mr. Cook has been elected president and will have his office in Detroit. J. B. Mulliken, formerly manager of the Detroit, Lansing & Northern Railway, and more recently a member of the Board of Public Works in Detroit, has been made general manager. The new company announce their policy as a very liberally disposed one, and also invite the largest possible subscription to the new stock by the citizens of Detroit, expressing their desire that from five hundred to a thousand of the residents of the city should be interested in the road.

Mr. Geo. Hendrie, the retiring president, has been actively connected with the old company for more than twenty-five years past, and has seen the system expand from a very insignificant affair to the valuable property it has now become.

NEW CABLE WORK IN CHICAGO.

SINCE the West Chicago cable lines were opened, business has so rapidly increased that it has far exceeded the greatest anticipations of the engineers, who built the power house which drives their down town loop, around which all of the West Side cable cars are obliged to pass. This is the loop which passes through a tunnel under the Chicago river, and is obliged to make a large number of sharp turns in its course. The result is that a vast amount of power is required, especially during the rush trips, that it has been decided to replace the driving machinery in their power station, at Jefferson and Washington streets, with stronger and heavier machinery throughout. To avoid closing down the line while this change is being made, there is now in process of erection immediately in the rear of the present station and fronting on Desplaines street, a auxiliary power house 25x150 feet. It will be a complete cable plant with 1,500-horsepower, and a battery of six vertical boilers, which together with the driving machinery, will be furnished by the Pennsylvania Iron Company, and the drums equipped with Walker's Differential Rims. As in the present station, so in the new one only one cable rope will be driven, and as soon as the new plant is finished, which will be in a short time, the cable will be carried on through the old power house and driven from the new one, after which the rope will again take its power from the old station. This arrangement will give the company always in reserve, a duplicate driving plant complete in every respect, so that any possible injury to any part of one station could not cause more than a short delay as the drive would be transferred from one house to the other.

Work on the Blue Island Avenue Cable Line is progressing nicely and the location of the power house has

been decided on. One will be on Blue Island avenue and Leavitt street, where the car barns are now situated, and the other at the corner of Van Buren and Jefferson streets. The contracts for the power houses are nearly all closed. The company are also considering the question of cabling Fulton street, an improvement which is greatly hoped for, and which would make an additional line of five miles. This, if completed, will parallel with cable, both sides of the present Lake Street Elevated Road and would not leave much for that line to carry.

IN Chicago, Indiana avenue is one of the swell street car lines, paralleling as it does within one block a street where the Pullmans, Armours, Fields and several other people in fairly comfortable circumstances reside. The patrons of the line mentioned are uniformly cultured people, but the other day, according to the *Inter-Ocean*, an over-dressed young man took a seat, wearing a bullet-shaped head so closely cropped as to give him at first the appearance of complete baldness. A number of healed cicatrices of various geometrical shapes on his poll looked like a sort of hieroglyphical biography. They were probably a record of his battles, for he was a bartender out for the day.

He was a blatant sample of the loud-voiced, self-conscious, look-at-me variety of man. After ogling a young lady in the seat in front of him for two or three minutes he called out to the conductor:

"Does this car go all the way?"

"Yes, sir," responded the conductor politely.

"Does it go as far as Thirty-fifth street? I want to get off there."

"Yes, sir," was the answer.

"Well, I want you to tell me when we get there. You'd better stick a stamp on your nose or put a straw in your mouth or tie a knot in one of your lips, so that you won't forget it."

"It would not be convenient for one in my position to do so," said the conductor courteously, "but if you will kindly pin your ears round your neck I think I shall remember to tell you.

And as the conductor had brawn as well as brains the silence thenceforward was oppressive.

THE utility of an electric car in cases of emergency was illustrated a few days since, when a fire occurred in a remote part of Austin, reached by the Cicero & Proviso Line. The hose cart was fastened to the motor car, and the way the wheels turned round was a revelation. The conflagration was reached in no time, and the fire quenched.

THE man who compels a street car full of passengers to wait for him thereby delays United States males and is committing a crime.

THE Bremen Street Railway Company has contracted with the Thomson-Houston people for equipment of two-thirds of their system.

THE LACLEDE CAR COMPANY OF ST. LOUIS.

THIS company was organized in 1884, and in a very short time sprang into prominence as one of the leading street car factories in the country,

This month the organization of the company will be changed and the capital stock increased to \$80,000, all paid up. The officers under the new organization are Jas. P. Kiely, president; E. I. Robinson, vice president and general manager; Thos. F. Colfer, treasurer, and Abe Cook, secretary. Mr. Kiely has been president of the company, with the exception of a short period, since its organization, and to him is due in a large measure its success. The finances of the company have been under his direction, and it is owing to his shrewd and foreseeing management of this part of the company's business that the success must be attributed. Mr. E. I. Robinson, the vice president and general manager, is a new member and enjoys a large acquaintance among the street railway men of the country. Mr. Robinson comes from a family of street railway managers. He is a practical car builder, having devoted the best part of his life to this part of the business. He has for the past ten years had charge of the entire street railway system of Cincinnati, where he acquired a wide and varied experience, not only in the construction of new work but also in the various minor details that enter into the successful operation and maintenance of street railways. His varied experience is a valuable acquisition to the company and gives it a prestige that few car companies can boast of. Mr. Thos. F. Colfer has been treasurer of the company for the past five years and continues in the same office. Abe Cook is a graduate of the civil engineering school of Washington University, and comes into the company as a new member under the reorganization. He will have charge of the draughting and designing. Taken altogether the personnel of the company has been vastly improved by the reorganization, and street railway managers who place their orders with this company may feel certain that the work will be turned out in a superior style. The various departments are in charge of experienced foremen, insuring prompt and satisfactory construction.

This company has now in process of construction cars for Cincinnati, Peoria, Detroit, Chicago, Austin, Springfield, Rockford, and Cairo, while their cars are found in all the principal cities of the country. Their work is strictly first class in every respect. The company now has under consideration plans for the enlargement of their plant whereby the capacity will be doubled. The railroad and switching facilities are the very best, the works having a frontage of 1,000 feet on the Wabash and C., B. & Q. R. R. Co.'s tracks, and are located at the eastern approach of the new Merchants' Bridge.

All parties who are in the market for rolling stock of any description should consider the merits of this company's cars, while a visit to their works will be instructive to all street railway men, as showing the latest and most improved methods of construction. We wish the new company success.

FOREIGN FACTS.

IN India a large amount of narrow-gauge steam-road lines is being constructed to serve as feeders to main lines. There will soon be an inviting field there for electrical equipment.

W. G. M. Mackenzie, Secretary of the General Electric Traction Company, London, was drowned recently while bathing at Hampton.

Albion T. Snell, engineer of the General Electric Traction and Power Company, London, was married recently, on which occasion he was the recipient of many elegant wedding presents from electrical friends.

Overhead Wires.—The London Overhead Wire Bill received royal assent on the third ultimo.

European Electrics.—German capitalists are to build two Sprague electric tramways at Stockholm and Kiev.

City & South London Railway.—In the London County Council vs. The City & South London Railway case, it has been settled that according to the act the railway is allowed to build its station where it pleases.

Central London Railway Belt.—In view of the many advantages of rapid transit, the Hammersmith vestry has petitioned the Committee of Lords to pass the proposed Central London Railway Bill.

Birmingham Business.—The Central Tramways Company has been compelled to cease the extension of its lines on account of the demands of the telephone company to provide return currents, in order to protect the underground telephone wires. This demand requires \$100,000 expenses, and the railway company will not ask it of the stockholders, although the extension of the lines would accommodate hundreds of thousands of passengers per annum. "It is to be hoped," says the London *Electrical Engineer*, "that these demands may be withdrawn."

A prominent electrical magazine in England says that thousands of reasons can be given for the rapid employment of electric traction in the United States and the slowness in the United Kingdom. The "experimental stage," under which the tramway directors labor, is the principal reason, and there is no doubt that until the British stop fooling with battery traction their progress will be slow.

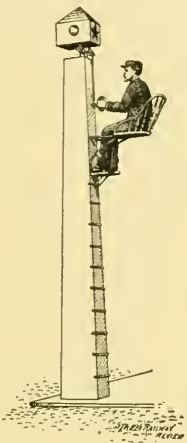
A combined passenger and freight road has been opened between Sissach and Gelterkinden, in Switzerland. The road is an overhead construction; current fifty amperes at 500 volts. The locomotive has two motors working independent axles through gearing, that reduces the revolutions of the axles to quarter of those of the motor shaft. The speed ranges from six and one-quarter to eleven and three-quarter miles per hour, and the gauge is about three feet.

The Thomson-Houston Company has obtained a franchise for operating an electric railway at Spandau, near Berlin, Germany, for fifty years.

The Paris municipal council has decided on a metropolitan railway as the most practicable system, by a vote of sixty to nine. It is ruled that no line shall follow the boulevards.

AVOIDING COLLISIONS AT CORNERS.

SEVERAL reports have been received during the past few weeks from a number of the larger cities, recounting the details of accidents, several quite serious, which have resulted from collisions at crossings, or where two lines converge and run onto one track. In some cases it has been between the cars of the same company, in others the cars of different companies have collided. In any event, such a disaster, or even the possibility of one, is to be avoided by all possible means, and the operation of cars at such points made as safe as any part of the system. Already in some cities managers have stationed flagmen in the middle of the streets to regulate the movement of cars, but usually the necessity for such signalmen occurs where the street vehicle traffic is heaviest, and often the flagman spends more time in avoiding being run over himself, and flagging wagons and carriages off his standing ground, than in performing the service for which he is employed. At night also, when numerous carriages and cabs are driving with lighted lamps, there is a possibility of the driver mistaking the right signal.



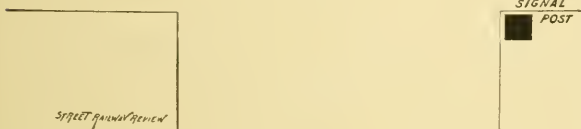
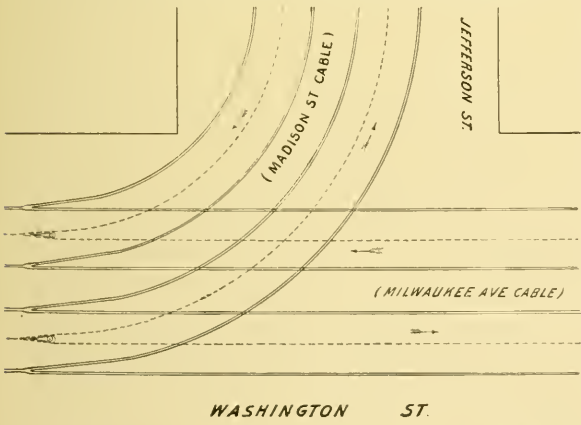
At this intersection the curve is sharp and the buildings prevent the drivers coming from the west and south seeing each other, and the difficulty is further increased from the fact that the cars from the west must run by momentum here to make the pickup. The accidents were in the endeavor of cars from the south and west both undertaking at the same moment to move in the same direction and to occupy the same portion of east-bound track, coming into collision like the point of a >. To avoid a repetition, the company erected a strong post some fifteen feet high at the corner, and stationed a signal man there, who effectually regulates the movements of the trains and gives his signal by turning a box with colored sides at the top of the pole, and so arranged that a signal to one train to proceed is a stop sign to the other. At night it is illuminated and can be seen a long distance. The watchman also from his exalted position is able to watch his cars without interruption from any source. Since the plan was adopted some two or three months ago no accidents have occurred, and the movement of trains, of which there are several thousand per day at this point, has been greatly facilitated.

As the position will be a severely exposed one in winter, the company are now building a small circular shaped house which will be supplied with a stove, and placed on the top of the post, the signal box surmounting all.

ASHTABULA AGAIN.

THE track laying of the proposed new road by W. Hazzard has not progressed very auspiciously, and he has been obliged to petition the city council for an extension of time. The track thus far laid is on streets not heretofore occupied by the Stewart tracks which were torn up by the city and dumped along the roadside, where they still remain.

The new track now laid north of the Lake Shore R. R. tracks is on the west side of Lake street, while Stewart's track was on the east side; but the new company, in order to continue their line and make it of much account, will be obliged to lay new track where the old line was, after passing the Lake Shore. This they will hardly be able to do as the old company has sixteen years to run under its ordinance of 1883, and the chances are an injunction will put a positive quietus on further construction, in which case several months will elapse before the old company can secure possession of its rights. In the meanwhile there are no street car facilities, and while other cities in the state are pushing ahead, Ashtabulaites are wearing out their good shoe leather at an alarming rate. Street railway building under the confiscation law evidently is not what it is recommended to be and the new company are finding Lake street rough sailing, and altogether a hard road to travel.



Jefferson streets. At this point the Madison Street Cables come in from the south and turn east onto the double track which leads into the tunnel under the Chicago river only a short distance away. From the west leads a double track used by the Milwaukee avenue cable cars.

THERE is a growing demand on the part of the citizens of Des Moines, Iowa, to have mail boxes placed on all of the street cars, and it is quite likely the arrangement will be put in practice at an early date.

WANTED.

Competent traveling man visiting all Street Railway Cos. Wants specialties to sell in that line. Address G. Box 13, Syracuse, N. Y.

H. R. PARROTT, President.

F. W. Treasurer.

The Parrott Varnish Co.**BRIDGEPORT CONN.**

MANUFACTURERS OF

The Finest Grades of . . .

-- VARNISHES.**RECEIVER'S SALE.**

Notice is hereby given that the undersigned, receiver, by virtue of a decree made and entered in the United States Circuit Court, of the Ninth Judicial Circuit in and for the District of Montana, on Wednesday, July 1st, 1890, in which Gilchrist Brothers and Edgar, are plaintiffs, against Helena Hot Springs and Smelter Railroad Company, et al., defendants, will sell at public auction, to the highest bidder, on the 1st day of September, 1891, at the court house in Helena, in the county of Lewis and Clarke, State of Montana, at 12 o'clock, M. of said day, all the right, title, and interest of the parties in said suit to the following described property, to-wit:—

That certain railway known as the Helena, Hot Springs and Smelter Railroad, commencing on the boundary line between the Broadwater Hot Springs Hotel property and the premises of the late Dwight T. Goodell, running thence in an easterly direction to and through the city of Helena to the Northern Pacific depot. Together with all the lands, tenements, and hereditaments, acquired or appropriated for the right of way of said railroad and branches. And all the easements, rights, liberties, privileges, franchises, immunities, and exemptions of said railroad company, appertaining to the owning, maintaining, operating, using and enjoying the same; together with all the railroad tracks, right of way, depot grounds, station ground and other lands, structures, station house, engine house, car house, fuel houses, warehouses, shops, machine houses, turntables, superstructures, rolling stocks, cars, furniture, tools, implements, machinery, of said railroad company, and all other property real, personal and mixed.

Written bids will also be received by the undersigned for said property, which said bids will be opened at the place and upon the day of sale, and openly read as the bids of the parties making the same. The sale shall be made subject to the approval and confirmation of the above named court.

The property will not be sold for less than \$35,000, of which sum at least \$12,000 shall be paid in cash, and the balance may be paid in six and nine months, secured by a mortgage lien upon the property, or such other security as may be approved by the court; all deferred payments bearing interest at the rate of 8 per cent. per annum.

WILLIAM H. CLARK, Receiver.

Helena, Hot Springs & Smelter Railroad, Helena, Mont.

THE HALE & KILBURN MFG. CO.**PHILADELPHIA,**

EXTENSIVE MAKERS OF

PATENTED**STREET CAR SEATS,**

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THE BEST

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THE NORTHERN PACIFIC WONDERLAND embraces a list of attractions simply unequalled.

The Twin cities of St. Paul and Minneapolis at the head of navigation on the Mississippi, Duluth, Ashland and the Superiors at the head of Lake Superior, to the westward the Lake Park Region of Minnesota, the Red River Valley wheat fields, Valley of the Yellowstone, Yellowstone National Park, Bozeman and the Gallatin Valley, Helena and Butte, Missoula and the Bitter Root Valley, Clark's Fork of the Columbia, Lakes Pend d'Oreille and Coeur d'Alene, Spokane City and Falls, Palouse, Walla Walla, Big Bend and Yakima agricultural districts. Mt. Tacoma and the Cascade Mountains, Tacoma, Seattle, Puyallup Valley, Snoqualmie Falls, Puget Sound, and Columbia River, Portland and the Willamette Valley, Gray's Harbor and City, Willapa Harbor and City of South Bend, Victoria on Vancouver's Island, Alaska on the north, and California on the south.

THE NORTHERN PACIFIC runs two daily express trains with Dining Car and complete Pullman service between St. Paul and Tacoma and Portland, via Helena and Butte, with through Tourist and Vestibuled Pullman sleepers from and to Chicago via the Wisconsin Central, and first class through sleeping car service in connection with the Chicago, Milwaukee & St. Paul Ry.

Passengers from the east leaving St. Louis in the forenoon and Chicago in the afternoon, will make close connections with the morning train out of St. Paul at 9:00 a. m. following day; leaving Chicago at night, connection will be made with Train No. 1, leaving St. Paul 4:15 the next afternoon.

Yellowstone Park Season, June 1st to October 1st.

District Passenger Agents of the Northern Pacific Railroad will take pleasure in supplying information, rates, maps, time tables, etc., or application can be made to CHAS. S. FEE, G. P. A., 1 Paul, Minn.

Write to above address for the latest and best map yet published of Alaska—just out.

Advertise in the

Street Railway Review,

The best medium for reaching the Street Railway interests everywhere.

SUBSCRIPTION ONE DOLLAR.**FOR SALE.**

On account of changing to electricity we offer for sale
8 12 ft. CLOSED CARS,

single end, each equipped with Fare Boxes, and all in good condition. Address CHAS. SMITH, Superintendent, Findlay Street Railway Co., FINDLAY, OHIO.

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H. H. WINDSOR,
Editor.

F. L. KENFIELD,
Business Manager.

CORRESPONDENCE.

We cordially invite correspondence on all subjects of interest to those engaged in any branch of Street Railway work, and will gratefully appreciate any marked copies of papers or news items our street railway friends may send us, pertaining either to companies or officers. Address:

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VOL. 1.

SEPTEMBER 15.

NO. 9

AMERICAN STREET RAILWAY ASSOCIATION.

Pittsburg, October 21, 22 and 23.

PAPERS.

✓ "A Perfect Electric Motor."

H. A. Everett, Secretary East Cleveland R. R. Co.

✓ "A Year's Progress of Cable Motive Power."

J. C. Robinson, formerly Vice President Los Angeles Cable Railway.

"Public and State Treatment of Corporations."—No. 3.

G. Hilton Scribner, President Central Park, North and East River R. R.

✓ "The Dependent—Overhead or Underground—System of Electric Motive Power."

Geo. W. Mansfield, Director, Attleboro, Mass.

✓ "The Independent—Storage or Primary Battery—System of Electric Motive Power."

Knight Nefel, Electrician, Lancaster City Ry.

THE October issue of the STREET RAILWAY REVIEW will be delayed a few days in order to report in full the proceedings of the American Street Railway Association at Pittsburg, October 21st, 22d and 23d.

THE convention headquarters of the STREET RAILWAY REVIEW will be in Parlor 9, Monongahela House, where we shall be pleased to receive our friends, which invitation, we trust, includes all who may attend.

THOSE papers who shout and clap their hands over two-cent fares in some European cities do not seem once to remember that the people there only get a one-cent ride, and even then the working people cannot generally afford to ride at the price.

THE paper by Hon. John Beckley, printed elsewhere, and read before the Street Railway Convention of New York, is the most valuable contribution on the subject of electric railway traction thus far presented. It deals with facts obtained by actual experience, and should be read by every street railway man in the country,

THE STREET RAILWAY REVIEW spares no expense or pains to give its readers the very latest and best in street railway matters, and has considered the convention of the New York State Association of sufficient interest and importance to warrant a verbatim report of the entire proceedings and papers read, being transmitted by telegraph, all of which appears in this number. The report is undoubtedly the largest ever sent by wire to a technical publication in this or any other country. As the convention occurred on our mailing day, we have delayed the paper twenty-four hours to contain the report.

PRESIDENT WHITNEY, of the West End Road, Boston, is one of the broadest gauged managers in the world, and exhibits a spirit of fairness in dealing with his men which finds few equals. Recently a committee of employes waited upon him desiring certain changes in arrangement of working hours, which they seemed to believe he could only appreciate by spending a few days with them, and apparently thought to corner him by a request which was "to get up in the morning and ride all through the day on the car, going to meals when the conductor and driver go to theirs." To this, not altogether reasonable request, Mr. Whitney, however, promptly replied that he would do so and asked the committee to name the day and car.

IN his address to the New York Railway Convention, President Lewis significantly refers to a power possessed by every street railway in greater or less degree, whereby the machinations of scheming and blackmailing politicians may often be effectually counteracted. Instances are not infrequent where these tricksters in aiming adverse legislation at railway corporations draw the lines so tight as to almost directly, though perhaps ignorantly, injure the best interests of the employe. The power which President Lewis holds to view is a mighty and far reaching one, and it is most timely and appropriate that street railways should realize their strength. The success of such action, though a wholly voluntarily one, in Cleveland, recently, is highly encouraging. Mr. Lewis tersely said: "The Street Railway interest, I fear, is not aware of the power behind it. If the gentlemen representing it would only stop for a moment and think that the solid vote of their employes, and the vote they could command would often turn the majority of the State one way or the other at elections, it would comprehend what it might be capable of doing in emergencies." Corporations and employes are rapidly coming to appreciate the fact that their interests are in a high degree mutual, and, working hand in hand, can exert a power that has too long lain dormant and unused.

IN our second article on Street Railway Funeral Cars, which appears in this issue, are a number of letters from leading undertakers. Some are opposed to the system, others look upon it as more advantageous to the companies and the public than to them, while others strongly commend the plan.

IN another column will be found a detailed statement showing the comparative earnings and expenses per car mile of steam, horse, cable, and storage battery systems, as operated by the Birmingham, England, Central Tramways Company. The net profit per car mile run was, by cable 6.50 d., storage 5.25 d., steam 4.68 d., and, as might be expected, horses at the bottom of the list with 1.23 d.

BROADWAY, New York, merchants are in despair over blockaded streets during cable construction. They will very soon, however, forget all about the temporary inconvenience, when the advantages to the street become appreciated. When the first cable was laid in Chicago, the State street business men thought they were ruined, but not one of them a few months later but had good occasion to change his mind, while hundreds had their fortune made for them by the opening of the line.

THE reduced fare question took an issue in Cleveland which was at once practical and effective, and came from an unexpected source. The public were fully satisfied with the rate of fare, which was 5 cents, and the service which is unsurpassed in any city in the world. An old pessimist in the city council thought to twang a popular chord and introduced a lower fare ordinance, probably with a view to helping his re-election. The employes, numbering several thousand promptly took the matter up voluntarily and so conclusively demonstrated that any change in existing rates would not only settle the question of any possible advance in wages for them, but would almost certainly result in a decrease, that the fare reducers could not withdraw the ordinance quick enough. A 5-cent fare is conceded to be in most cities none too small; and with modern appliances and accommodations, which cost money, but which the public insist on, the equivalent is greater than can be obtained by a like expenditure in scarcely any other way.

A VERY wholesome lesson was read by Judge Bookwalter, to the Mayor of Danville, Illinois, in the recent instance of the latter attempting to take the law into his own hands, and act in the dual capacity of judge and executioner. The electric railway had built considerable of its track, and in so doing had complied with the requirements of the ordinance under which the franchise was granted. The mayor, however, took it upon himself to interpret the construction as not in accordance with his ideas of what the ordinance called for; and upon the company declining to throw away its work and rebuild at great expense on the engineering plans of that official, he called out a body of 150 men at 4 o'clock in the morning, and would certainly have torn up the tracks, after

the most approved fashion in Ashtabula, had not the company served an injunction. This the mayor sought to have removed in the courts. Judge Bookwalter, however, rendered a scathing opinion in his decision in which he refused to annul the injunction and leave the road at the mercy of the erratic mayor. The decision is of unusual interest and will be found entire in another column. The Judge well takes the ground that in this case the question as to whether the company did or did not construct its road in conformity with the ordinance cuts no figure whatever. No city official acting in his own capacity as such, under instructions from city council, can destroy property of this kind in the way attempted on the basis taken in this case. If the company are not keeping good faith the court is the body and the place to decide that question, and mete out justice. The attorney for the mayor flaunted in the face of the company that had the attempt to destroy the tracks been successful, the company had recourse in a damage suit against the mayor personally, which in this case was shown to be an extremely doubtful investment. But even had there been an absolute certainty of recovery for all damage done, the right and wrong would not have been changed one iota. No man has a right to destroy another's property simply because "he is able to pay for it." It is to be hoped the humiliating position in which this over-zealous, over-officious and misguided ruler of a small city has placed himself, may prove a warning to any others who may be similarly inclined. A very small amount of authority only, is more than sufficient to upset some people, and the picture of the chief executive of a city heading a band of marauders at the dead of night, and by the exercise of physical force taking the level of an ignorant policeman whose chief delight is in wielding a club regardless of whom it may hit, is not one to which any man can point with pride.

THERE is at least a strong prospect that New Orleans is to have genuine rapid transit. Experiments have been made in previous years with various motors operated by caustic soda, steel springs and storage batteries and all have proved signal failures. Steam dummies are operated on one or two lines in the suburbs, but in the heart of the city service is performed by mules. The New Orleans & Carlton Railway Company now proposes to operate an electric system by overhead wires. A petition has been circulated to bona fide property owners, and already twelve hundred out of the necessary fifteen hundred signatures have been obtained. When everything is in readiness the company will petition the council for the necessary franchise and construct the electric system. This they have been refused repeatedly, as the council were strongly in favor of the storage system, but which after a long trial on the Colliseum line, resulted, in the words of the President of the company, in a "blooming failure." It is to be hoped the enterprise will receive prompt sanction at the hands of the New Orleans Council, and that the facilities now enjoyed in other cities both north and south may be put in daily operation there.

NEW YORK STATE CONVENTION

Met September 15th, at the Hotel Metropole, New York City—Large Attendance—President Lewis Fearless Address—Report of Executive Committee—By-Laws Changed—Hon. John N. Beckley Makes a Special Report on Electric Railway Operation—Discussion—Banquet—Delegates and Others Present—New Officers—Next Meeting at Saratoga.

(Special Telegram to the STREET RAILWAY REVIEW.)

NEW YORK, SEPTEMBER 15TH, 1891.

THE Ninth Annual Convention of the Street Railway Association of the State of New York was held to-day in the parlors of the Hotel Metropole.

The executive committee met at 9:30 a. m., and passed on routine business. At 10:30 the convention was called to order by President Daniel F. Lewis, president Brooklyn City Railway Company. After approval of minutes of last meeting, the president delivered the annual address, which was as follows:

The Street Railway Association of the State of New York:

GENTLEMEN—The convention about to be held is the ninth in the history of this Association; to it I have the great pleasure of welcoming the delegates. I trust when we adjourn it will be with profit in greater knowledge of the details of the business which we daily study, and in which we are all so deeply interested. It has been decided that as much of the time of the present session as possible be devoted to the subject of improved motive powers, and as cable power has been quite fully discussed by this and the "American" Association in the past, and as greater progress, comparatively, has been made in electrical power, this subject has been referred to able hands and will doubtless be treated in a manner which will be of great value and service to you. The past year has been one of prosperity to the street railway companies of this state. It has been comparatively free from severe snow storms. It has been free from epidemics among horses. The receipts from passengers show a good average increase. No adverse legislation of a general character was effected, and last but not least, no labor disturbances have taken place. In referring to the latter I feel that the heated experiences of the past few years have been of great benefit. The outcome has established a basis for the conditions under which employes of street railways should labor, and especially so as to the number of hours which should constitute a day's work, and also the proper compensation therefor; it has brought capital and labor closer together in having the employes better enlightened on this subject. In 1885 and 1886, the years the agitation in labor began among street railways, employes in all classes and grades of labor knew but one side of this question. They did not understand the relation capital and labor bore to each other, and in this condition of mind their demands were so much greater than capital could bear that strife followed, and the result has finally placed each on equitable positions, and, I believe, there to remain until something radical should occur to either advance or deplete the profits of the street railway business, which might again relatively and properly affect

the hours of labor and pay of men in such service. We have reason to congratulate ourselves on the benefits which will accrue to street railways growing out of the court of appeals decision in the case of the people vs. "The Union Trust Company of New York," which provides the manner in which the assessor shall treat the capital stock of corporations for purposes of assessment. It very plainly holds that all corporations deriving profit from its capital stock shall only be assessed on the par value thereof, and that surplus earnings shall be exempt from assessment to the extent of 10 per cent. of the capital of any such corporation. It has been the practice in many cities of the state to tax the capital at its market value, which basis is now held as erroneous and will relieve the railway companies of a part of the heavy burden they are compelled to bear in the many kinds and sizes of taxes which they pay annually to the cities and states. I shall appropriate as little of the time of this meeting as possible in this address, but before I close I desire to refer to a matter of capital importance to this association, it is this: Its membership and strength. You will no doubt recollect in accepting the office of president one year since, I referred to this subject and requested that each representative endeavor to induce other companies to join us, and in that way encourage a larger attendance at meetings and better results generally. I am sorry to say that the membership is no larger than it was in 1890, and in view of this, the executive committee have considered a remedy and will offer an amendment to the by-laws, which, if adopted, will, I trust have the desired results. It is very well to meet as we do annually and discuss the various current topics which affect the operation of our railways, but there is other work which this association is capable of doing if its membership embraced a large majority of the surface railways of this state, as it should. For many years, except the past two, when we were very kindly treated, bills have been introduced in the legislature which have affected or would affect street railways in all parts of the state and at times very seriously so. And, I may ask, who looks after such legislation? In answer I can say that, when it is looked after at all, it is done by the companies in the large cities, but is this right? Should not the smaller companies contribute their share of labor and attention? Are not their interests quite as great in proportion as those of other companies? Are not their interests as dear to them? Should a small company take refuge under the protection of a large company, because it is large, and not render a service which is at its com-

mand? They should be glad, because they are small and comparatively weak, to render any assistance they can in order that their share might be done on behalf of the protection they get and need. The late Mr. Forshay, at the meeting in New York, in 1884, in addressing you said: "We cannot overestimate the value of combined action," and likened it to the first cable wire stretched across the East river, which a child could break, but which made a part of a combination of wires afterward supporting the great Brooklyn bridge and the great volume of traffic over it. So it is in our case; if only a small fraction of the companies of this state participate in the labors and responsibilities of this association, it will not meet the requirements in the support of its interests, any more than the first feeble wire would in the support of the great East river bridge, while a vigorous and hearty co-operation on the part of all the railways of the state would render the service and support we desire, and should have.

The street railway interest, I fear, is not aware of the power behind it. If the gentlemen representing it would only stop for a moment and think that the solid vote of their employes and the vote they could command would often turn the majority of the state one way or the other at elections, it would then comprehend what it might be capable of doing in emergencies. I refer to this only to show that any very radical action which the legislature might undertake and which might cripple companies to a point where the employes would be seriously affected, would result disastrously to any party in case a political issue should be made of it, and anything so radical might very likely be so engineered if the proper management were at hand.

Every street railway in the State has its friends in the legislature and if this association will recruit and make itself strong in members, the officers could, by notifying its members of any danger at Albany, surround itself with the necessary help at all times to secure proper protection which is all we desire in this direction. Trusting the ensuing year will be one of peace and continued prosperity to you all, and with my appreciation of the compliment you conferred upon the company I represent and me one year ago in electing me the president of this association, I have the honor to be sincerely and obediently.

D. F. LEWIS, President.

The president's address elicited hearty applause. The report of the executive committee was then read by the secretary, and was as follows:

REPORT OF EXECUTIVE COMMITTEE STREET RAILWAY
ASSOCIATION OF THE STATE OF NEW YORK.

Gentlemen: Your executive committee respectfully submit the following report:

MEMBERSHIP.

During the year two members have withdrawn, viz.: The Central City, of Syracuse, and the Lockport companies. It was ascertained that while the management in both cases desired to retain the membership of their

companies, it was considered that the annual dues of \$35, which far exceeded a whole day's gross receipts of the company, was more than they could afford to pay. The executive committee, therefore, considered it a duty resting upon it to devise a plan whereby, if possible, all the small companies in the state might be induced to become members of the association. As the result of its careful study of the question, the committee submits an amendment to the by-laws, and offers for adoption the following resolution: Amendment to by-laws.

Resolved, That article XV. of the by-laws be amended, so as to read as follows: "Article XV.—Members whose annual gross receipts from passengers shall be more than \$100,000 shall pay an admission fee of \$25, and annual dues of \$35, payable in advance. Members whose annual gross receipts from passengers shall be less than \$100,000 shall pay an admission fee of \$5, and annual dues of \$5 payable in advance.

It is confidently expected that making the fees nominal, as proposed, will bring into active co-operation with us nearly, if not quite all of the companies concerned. The benefits which will result from such a consummation cannot be overestimated.

MOTIVE POWER.

The horse is with us, and always will be, in greater or less numbers. For his sake, however, we devoutly hope that, as a motive power, for street cars, his days, not years, are numbered. Cable power, is having its full share of attention, as is evidenced by the transformation into cable roads of the lines on the two leading business thoroughfares of the metropolis. This association, in its meeting this year, as in that of a year ago, has but one idea, however, and that is, electricity as a motive power. While such companies as the Third Avenue and the Broadway and Seventh Avenue, demonstrate the courage of their convictions by launching out upon an expenditure of millions.

Most of us must perforce make haste slowly, and we therefore turn our attention to electricity. The people want an improved motive power, i. e., an improvement over horses, and surely the most brilliant and magnetic, the loftiest and most promising motive power, based upon what we see and hear, is electricity. Thus it comes to pass that your committee has arranged for the preparation of another report upon electric motive power for street surface railways, by the president of a company whose lines are operated by this subtle and wital fascinating power. Participation in the discussion of the subject by men eminent on the surface as well as overhead systems, has also been arranged for.

EMPLOYER AND EMPLOYEE.

The Mutual Benefit Association, connected with several of the member companies, the organization of which we were pleased to notice a year ago, have continued to do their work altogether satisfactorily and with most gratifying results to all connected therewith. These societies have been the means of bringing the officers and employes of the companies into closer and friendlier

relations, and whatever will succeed in bringing about such a happy state of things, is to be commended. As we look out upon the future, judging by the recent past, we become optimists, while we realize the fact that the world is growing better. Even as nations come to settle their differences, not by the sword as formerly, but by international councils of peace, so labor and capital have both learned wisdom by experience, at least so far as the street railway industry is concerned, and all matters of difference, which may and inevitably must, from time to time, arise between employer and employe, will be adjusted amicably by the parties interested. The motto about which we used to hear so much "An injury to one is the concern of all," has had to give place to a higher and nobler sentiment, "An injury to either is the concern of both." Our host. We take occasion to express our sincere appreciation of the courtesy and hospitality of Geo. Green, Esq., who is really the host on this occasion, and whose guests we are. In bringing this brief report to a close. We would give expression of our profound gratitude to God, that while the year has been one of excessive mortality in the community, death has not marred our charmed circle

Respectfully submitted.

DANIEL F. LEWIS,
W. J. RICHARDSON,
JOHN N. PARTRIDGE,
C. DENSMORE WYMAN.

Committee.

The report was adopted.

The treasurer's report followed, and was adopted. Then came the paper by Hon. John N. Beckley, president Rochester Railway Company, and read by that gentleman.

"ELECTRIC MOTIVE POWER FOR STREET SURFACE RAILWAYS."

John N. Beckley then said:—The best thought of this time may well be expended upon this great question of furnishing quick, safe, cheap and comfortable transportation to the people, whose lot it is to dwell, as dwell they do in such vast numbers, in the towns and cities of this land. The problem which is presented to the street railroad men of to-day must be considered not simply with reference to the populations as they now exist, but with reference to the great increase of population which is certain to come.

There are seventy-four cities in the United States, which have a population in excess of 40,000. The total population of these seventy-four cities as shown by the last census is nearly 13,000,000, and the average increase of population in these cities during the last decade is nearly 47 per cent. in this state. There are twenty-eight cities having a population in excess of 10,000, a total aggregate population of nearly 3,500,000. The average increase in population of these cities in the past ten years has been more than 33 per cent. For all these growing towns and cities in our own state and throughout the

country, what can electricity do as motive power for the operation of their street railroads? We who have had to do somewhat with the change of the system of operation of street surface railroads from horse to electric power, know that we have now passed beyond the experimental stage and are beginning to tread upon ground which seems firm under foot. We hear now and then fears expressed by doubting Thomases as to whether the motors are going to last, as to whether the repair bill is not going to wipe out all profit, and as to whether the great expenditure which has been and is being made on our railroads may not be thrown away because some new and wonderful principle is to be discovered, which will enable our railroad companies to operate their roads with commercial success by means of storage batteries. We find in some communities so great a prejudice against overhead wires that railroad companies are unable to obtain the necessary franchises and privileges, the granting of which would result in giving to those communities the benefits of rapid transit with electricity as motive power. Hour by hour, however, experience is teaching all doubters that the problem of rapid transit for cities has been solved, and that the trolley has come, and come to stay.

As this convention is held in the city of New York, where as yet the people have not had a practical demonstration of the merits of the trolley system, it may not be inappropriate to look at this question from the point of view of the New York citizen and to meet, if we may, some objections which are here urged against the trolley system, so called. I have read with some interest, much that has appeared in the great New York dailies with reference to the horrible condition of things which exists in towns and cities where the trolley system is used for street car propulsion. Our friends over in Brooklyn have been endeavoring since the last meeting of this association to educate their townsmen upon this matter and with at least a reasonable measure of success. To them, and indeed to all of us, the facts which are perfectly well known have become tired from iteration. Everybody knows that a rapidly moving car, whether the propelling force is furnished by horses, by steam power exerted upon a steel rope, or by electricity, will hurt and perhaps kill the person with whom it comes in contact: but the rapidly moving car is essential to rapid transit. An electric car can be stopped as quickly, indeed more quickly, than can a cable or horse car running at the same speed. Collisions occur with one system of operating as much as with another, but we contend that so far as the danger question is concerned that the only danger to life or limb, from the operation of electric cars, comes from the possibility of collision with persons or vehicles, and that there is no danger from the electric current itself, propelling the car.

As I have stated, electric cars have been operated during the past year on more than 2500 miles of track, and although millions of people have been carried upon these cars no instance can be given of serious injury to any person by reason of shocks caused by the electric

current. We contend that the electric pressure used in the propulsion of street cars is below the danger limit. We know that in every locality where the electric railroad has been properly built and is properly operated, the people are enthusiastic in its praise, and that the proposition to go back to the system formerly used would meet with universal condemnation. We know that a railroad operated by electricity is a pleasant railroad to ride upon. The cars are started and stopped on such a railroad easily and without jerking. On such a railroad we don't see horses frequently struggling beyond their strength to start a loaded car or to haul it up a grade. As we ride on such a railroad, we experience a sense of exhilaration as the car swiftly and safely speeds along and unless our attention is specially called to the trolley wire overhead, we do not even realize that it is there.

Only last week many who reside in the City of New York had an opportunity of observing some of the advantages of propelling cars by electric power under hard conditions. Those in attendance upon the Republican State Convention at Rochester, indulged in the evening after the nominations had been made, in an impromptu celebration in front of the leading hotel of that city. The street in front of the hotel was completely blocked with people listening to the speeches and admiring the fireworks. The electric cars were, however, kept moving throughout the entire evening, and as several of the lines in operation in the city passed in front of the hotel it was necessary for the cars to feel their way through the vast crowd. During the time of the celebration between forty and fifty cars passed through the concourse of people, moving, if need be, at a snail's pace, backing when necessary, by the reversal of the current, and without in the slightest degree injuring a single person. Cars drawn by horses could not have gone through the crowd in safety. I believe that every person who witnessed that sight, no matter how prejudiced he may have been before, was convinced that the operation of street cars by electric power is safe.

There is, however, one objection which is urged with great insistence, especially in the City of New York, to the trolley system, and that is to the trolley wire itself. There is not the slightest danger in putting up or maintaining the trolley and necessary feed wires if the work is done in a proper manner and if reasonable care is exercised in their maintenance except as those wires are made dangerous. If the telephone and electric light companies would take as much pains in putting up and maintaining their wires as do the electric railroad companies there would never be any occasion for complaints so far as danger is concerned, and then the only objection which would be urged to the maintenance of the necessary wires to operate electric cars would be their so-called unsightliness. It must be conceded that poles however shapely and wires however well put up do not improve the appearance of city streets, but quite to the contrary. But experience has shown that except as poles be set and wires strung, electric roads cannot be made a commercial success, and therefore without poles and

wires, electric railroads will not be possible to the people of a city where the population is not large enough to sustain a cable railroad on a given line.

The problem then to such is this: Shall we have rapid transit by electric motive power and waive sentimental objection to the maintenance of a few light wires, eighteen or twenty feet above the surface of the street, or shall we have slow transit by horse-power, with its many disadvantages and disagreeable accompaniments and be rid of the wires?

The question is being answered almost every day in the towns and cities of our country in favor of electric rapid transit. The question is often asked by officials of street railroad companies who are contemplating making a change from horse to electric power, "What is the cost of operation of an electric railroad as compared with the cost of operating a horse railroad?"

I propose to state some experiences which electric railway companies have had upon this subject, and to answer the question as well as I can.

You have undoubtedly all seen the census bulletin prepared by Mr. Cooley upon the relative economy of electric, cable and animal motive power for street railways. Those, also, who have seen this bulletin and studied the tables which Mr. Cooley has prepared must have felt that so far as electric roads are concerned the information upon which they are based is very inadequate and unsatisfactory. Four of the electric railroads the reports of which furnished information for his table had been in operation less than one year at the time these statistics were furnished, and the electric railroad which commenced operation earliest extended no further back than May 1, 1888. The average cost of operating the ten electric railways taken for purposes of comparison by Mr. Cooley is in round numbers 13 cents per car mile, while the average cost of operating the ten railways operated by animal power is in round numbers 18 cents per car mile, and the average cost of operating the ten cable railways is in round numbers 14 cents per car mile. Mr. Cooley gives as the total average cost of road and equipment per mile of line with cable power in round numbers \$350,600; with electric power in round numbers \$46,000, and with animal power in round numbers \$71,000. There is little value, however to be attached to comparisons of this character.

Everybody knows that it costs less to construct and equip a horse railroad on a given line, than an electric railroad, and that it costs very much more to construct and equip a cable railroad than an electric railroad. Of course in determining the question of economy in operation, the first cost of construction and equipment is a very important element for consideration, as well as the actual cost of maintaining and operating the railroad.

Whatever the motive power, when once completed, it seems more profitable to avail ourselves of comparisons which have been made by surface railroad companies operating a part of its system by electricity and a part by horse power. Fortunately we have gone far enough in electric railroading to be able to obtain sufficient facts to

enable us to make an intelligent and trustworthy comparison. The company which has had the greatest experience as to these matters is the West End Street Railway Company, of Boston. That company has published a statement showing its earnings and expenses both with the electric and horse car system for the months of April, May and June of this year. I ought, perhaps, to state that as it seems to me the conditions involved in the consideration of these questions are so diverse in different cities, that the only proper basis of comparison of cost of operation is the cost per car mile. It is quite common for the street railroad officials to consider this question of the relative cost of operation upon the basis of a percentage of gross receipts. It will be readily seen, however, that this basis of comparison is necessarily misleading and inaccurate. The other basis is not exact, but approaches at least approximately to exactness. The total expense as shown by the West End Company for motive power, car repairs, damages, wages of conductors and drivers, and all other expenses per mile run with electric power during the three months mentioned, was as follows: April, 21.75 cents; May, 22.36 cents; June, 20.37 cents. The total expense per mile run with horse power for the time mentioned was as follows: April, 24.54 cents; May, 24.04 cents; June, 23.52 cents. Earnings upon the two lines during the period under consideration with the two systems were as follows: April, Electric 31.05 cents; horse, 31.77 cents; May, Electric 38.43 cents; horse 34.22 cents; June, Electric 42.71 cents; horse, 36.85 cents. It will be observed that the earning power of the electric cars is considerably in excess of that of the horse cars, and that the expense per car mile is considerably below. The West End Company states that the electric cars of the company are run on the longer and less remunerative lines. If this be true the showing made is very greatly in favor of the electric car from a commercial standpoint.

Permit me to refer to the experience of the company at Rochester, with which I am connected. In the month of May last, the Rochester Railway Company operated forty-four 18-foot vestibule electric cars. The gross receipts from passengers riding on these cars during the month was \$37,053.00 or 25 at 15 cents per car mile for a mileage of 159,567 miles. The total expense of operation of these cars for that month was \$18,332.00, thus leaving a net profit of \$18,721.00. The total cost of operation per car mile was 11.4 cents, and the profit per car mile was therefore 12.11 cents. It may be observed in passing that the operating expense was a trifle under 50 per cent. of the gross receipts. The cost of operating was divided as follows: Motive power 2.8 cents, car repairs 7 cents, conductors and motormen 4.9 cents, other expenses 3 cents. During the same period, the company operated sixty-two horse cars, all of them without conductors. Most of the horse cars were one horse or bob-tail cars. The total cost of operating the horse cars without conductors during the period, was about 10 cents per car mile, but the total receipts per car mile were but little above 12 cents.

In the month of June, the Rochester Railway Company operated fifty-four electric cars and sixty horse cars. The electric cars earned each per day \$23.60 or 22.77 cents per car mile, and the total expense of operating them per day was \$10.50 or 11.07 cents per car mile. The cost of operation per car mile was divided as follows: Motive power 2.10 cents, car repairs 1 cent, conductors and motormen 5.66 cents, other expenses 2.01 cents, making a total per car mile of 11.07 cents. The cost of operating the horse cars during the same month, per car mile, was 11.06 cents, and they earned 14.87 cents per car mile.

These illustrations are fairly indicative of our expense in Rochester month by month. My experience in the operation of street railroads has convinced me that the most economical system of operation is the electric system.

I have not in the statements which I have now made, taken into consideration the greater fixed charge in the operation of an electric railroad as compared with a horse railroad, due to the much greater cost of the former, but in arriving at the conclusion which I have above expressed, due consideration, has been given to this element of increased cost. We know that when a horse railroad is changed over and operated by electricity, the receipts are very largely increased. It is safe in any case to say that the increase in gross receipts will be at least 15 per cent., and the average increase is probably as high as 30 per cent. Some of this increase is undoubtedly due to the greater mileage which the cars make, and still more is due to the cleaner, more rapid, and more comfortable transportation of the people. We have reached the conclusion also that the bugaboo, which formerly somewhat frightened us, of the cost of maintenance and renewals of electric motors need frighten us no longer.

We have had motors in constant service on one of the first electric lines equipped in this country, namely, the line extending from Rochester to Charlotte, and these motors seem as efficient and in every way as satisfactory as they did the first month they were operated. We have of course renewed various parts of the motors, and we replaced gears which have worn out, the expense of which has gone into the cost of maintenance, but the motors are still there doing their work, and likely with proper care and renewal of parts, to be doing their work ten and even twenty years from to-day. The cost of maintenance and renewals of parts has not been so large as to carry operating expenses up to anywhere near the expense of operating the same number of cars at the same mileage by animal or cable power.

Those who propose to substitute electric for horse power will make a great blunder if they attempt to put in cheap construction or material. We who have gone into this matter have learned that the track upon which it is proposed to operate electric cars should be of girder or T rail, of not less weight than fifty pounds to the yard of T, and sixty-two pounds to the yard of girder rail. The weakest place in the track is of course at the joint, and no cheap contrivance at that point should on any account be permitted.

It seems to me, a useless expense to lay a continuous supplementary wire. The rails should of course be well and heavily bonded at the joints with iron, not copper wire, and cross connection of rails be frequently made. Where tramway track is used, I think a continuous wire should be laid connected with the bond wires. The overhead wire cannot be too well put up. Cheap devices should never be used because they are cheap. The best and strongest are none too good. In putting up the feed wire and in putting in the ground wire return to the generators, do not spare copper.

I am convinced that much that we have heard about the inefficiency of generators and motors is due to trying to get too great a quantity of current through too small a quantity of copper. In the power station do not make the units too large. Accidents will happen as long as machinery is run, and an accident to a 500-horse-power plant is serious. While you can keep your cars, or most of them moving, if one of two or three small engines break down, the same rule of course holds as to the generators.

Always put in a condensing steam plant, one large item of expense of operation is the coal bill. Cut that down at least 40 per cent by erecting condensing engines. The first cost is of course a little more, but your stockholders, as they examine your statements of operation in the years to come, will say you were wise in your day and generation.

Locate your power station as near as may be in the center of your system, but above all, if possible, on a stream large enough to furnish all the water you require for the boilers and condensers. City water, where your consumption runs into the millions of gallons fast, is expensive.

It seems to me a mistake to equip a car-body of greater length than 18 feet, and I think a 16-foot car is better still. During the hours of the day when travel is heavy, it is easy to pull a trailer, and when traffic is light, you are not then using up your power in hauling around a great lumbering double-truck structure practically empty.

A great many companies have had trouble with their motors. The chief reason for this trouble has been that their motors have been too light mechanically and too economically built electrically to stand the strain. All the manufacturing companies have learned their lesson, and to-day most of the motors put upon the market are strong enough mechanically and electrically to perform, under proper conditions, the work expected of them.

The managers of electric roads, if they are to be made successful, must learn that the greater earning power is no excuse for extravagant mismanagement, and that the difference between success and failure is often a narrow one. Everything depends upon taking the stitch in time. A loose bolt, an imperfect connection, any one of forty little things may result in serious damage and consequent financial loss. I do not know of an electric railroad anywhere where the overhead single-trolley system is used which ought not to be successful. I know of some which have not been. In some cases, cheap construction

and in some other cases careless management or reckless extravagance, is the cause of the failure. The scrap heap about an electric car barn or machine shop often, tells a significant story. In intelligent supervision and painstaking, watchfulness is found one great secret of commercial success, in this business as well as in most others.

Every manager should keep a record of the items which go to make up operating expenses, and those responsible for management should carefully study these statements month by month, with a view of lessening the expense of each item. An intelligent and careful examination of the cause of accidents to parts of a motor will often be the means of preventing the re-occurrence of troubles in the future. So far as possible motor men as well as conductors should be made to understand the mechanism which propel their cars and the function of each part. Thereby they become proficient and are made ready to act promptly and intelligently in case of any trouble with a motor. The directors of some companies, because of their desire to make handsome returns to their stockholders, have paid out in dividends money which ought to have gone back into the road. The proper policy to pursue in all cases is the building up and bettering the plant out of earnings so far as necessary, even at the expense of cutting down dividends. The field in which we are working is a great one. There is in this field abundant opportunity for the intelligent, progressive and sagacious business man. The primary object which the management of a street railway seeks to attain is business success, but success in that direction cannot be had without great resulting benefits to the people of the community served by the railroad operated. We should not lose sight of the fact that we are engaged in a work the successful performance of which builds up communities, aids business enterprises and makes the life of the people in those communities better worth living.

The report received well deserved and continued applause, and was discussed at some length by delegates and representatives of electric motor systems. Mr. Chas. A. Benton, of the Rae system, Mr. M. K. Bowen of the Short Electric Company, and Mr. Geo. W. Mansfield, of the Thomson & Houston, spoke in favor of their respective systems.

It was then voted to print and distribute to all the street railways in the state the Presidents address and Mr. Beckleys report. Then came general business including the appointment of the nominating committee, their report and the election of the following officers:

President, Hon. John N. Beckley, Rochester, N. Y.
 Vice President, Thos. H. McLean, New York.
 Second Vice President, Geo. Law, New York.
 Secretary, and Treasurer, Wm. J. Richardson, Brooklyn.
 Executive Committee, D. F. Lewis, Brooklyn; C. Densmore Wyman, N. Y.; Chas. Cleminshaw, Troy, N. Y.

The next meeting will be held at Saratoga, September 20, 1892. The convention adjourned at 2 o'clock for lunch, and at 2:30 enjoyed a delightful drive, returning in time for the banquet at 5 o'clock.

THE BANQUET.

The banquet, tendered by Mr. George Green, was served at 5 o'clock, forty plates being laid. It was the finest ever given the association. Decorations were especially rich and attractive. Following is the

MENU:

Huitres en Coquilles, Nierstner, Potages,
 Creme St. Germain, Consomme des Lignac, Amontillado, Horsd'oevres,
 Varices, Petit pate a la reine,
 Varices, Poisson, Saumon a la Hollandoise,
 Pommes Parisiennes, Salade de concombres, "Releve Fillet de Beef pique richment,
 Haricots verts, saut ternes,
 "Entree" Ris de Veau encaise a la Toulouse,
 Pois Neaveux Hauteau Lango, Sorbet en Surprise,
 "Roi" Chicken Grouse, Current Jelly, Mout and Chandon,
 Salade de laitue et tomate,
 "Entrenet" Fruits Glaces, Petits fours, Fromages, Pieces Montees,
 Liqueurs, Cafe.

After dinner Toast-Master Daniel B. Hasbrouck president of the Houston, West Street & Pavonia Ferry Road, with a few happy remarks, introduced the speakers, who were D. F. Lewis, John N. Beckley, C. Densmore Wyman, J. S. Foster, Charles Curtis, G. W. McNamara, J. H. McGraw, and Geo. Green. The responses were short, but well taken and highly complimentary to the genial host. Mr. Beckley urged the assistance of all present to secure for Rochester, in 1892, the convention of the American Street Railway Association. An orchestra discoursed delightful music during the repast.

HEADQUARTERS.

No hotel in New York could have offered quite as welcome a reception as was received from Messrs. Green and Putney, who are famous for their treatment of the traveling public. Located as it is the Hotel Metropole at the junction of Broadway and Seventh avenue, at the crossing of 42nd street, with three street car lines passing the doors, while the elevated is but one block and the Grand Central depot four blocks away, makes it most convenient for strangers, whether on pleasure or business.

No street railway man in the country is better known than Mr. Geo. Green, formerly president and now a director of the Forty-second Street and Grand Street Ferry Railroad Company, and on this occasion, as once before, his heart and house were generously opened to the fraternity. The lunch, which was modestly called "A Hotel Metropole Sandwich," was a great success, but was eclipsed in the banquet, which, with the carriages were all tendered with the compliments of Mr. Green.

DELEGATES.

The following is the list of delegates in attendance:

Geo. Law, president Eighth Avenue Railroad Company, Brooklyn; Geo. W. Lynch, vice-president Christopher and Tenth Street Railway Company, New York; Milton I. Masson, secretary Central Crosstown Railroad Company, New York City; D. B. Hasbrouck, secretary Houston, West Street and Pavonia Ferry Railroad Company, New York City; Geo. Hilton Scribner, president Central Park, North and East River Railway Company, New York City; Henry Thompson, president Broadway and Seventh Avenue Railroad Company, New York City; H. M. Watson, president Buffalo Railway Company, Buffalo; H. H. Littell, president Crosstown Railroad Company, Buffalo; W. H. Delaney, superintendent North

and East River Railway Company, New York City; Frank Curtiss, president Sixth Avenue Railroad Company, New York City; John Kreusi, president Schenectaday Street Railway Company, Schenectaday; John W. McNamara, president Albany Railway, Albany; Daniel F. Lewis, president Brooklyn Street Railroad Company, Brooklyn; John N. Partridge, president Brooklyn City and Newtown Railroad Company, Brooklyn; Duncan B. Cannon, secretary Brooklyn City and Newtown Railroad Company, Brooklyn; C. J. Field, electrical engineer Buffalo Railway Company, Buffalo; C. Densmore Wyman, vice-president Central Park, North and East River Railroad Company, New York City; J. L. Valentine, secretary Central Park, North and East River Railroad Company, New York City; E. A. Landen, auditor Dry Dock, East Broadway & Brooklyn Railroad Company, New York City; John M. Calhoun, president Forty-second Street and Grand Street Ferry Railroad Company, New York City; John S. Foster, president Forty-second Street and St. Nicholas Avenue Railway Company, New York City; L. H. McIntyre, engineer Harlem Bridge, Manhattan & Ferry Railway Company, New York City; John N. Beckley, president Rochester Railway Company, Rochester; Benjamin Graham, vice-president Rochester Railway Company, Rochester; C. K. Minary, general manager Rochester Railway Company, Rochester; Thomas H. McLean, secretary Twenty-third Street Railway Company, New York City, and Edwin Beers, president Broadway Railway Company, Brooklyn.

There were also present, Thomas C. Barr, president People's Passenger Railway Company, Philadelphia; Lewis Perrine, president Trenton Horse Railroad Company, Trenton, N. J.; Edward J. Lawless, superintendent Paterson Railway, Paterson, N. J.

The street railway and electrical press were represented as follows: F. L. Kenfield, business manager, STREET RAILWAY REVIEW; T. C. Maitin, of *Electrical Engineer*; C. E. Stump, C. B. Fairchild, and J. H. McGraw, of the *Street Railway Journal*; P. G. Monroe, of the *Street Railway Gazette*; Charles W. Price, *Electrical Review*, and L. H. Hart, *Electrical World*, and C. W. Price, *Electrical Review*.

Following are the manufacturers and agents present: C. A. Burton, John S. Pugh, Chas. A. Schieren, Jr., D. W. Pugh, J. A. Tackaberry, James A. Trimble, John N. Stearnes, E. Peckham, C. T. Chapin, F. D. Russell, Cliff. Wise, C. C. Curtiss, B. G. Hann, Major H. C. Evans, C. G. Stearns, P. Cling, Gen. Wallace, Gus. Suckow, R. Vose, H. W. Grannis, C. W. Mansfield, H. P. Barr, C. R. Shayne, D. B. Bean, W. H. Gordon, F. L. Perine, W. F. D. Crane, C. J. Field, F. M. Pierce, J. H. Fox, Mr. Rowell, Wm. Hazelton, Chas. A. Lieb, T. Conroy, Wm. H. Delaney, F. S. Holmes.

WE are under many obligations to Chicago Manager Pettit of the Postal Telegraph Company for their prompt, and as will be seen from reading the report, very accurate transmission of the papers and entire proceedings of the convention.

Hon. John N. Beckley.

The Street Railway Association of New York State, in its choice of chief executive officer for the coming year has conferred an honor not only upon Hon. John N. Beckley, but likewise upon itself. He will represent the association as a progressive, broad-gauged man, and a careful student of railway problems.

Almost every profession or business has its school or at least its grades of office, but the guidance of the great street railway systems of this country the man must be born, not made. Herewith we present the features of a man to whom the special providence that watches over street railways, has poured out a double portion of the statesmanship, financial ability and finesse required, and to such an extent that he has been made president of the Rochester Railway Company, vice-president of the Rochester Electric Railway Company, president of the Merrimac Valley Street Railway Company of Lawrence, Mass., a director in the Grand View Beach Railroad Company, and the Buffalo Railway Company. He is also a considerable owner in the street railway properties at Fall River, Mass., Bridgeport, Conn., and Patterson, New Jersey.

Like the Spanish gentleman of many names, this array of title can be translated into one, Hon. John N. Beckley of Rochester, New York.

Mr. Beckley's career opened on the 30th day of December, 1848, at Clarendon, N. Y. His school-days were passed at the Brockport Institute, and later at the Genesee Wesleyan Seminary and Genesee College, whose walls he left at the end of his sophomore year. Until 1872 he taught, as principal of the public schools at Lanesboro and Rushford, Minn. In 1872 he began the study of law and was admitted to the New York bar in 1875. He was three terms successively city attorney for Rochester and finally member of the well-known law firm of Bacon, Briggs, Beckley & Bissell. Here he became interested in street railways to the extent hinted at the beginning of the sketch. Mr. Beckley's fine social activity is ably seconded by his charming wife, nee Miss Belle Corwin of Brighton.

Mr. Beckley is still a rising man; he has talents of a varied order, and we promise for him a brilliant future.

WEST END OF BOSTON, STATEMENT.

THE July statement of the West End Road of Boston exhibits some very interesting figures, from which we condense the following:

Earnings entire system,	-	-	\$	554,431
Total operating expenses,	-	-		350,137
Net earnings,	-	-		204,294
Miles run,	-	-		1,497,568
Earnings per mile run,	-	-		37.02
Expenses per mile run,	-	-		23.38
Net earned per mile run,	-	-		13.64

Of this amount the electric lines performed 25.19 of the miles run, earned 38.32 cents per mile at an expense of 20.48; while the horse lines made 74.81 of the mileage, earning 36.58 per mile at a cost of 24.35. The net earnings per mile run were 17.84 for the electrics against 12.23 for the horsecar system.

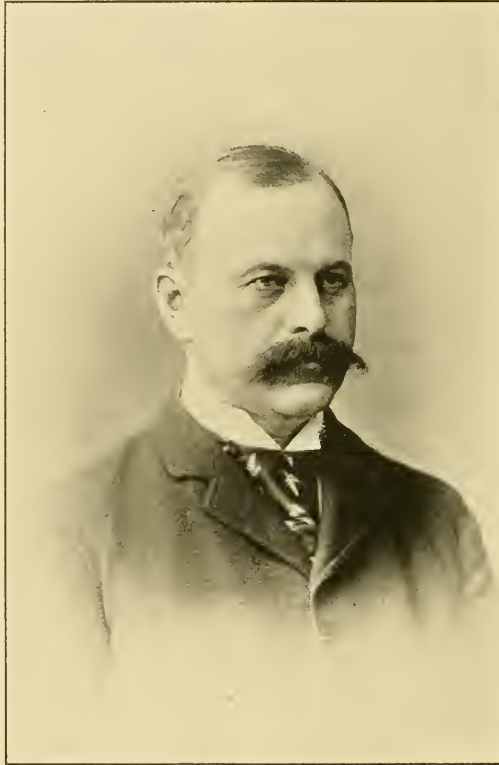
On this basis the company will not only pay a 10 per cent. dividend but have a handsome surplus. The company has just closed a \$500,000 contract for additional equipment. The report shows careful management, and the property is in excellent condition.

THE underground system of the New York Rapid Transit Commission is still "in the air" while people are beginning to complain at the expenditure of half a million and no final results yet. Meanwhile the Broadway and Third Avenue cable roads are steadily forging to the front and will soon have a genuine system of rapid transit. The power house of the Third Avenue road will

be the finest equipped of any in the world.

ONE of the main lines of the Hartford, Connecticut, street railway has at either terminus an institution which is of a public character, and to which a good many people go and yet every body down that way are making desperate efforts to keep out of both. One is a cemetery—the other the penitentiary.

THE Montague cable road, in Brooklyn, has developed unexpected passenger business and proved a most agreeable surprise to President D. F. Lewis. This is the more gratifying as there were more people out of the city this year than ever before.



HON. JOHN N. BECKLEY,
President-Elect Street Railway Association of New York State.

PERSONALS.

O. W. MEYSENBURG, Chicago, has returned from an extended European trip.

J. R. HARDY has been made general manager of the electric lines in Augusta, Ga.

C. E. LOSS, of Chicago, has returned from several months rest in Europe, where his health was fully recovered.

GEO. B. HATHAWAY, who having sold his interest in the Belle City Railway, of Racine, on retiring as superintendent, was presented with a gold-headed cane by his employees.

JOHN WALKER, general manager of the Walker Manufacturing Company, is back again after having had a delightful ramble through England and the continent.

HENRY M. WATSON, president of the American Street Railway Association, and also of the Buffalo City Railway, spent the summer with his family at Bar Harbor.

R. F. Kelker, who has served for many years as treasurer of the Harrisburg, Pa., City Passenger Railway, has retired, and L. R. Gorgas has succeeded him.

FRANK E. BALLARD, secretary of the Cicero & Proviso Electric Railway, was recently seriously injured by being thrown from a buggy in which he was exercising a team of horses.

L. E. MYERS, who has been connected for several years past with the lighting department of the Edison Company, at Philadelphia, has come to Chicago to join forces with his brother, President Garson Myers, of the Calorific Heating Company.

HENRY A. EVERETT has evinced no small amount of skill in securing the Toronto franchise, and now as general manager of the new company, will soon have a system, which, if half as good as his Cleveland road, will create a big demand in Canada for American street railway talent.

N. E. HARRINGTON has tendered his resignation as superintendent of the Pennsylvania's Electric Railway at Atlantic City, which position he had held since the construction of the line in 1889, to take charge of the railway department of Thos. H. Dallett & Company, Philadelphia. The change takes effect September 15th.

GEORGE H. NOLTKE, after two years of successful service, has resigned his position as secretary and treasurer of the Topeka City Railway Company, and the Topeka Belt Railway Company, to reassume the responsibility of a banker's life with Cordley & Company, of Boston. Jas. McKenzie, a well known Kansas City capitalist, is the successor and comes to his new duties with ripe business experience.

M. K. BOWEN has taken the position as special agent in charge of the New York office of the Short Electric Company, instead of an editorial chair with a street railway paper, as copied from a Kansas City daily, in these columns last month. Mr. Bowen will make a strong representative, and both he and the Short Company are to be congratulated on being thus associated.

WOODLAND AVENUE ELECTRIC.

THE only company operating extensively by horses in Cleveland is now to change its power to electricity. The stockholders of the Woodland Avenue and West Side Railroad Company, at a stockholders meeting, September 4th, by a unanimous vote decided to take this step and increase the capital stock \$900,000; stock to be pro rated among the present holders and paid for at par. The change contemplates the relaying of all old track, with new 82 pound girder rail on ties two feet from centers. A twenty-one foot car will be adopted for motor cars and be carried on elliptical springs on either side of the axles. Motors and generators have not yet been decided on but the selection will be made soon. This will be a splendid improvement and accommodate a large territory.

HELENA MOTOR LINE SALE.

THE citizens of Helena, Montana, are sincerely grateful to know that the long disrupted steam motor line has at last a possessor and prospects for usefulness. Kenneth McRae, of Minneapolis, Minn., bid it in from the hands of the receiver for \$36,000. The line runs from the Northern Pacific depot through the principal part of town to the Broadwater hotel on the west side. It is equipped with rolling stock sufficient for present needs and seems to be on a paying basis, transacting a large amount of the passenger traffic of the city. The sale includes the real estate, engine-house and buildings near the Broadwater. The terms of the sale as advertised in the STREET RAILWAY REVIEW last month were adhered to and the present owner has a valuable property at a reasonable price.

THE New York Tribune, whose prehistoric ideas of City electric railways, leads it to remark that "Jersey is to be freed from that dangerous nuisance, the trolley" seems to imagine that a return to horses is progress. It has just been discovered that under a new law the permission recently granted by the city council is invalid. The residents of Jersey are certainly entitled to a front seat on the mourner's bench.

THE highly successful transmission of electrical power over a distance of 108 miles, from the water power to the buildings of the Frankfort exhibition, is the most interesting feature of that remarkable electrical exposition. It without doubt is the title page to a large forthcoming volume of enterprises which will, especially in fuel-remote sections, soon come to be a profitable investment field, and will afford opportunities for the exercise of the best financial and engineering ability.

STREET RAILWAY LAW.

EDITED BY MR. FRANK H. CLARK, ATTORNEY AT LAW, CHICAGO.

Insulting Conduct of Street Car Driver Towards Passengers.

A street railway company is not liable, in an action of malicious prosecution, for the act of a driver of one of its cars in causing the arrest of a passenger on a charge of passing counterfeit money, such act not being within the scope of the driver's employment. But for his insult, abuse, and defamation of a passenger in defendant's car, the company is liable.

McENERY, J., delivered the opinion of the court. The plaintiff sued the defendant company for \$20,000 for damages for abuse when in defendant's car, and for damages for malicious prosecution, and false arrest and imprisonment. There was judgment for the plaintiff for the sum of \$400, from which the defendant appealed. The facts are that on the 27th day of December, 1889, the plaintiff entered the street car of the defendant company. He handed to the driver of the car, through the change gate, one silver dollar for change. The drivers of the cars are instructed to furnish change to the amount of two dollars to passengers. The driver returned to the plaintiff 95 cents, 15 cents of which he placed in the fare box for himself and friends. There was some altercation about the change being short 5 cents. The driver gave the plaintiff 5 cents to make good the deficiency. After going several squares, the driver charged the plaintiff with having handed a counterfeit dollar to him, for which he had given him the change. The driver, in the hearing of the passengers, threatened to have the plaintiff arrested when he reached the station. He frequently looked at the plaintiff in a menacing manner, which attracted attention, and placed the plaintiff under suspicion. When the car reached the station, the driver and the starter at the station had the plaintiff arrested by a policeman, and confined in prison for a short while. There was a charge of passing counterfeit money lodged against plaintiff. The prosecution was dismissed, as the dollar which it is alleged was counterfeit was a good coin. There is some conflict of testimony as to the exact point where the plaintiff was arrested. But we believe his statement was corroborated that he was arrested at the request of the driver by the policeman in response to the "whistle,"—a signal for the officer which he blew before the car stopped,—just as he was stepping from the car. The petition of plaintiff contains two causes of action,—one for abuse and defamation when in defendant's car, and the other for malicious prosecution. On the latter cause, the record does not show that the charge against plaintiff, and his consequent arrest, instigated by the driver of the car, was done in the exercise of the functions in which he was employed. The driver had no instructions to make arrest for the passing of counterfeit money. No inference of such authority can be drawn from the fact of changing money for passengers. He does this at his own risk and responsibility; the company loses nothing if counterfeit coin is accepted by the driver, as he is charged with it. It

has no interest, therefore, in the arrest of the person attempting to pass counterfeit money, other than that which induces every citizen to make known crime when committed. It may be, as alleged by plaintiff, that the act was malicious, willful and tortious, but, as it was not done within the scope of the driver's employment, the defendant company cannot be held responsible in damages. Rev. Civil Code, art. 2,320; *Williams v. Pullman Palace Car Company*, 40 La. Ann. 88; *Gerber v. Viosca*, 8 Rob. (La.) 150; *Ware v. Baratavia & L. Canal Company*, 15 La. 169; *Dyer v. Rieley*, 28 La. Ann. 6; *Cooley, Torts*, p. 536.

The plaintiff was a passenger on defendant's street car line. He had paid his fare to his destination. He behaved himself with propriety. He was not drunk or disorderly. The complaint against him for passing counterfeit money was groundless. He was subjected to insult and defamation by the driver in the presence of other passengers. If not subject to arrest within the car, he was practically placed under surveillance by the driver from the time he was charged with passing the counterfeit dollar until he arrived at his destination. In the case of *Williams v. Pullman Palace Car Company*, 40 La. Ann. 88, we quoted from and approved of the law as expressed in the case of *Boddard v. Grand Trunk Railway Company*, 57 Me. 202. In that case the court said: "The carrier's obligation is to carry his passenger safely and properly, and to treat him respectfully, and if he trusts the performance of this duty to his servants, the law holds him responsible for the manner in which they execute the trust. He must not only protect his passengers against the violence and insults of strangers and co-passengers, but *a fortiori* against the violence and insults of his own servants." The same doctrine is laid down in the case of *Keene v. Lizardi*, 5 La. 431; also referred to and affirmed in the cases of *Williams v. Pullman Palace Car Company* 40 La. Ann. 88, and *Mallah v. Ridley*, 15 N. Y. S. R. 4.

There was no conductor on defendant's car. The driver was in exclusive control of the car, and charged with the safe delivery of the passengers. He was the only servant of the company to whom the passengers could look for protection. It is difficult to estimate damages to feelings and reputations. If the plaintiff was possessed of any pride, or had any regard for his character, his humiliation in the presence of others, when in defendant's car, must have produced the severest mortification. Under the facts presented in this case, it was the peculiar province of the jury to estimate the damages.

The claim for damages for the false arrest and malicious prosecution did not go to the jury. Their finding was confined to the insult, abuse and defamation while in defendant's car. We see no reason to disturb the amount awarded by the jury. (*Sup. Ct. La. Lafitte v. New Orleans City & Lake Railway Company*. 12 L. R. A. 237.)*



HENRY M. WATSON,

President Buffalo Railway Company.

PRESIDENT AMERICAN STREET RAILWAY ASSOCIATION.

Corporations—Suits by Stockholders—Misappropriation by Officers—Limitations.

The stockholders of a corporation sued the officers of the company, the company itself and another company with which it had been consolidated by the officers, praying for the appointment of a receiver and a recovery in their own behalf as stockholders. By their amended petition they prayed the same relief set out in the same cause of action, and made the same parties defendants, but prayed a recovery in behalf of the corporation instead of themselves as stockholders. *Held*, that the amended petition did not set up a new cause of action, and that the statute of limitations was arrested by the original petition.

Where such petition alleges the misappropriation of the corporate funds by the president and directors, and the fraudulent transfer of the stock and property to another corporation, and that one of the plaintiffs demanded of the president and officers that the property be restored to the corporation, and the business of the company be placed on its former footing, it sufficiently shows that plaintiffs made a proper effort to obtain redress within the corporation before bringing the suit.

(Sup. Ct. Tex. *Becker v. Gulf City St. Ry. & R. E. Co.* 10 Ry. & Corp. L. Jour. 50.)

Electric Street Railways—Single Trolley Overhead System—Rights of Telephone Companies.

The dominant purpose for which streets in a municipality are dedicated and opened, is to facilitate public travel and transportation, and, in that view, new and improved modes of conveyance by street railways are by law authorized to be constructed, and a franchise granted to a telephone company of constructing and operating its lines along and upon such streets is subordinate to the rights of the public in the streets for the purpose of travel and transportation.

The fact that a telephone company acquired and entered upon the exercise of a franchise to erect and maintain its telephone poles and wires upon the streets of a city prior to the operation of an electric railway thereon, will not give the telephone company, in the use of the streets, a right paramount to the easement of the public to adopt and use the best and most approved mode of travel thereon; and, if the operation of the street railway by electricity as a motive power tends to disturb the working of the telephone system, the remedy of the telephone company will be to readjust its methods to meet the condition created by the introduction of electro-motive power upon the street railway.

Where a telephone company, under authority derived from the statute, places its poles and wires in the streets of a municipality, and, in order to make a complete electric circuit for the transmission of telephonic messages, uses the earth, or what is known as the "ground circuit," for a return current of electricity, and where an electric street railway, afterwards constructed upon the same streets, is operated with the "single trolley overhead system," so called, of which the ground circuit is a constituent part, if the use of the ground circuit in the operation of the

street railway interferes with telephone communication, the telephone company, as against the street railway, will not have a vested interest and exclusive right in and to the use of the ground circuit as a part of the telephone system.

(Sup. Ct. Ohio. *Cincinnati Inclined plane Ry. Co. vs. City & Suburban Tel. Ass'n.* 10 Ry. & Corp. L. Jour. 82.)

Street Railway—Mechanics' Lien.

There can be no lien for labor on a street railway under a statute authorizing "liens on an railroad" or "any other structure" where the owner has no estate in the land occupied, but the fee of the street is in the city for a public street.

(Sup. Ct. Wash. *Front Street Cable Ry. Co. vs. Johnson.* 11 L. R. A. 693.)

Franchises—Failure to construct road in time specified—Forfeiture.

Laws N. Y. 1860, c. 461, granted to a street railroad company permission to lay several lines of roads on certain streets and plank roads, and provided that said company should complete the tracks upon said streets by October 1, 1861, or as soon thereafter as said streets should be opened and paved, and upon the plank roads whenever the consent of the plank road companies should have been obtained. *Held* that the company having accepted the franchise, was obliged to lay its tracks by the date named on so much of said streets as had then been opened and paved, though they had not been so opened and paved for the entire extent of the proposed lines.

The neglect of the company for twelve years to lay its tracks on the proposed lines, is cause for forfeiting the franchise for non-user.

The fact that the company was prohibited by laws N. Y. 1867, c. 905, from building one of said lines is no reason for not forfeiting its franchise therefor, where it appears that when said law was passed the company had been in default for five years.

In an action to enforce such a forfeiture, it is not necessary to show that the company had obtained the consent of the plank road companies, especially where the plank roads had disappeared, and tolls had ceased to be taken several years before the action was begun.

Laws N. Y. 1875, c. 598, and Laws N. Y. 1879, c. 850, which extended the time for building railroads for two years, and provided that "failure by any railroad company to construct its road heretofore shall not cause a forfeiture of its corporate powers," do not apply to a railroad company which has willfully and intentionally failed to construct its road when able to do so.

Ct. Appls. N. Y. *People v. Broadway Ry. Co. of Brooklyn.* 10 Ry. & Corp. L. Jour. 89.

NOTE—In the case of *Savannah Street Railway Company v. Bryan*, 9 Ry. & Corp. L. Jour. 136, 1 STREET RAILWAY REVIEW 85, the Supreme Court of Georgia held that a street railroad company is responsible to a passenger for a battery by the conductor committed first on the car, and repeated shortly afterwards at the office of the company, whither the passenger had gone to make complaint to the superintendent.—ED.

SEATTLE RAILWAY SYSTEMS.

PART I.

THERE is nothing of which Seattle is prouder than of its street railway system; and there is nothing of which it should be prouder. According to the census of June, 1890, the city had 43,847 inhabitants. Since then many more have come, and several populous suburbs, brought near by the extension of the railways, have been annexed, so that now the population is at least 50,000. For these people, 78 miles of street railway track are in daily operation—nearly 70 miles of it constructed within the last two years. These railways have been one of the most important factors in the development of Seattle, for without them the city could never have spread as it has over the large territory which it occupies.

Seattle lies between Puget Sound or rather its arm, Elliott Bay, on the west, and Lake Washington, a beautiful body of water, on the east. The distance in a straight line from the sound to the lake is about $2\frac{1}{2}$ miles at the narrowest point, but toward the north shore of the sound stretches to the west and the shore of the lake to the east, so that the distance is nearly 10 miles. From the south limit to the extreme north limit

is also 10 miles. The land rises quite abruptly from the sound, and on the summit between the bay and the lake reaches a height of between three and four hundred feet. At the top of the first hill you do not find a table-land, but a valley intervenes, then another ridge, another valley and a last ridge before the slope to the lake. A little to the north of the main part of the city lies Lake Union, and the land, from there to the bay, in a southwest line comparatively level. Between Lake Union and the sound is another high, steep hill, and about 3 miles north of Lake Union is a smaller body of water, Green Lake. Much of this territory has within two years been cleared, settled and brought within the corporate limits.

Few men are willing to climb hills on foot; and since horse locomotion in such grades—from 8 to 20 per cent—is not only slow, but very expensive as well, cable and electric roads have been absolutely necessary to furnish

cheap and rapid transit. Had not a few enterprising men boldly undertaken the construction of roads out into the woods, the incoming population would have been huddled down along the water front, or have been driven to other places. As it is, hundreds of acres of good residence property were opened in the nick of time; and in spite of speculative prices, fairly cheap homes were provided for all who needed them. In this way residence property has been kept at lower prices here than in other places in the northwest.

The roads have not only benefited the city, but have made fortunes for their projectors and managers. In almost every instance interested property holders have given very large subsidies, and land along the line has so advanced in price that loss from operation at first has

been more than made up. But the opening of a line has generally been followed by a rush of settlers, whom the steepness of the hills in the hot haste of western life has driven to ride. So the cars have been crowded, and dividends have been paid almost from the start. Of course in a city growing more slowly such success would have been impossible.

In some ways the cost of construction has been high. Though little or nothing



POWER HOUSE, YESLER AVENUE CABLE LINE, SEATTLE.

has been paid for franchises, much has been expended in wages, for until very recently workmen have been scarce, and an unskilled laborer has been able to earn from \$2.00 to \$2.50 a day. Machinery and other supplies brought from the east, have been subjected to heavy freight rates. Though much clearing of wood and grading has been necessary there has been no rock cutting. The soil is a hard clay, mixed with pebbles and sand; and since the frosts of winter are very light, few retaining walls have been needed. Wood is cheap and has been used wherever possible for poles, stringers, sleepers and pavement. The absence of snow lessens the expense of winter maintenance, indeed, many open cars are run the year around.

Under these conditions the railways have been built the cable lines across the hills to Lake Washington, up to North Seattle, and also the West Seattle hill. The electric lines have followed the nearly level gulches along

the water front and in the valleys about Lake Union and Lake Washington. There are five cables in operation, and thirteen lines of seven electric companies. The mileage is shown in the following summary:

NAME OF ROAD.	Miles of Single Track.	Miles of Double Track.	Total Mileage of Track.
Seattle City, (Yesler Cable)	5 00	-----	5 00
Front Street Cable	-----	2 750	5 50
Madison Street Cable	-----	3 625	7 25
West Seattle Cable	2 25	-----	2 25
Union Trunk Line,	-----	-----	-----
Cable	-----	7 50	1 50
Electric	5 75	5 00	6 75
Seattle Consolidated (Electric)	2 50	10 000	22 50
Green Lake Electric	4 50	-----	4 50
Rainier Power and R'y (Electric)	3 50	-----	3 50
Woodland Park Electric	1 25	-----	1 25
West Street & North End (Electric)	3 50	2 500	8 50
Rainier Avenue Electric	7 00	-----	7 00
South Seattle Cable R'y (motor)	2 50	-----	2 50
Total	37 75	20 125	78 00

A single fare on all roads is five cents, but except with the Seattle Consolidated and its feeders and the branches of the Union Trunk Line, there are no transfers.

Though there are more miles of electric than of cable road in the city, nevertheless the latter mode of locomotion is in a sense peculiar to Seattle, for without cables, the climbing of the hills would have been impracticable.

The pioneer cable line not only of Seattle, but of the Northwest is that now owned by the

SEATTLE CITY RAILWAY.

It starts on Yesler avenue close to Fruit street—Pioneer Place. The Fruit street cable passes there; the Union Trunk Line starts there; and the Consolidated Electric runs its loop through at that point. The cable road goes straight out to Yesler avenue to the hill overlooking Lake Washington, and then comes down over a long and rather steep trestle to the water. The power house is placed at that point. The returning cars go back over the trestle, and at the top of the hill turn three blocks to the south, and then go west to the city's water front over Jackson street, which runs parallel to Yesler avenue. One block east of the city's main thoroughfare the line turns, and going three blocks to the north, reaches the original starting point. There the sharpness of the curve makes a turntable necessary, as at the power house. The whole length of this circuit is close to five miles.

The building of this line in 1888 was really a bold undertaking. There was no cable line north of San Francisco. Seattle was then a city of less than 20,000 inhabitants. The business houses were huddled together on the water front, and the dwellings extended a few blocks up the steep hill, on to the north on the comparatively level stretches toward Lake Union. The ridges and the valleys lying between the crest of the first hill and Lake Washington had been partly cleared by lumber companies, but there were only a few scattered houses of people who lived in the "country." A rough wagon road followed the general line of Jackson street to the lake. Such were the conditions when J. M. Thompson with a number of the leading men of the city, George A.

Moore, A. S. Moore, J. B. Metcalfe, Josiah O. Low, Junius Rochester, and John Leary organized the Seattle Construction Company with a capital of \$250,000. The appliances for building were not what they are now, and no one had the knowledge gained by experience. The work was begun in March, 1888, and in October of the same year cars began running. Over nearly the whole distance the company had to clear the woods, cut and grade, establish grades, and in short, bear the whole burden of the work. From a point seven blocks east of the starting place, clear through to Lake Washington, there were but thirteen isolated houses; and when the cars first began running a man had to be careful not to stick his head from the side of the car for fear of striking against a stump.

But immigrants from the east were coming into the city by thousands. The Yesler avenue line afforded an outlet—the first one—and people poured into it like water through a break in a dam. The rapidity of the growth of the part of the city traversed by the line is shown by the fact that in that territory there are now 3,000 houses, some of them among the finest residences in the city. The property on the high ridges, whence a view of the bay and the mountains can be obtained, is known as "gilt-edged." The streets through which the cars run are graded and provided with sidewalks—and for most of the distance planked. The region adjacent is filled with miles of graded streets. The road has paid from the very start, and to-day is the most profitable one in the city, and pays good dividends on \$600,000 in stock.

Though the construction of the road-bed was not as expensive as in cable lines built here later, nevertheless, the original cost was \$220,000. The guage is thirty-six inches. Iron yokes are used, placed eight feet apart, but considerable fir is employed in the construction. The space between the rails is planked with fir, to which are riveted long flat slot-irons. The steepest grade is 15.62. A large number of depression pulleys are necessary, because the cable has to pass down through several hollows. The round trip, including stops and one or two minutes at the turn-table, is made in thirty-five minutes.

The power-house is fitted with two engines of 150 and 250 horse power each, respectively.

In the fall of 1889, Fred. E. Sander, one of the most enterprising and successful men of the city, bought out John Leary, and then all the other stockholders, so that he was sole owner of the road. The following spring he sold the property for \$600,000 to the Lake Washington Railway Company, of which he himself owned most of the stock. During the period of Mr. Sander's control of the line many improvements were made. The streets through which the road passed were graded; while this was being done the track was propped up on a trestle in many places, the grading done, and at night when the cars had stopped, the track would be lowered to its proper place. There was scarcely an interruption of the operation of the road during any of the work. A second track was laid in Yesler avenue, the intention being to run cars both ways on this street, and to use the old track

on Jackson street for still another line, whose return would be on a street several blocks farther south. Before this plan could be put into operation the fire of June 6, 1889, Seattle's great fire, destroyed several blocks of the track. Cars were started on the old route after some weeks, but the new track has never been used. The company, however, intends carrying out the proposed extension and improvement. Mr. Sander also built at the Lake Washington end several boat-houses and a large pavilion 90x120 feet for concerts and dances. He started to lay out a small park and recreation ground.

On August 23, 1890, the Lake Washington Cable Railway Company sold the property to the Seattle City Railway, a corporation controlled by L. S. J. Hunt. The capital stock is \$600,000. Mr. Hunt has continued to improve the plant. New machinery has been added to the power-house and new rolling stock bought. The road as first constructed ran down to the lake by a trestle

The officers of the company are: President, Fred. J. Grant; vice-president, W. A. Underwood; secretary and manager, A. F. Haas; Treasurer, First National Bank.

The second cable road to be built was the

FRONT STREET CABLE LINE,

traversing Front street—the main business thoroughfare of Seattle—for the fourteen principal streets and then turns to Second, the parallel street, and runs through the suburbs out up the high hill of North Seattle. The total distance, which is double tracked, is two and three-fourths miles. This includes an extension of a mile, open within the last two months. The success of the Yesler avenue line led to the building of this one, which is modeled after that of Market street, San Francisco. The charter was obtained October 24, 1888, on a capital of \$600,000; and construction was begun the same year. On March 13, 1889, the cars began running. The track, which has a fifty-seven inch gauge, is laid on iron yokes. The rail



TRESTLE AT TERMINUS YESLER AVENUE CABLE LINE, SEATTLE, LOOKING TOWARD LAKE WASHINGTON.

from Yesler avenue, then three blocks along the shore, and back by a long steep trestle to Jackson street. The latter trestle was so steep as to be unpleasant to ride on, and so the company abandoned it and made the return by the Yesler trestle. The grounds at the lake have been rendered very pretty and attractive, and a menagerie has been started. Thousands go out there each Sunday to row or sail, or listen to the music. On these various improvements over \$100,000 has been expended since the first outlay.

The rolling stock now includes twelve grip cars, twelve closed cars and four open cars, and three freight cars. Trains of a grip car and one open car run every four or five minutes during the day. The freight cars, which are small, flat trucks for carrying light freight, are attached to the regular trains and run over the line each day.

weighs forty-five pounds. The maximum grade is 18, per cent. and that lasts for only 400 feet. There are five curves with a minimum radius of 100 feet. The cable is an inch and a quarter in diameter; it is divided into two ropes, one 19,000 and the other 11,000 feet long in round numbers. These cables are run at a speed of seven and a half miles an hour by two single non-condensing engines 18x42x48. Each has an indicated horse power of 150. A five and a half minute service is furnished by seven grip cars, seven passenger coaches used as trailers, and two combination cars. The cables have an open front in which the grip is placed. The officers of the company are: President, A. B. Stewart; vice president, A. P. Mitten; secretary, Maurice McMicken; treasurer, Jacob Furth; manager, E. Shepard; superintendent Samuel Gibson.

THE MADISON STREET CABLE RAILWAY

was built by the same party of capitalists that owns the Front Street Road. The company was incorporated September 17, 1889, by A. B. Stewart, Jacob Furth, H. G. Struve, J. C. Haines, Maurice McMicken, Rollin H. Denny, George H. Heilbron, L. S. J. Hunt, A. P. Mitten, Bailey Gatzert and W. P. Harrington. The capital is \$750,000. After an expenditure of \$550,000 the road began to operate April 6, 1890. The line starts on the water front four blocks north of Yesler avenue and runs a little north of east out over the hills, three and five-eighths miles to Lake Washington. The whole length of the track, which is forty-two inches wide, is seven and a quarter miles. The construction is of the best in every particular. The rail weighs forty-five pounds to the yard. The space between the rails is paved with block of basalt rock, in which are placed manhole covers. The maximum grade is 20 per cent. for a distance of 300 feet. There is but one curve, and that a slight one. At this point, which is near the middle of the line the power house is placed. It contains two non-condensing engines 24x48, of 250-horse-power each; but the average horse power used is only 175. There are two cables of about the same length—the diameter being 1¼ inches.

The cable that comes up from the Sound is run more slowly because it crosses a rougher piece of country. The speed of this cable is nine miles an hour; and of the other ten and a half. The company owns sixteen combination cars, but only eleven of them are in common use. In July last, 175,520 passengers were carried.

This road was built through a country almost as uninviting as that which lay around the Yesler cable at first. The Madison Street Company had a good deal of grading and clearing; but considering the time of operation the results have been as satisfactory. No trestle is needed to reach the lake, and so the street is becoming one of the finest thoroughfares of the city, stretching from water to water. The middle ridge on each side of the street is a very fashionable place of residence and is rapidly building with houses as good as any in the Northwest. The company has erected at the lake a pavilion, boat houses, and bathing houses, and has laid out a park. These

draw large crowds on Sundays and holidays. The handsome cars and quick time have also made the road very popular for pleasure riding.

The officers of the company are: president, H. G. Struve; vice-president, A. B. Stewart; secretary, Maurice McMicken; treasurer, Jacob Furth; manager, E. Shepard.

A street railway, which, though not within the city's legal limits, may yet be reckoned as belonging to the city, is that of the

WEST SEATTLE CABLE RAILWAY COMPANY.

It was undertaken by the members of the West Seattle Land and Improvement Company, in order to bring into the market some slightly and beautiful pieces of residence and business property on the point to the west opposite Seattle, three miles across the bay. The company maintains a ferry to West Seattle. The cable cars, starting from the ferry slip there, run to the north up a sloping shelf

to the top of the high hill; then around a circuit near the outer side of the point, and down to the slip again from the south. The whole distance is 1¼ miles, but when traffic demands, the line will be extended. The company claims to have the best built cable railway on the Pacific coast, and certainly it is hard to see where an improvement could be made. The material throughout is concrete and iron. The yokes



TURN TABLE AT FOOT YESLER AVENUE, CABLE, SEATTLE.

and rails are laid in a bed of concrete with concrete conduit, while the pavement between the tracks is concrete with corrugations to prevent horses feet from slipping. The slot iron weigh forty pounds to the yard, and the cars run in a forty pound combination rail. Five foot iron hatches are placed every thirty-five feet, so that it is easy to get at any part of the cable in case of accident. The grades are easy except in going up and coming down the hill, where there is in one place a pitch of 16 per cent. The power house is a two story wooden building 80 by 120 feet. It has a fine Wheelock engine of 300-horse-power and a double set of boilers. Four combination cars give a fifteen minute service, and on special occasions can be run even faster. The company cleared off the point and began construction of the road in June, 1890. On September 13th, of the same year, after \$171,000 had been spent in the work, which included a great deal of heavy

grading and cutting to get down the hill, the line was opened. Since then a number of fine houses have been built in West Seattle, and the place has become a popular pleasure resort. The railway company is nominally distinct from the Land and Improvement Company, though the same men are in both. The capital stock is \$500,000, and the officers as follows: President, Thomas Ewing; Vice-President, H. G. Struve; Secretary, W. S. Bates; Treasurer, Dexter, Horton & Co.; Directors, J. P. Hoyt, George W. Prescott and Homer T. King.

THE RANIER POWER AND RAILWAY COMPANY

has franchises for running electric railways and furnishing electric power and light in that belt of the city between Lake Washington and the Sound occupied by Lake Union. The company has franchises for 10 miles of

have been ordered to be equipped with Westinghouse motors. One or two freight cars will also be put on the line.

The officers of the company, who own a large part of the real estate which the road will develop, are: President, D. T. Denny; vice-president, Roger S. Greene; treasurer, George Kinnear; secretary, John B. Denny; general manager, D. Thomas Denny. The fact that three members of the Denny family, one of the first to settle in this state, are officers of the company, makes the road familiarly known as the Denny System.

(To be Continued.)

THE wages of the conductors and gripmen on the Metropolitan Road in Kansas City have been reduced from 20 to 17 cents per hour.



WEST SEATTLE CABLE CAR—COMING DOWN THE MOUNTAIN.

road east and west of the lake, to be completed in January, 1893, but the part at present in operation begins at the end of the consolidated branches near the southern extremity of the lake and extends $3\frac{1}{2}$ miles along the east side of the lake, across the eastern arm by a bridge, and thence east through a suburb known as Brooklyn. Work on this portion was begun August 1, 1890, and the line was opened July 23, 1891. Another three-fourths of a mile is under construction, running southwest along Lake Union and then west toward the Sound. The track conforms with the standard gauge of the Consolidated, and is partly in T and partly in girder rails.

The capitalization of the company is \$500,000, but only \$30,000 has thus far been expended. Considerable money will be laid out in a power-house and dynamos, but at present the Consolidated furnishes the power for running a twenty-two-minute service. Several new cars

THAT DANVILLE DECISION.

LAST month we mentioned the attempted outrage at Danville, Illinois, where an over-officious mayor undertook to interpret as well as enforce the law in the case of the electric railway at that place, which was not, the mayor claimed, building a railroad in accordance with his advanced ideas.

When the franchise was granted, there were some technical clauses as to how the track should be laid on paved streets. The company therefore proceeded, when the time came to build, to construct its line in accordance therewith. In the meantime the city concluded to somewhat change their proposed paving plans, so that the nearly completed railway would not literally comply with the changed requirements when the paving should come to be laid. At the same time the company had substantially done so, and, in fact, as nearly complied as possible, and were performing their work in good faith and in a

workmanlike manner. The mayor thereupon assembled 150 men at midnight, and but for the energy of the company who as promptly obtained an injunction, would have torn the track up entirely. Court was in session in the city and the company asked to have the injunction made permanent, and the *Danville Daily News* thus reports a portion of the summing up of the argument of Hon. J. B. Mann, the company's attorney: "When the Mayor of Danville went with 150 men at night to destroy the property of this company he placed himself within the pale of the criminal law, and if the states attorney does his duty Mayor Beard will be indicted by the next grand jury.

Mr. Beard, our mayor, led a mob, and had he set it in destructive motion he could not have controlled its destruction. Mayor Beard in assembling those men to destroy the track and property of this company did an unlawful act, a cowardly act, a criminal act, an act of a desperado, which any man should be ashamed of. Does any officer who knows he is exercising lawful authority steal in at night with a mob? No, and to say so is silly. Mr. Beard has just as much right to come to my house and tear it down, and in that case I would have a right to slay him in defense of my property. This company had the right to meet force with force, and had John Beard been slain, and the jack-assical councilmen who supported his folly, you would all have said "amen." But innocent parties would have been hurt, and this company knowing that appealed to the law for protection.

If this little czar is turned loose he will proceed to destroy the property which he tried to destroy when you bound him. The other side say, "you can sue him for damages." Why, sue John Beard for damages and he wouldn't have enough property to stuff a bluebird. All know that, who have ever had anything to do with him in a court of law. His books are not to be found when sent for by the court. To dissolve this injunction is to turn loose this irresponsible little mayor on this property and invite riot and bloodshed. Keep his hands tied until the next term of court in October, then you can hear this whole question; from that decision an appeal will lie, and then it will be settled by the highest tribunal in this state, as it should be."

Judge Bookwalter's opinion was well taken and vigorous, and is as follows:

"On the 30th July the complainants presented this bill to myself as one of the judges of the circuit court, in

vacation, and asked for a temporary injunction upon the allegations in the bill. The bill sets out at length the rights claimed by the complainant to construct their electric street railway in the city of Danville. It alleges that the complainants had gone on, under the provisions of the ordinance of the city and grant by it given, and had in part constructed or was constructing its railway, and that the defendants were threatening to destroy the railroad and tear it up.

A temporary injunction was granted at that time to restrain the defendants from destroying the property.

It seems to me that the injunction was properly granted, that the court in the interest of peace and harmony and safety of property, could not have done otherwise than to have granted a temporary injunction.

The wisdom and the justice of granting that injunction is manifest by what immediately followed by the action of the defendant: 150 men assembled and armed, and proceeded in the night time to attack, tear up and destroy complainant's property. If an injunction had not been granted, to say the least, there would have been a vast amount of property destroyed, and no doubt blood shed and loss of life. And it does seem to me that it was a proper case for the interposition of the chancellor to grant a temporary injunction.



WEST SEATTLE CABLE RAILWAY POWER HOUSE.

Now the defendants come in and move that this temporary injunction be dissolved before a final hearing upon the merits of the case. They do not show in their answer that they did not intend to destroy and tear up this property, neither are there any pledges given or any allegations made that it would not be done if this injunction should be dissolved.

Should this injunction be dissolved, the parties would be placed in statu quo and be left just as they were before any injunction writ was issued, and to have whatever right to tear up and destroy the property of the complainant they supposed they had before.

Now, I do not think any court ought to permit that to be done if it can be peaceably prevented; and it comes within the province and jurisdiction of the court.

This motion does not involve a construction of this contract entirely,—or this ordinance and the acceptance of the ordinance—which amounts to a contract. The complainants are not in the attitude of trespassers in the street. They are there by virtue and authority of law. It may be, after they are in the streets, that they do not conform to the provisions of the ordinance; but it is not

for the defendants, the city of Danville or the city council to say whether or not the complainants have conformed to the provisions of the ordinance to such an extent that they may go and remove and destroy property of complainants.

The complainants are in the streets of the city of Danville for a legitimate purpose, there is no question about that. The building of a street railway has long since been recognized as a legitimate use of the streets.

It was contemplated by the city and by the complainants that a street railway should be built. Certain limitations and provisions were interposed in the ordinances. These ordinances are to a certain extent uncertain. Now in that uncertainty of affairs it is very natural that a misunderstanding should arise between the complainants and the city. When a dispute arises, it is not for the complainants to solve it in their way, and act upon it as they see fit, neither is it in the province of the city or city council to act as it sees fit, and to construe this contract as it thinks proper. That will have to be settled in the courts. That is what the courts are for—to settle disputes between parties. If parties were allowed to take the law in their own hands, the inevitable result would be destruction of property and loss of life.

There is no doubt that the complainants must comply reasonably and substantially with the provisions of the ordinance. They must construct, operate and maintain a street railway with due regards to the provisions of the ordinance, but that being true, does not give the city, nor the city council, the right to say whether or not that is being done, and to say if it is not being done as they think, that they have a right to destroy and tear up the property of the complainants.

The complainants have a vested right in the streets. It is denied that right amounts a franchise, but only to a license. If it is a license it is a license coupled with an interest; and where a license is coupled with an interest the city would not have the right to take the matter in its own hands and determine the matter in dispute in its own way. If it is a franchise the same rule applies. It is not like where a mere naked license has been given by the city to do something. In this case authority is given either by franchise, or license coupled with an interest for the complainants to go ahead and construct a street railway for the interest of the public, as well as for private gain to some extent.

I think if this injunction should be dissolved the defendants would do just what they threatened to do before, and at the time this injunction was granted. I have no doubt the defendants would proceed to tear up this road and destroy this property; and I do not think I would be doing my duty as a chancellor where the power seems to be manifest, should it not be extended to curb and prevent this kind of conduct. It would not be the right thing for the court to unbridle parties who have been bridled for the time being, and open the way again to let a thing be done which might lead not only to the destruction of the complainant's property, but to the destruction of the city, and possible the loss of a great many lives."

"The motion will be denied."

AN ABLE SECRETARY.

PROBABLY no other street railway officer in the world can boast of as large and varied an acquaintance with the fraternity, as Mr. Wm. J. Richardson; and quite as sure is it no other has a larger number of warm friends among the same. Mr. Richardson was born October 22d, 1849, at Albany, N. Y., where his early education was received, afterward supplemented in New York City, to which place he removed in 1864, when his father became president of the Dry Dock road there. At the age of sixteen he entered an establishment engaged in importing English hardware, at which occupation he at first received the munificent compensation of \$10 per month. In 1876 he left to assist his father in his railway business in Brooklyn, where he remained two years. Then followed a three years course in the collegiate department of the Brooklyn Polytechnic and Collegiate Institute. After graduating he became superintendent of the Brooklyn, Carnarsie & Rockaway Beach Railroad and Steamboat line, which position he filled one year and resigned to join his father in operating the Atlantic avenue lines, then known as Atlantic Avenue, East New York & Greenwood Railroad. When in 1872 this company was reorganized, Mr. Richardson was elected secretary, which position he has held continuously ever since. The following year he was married to Miss Mary C. Raymond, daughter of John H. Raymond, L.L.D., president of Vassar College.

Mr. Richardson's motto is to finally dispose of every matter as it comes up, and thus it is he accomplishes a vast amount of work otherwise impossible.

When in 1882 the American Street Railway Association was organized, Mr. Richardson, quite against his will, was forced into accepting the double office of secretary and treasurer, which position he has held ever since, also acting in a similar capacity for the Street Railway Association of New York state, formed in 1883. To say that he has contributed more than any other to the success of both associations is but poorly to express the service he has rendered, and for which all our readers will most gladly unite in giving him credit. He has attended to the multitudinous interests with a conscientious and painstaking zeal which has never flagged, and very few of all those who attend the annual conventions and find nothing wanting or forgotten have any appreciable idea of the preliminary and other work involved.

Mr. Richardson has held an official railway position for a term of years exceeded by but few, and while yet a young man combines an unbounded amount of energy, with wide experience and broad views which place him among the leading managers of the country. His uniform pleasant bearing and courteous treatment, with rare executive ability, have combined to make him a particularly happy selection as the representative of the American Street Railway Association. His wife, a highly accomplished and cultivated lady, always accompanies him, and by many thoughtful courtesies to the other ladies in attendance has become a general favorite and is much sought after.



WILLIAM J. RICHARDSON,

Secretary Atlantic Ave. Railway, Brooklyn.

SECRETARY AMERICAN STREET RAILWAY ASSOCIATION.

HYGIENE AND VETERINARY.

BY F. T. M'MAHON, VETERINARY SURGEON, CHICAGO CITY RAILWAY.

IN concluding the diseases of the feet we shall mention several other ailments to which the street car horse is subject.

NAVICULAR DISEASE

is the term applied to a groggy lameness in the navicula, or coffin joint, an irritation set up in the cancellated structure of the bone, which extends and interferes with the nutrition of the articular cartilage, causing caries of the navicular bone.

The causes of this affection may be strictly called hereditary or predisposing; the tendency may exist from birth. Pressure and concussion are, in general, the remote causes; the proximate is found in inflammation, leading to ulceration, or some ossific deposit. At one time it was thought the contracted heels and hollow arch of the sole were the cause, but they are mere symptoms. The perforans tendon is inserted into the most backward portion of the sole belonging to the coffin bone. To gain this point it has to pass underneath the navicular bone. In progression, no inconsiderable portion of the weight is cast upon the navicular bone, and by it is transferred to the perforans tendon, which, however, is protected and in some measure supported by the frog beneath. When we consider the immense weight of the horse, increased by motion, it cannot be wondered that the protection and support sometimes proves weaker than is required. The tendon receives, in all cases, the first injury. Often the occasion is marked by instantaneous lameness; at other times it is slow in coming on, and often repeated before the disease is confirmed. Between the bone and the tendon is situated a synovial capsule, which facilitates the independent motions of each upon the other. The first consequence of injury is inflammation.

Inflammation of the tendon is readily communicated to the synovial capsule. The secretion of the lubricating fluid is thereupon stopped, friction takes place as a consequence, the navicular bone is denuded of its articular cartilage, and ulceration is ultimately established. This may end in the absorption of the synovial sac and the junction of the bone to the tendon: it may terminate in fracture of the bone, and it may also conclude with the rupture of the tendon. In case of the first termination, the horse is groggy ever afterward, and when either of the two last terminations occur it is better to order the animal to be immediately destroyed, for his service is at an end.

The kind of foot most subject to navicular disease is well worthy of remark, inasmuch as it is the very one which would apparently be the most perfect. A good circular foot with wide heels, a prominent frog, and much strength and thickness of horn, that would suggest the idea of giving complete protection to delicate structures within, is the one which, unfortunately, is favorable to an injury of that most delicate point of all, the navicular joint. This is explained by the circumstance of the hoof not being sufficiently yielding to relieve any concussion

that may take place in the joint. Flat feet are much less likely to be affected with this disease, in consequence of their being encased in horn much thinner and more pliable.

The symptoms of navicular disease are various, according to the progress of the ailment. At first the horse is lame, and the cause can be discovered in no other part than the foot. If the animal be now carefully observed when at rest and within the stable, he will be seen to favor one foot, and to have the diseased one slightly in advance of the other. Should the animal now be taken out and driven, he goes forth lame and returns home sound, for the warmth of exertion forces back the absent synovia. Should the disease progress to the ulcerative stage, the lameness has, like toothache, moments of uncertain ease, but it keeps on more or less. The foot is now generally advanced or pointed, the frog narrows, hardens, becomes elevated, and is continually emitting a loathsome thrush. The sole likewise grows more thick and high; the quarters become considerably heightened and of much greater substance. The horse now goes along with a peculiar short gait, going up hill better than down. Contraction is observable in several different ways, being sometimes most evident in the inner heel, at others, a remarkable falling in of the hoof, just after it leaves the coronet, is shown. There is also the usual concavity of the sole to be observed, and a close examination of the foot which has been frequently attacked with navicular disease will detect a wavy ridge about each quarter, similar to those produced by the irregular growth of hoof consequent upon laminitis, but not extending in front of it.

The treatment, unfortunately, must begin very early, and be followed by a very long rest, to be successful; and it is seldom that the animal is treated until disorganization has proceeded too far for permanent benefit. Soaking in hot water, poultices, blistering the coronets, and frog seatons, are used with some good results. Neurotomy or division of the nerves as a last resort, will somewhat stay the ulcerative process, and always ease the suffering animal during progress, as well as give liberty in action. The operation, however, should not be attempted while any active symptoms of the inflammation remain, or when the crust or horn of the foot is scanty or weak. Our remedies for navicular disease being at best but little satisfactory; for subdue the disease in the first instance as we may, a relapse is almost sure to follow on the horse being put to trying work, it is worthy of serious consideration, whether some measures cannot be adopted to prevent its appearance. We have remarked that it is the strong, unyielding hoof which covers the foot most subject to navicular disease, and presume that, although there may be an hereditary tendency, concussion is the exciting cause, it is then to the moderation of this jar that we must direct our energies, and that can only be effected by proper attention to the foot in the stable and at the forge. When a horse is kept in a stable, it follows that

a certain amount of heat and dryness must render the hoof comparatively rigid, it is good practice therefore to soak the feet once or twice a week during dry weather, or slopping of linseed meal may be used. Good air and cleanliness of the stable, even in such a remote instance as this, has a great effect. The feverish horse will have feverish feet. Do not let him stand too long in the stable, but give him two or three hours exercise daily. At the forge our attention must be directed principally to the preparation of the foot. Contradictory as it may appear, avoid too great a use of the knife. Permanent elasticity is not gained by paring the hoof so as to spring beneath your finger, and the cheesy, india-rubber like appearance of the newly cut frog is but temporary, the surface speedily hardening by exposure to the atmosphere. Let then the natural scaly protection remain and the under surface will continue yielding; don't allow the crust to be robbed of its wax-like covering by the rasp: see that the nails are skilfully driven, so as not to make three or four holes by continual drawbacks, that they are as few as possible in number, that the heels are not unnaturally lowered, the shoe not applied hot, and that its bearing is level. Attention to the above rules will certainly contribute to the health of the foot in general, and it is hoped sometimes avert that almost incurable disease which has just been considered.

SANDCRACK OR SPLIT HOOF.

This is a solution of continuity between some of the horny fibres of the hoof, generally in the direction of their growth, that is, from above downwards. Now and then, though but very seldom, the crack exists in a horizontal position. This affection is called sandcrack, because it was formerly supposed peculiar to hot, sandy districts, the heat of which, applied to the feet, gave them a disposition to crack. These fissures are more common to the fore than to the hind feet; not but that the latter are sometimes affected, particularly in heavy horses. In the fore feet they are more frequently situated on the inner side of the foot. Here also the weakness of the quarter and the increased weight thrown on it acts peculiarly disadvantage. In every instance, where it is not occasioned by some outward injury to the hoof, it is, we believe, brought on by a brittle state of the horny fibres. Sometimes it is constitutional. When the hoof is completely penetrated, it becomes a most painful affection, and production of extreme lameness, for the divided edges of the horn are apt during exercise to admit the protrusion of the soft parts underneath, which, becoming suddenly pressed on by the approximation of the horny edges, exquisite momentary pain is produced from the injury done to the sensitive laminated expansion. There is often a sprouting of fungus between the divided edges, which greatly aggravates the symptoms.

TREATMENT.

The chief object must be to interrupt the communication between the crack and the sound horn. Much difference of opinion has arisen as to the best mode of destroying the connection between the divided and the entire

hoof; some prefer the firing iron, others the rasp, and some the knife. Either one will answer the purpose, by severing the portion of the sound hoof from that portion that is split: this may be carried on to a depth just short of wounding the sensitive laminae. The portion thus included will then be found to yield to pressure from the thumb, and the crack will thus be completely isolated from the surrounding crust and be ready for independent treatment. In the usual cases of sandcrack, the state of opening must be first carefully attended to. When, either from pressure or from dirt getting into the wound, suppuration has taken place, were an attempt made at once to close and bind up the opening, much harm would be the result. Instead of this the hard edges of the horn should be removed first with a knife, and the surrounding portions thinned considerably, after which the opening should be dressed with any mild stimulant likely to encourage the adhesive inflammation, as a solution of chloride of zinc and pine tar may be spread over that, and if the inflammation and irritation are considerable, apply a poultice of linseed meal. In a few days, after repeating the same treatment, the dirt will become evacuated, and the parts will heal, harden and become dry. When a sandcrack has occurred which shows no signs of active suppuration, although it has completely penetrated the horn, and a little blood or serous moisture shows itself at the edges, but only under the effects of motion, proceed to pare away the horn around it, and then apply a solution of chloride of zinc or sulphate of copper, for two or three days, or until the oozing or moisture has entirely stopped. In some cases the hoof is so brittle that these cracks assume a chronic form, it seems almost impossible to prevent them. When such occur, rivets have been very ingeniously introduced to keep the crack from opening. Great care should be exercised in the shoeing of such feet, so as to transfer the weight of the animal as much as possible to the frog, and keep the horn as soft and pliable as possible by hoof ointment.

EAST DETROIT ELECTRIC RAILWAY.

THE new East Detroit & Grosse Point Electric Railway, has driven its last spike and has connected by thirteen miles of rapid transit the Michigan Central depot with the Grosse Point Club House. Building was begun simultaneously at both ends of the road and the two gangs of tracklayers met about the middle of the line. The track is 52 pound T rail laid to standard gauge and well ballasted. Manager Strathern Hendrie and a body of prominent citizens made the baptismal trip with great eclat.

The equipment will be with Healey motors, one of which is in service and four more are now in process of construction at the works. A through fare of 15 cents is scheduled and only one transfer will be made on the route.

RECENTLY, one conductor on one of the electric cars running between Omaha and Council Bluffs collected 2,240 fares, or \$112 in a single day.

Hose Bridge for Railway Protection.

THERE is always more or less inconvenience, loss of time and loss of money, occasioned in every city railway system of any size, by the stoppage of cars in the running of fire-hose across the track during a conflagration. With a cable system of transit this trouble is doubly expensive, from the fact that it is impossible to turn the cars and transfer passengers to the other side of the fire and transport them to their destination, and at any large fire on the direct route of a cable line, cars are backed up by the dozen, awaiting the time when the hose can be lifted and the cars allowed to proceed. With other methods the trouble is in registering, transferring and straightening out the accounts of each transfer. The firemen, be it said to their credit, are as expeditious as possible, yet several hours sometimes intervene before it is advisable to change the positions of the engines. Several remedies have been suggested and tried for this difficulty, but all of them so far have been

a foreman to manage and set it in that time. Its dimensions are as follows: Height, to the top of the horizontal bar, 13 feet; distance between the feet of each trestle, 7½ feet; distance between each trestle, 13 feet. The bridge can hold three hose laid on and two more can be lodged safely by strapping them together. The building in which the bridge wagon is kept has been connected with the fire department headquarters, and whenever an alarm comes in from that division of the city it is instantly repeated on a large gong in the company's barn. The crew, who are at other times employed at other work, mount their wagon, the team is hitched in a second, and the wagon, being lighter, can make a quicker run than the fire department, so that in most cases the crew reach the ground and have their bridges erected before the steamers begin to pump. Once the hose is set in position and filled with water two men can keep the eager and inquisitive gamin from cutting a hole in the hose, or from swinging on the bars. It is absolutely necessary that the



unable to gain any very widespread confidence among street car managers, whose first question of all new inventions is, "will it work?"

The reader will no doubt remember that it took no less a mind than that of the great Leonardo Da Vinci to evolve the wheelbarrow, and it will occasion no surprise to state that Chas. Nagl, superintendent of the West Side Cable road in this city, has formulated the first practical remedy for this difficulty that has ever been tried in Chicago, where 60,000 persons are transported past a given point every hour, and where there are several fires daily.

The arrangement suggested by Mr. Nagl is very simple, but very effective.

The hose bridge in question, which is represented by the accompanying engraving, consists of three pairs of trestles, made of gas-pipe joined by two rods and held in an upright position by two end-pieces, whose sharpened points are firmly fixed in the pavement or ground. The entire bridge has but seven parts and can be put up or taken down in four minutes, and requires but six men and

hose be limp when placed on the rack, and as enough slack can be spared, no inconvenience is experienced from this cause.

Three sets of bridges are packed in the wagon and the crew is trained in the practice of setting and breaking the bridge two nights per week, so that military precision and expedition are obtained.

In the recent Twenty-first street fire the traffic saved, more than paid for the cost of the bridge, and as others are added to the force the protection will be still more valuable.

THE Harrisburg, Pa., City Passenger Railway Company ends its year and its lease with a statement of its affairs for the past twelve months. The total of passengers carried was 757,013; total expenses, \$32,087.65; receipts, \$38,783.38; dividends paid, \$7,000; cash on hand July 1st, \$2,321.03. R. F. Kelker, treasurer, has resigned in favor of L. R. Gorgas, and W. A. Kelker, clerk, also goes out this year. Only two accidents occurred during the year.

THE CONVENTION CITY.

Pittsburg—Its Traction Companies and Inclined Planes—Its Rivers and Railroads—Its Products and People —
Its Industries, Hotels and Public Buildings—A City Where the Street Cars
Are Patronized by all Classes.

THE practical street railway man who goes away from home now and then in quest of new ideas, and is willing to profit by the experience of others, will find it well worth a day's journey any time to study on the ground the cable and electric traction lines of Pittsburg and Alleghany. Nowhere in America has the demand for rapid transit been more ably met. Narrow and irregular business streets, angles, curves and corners without number, steep grades following each other in close succession, and "magnificent" distances have had no terror for the indomitable street railway builders of the great iron city. Over the high hills and through the winding hollows along the streets,

Alleghany and the Monongahela river, narrowing down to a point at their confluence to form the Ohio river. On the south bank of the Monongahela is a large collection of mills, which, with the homes of the mill workers and business places which supply their wants, extend up and down the river bank a distance of nearly three miles. This section was formerly known as Birmingham, but it is now designated as the "South Side." Alleghany City, whose relation to Pittsburg is very much the same as that of Brooklyn to New York, covers the shore and the highlands north of the Alleghany river. So closely are these three settlements identified in all their social and business relations, that to all intents and purposes, they may be

PITTSBURG STREET RAILWAY COMPANIES.	CAPITAL STOCK	BONDED DEBT	MOTIVE POWER.	NUMBER OF CARS.	MILES OF SINGLE TRACK.	PRESIDENT.
Central Traction Company,	\$1,500,000	\$ 375,000	Cable.	16	5	Geo. E. Whitney.
Citizens' Traction Company,	3,000,000	1,250,000	Cable, Electricity and Horses.	91	25	John G. Holmes.
Duquesne Traction Company,	3,000,000	1,500,000	Electricity.	60	28	C. L. Magee.
Federal Street & Pleasant Valley Company,	1,300,000	525,000	Electricity.	55	28	D. F. Henry.
Pittsburg Traction Company,	2,500,000	750,000	Cable & Elec.	76	10 $\frac{2}{3}$	Geo. W. Elkins.
Pittsburg, Alleghany & Manchester Company,	3,000,000	1,300,000	Electricity.	55	18	J. H. Dalzell.
Pittsburg & Birmingham Traction Company,	3,000,000	1,500,000	Elec. & Horse.	38	14	Murry A. Verner
Second Avenue Electric Railway,	300,000	150,000	Electricity.	20	10 $\frac{1}{4}$	Jas. D. Callery.
West End Passenger Railway Company,	200,000	75,000	Horses.	18	7	John C. Reilly.
Suburban Rapid Transit Street Railway Co.,	350,000	150,000	Electricity.	7	2 $\frac{1}{4}$	Henry Miller.
Schenley Park & Highland Railway Company,	100,000	50,000	Electricity.	5	3 $\frac{1}{2}$	Thos. A. Noble.
Alleghany Traction Company,	350,000	150,000	Horses.	14	6 $\frac{1}{2}$	George B. Hill.

where the weary horses and the patient mules plodded at a snail's pace five years ago, the large and handsome cars of three cable and five electric lines now roll along at the rate of ten miles an hour, carrying their loads of passengers from the smoky business center, away out into the delightful suburbs and to the remotest corner of Alleghany, almost as fast as they could be safely carried by steam. It cost a mint of money—more than \$25,000,000 to bring about the transformation, but millions were never more wisely invested.

Inasmuch as the tenth annual meeting of the American Street Railway Association next month will attract to Pittsburg several hundred street railway officials and a large delegation of manufacturers of street railway supplies, some data concerning this city, its resources, its institutions and its people will be of timely interest.

Pittsburg is the metropolis of western Pennsylvania, and with its sister city Alleghany, boasts a population exceeding 400,000. The compact, retail, wholesale and commercial business center occupies a level tract of land not more than three square miles in extent between the

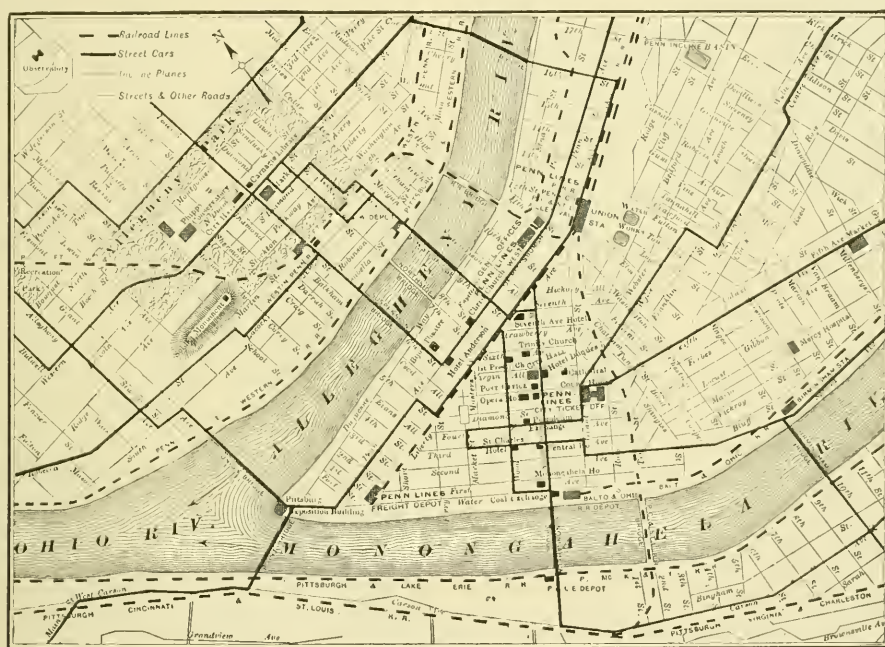
regarded as one. The many manufacturing industries which are the distinctive features of Pittsburg—the blast furnace, rolling mills, iron works and glass works—line the banks of both rivers, while the great body of the population reside on the highlands of Alleghany and in a fine stretch of rolling country some fifteen square miles in extent, to the eastward of Pittsburg, which is popularly known as the "East Side."

Back of the narrow strip of land along the river bank on which the South Side mills are located, back of Alleghany City, and to the east of the densely built business center are high bluffs, which are accessible only by tortuous roads cut along their steep sides and through the hollows, and by the inclined planes, of which there are a dozen or more. Most of them run in a direct line up to the top of the bluff, while two or more sweep around long curves. Nearly all of these interesting inclined railways were designed and built under the direction of Mr. Samuel L. Drescher, a celebrated Pittsburg engineer. Opposite the Monongahela House, on the south side of the river and most accessible from the Street Railway Headquar-

ters is the Monongahela incline, a double plane with separate cars for passengers and vehicles, and one of the steepest in the city. The length is 650 feet, the grade 72 feet in 100, and the total elevation 375 feet. The bluff which it makes accessible is known as Mount Washington, and from the top of this elevation, when the smoke is not too dense, a magnificent view of the two cities, the three rivers and the valleys through which they wind can be obtained.

Fifteen bridges, no two alike, cross the three rivers which bring commerce to Pittsburg. Two of these are wooden truss bridges of an ancient type, one a wire rope suspension bridge, two stiffened suspension bridges, and the remainder are modern truss bridges. Four of these bridges are crossed by street cars, three of the lines being operated by electricity.

adjustable dams of the Charriome wicket pattern, planned by the United States government, for the improvement of the Ohio river. The dam cost \$980,000, contains a steamboat lock 500 feet long and 110 feet wide, (the largest in the world), and is of very great value to the port of Pittsburg. The slopes of the basin of the Monongahela are rich in bituminous coal, and the products of the mines are brought down to Pittsburg in boats and barges of from 100 to 900 tons capacity. These barges are made up into fleets of about 10,000 tons burden, and whenever a rise in the rivers renders the Ohio navigable, these fleets are pushed by stern-wheel tow-boats as far as Louisville. Here they are made up into fleets of from 20,000 to 30,000 tons burden for the St. Louis, Cairo and New Orleans trade, and pushed down the Mississippi to the gulf—a distance of 2,100 miles from Pittsburg. The cost of thus



MAP OF BUSINESS CENTER OF PITTSBURGH AND ALLEGHANY.

Through the Alleghany, Monongahela and Ohio rivers, and the great water-way to the gulf, to which the Ohio is tributary, more than 20,000 miles of inland navigation are opened up to the 4,000 vessels which hail from Pittsburg. The most distant point ever touched by a Pittsburg boat is Fort Benton, on the Missouri river, 4,300 miles distant. The Pittsburg craft represents an invested capital of nearly \$10,000,000, and the aggregate tonnage exceeds that of New York City. The Monongahela river is made navigable at all seasons of the year for 102 miles above the city, by a series of eleven dams, with locks of an average lift of 10 feet. By means of this expedient a sufficient depth of water is maintained at all times for steamers and coal barges drawing not more than 6 feet of water. Four miles below the city, on the Ohio river, is the celebrated Davis Island dam—the first of a series of

transporting "black diamonds" along "King Coal's highway" is less than one-tenth of a cent per ton per mile.

Three great trunk lines of railway, composed of many branches, are tributary to Pittsburg, viz: The Pennsylvania, the Baltimore & Ohio and the Vanderbilt systems. The main line of the Pennsylvania leads eastward, the Panhandle system and the Fort Wayne & Chicago lead westward, the Cleveland & Pittsburg, the Erie & Pittsburg and the Alleghany Valley give an outlet to the north, while the Baltimore & Ohio system takes care of the traffic to the south. Fifteen lines of railway in all, center in Pittsburg, and the total tonnage of the Pittsburg traffic by these lines in 1890 was estimated at 27,000,000 tons.

Iron and steel have been and are still the basis of Pittsburg's pre-eminence as a manufacturing city. The

first furnace was built at what is now known as Shady-side Station, on the Pennsylvania railroad, just about 100 years ago. Pittsburg was then a straggling village of some 500 inhabitants, whose unpretentious dwellings were clustered about Fort Pitt, which was built on the site of the ruins of the historic Fort Duquesne, after its abandonment by the French in 1758. The first iron foundry was built on the site of the present post office in 1802, and the first rolling mill was established in 1824. Now there are in Pittsburg and its environs twenty-one blast

veins reaching in some places a thickness of ten feet. The four counties adjacent to Pittsburg furnish annually 13,000,000 tons of coal—about 20 per cent. of the aggregate product of the United States. In Alleghany county alone there are 81 coal mines, some of them actually within the city limits of Pittsburg, and their output in 1890 was 5,750,000 tons. Of this great mass, 4,000,000 tons were shipped down the river in barges.

The Pennsylvania and New York oil fields have likewise been tributary to Pittsburg's greatness. The petroleum-producing region lies chiefly in the basin of the Alleghany river, and extends from a point a few miles across the New York state line on the northeast, to as far as the West Virginia line on the southwest. The newly developed McDonald oil field about 30 miles from the city is now proving wonderfully productive. The transportation of oil by pipe lines has given a great impetus to the iron pipe producing industry in Pittsburg, and the annual output is now about 800,000 tons. On the south shore of the Alleghany, just above the city, are a number of large oil refineries, constantly in operation.

For seven years, in consequence of the use of natural gas fuel, Pittsburg proudly termed herself, "The Smokeless City." A number of natural gas producing districts, lying in a semi-circle, each about 20 miles from the city, were successfully developed,



B. & O. DEPOT.

furnaces, whose annual output is 1,300,000 tons of pig-iron, and thirty-three iron and steel rolling mills, whose annual product approximates 2,000,000 tons. In addition to the pig-iron produced in Pittsburg, about 1,250,000 tons are brought here annually for manufacture into higher forms of metal. From the actual figures it appears that Pittsburg produces 18½ per cent. or nearly one-fifth of all the iron and steel used in the United States. The local capital invested in this industry approximates \$52,000,000, and the number of workmen employed is about 50,000. The Pittsburg foundries likewise employ 3,500 hands, and produce annually about \$7,000,000 worth of manufactures.

As a result of these iron and steel industries, since the return to bituminous coal on account of the decrease in the supply of natural gas, Pittsburg and the valleys of the Alleghany and Monongahela are constantly overhung with a cloud of thick vapor. Speaking of this feature of the city and its river basins, someone has poetically remarked: "The sentinel on the hills above, like the Children of Israel, can mark their situation and come by a cloudy pillar of smoke by day, and a fitful, lurid glare by night."

Another element in Pittsburg's greatness, scarcely less important than her iron and steel industries, is the great bituminous coal field, 14,000 square miles in extent, which surrounds the city on all sides. The seams crop out on the flanks of the hills and the banks of the rivers, the



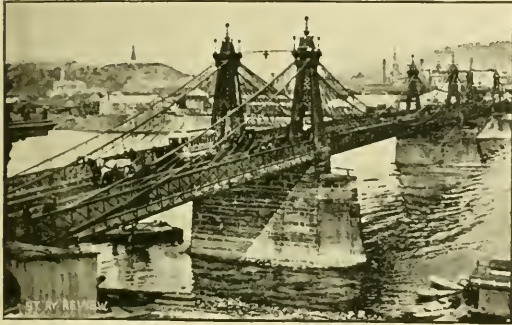
CONVENTION HEADQUARTERS.



PENNSYLVANIA DEPOT.

and the fossil fuel was brought to the city by direct pressure from the wells, through iron pipes 16 inches in diameter. The number of miles of pipe now bringing natural gas to Pittsburg, and distributing it to consumers, is estimated at 1,200, of which 750 are owned or controlled by the Philadelphia Company. The invested capital is about \$15,000,000. Until the recent increase in price, consequent upon the diminishing supply, caused many manufacturers to resume the use of their former fuel, it was estimated that the amount of coal displaced annually in Alleghany county, including Pittsburg, was 5,000,000 tons. This implied an annual consumption

of over 100,000,000 feet of gas, valued at \$6,500,000. Now, however, the price of this matchless fuel has been advanced to 20 cents per 1,000 feet to families, and the rates to large consumers have been correspondingly advanced. Taking all things into consideration, it is evident that King Coal is about to be restored to his throne, and while many Pittsburgers deplore the increasing clouds of smoke which again over-hang the city, they



SUSPENSION BRIDGE.

are consoled in a measure by the knowledge that the production and handling of the fuel from the mines will give employment to many thousands of men.

The manufacture of glass is another Pittsburg industry of commanding proportions. The proximity of the finest grades of sand, and the cheapness of coal and natural gas, combined with the skill of the native glass workers, has made this city a center for everything in the line of glass from the heaviest of plate to the most delicate of tableware. Within the city limits there are twenty-nine window glass factories, as many more factories engaged in the production of flint and fine glassware of every variety, and one plate glass factory. The larger plate glass works are situated in villages which are tributary to the city. The annual output of the Pittsburg factories is about 85,000,000 bottles, 42,000,000 lamp chimneys, and a large quantity of pressed ware. The glass workers number about 7,000.

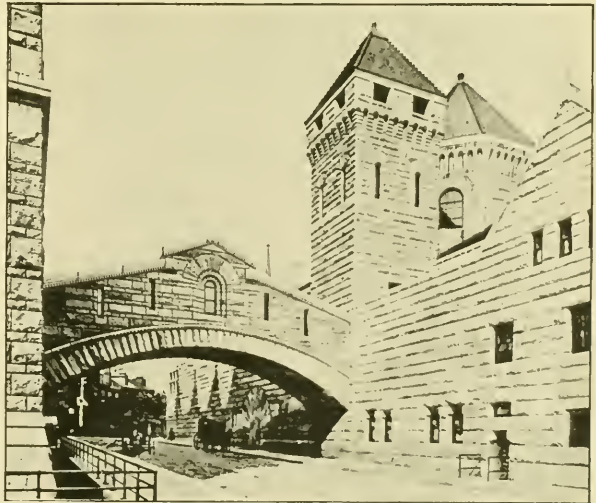
The only useful and satisfactory way to study the street railway system of Pittsburg is to consider each road separately. With three forms of transit and a great diversity of conditions, any other method of treatment would result in utter confusion. From the description given of the city, it is apparent that the traffic must be heavy, and it is claimed that a larger percentage of the population yield up their nickels for transportation than in any other American city, and the figures seem to bear out this interesting statement.

Among the many attractive bridges in the city, none are more so than those illustrated on this page; one is the suspension bridge over the Alleghany river, and the other is called the "Bridge of Sighs," which connects the new court house and jail.

THE CITIZENS' TRACTION COMPANY.

The pioneer street railway of Pittsburg was the line paralleling the Alleghany river, which, since its consolidation with another line, and its conversion into a cable traction road, has been known as the Citizens' Traction Company. This company was the first to meet the popular demand for more rapid transit than was afforded by the tired horses and mules that dragged their weary way through the narrow streets, and as the reward of progressiveness, they now operate more cars, carry more passengers, count up larger daily receipts, and have a higher standing in the stock market than any other company in the two cities. The aggregate length of their lines is 25 miles—12 miles operated by cable, 7 by electricity and 6 by horse-power. As represented on the map the road forms a letter Y, one branch extending out to East Liberty, the most populous and popular residence suburb, the other branch continuing along the river and crossing it near the terminus to Sharpsburg, while the stem comes down to the business center.

The rolling stock consists of 66 8-wheel Pullman cable cars, 28 feet in length and vestibuled in front, 10 Gilbert vestibule electric cars, and 15 horse cars. The cable cars have 22-inch wheels; the grip is hung to the body of the car, over the front truck, and each gripman carries in his cab a full set of tools as a precaution against accidents en route. Lever brakes are used, and two alarm-bells clamped to the front axle of each car keep up a constant warning jingle when the car is in motion.



BRIDGE OF SIGHS.

The down-town end of the main line terminates in a loop, and all the cars run through a building in which, under the track, is an open pit, over which each car is stopped long enough to permit the examiners to lift the cable from the jaws of the grip and oil the working parts.

The cable power-house is located on the main line just below the junction of the two forks of the road. The down-town cable is 25,800 feet in length, and is run at

9½ miles per hour. The East Liberty cable is 28,400 feet in length, and the one which operates the other fork is 12,000 feet long—the remainder of the distance being covered by the electric cars. The power-plant consists of 3 Wetherill Corliss engines of 500-horse-power each, 3 sets of driving-drums, and the usual accessories. The two batteries of boilers are of Wetherill make, and the fuel used is natural gas—about 400,000 feet per day.



J. E. RUGG,
General Superintendent Citizens' Traction Company.

The electric power station which furnishes the motive power for the Sharpsburgh branch is equipped with three Buckeye engines of 125-horse-power each, and three Edison generators. The ten electric cars are supplied with Westinghouse motors.

While the several branches of the Citizens' Traction Company, even when horses were the only motive power, have always enjoyed a paying patronage, the development of traffic since the installation of the cable in January, 1889, has been very marked. The receipts for February, 1889, showed an increase of 50 per cent. over the receipts for the corresponding month of the preceding year, while the number of passengers carried in February, 1890, was 207,000 greater than the record for February, 1889. The total number of passengers whose five cent pieces passed into the coffers of the Citizens' Company last year was over 12,000,000.

The present officers of this prosperous corporation are: John G. Holmes, president; H. S. A. Stewart, vice-president; Charles M. Gormerly, secretary; N. Holmes, Jr., treasurer; J. E. Rugg, general superintendent.

THE DUQUESNE TRACTION COMPANY.

The recently completed Duquesne Electric Street Railway, which furnishes rapid transit to half a dozen of the delightful suburbs, which taken collectively, are known as the "East End," in one of the most extensive and complete electric system is this country. In the annals of

rapid street railway construction, it stands almost at the head. Ground was broken for the 28 miles of track in 1890, and in February of this year the road-bed, rolling stock, car house, electrical equipment and power station were all ready for operation, when an unfortunate fire resulting from a gasoline explosion destroyed nearly the entire power plant. It took three months to replace the engines and electrical machinery thus rendered useless, and the opening of traffic was delayed until May 21st. Since that date, sixty cars have been in regular service, making good time, and doing much to develop the outlying territory now for the first time placed in easy communication with the business center. The road-bed is laid in the most substantial manner, consisting of oak ties filled in with concrete. Each tie resting on a pocket of concrete 6 inches deep. Steel rails and Walworth poles are used throughout. The present rolling stock consists of double track Pullman Cars, each 30 feet long, finished in cherry, and running on Allen paper wheels with steel tires. These cars, however, have been found too heavy for the Pittsburg grades, and the management is now considering the expediency of substituting smaller cars, and a greater number, in order that better time may be made.



C. L. MAGEE,
President Duquesne Traction Company.

The power house is located alongside the Pennsylvania Railroad, at Ben Venue station, at a distance of nearly one-third of a mile from the nearest street traversed by the Duquesne tracks, in order that in the coming days of costly natural gas, the oil and coal used as fuel may be delivered at its doors at a minimum expense. The boilers are in two batteries, and in one of them crude petroleum vaporized by means of steam jets is now successfully used as fuel. The twelve Thomson-Houston generators are driven by three Wetherill-Corliss engines, two of 600-horse-power each, and one of 500-horse-power. The

great switch board is 46 feet in length and 6½ feet high, and is constructed in the most thorough manner, with every possible precaution against fires from lightning.

The car house is a substantial and highly ornamental structure of brick, 1,40x400 feet, with numerous skylights, incandescent electric lights, and every modern device for the rapid handling and care of the rolling stock. The president of the Duquesne company is Mr. C. L. Magee, whose prominence in Pennsylvania politics has won for him a national reputation. The builder of the road, and the general manager is Vice-President George Rice, one of the best known street railway engineers in America, who likewise built the cable roads of the Pittsburgh, Citizens', and Central Traction companies.

THE PITTSBURG & BIRMINGHAM TRACTION COMPANY.

If one were to ask Murry Verner to disclose his present crowning ambition, he would doubtless say that he is



MURRY A. VERNER.

President Pittsburg & Birmingham Traction Company.

dragging out an existence, reconciled to life by the hope of some day operating 50-foot electric cars on 30-foot city streets, at 20 miles per hour, and pay big dividends. And the visitors to the convention in October will not be disposed to doubt Mr. Verner's ability to carry out anything he undertakes when they see how successfully he is making 10 miles per hour, on narrow and crowded Smithfield street, with Gilbert cars 33 feet in length. The Pittsburg and Birmingham Electric Road which Mr. Verner dominates is one of the finest short lines in the country. It begins at the Central depot, where all the trains of the Pennsylvania system pour their daily throngs of passengers into the city, and thence runs down Liberty avenue to Smithfield street, past the post office, past the old government building, the city hall, the grand new federal building, the post office, newspaper offices, Duquesne hotel, Monongahela House (the American Street Railway Association headquarters), past the splendid new Baltimore

and Ohio depot, and thence across the Smithfield street bridge over their own independent roadway, at the rate of 15 miles per hour, to the Pittsburg & Lake Erie depot, and then down Carson street for 2 miles, right through the heart of a densely populated district of mills, iron works, glass works and blast furnaces. Half a dozen inclined planes bring down loads of passengers to this street railway from the rolling plateau back of the bluffs, and take them home again at the close of their day's work. The report filed with the Pennsylvania secretary of state, a few days ago, shows that during the year ending June 30, 1891, this corporation carried 4,843,039 passengers, earned \$243,702.98 and spent \$122,622.76. These figures are significant when it is remembered that previous to June 1st of this year the main line was operated by horses, and since the introduction of electric motive power the traffic has increased more than 50 per cent.

The electric line of the Birmingham system is 3½ miles in length, with double track. The horse car line runs down Second avenue on the north side of the Monongahela for a considerable distance and finally crosses over to the South side on the last bridge above the city.

The power-house is an ornate brick structure, located well up the river on the South Side, near the terminus of the line. Three Hamilton Corliss engines, of 500-horsepower each, and four Edison generators are the chief attractions here. The boilers are in two batteries and soft coal is used for fuel. The car-house and repair shops are contiguous to the power-house, while in the rear are located the stables for the horses. The officers of the Pittsburg & Birmingham Traction Company are: Murry A. Verner, president; F. J. Tener, secretary, and Daniel Beech, treasurer.

FEDERAL STREET & PLEASANT VALLEY RAILWAY COMPANY.

The electrical pioneer in the Pittsburg street railway field and the first transportation company to give to the wide-spread and hilly residence regions of Alleghany the advantages of rapid transit, was the Federal Street & Pleasant Valley Company. Few corporations contemplating a great public improvement have been called upon to contend with so many difficulties in carrying out their purpose. The public press of Pittsburg and Alleghany, the rival transportation companies, and the owners of the bridges connecting the two cities, acted as a unit in obstructing the introduction of the trolley system as a substitute for the horse cars. But the press was educated to a more rational view of overhead wires, rival corporations were defeated in the courts, the president, secretary and solicitor of the company bought a controlling interest in the Ninth street bridge and rebuilt the structure, and the electric line was established. Its success and the wonderful increase in traffic is doubtless the reason why at the present time every other rapid transit street railway in the two cities, with a single exception, is operated wholly or in part by electricity.

The company is now maintaining 28 miles of single track, and is operating 55 single truck electric cars.

starting from the Pittsburg post-office, running through the most populous streets, crossing the Ninth street bridge, and thence diverging to half a dozen Alleghany residence districts.

The entire system is operated from a single fire-proof power house, built throughout of brick and terra cotta lumber, and containing three Buckeye engines of 1000-horse-power in the aggregate, one 250-horse-power Westinghouse engine, and three Edison dynamos, aggregating in capacity 1,135 electric horse-power. The switch board is built entirely of terra cotta, as a precaution against fires from lightning or the crossing of electric light wires. In the boiler room are two Hazelton tripod boil-



D. F. HENRY.

President Federal Street & Pleasant Valley Railway Company.

ers of 500-horse-power each, and a battery of two horizontal tubular boilers of 125-horse-power each, with Roney automatic stokers, an artesian well to provide for a supply of water in the event of a break in the city mains, and coal bins whose capacity is 1,000 tons—forty days supply.

One of the buildings on the Pleasant Valley line was remodeled into a complete repair shop, with all the requisite apparatus for rebuilding cars and the building of new motors and rebuilding of old ones. This has proven of great material advantage to the company. The company maintains four separate car houses at the terminus of different lines, as a matter of convenience, one of which is large enough to store 75 cars, the entire rolling stock of the road.

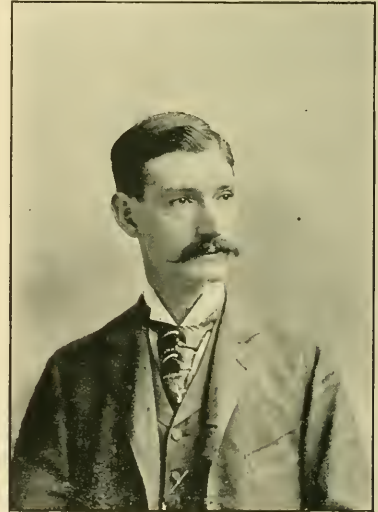
The Pleasant Valley Line, as it is popularly called, is one of the most difficult roads in existence to operate. It crosses the Alleghany river, six cable railways and six steam railways, climbs the steepest grades, and has in its 28 miles of single track over 200 curves, many of them of short radius. And yet with all these obstacles and difficult conditions to meet, through the genius of President Henry and his official associates, the lines have car-

ried almost without accident during the past year more than 6,000,000 passengers, and have earned handsome dividends for the stockholders. The officers of the road are: David F. Henry, president; R. F. Ramsey, treasurer; Wm. H. Graham, secretary; Wm. A. Stone, solicitor.

THE SECOND AVENUE ELECTRIC COMPANY.

About ten years ago a horse car line was established on Second avenue, to provide for the transportation needs of the manufacturing district on the north bank of the Monongahela river at the foot of the high bluffs which follow the course of the river, at a respectful distance, for miles. At a later period this line came into the possession of the Callery family, and under the management and direction of the president, James D. Callery, in 1889 it was extended to Hazlewood and Glenwood, two East End river bank suburbs, and converted into an electric line, which was opened for traffic in March, 1890. During the present month the line will be extended a mile beyond its present terminus, to the south entrance of Schenly Park—Pittsburg's new pleasure ground.

The company is now operating twenty cars, fifteen equipped with single trucks and Thompson-Houston motors, and five with Westinghouse single reduction motors.



JAS. D. CALLERY.

President Second Avenue Electric Company.

The power house is at Soho, near the first dam and back of the Monongahela Navigation Company. The plant consists of three Russell automatic engines of 450-horse-power, and three Thompson-Houston generators of the 80-horse-power type. An addition to the power house which will be completed before convention time, will contain two more Russell engines of 125-horse-power each, and two more 80-horse-power Thompson-Houston generators. Two tubular boilers and one Sterling boiler constitute the steam plant.

The car barn is located at Glenwood, in a neat and well proportioned structure, 50x175 feet, containing four parallel tracks. This is now the eastern terminus of the road. The down town terminus is at the Exposition building, close by the Point bridge.

At the present time the officers of the Second Avenue Electric Company are: James D. Callery, president; Chas. D. Mitnor, secretary; John W. Taylor, treasurer; W. J. Burns, manager; John Murphy, superintendent.

THE CENTRAL TRACTION COMPANY.

A well-built cable line, which ably illustrates the possibilities of rapid traction up and down steep grades, is the $2\frac{1}{2}$ mile line of the Central Traction Company. Starting in the very business heart of the city, at the corner of Fifth avenue and Wood street, the neat, well-built, double-track Pullman cars of this line run past the new government building and the still more pretentious court house, and thence by a circuitous detour to Wylie avenue, and straight out to the foot of Heron Hill, the highest point in the city. From end to end Wylie avenue is a



GEORGE I. WHITNEY,
President Central Traction Company.

succession of steep grades, one of them over eleven per cent., and at two points in the route depressing pulleys are required to keep the cable from coming to the surface. There are fourteen curves on the route, five of them right angle. The power house, which is a model structure in all its appointments, is located close by the court house, not far from the retail business center. Two Wetherill Corliss engines of 500 horse power each, furnish the necessary force, when run at half their capacity, to keep in steady motion the five miles of cable. The down-town cable is 6,000 feet long and runs seven miles per hour, and the Wylie avenue cable is 21,500 feet in length and its speed is nine miles per hour. The down-town cable runs over a 12-foot drum and the Wylie avenue cable over a 16-foot drum, both on a single shaft, the difference in the diameters of the drums regulating

the speed of the cable. Natural gas fuel is used in the boiler room. The Central Company operates sixteen cars, provided with the Root or California grip, which takes the cable on the side. At the Minersville terminus of the line, at the foot of Heron Hill, is the car house, 50 x 300 feet, with a loop of the cable running through, and convenient pits for the examination and oiling of the grips.

The historic horse car line was converted into a cable traction company in 1889, and opened for business February 24, 1890. The officers of the present company are George I. Whitney, President; T. A. Gillespie, Vice president; F. L. Stevenson, secretary and treasurer; W. C. Smith, superintendent.

SCHENLY PARK & HIGHLAND AVENUE RAILWAY COMPANY.

A new company, of which Mr. Thomas A. Noble is president, is now engaged in building a $3\frac{1}{8}$ mile electric railway, from the cable line of the Pittsburg Traction Company, at the corner of Forbes and Bouquet streets, through a suburban district not at present supplied with rapid transit facilities by any other company. Already $1\frac{1}{4}$ miles are completed and will be in operation by the time this paper goes to press. Five Gilbert cars have been ordered, four of them equipped with Daft electric motors. Electric power is rented from the Pittsburg Traction Company.

WEST END PASSENGER RAILWAY COMPANY.

The West End Company is one of the two surviving horse-car companies in Pittsburg. It starts at the corner of Market street and Liberty avenue, crosses the new Point bridge and runs along the south bank of the Ohio river to Chartiers. Seven miles of single track and eighteen cars are operated.

PITTSBURG, ALLEGHANY & MANCHESTER RAILWAY COMPANY.

On the very day which this number of THE STREET RAILWAY REVIEW is dated, the Pittsburg, Alleghany & Manchester Railway Company expects to place in actual service its new electric cars. While this company is the last great street railway system in the two cities to fall into line and meet the demand for rapid transit, its stockholders will not be the losers by the delay. Many of the costly mistakes of the earlier electric companies have been avoided by the sagacious officials of these corporations, and it is safe to say that when the lines now in course of reconstruction are completed (which will be before convention time) the road will represent the very highest development of the electric railway of to-day.

The company has built a new power house on the banks of the Ohio river, in Alleghany, near the terminus of one of its lines, with a switch from the P. Ft. W. & C. Railway tracks alongside the boiler room. This contains six Thompson-Houston dynamos of the latest improved type, two Wetherill Corliss engines, each of 500-horsepower, and two batteries of boilers, which will be equipped with apparatus for the burning of crude oil.

A new car house of handsome architecture has likewise been built, and this contains as the first installment o

rolling stock, forty Pullman cars, painted white, with the names of the streets lettered on green panels. These cars are provided with McGuire double trucks, Thompson-Houston motors, Allen paper wheels, air brakes, and every device to promote the comfort of passengers and protect them from injury. In addition to the long cars, fifteen single truck, 16-foot cars have likewise been ordered, to operate on the lines where the radius of the curves will not permit the use of double-truck cars.

One great material point of advantage possessed by this company is the fact that the main line crosses the Sixth street wire cable suspension bridge, which is the chief thoroughfare between the two cities. This bridge



JOHN H. DALZELL,

President Pittsburg, Alleghany & Manchester Traction Company.

is now being replaced with a new modern structure, without any interruption to traffic—a remarkable engineering feat in the history of bridge building.

With the slowest and shabbiest and most comfortless horse cars imaginable, the Pittsburg, Alleghany & Manchester Company, during the year ending July 1st, 1891, took in from \$1,200 to \$1,300 per day, and it is safe to assume that when the impetus to traffic, which always comes from rapid transit, shows itself in the receipts for the next twelve months, it will be found that this company will lead all the others in daily receipts.

The present officials are: John H. Dalzell, president; Joshua Rhodes, vice-president; A. M. Neepser, secretary; F. C. Hutchinson, treasurer.

THE PITTSBURG TRACTION COMPANY.

The pioneer cable line and the first rapid transit road built in Pittsburg, was the Fifth Avenue Line of the Pittsburg Traction Company, which was opened for traffic September 12, 1888. Previous to that time the resident of the East End depended upon the suburban trains of the Pennsylvania Railroad for transportation. The dingy horse cars of the Oakland & East Liberty Company, whose line traversed the present cable route, were

so slow and cheerless that they were patronized only from sheer necessity. The East End, away from the Pennsylvania suburban stations, was building up very slowly, and the low price commanded by the finest property retarded all municipal improvements. What a wondrous change rapid transit has wrought. Fifth avenue from Oakland out is now lined with splendid structures of cut stone and brick, set in the midst of well kept lawns and park-like grounds, while all the side streets are rapidly filling up with the handsome residences of the well-to-do classes. As some one has remarked, "The first cable road cost \$3,000,000 to build and equip, and for every dollar invested, ten dollars has been added to real estate valuation of the East End."

The Fifth Avenue Line, as this road is commonly known, is five miles in length, double tracks throughout, with a loop at each end. The down town loop is quite a notable feature, in view of the fact that it has a radius of only twenty-seven feet and four inches. At the East Liberty end the line passes through the building used as the headquarters of the company, where the grip of each car is examined and oiled in a pit beneath the track. The entire line is laid with the Johnson girder rail.

The three cables by which the cars are propelled are operated from two power houses, one at Oakland and the other well down town. The down town cable is kept in motion by two Wetherill-Corliss engines of 150-horse-power each, the speed being limited to eight miles per hour. The middle section of the cable, which is 20,000 feet in length, and the East Liberty section, which is 30,000 feet in length, are operated from the Oakland power house, by two Wetherill-Corliss engines of 500-horse-power each. The speed is twelve miles per hour.

The grades on this line are not steep, but the corners and curves are numerous. About midway in the middle sections is a picturesque double reverse curve, having radii of 275 and 300 feet.

At Oakland, contiguous to the power-house, is the large two-story car house, with every modern facility to expedite the handling of the cars. A completely equipped repair shop is one of the second floor features.

No one can complain of the cars of the Pittsburg Traction Company. Some are combination cars, with a smoking room in front, a number of large open cars of a new pattern, built especially for this company, have been operated to take care of the summer traffic, and half a dozen palace cars with curved front ends, rich plush cushions, plate glass windows and bevel mirrors, with a separate cab for the gripman, are a feature of the winter service.

The Pittsburg Traction Company likewise operates an electric line one mile in length, equipped throughout with the Short system, which is giving the very best of satisfaction. It begins at the Oakland power house and extends through a suburban district remote from all other street railways.

The officers of the company are: George W. Elkins, president; Thomas S. Bigelow, vice-president; J. G. Traggardh, secretary and treasurer, and Eli W. Davis, general superintendent.

ALLEGHANY TRACTION COMPANY.

The Alleghany Traction Company, of which George B. Hill is president, operates fourteen horse-cars over $6\frac{1}{2}$ miles of single track, from the Baltimore & Ohio depot to Spring Garden. Just at present the corporation appears to derive more real profit from a valuable stretch of track, which it leases to half a dozen other companies, than from the traffic, but as Mr. Hill is a heavy stockholder in



GEORGE B. HILL,
President Alleghany Traction Company.

several of the other companies, it is probable that this line will soon be merged into one of them, or else become the basis of an important cable or electric system.

THE SUBURBAN RAPID TRANSIT STREET RAILWAY COMPANY.

The $2\frac{1}{2}$ -mile line of the Suburban Company furnishes rapid transit to a section of the rolling plateau back of the high bluffs, which parallel the Monongahela river, on the South Side. It is reached by the Mount Oliver incline plane and horse cars. Seven electric cars of Brill make are operated by the Daft system, the power being furnished by two Mather generators, of 100-horse-power each. The line is built along the side of an unpaved street, with wooden poles from which the trolley wire is suspended on brackets. The traffic is fair and rapidly increasing, in consequence of the delightful new South Side territory thus opened up for settlement.

This company expects eventually to continue its line from the present terminus on Mount Oliver to the bluff overlooking the city, and thence down the side of the slope on a six per cent. grade to Eighteenth street, where connection will be made with the Pittsburg & Birmingham Traction Company's cars.

THE Brooklyn Elevated Road earned the first six months of this year \$460,767, with operating expenses of \$221,298, which, after deducting fixed charges, left a net of \$52,468.

THE HORSELESS SYSTEM OF MINNE-PAUL.

ABOUT the only thing on which St. Paul and Minneapolis agree is as to the efficiency and advantages of the electric system of the twin cities, which in spite of themselves is binding them so closely together. President Thomas Lowry, in speaking of the system there, recently said to a Boston reporter:

"As to our street railway system, I suppose it is a fact that we have at St. Paul and Minneapolis the biggest electric system in the world, and, moreover, everybody is perfectly satisfied with its operation. We hear nothing but praise. Here are to-day nearly 350,000 people and not a horse-car in either city. Minneapolis has 120 miles of street railway, all equipped with the overhead electric system, with posts set in middle of the street and arms for the wires extending over the track on either side. St. Paul has 90 miles of street railway; 75 miles of it are in the electric system and 15 miles in cable. One can now travel by our electric line from the north side of Minneapolis to St. Paul Park, over 20 miles, upon a transfer check. I have just received from the West the first monthly report of the Minneapolis street railway system, in which no horse account appears. It shows gross earnings for July of \$106,571, and expenses of \$52,585, and net earnings of \$54,985. This shows expenses of less than 49 per cent. for the operating, and I feel perfectly sure that within two years we shall be operating our entire electric system of 215 miles in two cities at less than 40 per cent. for expenses. A year ago our Minneapolis lines were earning about \$70,000 a month. We have increased our gross earnings 50 per cent. by the improved facilities which the electric lines afford to the traveling public.

The ratio of operating expenses of electric systems is downward, not upward. My report this morning from Minneapolis covers eleven electric lines for July. The line of our heaviest traffic, $9\frac{1}{2}$ miles, between Minneapolis and St. Paul, shows only 35 per cent. of a 5-cent fare as cost of operating. We run trains of two cars on this line, and we are going to run three cars as the business increases. The principal increase in expense will be the cost of a conductor, as we have a man on each car. At Minneapolis and St. Paul we carry 150,000 passengers per day. Two years ago, when we started to introduce electricity, the street railway's gross earnings in St. Paul and Minneapolis were only about \$800,000. We are now earning and shall earn this calendar year \$2,000,000 gross. Next year we expect \$2,500,000, and 1893 should give us \$3,000,000 of gross earnings."

At the last convention, Mr. Lowry made the historic statement that it was probably the last one at which horses would be discussed as motive power, and he has certainly counted that subject out as far as his interest is concerned, having sold his last car-horse.

A LINEMAN in the employ of the Consolidated Street Railway of Atlanta received a shock 500 volts strong, and although very much shocked, he kept his balance all right and reached the ground in safety.

STREET RAILWAY FUNERAL CARS.

CHAPTER II.

FUNERAL CARS IN THE CITY OF MEXICO.

THE progressive railway man of this country would likely last of all think of sending to Mexico for new ideas on management. But the City of Mexico has one of the best equipped roads on the continent, and



CITY OF MEXICO—CHEAP FUNERAL CAR.

is operating over 400 cars daily, the most of which were built by the John Stephenson Company. Among them are the funeral cars, some thirty in number, varying in cost and appearance to suit the taste and pocket of all classes. Some are finished in plain black, with black cloth trimmings—others in white, with white broadcloth and silk fringe trimmings. Handsome black horses of large size, with white and black harness, are used to draw these cars, the horses having been brought from New York and other northern cities.

The many lines of street cars in the City of Mexico all start from the Alameda and make loop routes to various parts of the city, returning to starting point, so that the funeral cars can reach any part of the city, return to the Alameda and take the routes to the cemeteries; some of the more expensive cars have wheels with flanges $2\frac{1}{2}$ inches wide, and when the cemetery entrance is reached they are derailed and driven into the grounds direct to the grave. Others stop at the gate and the casket is carried by hand to its final destination.

Funerals are conducted entirely by street cars, the charge ranging from \$5 to \$150, according to service

furnished. The illustrations will give a very good idea of what these cars are like. They were designed by Caleb Wilkinson, of the street railway company there. We are indebted to George W. Morris, general manager of the A. French Spring Co., for the photographs of the cars, which he secured during a recent visit to the City of Mexico.

The company find the business a profitable one, and are increasing the service in this department. It is not found to impede other traffic on the lines nor to prove in anyway objectionable to patrons of other cars or the general public. Indeed, it creates no more remark than does the passage of a funeral procession in this country.

WHAT THE UNDERTAKERS SAY.

One would, at first thought, imagine the scheme would meet with general and vigorous opposition from undertakers. This, however, has not proved to be the result in our investigations, which have covered all the large cities of the country, replies having been received from several funeral directors in each city. Some are bitterly opposed, on the ground that it would hurt their own business: others concede the competition, but admit the plan to be a good one; others still, favor the plan, but say it would be impracticable in their city, and some hail it with joy, stating there is no profit to them in the carriage service any way. From among the many opinions we can only give a few, but these furnish a very fair indication of what the general sentiment is. From

MINNEAPOLIS

The Johnson-Landis Undertaking Company write: "It



MEXICAN FUNERAL CAR FOR ADULTS.

would be impossible in this city on account of detaining travel. Funerals cannot be handled with military precision. In most cases the distance to and from the car

would be too great. There would be no saving of time except on long distances. A funeral car should be divided into two rooms—one for the casket, the other for the bearers. In nearly all cases one hearse car and two or three passenger cars would suffice."

To the question—"Would it interfere with the profit accruing to an undertaker to use cars rather than carriages?" they reply:

"Not materially. We would be willing to waive any profits in the matter to benefit our customers. On account of the location of the cemeteries in this city it would be impracticable to inaugurate a system of this kind."

DETROIT.

P. Blake & Sons, the leading undertakers of Detroit, had frequently given the subject considerable thought,

and pay the livery bills the first of each month, and we have to carry that amount until such time as the family are ready to pay us. We would still have to retain our hearses, as the street cars do not run on or close to every street, and the pall-bearers could not carry a casket containing the remains a long distance. In any city where the street cars cover the territory well, we consider your suggestion a very good one, affording quicker and better service, and it should be very much cheaper than the present carriage service."

AT ST. LOUIS.

Smithers & Wagoner very frankly say: "We, as undertakers, are in favor of anything which will benefit the public regardless of our own end of the string; but at the same time there are many points to consider in secur-



MEXICAN FUNERAL CAR FOR CHILDREN.

and say they would favor funeral cars if the system was complete and sufficient to satisfy patrons. They believe that where the car passed within 200 feet of the funeral house, there would be no serious difficulty in getting from one to the other; otherwise, a conveyance would be necessary for the casket. That if the railway based their rates in proportion to regular fares, the saving to patrons would be a quite material one.

They recommend a compartment car, one room being devoted to the casket and flowers, the other for bearers or mourners. That ordinarily one such funeral car and a trailer would afford ample accommodations; and where electric or cable cars were available, the saving in time would be great. In reply to the question as to how it would affect the profits of their business as at present conducted, they state:—

"On our carriage bill we do not realize a penny, as Detroit undertakers hire the carriages from the livery,

ing what will be proper transportation for corpse and funeral. As the railroad only reaches the entrance, there would devolve on some one else to furnish conveyance for body and mourners to place of interment, which in our cemeteries would be too great to carry corpse and for people to walk; so that until the matter is so arranged as not to require the use of hearse and carriage at both ends of the street car facilities, so far as economy is concerned it would be a failure. Of course our opinion as expressed is in reference entirely to the situation here."

In our Seattle letter, in this issue, will be found a description of the first funeral train run in that city recently, and which will be made a permanent feature of the street railway business there.

In Portland, Oregon, the railway companies are also taking steps to introduce the system there as soon as possible.

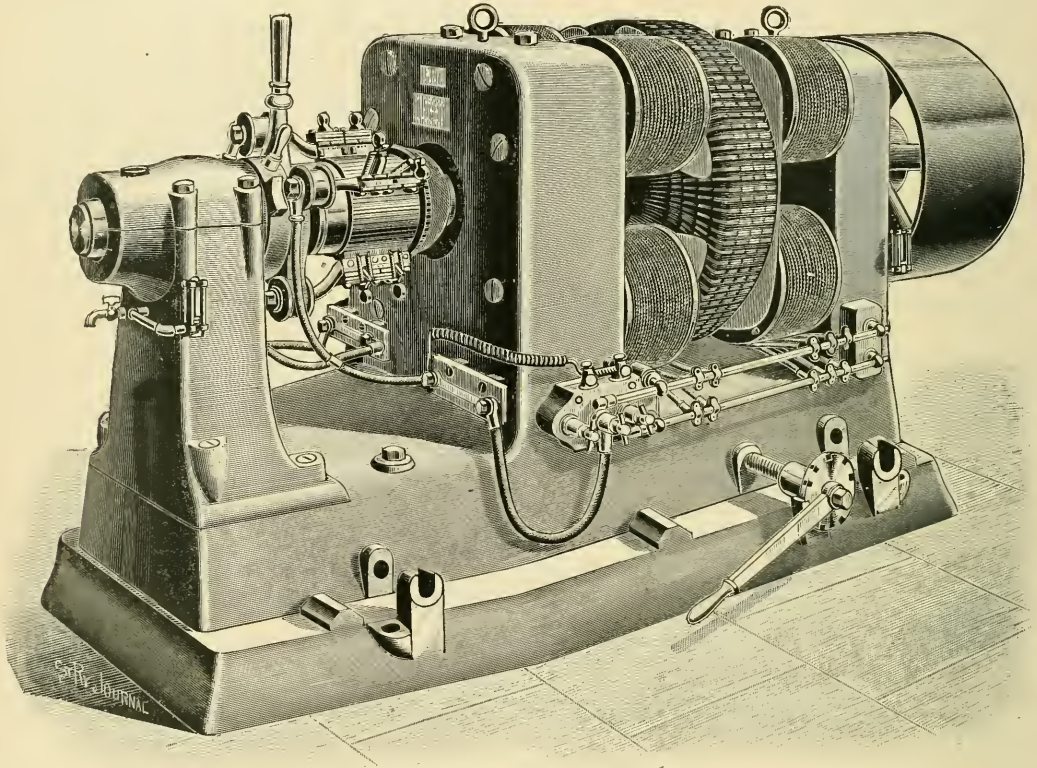
(To be continued.)

CONSTRUCTION AND EQUIPMENT NOTES.

The Latest Railway Generator.

IT is an oft quoted remark of one Solomon, that "there is nothing new under the sun." But then Solomon did not live in the days of electricity and consequently never saw a Short Railway generator of the latest pattern. This is the first of a new type of generator, simple, massive and perfect in construction and finish. The novelty of design is apparent to the veriest tyro, and we take pleasure this month, in presenting an illustration and description of a 150-horse-power generator, capable of delivering a continuous service of 225 amperes, at a pressure of 500 volts, which is equal to a total output of 112,500 watts. Besides this, the reserve capacity is 30 per cent. above the normal in current and voltage.

is formed of this sheet iron wound spirally on the foundation ring and riveted firmly together. The outside circumference of the ring is somewhat wider than the remainder, and this portion is milled out into notches forming a modified Paccinotti ring. The coils are then wound on the core around the hollow ring, the method being such that each of the 200 coils is entirely exposed to the air on all sides, thus securing the perfect ventilation which is obtainable in no other type of armature. The projecting coils, are in fact a sort of a fan, and in standing before the machine the current of air set in motion by the armature can be detected ten or fifteen feet away. As a consequence, both armature and field run cool, and it is almost impossible to burn out a coil even with heavy



SHORT RAILWAY GENERATOR.

The field magnet frame weighs 8,000 lbs. and is of the softest and purest iron. Light field magnets are bolted to this frame, carrying shunt and series coils and provided with pole pieces of peculiar shape, arranged for side presentation to the armature, and so disposed as to make a powerful and almost perfectly uniform "field of force," with a narrow "magnetic gap" of large diameter.

The armature revolves within this space, which is a peculiar feature of the machine.

Upon a shaft nine feet long by six inches in diameter, is keyed a massive spider, carrying the foundation ring upon which the armature is built up. The armature core

overloads. Moreover, the destruction of a single coil does not affect adjacent coils, and it is even possible, in case of necessity to run the machine for several days without rewinding a burned out coil, a feat absolutely impossible with any type of Siemen's armature. A burned out coil can be wound by any good mechanic at a cost of two or three dollars and a half day's labor. One of the most noteworthy features of the armature is its large diameter, viz.: 36 inches, which is also by the way, the diameter of the pulley usually employed with high speed engines.

In seeing this magnificent generator in operation, one

is struck with its analogy to the Corliss engine, the large armature and pulley revolving at slow speed seeming like the great fly wheel of a Corliss, in comparison with which the long narrow drum armature of other dynamos is analogous to the high speed type of engine. The center of gravity is low and the machine runs smoothly and quietly.

All the construction in every detail is carefully worked out. The armature-shaft runs in a large self-centering and self-oiling bearing, the lubrication being accomplished by rings carried by the shaft, and drawing oil from a reservoir in the usual way. The height of the oil is indicated by the little sight-glass on each box. At the commutator-box is also found an adjustable ball-bearing thrust-collar, containing several hundred balls, and so arranged as to carry the armature-thrust in either direction without the slightest heating. This is an entirely novel feature in this class of machinery.

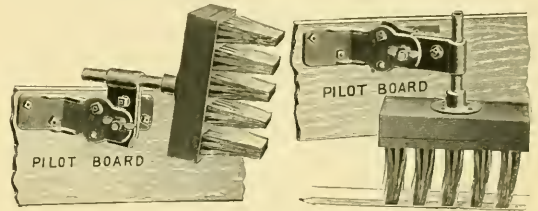
An unusually large 20-inch commutator of careful construction is another feature. It has 200 bars, so that the pressure between two adjacent bars is very small and the sparking *nil*. The brushes are four in number, and are carried by two independent collars and sets of brush-holders. In order to secure perfect adjustment at the neutral points, multiple carbon brushes are used. The terminals of the field-coils are carried to two heavy bars, held securely in place on each side of the base of the machine. The plan of connections is simple and in plain sight, the machines are so nearly duplicates that there is no necessity for complicated "shunt spools" or other adjusting devices, beyond the ordinary field rheostat box. The dynamo is placed on a heavy foundation plate, and moves on V-shaped rails by means of an ordinary ratchet-bar and screw. The electrical properties of the machine are quite as noteworthy as the mechanical. The magnets always work far below the saturation point, even at heavy overloads. The compounding has been so carefully calculated that the "pressure curve" is a straight line, passing from 500 volts at no load, to 525 volts at full load, with speed maintained constant at 500 revolutions. Five sizes of these generators are built by the Short people, 75 H. P., 100 H. P., 150 H. P., 300 H. P. and 500 H. P. Probably larger powers will be built with the increased demand for heavy railway works.

The Short Electric Railway Company has been wonderfully progressive and persevering in its efforts to advance the standard and capabilities of electric railway appliances, and is entitled to great credit and all the success it has attained.

A NEW wrinkle has been worked of late on the unsuspecting street railway public of Cleveland. A well-dressed young man would enter a crowded car and push to the front, where he would rap smartly on the glass of the window of the door, and as one or more passengers handed back their various pieces of money the recipient would quickly make his way out and leave the car.

Adjustable Track Brush Holder.

ONE of the neatest as it is among the simplest of recent inventions in railway appliances is that now put on the market by the Northern Car Company, of Minneapolis. Instead of the stationary casting for holding the track broom which has been in general use, the adjustable holder goes farther and by a simple clamp which can be set or loosened by the thumb and finger allows the placing of the brush in any desired position. If a light snow or mud are on the rails when the



cars start out, the brush is turned down and clamped to sweep, but after one or two trips when the rail is cleaned it is unnecessary to remove the brush, as the driver can throw it out of action in an instant. By this arrangement it is always ready and yet there is not an hour's needless wear. The brushes are set in rows sufficiently distant to insure a clean broom and no clogging with snow or ice. When the brush becomes worn it may be let down by loosening a bolt shown in the engraving, by which arrangement it is possible to use the brush until all worn away. The device is the invention of Superintendent Wardwell, of the Duluth Street Railway, where it was in use all last winter and proved perfectly satisfactory.

Shaw's Steel Spring.

SUMMER and winter cars go and come in season, but S. H. Shaw, of Kansas, has constructed a spring car intended to go all the time. The springs, of which there are eight in number, are wound in barrels 26 inches in diameter, the outer edges of the barrels forming sprocket wheels connected by endless chains to car axle. Each spring is estimated to exert 2-horse-power when first wound.

On down grades the springs rewind themselves, so that theoretically a line having grades of equal length at each end, once started ought to run for years with an occasional winding where the wheels slip. The spring idea is very old and hitherto has always proved an extremely worthless one. If they have not rusted out there are some spring motors in New Orleans which can be had as a "job lot."

C. F. ORR & Co., 179 Madison street, Chicago, are making more and better street railway uniforms than any firm in the West, if not in the country. They make a specialty of street railway work and furnish all the roads in Chicago. Every suit is made from actual measurement and is not allowed to go out unless a perfect fit. Their uniforms are by long odds the cheapest clothing street railway employes can wear.

THE CONVENTION.

THE tenth annual convention of the American Street Railway Association will convene at 10 a. m., on October 21st, at the Monongahela Hotel, Pittsburg. Every possible provision has been made by the local committee of arrangements for the comfort and convenience of the delegates. One hundred rooms have been engaged by them at the headquarters hotel, and delegates who have not already done so should address the Committee of Arrangements, American Street Railway, Room 6, Jackson Building, Pittsburg, Pa., stating amount of room required. As a large number of reservations have already been made, those intending to go will greatly facilitate matters by reporting immediately. Other good houses are the Hotel Duquesne, (American and European plan), the Seventh Avenue Hotel (\$2.50 to \$3.50 per day), and the Hotel Anderson (\$3 to \$5 per day.) The committee will endeavor to secure rooms at either of these hotels, as desired, if notified sufficiently in advance of meeting.

OUTLINE OF MEETING.

The division of time as now arranged provides for convention sessions Wednesday morning for the usual organization, admission of new members, and the regular reports of officers and executive committee of the association. In the afternoon and evening, sessions for hearing and discussing papers. Thursday morning and afternoon, reading of prepared papers and election of officers, and Thursday evening the usual banquet, which will be given at the Monongahela Hotel, at 8 p. m. On Friday the street railway companies of Pittsburg and Allegheny unite in tendering an excursion to the visiting fraternity which will occupy a good share of the day. It will include a visit to the magnificent steel and glass works and oil interests in and around the city, for which a special train of parlor cars has been chartered. This will prove one of the most attractive and instructive excursions ever afforded the association, and will admit the guests to works where visitors are not generally allowed. The railway managers of Pittsburg are leaving nothing undone to make the meeting a successful and delightful one.

RAILROAD RATES.

Secretary Richardson has secured a round trip rate of one and one-third fares for delegates and families from the following associations: Boston Lines Passenger, Central Traffic, (Michigan excepted.) New York and New England Passenger, Southern Passenger and Trunk Line, and the Chicago and Alton Railroad from points. The above covers nearly all the country except that controlled by the Western Passenger association.

THE EXHIBIT.

The exhibit of street railway appliances will form one of the most attractive and useful features of the meeting. As there were no available quarters of adequate capacity within easy access of headquarters, nor a foot of vacant ground on which the committee could erect even a tem-

porary shelter, their ingenuity was sorely taxed. But men who were never daunted by the tremendous difficulties which have stood in the path of railway construction in that city soon solved the problem, and promptly chartered a large passenger barge used for excursion parties on the river, which will be anchored at the foot of the levee, which stretches from headquarters hotel down to the river. The lower deck is free of all obstruction and affords some 6,000 square feet of floor, while the upper deck which is covered by a roof, has about 4,000 feet additional, and a ladies' parlor and waiting rooms. The boat will be hung with curtains on the sides, gaily decorated, and at night brilliantly illuminated with an abundance of electric lights, so that at night the effect will be as charming as it will be unique, and withal cool and comfortable. A better arrangement could not have been made.



THE EXHIBIT BOAT.

Among the exhibitors will be the following who have already secured choice locations.

The Chas. Munson Belting Company will be very glad to see you.

The Allen Paper Car Wheel Company will also have an exhibit.

The Baltimore Car Wheel Company will be represented by John Pugh.

The St. Louis Car Company will be on hand in the person of General Manager Kling.

The Walker Manufacturing Company will be looked after by General Manager Walker.

The McGuire Manufacturing Company will have their celebrated trucks in charge of Mr. Cook.

The John Stephenson Company, as for many years past, will be represented by D. W. Pugh.

The Bodifield Belting Company, Cleveland, have secured space and will make a nice exhibit.

The merits of the Meaker Manufacturing Company of Chicago, will be rung up by J. W. Meaker, president.

The Eastern Electric & Supply Company will be on hand and have something very attractive for everybody.

The E. L. Bushnell Spring Company will be represented by Mr. E. L. Bushnell, President of the company.

The Chas. Schieren Belting Company will be looked after by President Chas. A. Schieren and E. P. Atkinson.

The Electric Supply Company, Chicago, will have a nice exhibit, which will be of interest to street railway men.

The American Car Company, of St. Louis, will be introduced to street railway men by President Wm. Sutton.

The Railway Register Company will have a large exhibit and will be looked after by General Manager Beale.

The Ellis Car Company, Amesbury, Mass., will have something of interest for everybody. Do not fail to look them up.

The LaCledde Car Company, of St. Louis, will be represented by President Keily, who will be glad to meet his friends.

The Falls Rivet & Machine Company, Cuyahoga Falls, Ohio, will have something to show and something to say to their friends.

The Ball Engine Company, of Erie, will be looked after by Messrs. Dravo & Black, who are the Pittsburg agents of that concern.

The Fulton Foundry Company, of Cleveland, will be on hand and their interests looked after by Messrs. W. E. Haycox and C. J. Langdon.

The Schultz Belting Company, St. Louis, will have some of their celebrated rawhide, with lace-leather and picker-leather belts as a side dish.

The Great Western Electric Company, of Chicago, have taken a large amount of space, which they will fill with a great variety of electrical supplies.

The Cushion Car Wheel, which has been brought out in the last three months, will be run and exhibited by P. F. Leach, vice-president of the company.

The Okonite Company, whose electric railway wires are so generally used, will have a very attractive exhibit, which will be in charge of Geo. T. Morrison.

The Burton Electric Heater will be in operation in Parlor No. 5, Monongahela House, where visitors will have an opportunity to meet Dr. Burton, inventor of the same.

Hathaway & Robinson will be represented by Mr. Chas. Hathaway, who never misses a convention and who knows almost every street railway man in the United States.

E. B. Preston & Co., of Chicago, will attend and open up their "Acorn" brands for the benefit of seekers after truth. The "Acorn" brand is their celebrated pure oak bark tan belt.

The New Departure Bell Company will attend their first convention with an exhibit which will rival the Swiss Bell Ringers, and be in charge of that well known artist C. A. Hoagland.

The Griffin Car Wheel Company, Chicago, will have a set of wheels suited to the various railway wants, which will be in charge of Secretary Wellington and Geo. Fuller, Northwestern agent.

The Wightman Electric Manufacturing Company, which has come into such prominence since the last convention, will be represented, and glad to answer any questions regarding their excellent motors.

The Adams & Westlake Company will be found in Parlor No. 3, Monongahela House, in charge of W. W. Willetts, General Manager of their railway Department, assisted by F. B. Jones and L. A. Gray, of Chicago.

The Electric Merchandise Company will occupy Parlor No. 5, of the Monongahela House, and will have a large exhibit of their line of varied specialties. W. R. Mason, General Manager, will be assisted by several of his force.

The Johnson Company, Johnstown, Pa., whose street car rails are found in every city, will have a full line of sections of rails, including their two new 7-inch sections which are being placed on Broadway and Chicago cable roads.

The Caloric Ventilating Heater Company, Chicago, will be represented by Garson Myers, president, who will have a full line of heaters, and exhibit for the first time his new stove, which has been christened "The Standard."

The Universal Electric Construction Company, of Philadelphia, will exhibit for the first time their new clutches, which will be in operation on electric cars and on exhibition at the boat. J. T. McLaughlin, the company's electric engineer will represent them.

The R. D. Nuttall Company will have on exhibition their entire shop, which contains the largest set of gear-cutting machinery in the country, and will take pleasure in conducting their friends to their immense plant, which is across the river a short distance from headquarters.

The Lewis & Fowler Manufacturing Company will, as in former years, have an exhibit which in itself will be an exposition of street railway appliances of all kinds. They never fail to attract a large number of interested visitors, and no one attending the convention should fail to visit their headquarters.

The Brownell Car Company, of St. Louis, proposes to exhibit a street car in which have been introduced many novel features. It is expected, in fact, that this new style of car will fill the long looked for requirements in the car line, necessary to the carrying of large loads, and the quick and easy entrance and exit of passengers, so desirable on electric and cable roads.

Chas. L. Bowler, Manager of the Uniform Cloth Department, of the well known manufacturers, Sawyer, Manning & Co., will have on exhibition a fine line of uniforms and uniform cloths suitable to all wants. Mr.

Bowler has had many years experience in manufacturing street railway uniforms and has probably made a more careful study of the question than almost any other person in the country,

Other exhibitors who have taken space at present writing are:

- Edison General Electric Company.
- J. G. Brill Car Company.
- Valentine Varnish Company.
- New York Car Wheel Works.
- Thomson-Houston Electric Company.
- Morton Safety Heating Company.
- Peckam Motor, Truck and Wheel Company.
- Vacuum Oil Company.
- New Process Raw Hide Company.
- Standard Underground Cable Company.
- Equitable Engineering & Construction Company.
- Stanwood Manufacturing Company.
- Michigan Stove Company.
- Robinson Machine Company.

OPERATING EXPENSES IN ENGLAND.

THE Birmingham Central Traction Company is the only company in the world operating regularly by the four systems of steam dummies, horses, cable and storage batteries. The annual report showing the comparative earnings and expenses of the various methods, as published in the London *Electrician*, will prove of interest.

In reading this table bear in mind that the figures are expressed in English pence.

Miles Run and Passengers Carried.

System.	Miles run.	Passengers carried.	Passengers carried per car mile.
Steam	1,184,401	14,242,827	12.02
Horse { Tramways	131,528	1,114,388	5.9
{ Omnibuses	506,196	2,638,028	
Cable	522,876	5,241,362	10.02
† Electric	138,396	1,144,718	8.27
Total	2,483,397	24,381,323	

† The showing of the electric cars is, therefore on 5.6 per cent. of the total number of car miles run, and on 4.7 per cent. of the total number of passengers carried.

Cost of Traction, Gross Receipts, and Net Profit per Car-Mile Run.

Steam.	Horse.	Cable.	Electric.
GROSS RECEIPTS 15.67	GROSS RECEIPTS 11.02	GROSS RECEIPTS 12.83	GROSS RECEIPTS 15.15
COST OF TRACTION—			
Engines 6.38	Horses 7.33	Cable haulage 2.41	Electric haulage 5.15
Car repairs35	Vehicle repairs54	Cables and machinery85	Machinery29
Traffic expenses 1.68	Traffic expenses 1.26	Car repairs83	Car repairs 1.93
Permanent way and build- ings 1.55	Permanent way and build- ings14	Traffic expenses 1.30	Traffic expenses 1.34
General charges 1.05	General charges52	Permanent way and buildings13	Permanent way and buildings 1.14
		General charges 71	General charges 1.05
Total 10.99	Total 9.79	Total 6.33	Total 9.90
NET PROFIT 4.68	NET PROFIT 1.23	NET PROFIT 6.50	NET PROFIT 5.25

THE very latest fad among the southern young people is a street-car party. Augusta, Ga., is the originator of the idea and the electric line, through beautiful scenery, in a car chartered for the purpose is a pleasant road for young people to travel. Games and music enliven the trips.

A PECULIAR ACCIDENT.

TWO unusual accidents occurred in Chicago during the past month, and both to passengers riding on front seats of cable cars, and yet in each case the grip driver was in no manner to blame. One was where a wagon load of long 2-inch iron pipes, extending several feet over the vehicle, pulled into the cable track at a time when it had no business to, and one pipe struck a passenger reading a paper, which he held before his face; the pipe entering his side and passed nearly through him. The other was due to the foolishness of an express wagon driver, who drove towards the car on the same track, and when he endeavored to pull out, his horse became unmanageable and started to run away; one of the shafts passing so far through a passenger's thigh, it was necessary to procure a saw and cut off the wood on both sides before the patient could be extricated. It is undoubtedly a fact that more people by far are injured by careless drivers of wagons and other street vehicles, than from all causes combined, through the agency of street cars. And yet the former rarely ever are punished, while a great hue and cry is made everytime a foolish passenger tries to alight by walking backwards on air before the car stops.

ENOUGH TO WARM A CITY.

UNDoubtedly the largest order ever placed for car heaters, is that being filled for the North and West Chicago Street Railroads, for whom the Caloric Ventilating & Heating Company are making 1,000 of their street car heaters. As many of the cars are very large, and in certain hours will average a load of seventy-five passengers, we have the astonishing number of 75,000 people at one time, in one city, thus made comfortable.

THE INTERSTATE ELECTRIC ROAD.

THE latest piece of long distance electric railway building, which has been hanging fire some time, now bids fair to become a rapid reality. The road in question is to be constructed by laying a connecting track, thus joining a number of more or less abbreviated Rhode Island roads into a continuous line of 50 miles in length, which will join Woonsocket, R. I. with the other

surrounding towns. Franchises have been given by the various town councils along the route and the preliminary track building is at any time probable. Providence, with the Union Railroad line, Attleboro and Bullock's Point, the terminus, are taken in by the long line.

A Double Car.

QUITE a novelty in car building is brought out by the Lindell Railway Company, of St. Louis, and General Superintendent Geo. W. Baumhoff is highly delighted with his results, as he has good reason to be.

The car is built by sawing off the hoods and platforms from one end of each of two 16 foot cars, and splicing them by leaving a space of 4 feet between the bodies which is made into a vestibule as illustrated. The car is trussed beneath and made staunch and strong, and, including platforms is 44 feet over all. The new car body thus secured is 36 feet in length. The trolley is planted in the middle of what was one of the original cars. The vestibule is built with doubled doors, so arranged that when open on one side the car, the opposite pair shall be closed, or may be open on both sides and one side gated. Platform steps are attached on both sides under these doors, with a wire guard-net covering the closed side.

car is strong enough to carry double that number. Mr. Baumhoff has applied for a patent which is now pending. The advantages of the extra exit, midway in the car, where it is most needed are self evident. The driver has exclusive occupancy of the front platform, and the car drives from both ends.

Some Great Clutches.

AMONG the extensive installations of the Eclipse Friction Clutch, for street railway work, may be mentioned that of the Union Depot Railway Company, of St. Louis, having one continuous line of heavy hammered shafting over 200 feet in length, to which four Hamilton-Corliss engines are interchangably connected by means of heavy friction cut-off couplings with quills or sleeves. The shaft is in four sections, and the generators are each driven by a friction clutch. Ordinarily each engine has its own section of shaft to drive, but should occasion require, any generator can be driven by any engine. The shaft is seven inches in diameter, and



NEW DOUBLE CAR OF THE LINDELL RAILWAY, ST. LOUIS.

There is a sliding vestibule seat so arranged, that when the door is closed on the track side, the seat is out of the way, thereby giving seating capacity for three passengers and enabling the conductor to change the entrance of the vestibule at will. The seat can be changed to the opposite side in less than one minute.

The car is carried on two four wheel trucks, and propelled by two 15-horse-power motors, and the experience thus far is that the saving in power and operating expense as compared with a 16 foot car pulling a trail car to be largely in favor of the long car. There are several 33 foot radius curves on the line, which the car rounds with ease and comfort, and the car has received many compliments from car builders and managers who have inspected it. There certainly could never be any accidents to passengers endeavoring to pass from one "car" to another in this car, as is frequently the case with motor and trail car.

On the first trip the new candidate carried 121 passengers, of which 116 were on at one time, though the

runs to perfection at the high speed of 330 revolutions per minute, thus showing careful construction and perfect balance of work.

Among other heavy equipments with the Eclipse Friction Clutch for street railway purposes, may be mentioned that of the Omaha & Council Bluffs Railway, and Bridge Company, where a hammered shaft, 13 inches in diameter is used, also one pulley 22 feet in diameter, 52 inches face. The James Street Railway, Seattle, Wash., is also driving heavy generators with Eclipse Clutch Rope Sheaves.

The equipment and facilities of the Eclipse Clutch Works, of Beloit, Wis., for turning out the heaviest class of power transmission equipment, are not excelled, and we shall hope soon to illustrate their very fine plant.

A SAN ANTONIO, Tex., motor-man will now strive to make more noise in the world. He was fined \$10 for not ringing his bell at street corners. Moral: Its sometimes a misdemeanor not to blow your own horn.

Track Cleaners.

THESE pleasant days, with clean rails and zephyr winds, is a good time to reflect on the coming winter months, and complete arrangements for such track cleaning apparatus as will be necessary when the ground begins to freeze. Track cleaners or scrapers are even more valuable than heavy plows when the actual returns are considered on the comparative cost of the two. Heavy plows are of course the only relief in heavy snow, yet a line may often be kept open and on good running headway when the cars are each equipped with scrapers, where without them, a plow even, would have stalled by a rapid fall. The secret of open tracks often is in frequent small cleaning, which does not permit snow to gather, rather than depending on a general cleaning off once an hour. They save their cost in fuel or horse flesh with even an inch of snow, and many roads have their entire rolling stock thus equipped, and all should be.

One of the best track cleaners obtainable, and suited to electric cable or horse cars, and one which has stood the test of eight years satisfactory service, is the Clark patent track cleaner, manufactured by Dorner & Dutton, Cleveland, Ohio. They are in use in all parts of the country, and everywhere giving the best of satisfaction. The shovels may be lifted and thrown entirely out of use, or given any desired pressure on the rail as required, by a lever furnished with a handle, and fastened in front of the dash where convenient to the driver. The West End Road, of Boston, has adopted these cleaners and placed them on all its motor cars.

LOVE'S ELECTRIC.

THE Love Electric Traction Company will begin to lay track October 10, for a demonstration of their system of underground wire. Mr. Yerkes has given right of way on the Fullerton Avenue loop, on the North Side, and will lay seventy-five pound rail, while the Love people will devote \$100,000 to the movement.

THE GOLDEN ELECTRIC WINS.

A hot contest has been waged in the courts between the Golden Electric and the Denver, Apex & Western Railways of Colorado. The suit is "King vs. the Denver, Lakewood & Golden Railway Company, et al. The Apex people wanted a continuance of the injunction against the Golden Company. The court ruled for the defendants, and the Denver, Lakewood & Golden Electric has come into active existence. An initial trip, with invited guests, was made and passenger traffic has assumed considerable importance, besides a valuable freight traffic at night, which brings a large coal trade into Denver. The road enters Golden by Jackson street, and over this part the contest was held. The track is said to be one of the best laid in the West and is of 75 pound steel. President Welch, General Manager Starkweather, and Attorney Hersey are jubilant over the present outlook.

New Electric Plow.

THE Ellis Car Company, of Amesbury, Mass., have added a new and important department to their already extensive street car building, and are now getting out a first order of four large electric snow plows for the Newburyport & Amesbury Railway Company. These plows, while patterned somewhat after those on the Boston lines, will include several decided improvements of their own. They have also decided to build and keep in stock during all winter months several of these plows, so that any company which may find the necessity, either from accident or unexpected requirements, to order plows by telegraph, can insure the shipment of one or more plows without any delay whatever. The plows will be as strong as selected woods and iron can possibly be made to furnish. The Merrimac Valley Street Railway, of Lawrence, Mass., have also placed an order for these plows after having seen the four building at Newburyport; managers will certainly appreciate the enterprise displayed by the Ellis Car Company.

CINCINNATI EAST END ELECTRIC.

THE East End Electric Railway of Cincinnati began operation this month after an unavoidable delay of about six weeks. The work was begun in February and would have been finished July 1, except for heavy rains. The route is the same as the old horse car line, but the double trolley system makes the trip in one hour instead of two. Thirty-three new cars each, provided with 40-horse-power motors, from the well-known Laclède Car Works of St. Louis, give magnificent accommodations to the populace. The cars are given five minutes headway, and a uniform five cent fare has been scheduled with a three cent or two-for-a-nickle rate on children. President Kilgour has carried this public spirited enterprise through in the face of all difficulties and has the universal gratitude of all East Enders who have pined many years for this consummation. The West End has come in committee to President Kilgour, asking for the same boon—rapid transit. With his usual public spirit the president gave them his hearty support and co-operation.

THE DUPLEX STREET RAILWAY TRACK COMPANY comes out with a neat folder, giving their ten principal points of advantage. The Duplex system has been endorsed by such high authority as Maj. Geo. W. McNulty, chief engineer Broadway and Seventh Avenue Railway Company, New York; J. C. Henderson, Esq., engineer-in-chief Edison General Electric Company, New York; Charles T. Yerkes, Esq., president North Chicago Street Railway Company, Chicago; John B. Parsons, Esq., vice-president and manager West Chicago Street Railway Company, Chicago; A. Langstaff Johnston, C. E., Richmond, Va.; J. Vernon Campbell, Esq., Baltimore, Maryland; E. S. Moffat, Esq., superintendent Lackawanna Iron and Steel Company, Scranton, Pa., and many others.

Schneider's Combination Cars.

CONSIDERABLE interest has been awakened of late in new styles of building street cars, growing out of the great activity in railway construction and the desire of new roads to put in service an equipment which shall please the fast-increasing great army of riders. This has had a tendency to cause the old style cars, which had for so long a time been considered pretty nice, to gradually become back numbers, until now every manager is anxious to improve and keep up with the times.

To meet the demand from many roads for some method of reconstructing their old cars, and also to accommodate those smaller companies who desire open and closed cars but who do not feel justified in maintaining two full equipments of rolling stock, has lead J. G. Schneider of Chicago to patent two types of adjustable car.

One is the winter car which may readily be converted to an open car by the removal of the outer panels which are made in sections and held in place at the bottom with two dowels and locks which operate with a button at either side of each panel. These panels have rubber casings to prevent rattle and jar and make them perfectly tight. When the box car becomes an open one by removing the panels, the seats turn over so as to face outward, while extending lengthwise as in a closed car. This leaves space for the conductor to pass through for collections. The panels can be quickly removed, and may be painted when not in use in summer, thus reducing the time car must otherwise spend in shop. To rebuild an open car into closed, an aisle is sawed through the cross seats and the panels put on the outside. In summer the seat thus taken out is replaced and panels removed, when the car resumes its original appearance. The illustrations show both patterns, the open car, open and closed; and the box car, closed and open. In both cases the running footboard of the open pattern may be either folded up against the side of the car or removed entirely for the season. Also, the upholstered portion of the seat is removed when the seat is turned for summer car, and the cushion put away.

Mr. Schneider will exhibit models of each type of car described at the coming convention in Pittsburg.

CHARLES HICKS, the general manager of the Austin, Texas, Street Railway Company, died September 2, of consumption.

Model Rule Book.

THE most complete set of rules for conductors and drivers we have yet seen is the "Revised Edition," just compiled and put in service by General Manager H. H. Littell, of the Buffalo City Railway. The first chapter includes general rules for all conductors; the second, rules for horse drivers; then special rules for drivers of fare box-cars, and rules for drivers of motor cars. Also special rules for conductors of motor cars. Also special instructions as to the handling of the different makes of motors, and quotations from the state code stating rights of company as to disorderly passengers and obstructions on the track. A complete list of every cross-

street on each line, with the street number of same, which enables a conductor to instantly inform patrons as to what is the nearest cross-street at which to leave the car for any desired number. The whole is indexed, and a model code in all respects. From the

special rules for motor drivers we copy a few, as follows:

OBSTRUCTION ON TRACK.—Do not run over any wire, sticks, stones or coal, but always pick up the obstruction and remove it to a safe distance from the track. All bolts, nuts or wire found on the track must be brought to the station.

STUDY MOTORS, ETC.—Try and learn all that is possible about caring for and repairing motors and machinery. All employes will be welcome to the shops for this purpose. Do not hesitate to ask any question about the motor, etc.

SWITCH HANDLE.—Should you leave your

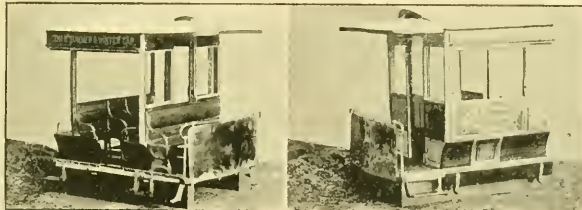
platform, always take your switch handle with you. Be careful to see that it points to the "Off" mark before taking it off. Never permit the trolley to be put on until your handle is on the switch box, and be sure that it points to the "Off" mark.

TO CUT OUT MOTORS.—Never carry any metals of any kind in your upper vest pocket, for in bending over motors they are likely to drop out and fall in motors.

CHAS. T. YERKES is erecting a beautiful mausoleum for his final resting place, in Greenwood cemetery, Brooklyn. It is of Grecian form, after the form of the Athenian Parthenon, having eight columns with Ionic capitals and four pilasters. It is of light colored Vermont marble and 50 feet 6 inches long by 23 feet wide and 20 feet 6 inches high. The cost will be in the neighborhood of \$50,000 when completed.



COMBINATION CLOSED AND OPEN CAR.



COMBINATION OPEN AND CLOSED CAR.

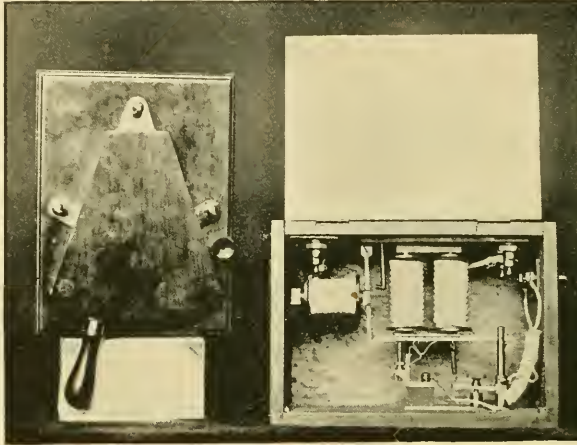
Automatic Electric Hill Stop.

A NOVEL and interesting device for instantly locking and holding the wheels of an electric car on an ascending grade, in case for any reason—such as trolley leaving the wire or blown fuse, the current fails—has been patented by George W. Blanchard, of Waterville, Maine. The Hill Stop is controlled by a switch placed at either end of the car, and with which, when the car reaches the foot of an ascending grade, the driver throws it into service. The arrangement is such that should there be no failure of current the stop remains normal, but on the failure of the current for a single moment, the car wheels are instantly locked, and before starting back in the least, with the return of the current, the wheels are automatically released. The locking mechanism is placed on axle and wheel, and occupies but three inches of axle, and consists of a notched gear or disc bolted to and turning with the wheel, and a stationary frame within which the axle turns and carrying pivoted blocks, held up by springs and operated by magnets. These

battery circuit, normally out of position; a magnet for withdrawing the stop and leaving the bar free to drop and lock the car, all of which is included in a dust proof box. On level ground the device is thrown out of action by the switch. The device is applicable to horse cars, and may also be arranged to work by a simple push button. The parts encircling axle are made in halves, which enables

the placing or removal without interfering with the running gear in any way.

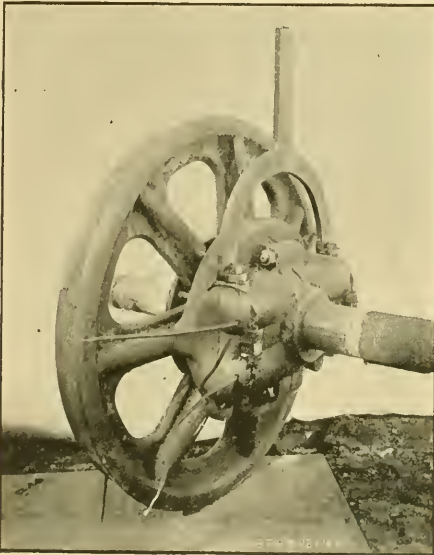
A set of the Hill stops are now being placed on one of the leading electric roads in the east with a view to demonstrating the absolute certainty of action.



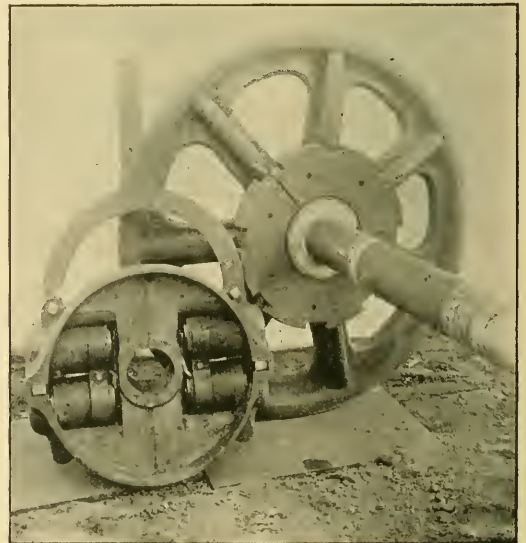
SWITCH AND MAGNET BOX—AUTOMATIC ELECTRIC HILL STOP.

THE Short Electric Company is making an active canvass in the West. Among its recent contracts for "Gearless" motors may be noted that at Harvey, a suburb of Chicago. The Harvey Transit Company, composed of some of the

heaviest capitalists in the city of Chicago, are building this railway, and have made a most careful and thorough investigation of the different electric railway systems, finally deciding on the Short "Gearless" motor as being the final



EXTERIOR VIEW AUTOMATIC HILL STOP.



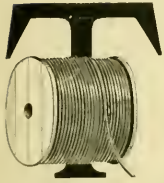
INTERIOR VIEW AUTOMATIC HILL STOP.

magnets are operated from six or eight cells of open circuit battery or one of storage.

The automatic part consists of a magnet and a movable stop or latch which holds the bar which closes the

form and successful in every respect. They are pleased with the simplicity of the motor and its probable freedom from repair accounts. This road will be of service to the Short Company in western territorial negotiations.

The Acme Lead Cable; its Manufacture.



THIS is one of the latest products of the International Okonite Company (limited), New York and London. It is a lead-covered cable and designed for extra heavy work and high voltage under extremes of temperature, being therefore especially adapted for underground work. A special feature of the new cable is its thorough insulation, which consists of a combination of two or more distinct insulating materials, possessing different valuable qualities, one, of the high electrical resistance of Okonite; the other, an improved rubber compound specially adapted to resist the effects of high temperature. The high insulating properties of Okonite are well known to the trade. The special rubber compound, which also possesses high insulating and waterproofing qualities, has the additional quality of not being sensitive to heat. Its application serves as a protection to the high grade Okonite insulating material beneath, and insures centralization of the conductor at high temperature. In other words, it does not soften, neither does it allow the conductor by its weight to sag down through the insulating materials. After this second layer is applied, the cable thus far made, is run through a bath under high heat until the insulation becomes impregnated with a material which protects it thoroughly from the effects of gas and moisture.

Over these two layers of special insulating material is super-imposed a braid, which in its turn is saturated with the same material to prevent capillary attraction on the exposed ends of the cable and protect it from the rotting effects of gas, and to increase lasting qualities. Though more expensive, the manufacturers use a braid in preference to a tape, on account of its superiority. Being elastic it does not break on bending.

The now practically finished cable is then lead-covered by the most improved hydraulic processes that have yet been introduced, insuring freedom from blow holes and air bubbles, and an even thickness and quality of lead. The lead is alloyed with tin, to secure sufficient hardness and to resist abrasion in drawing through ducts, yet assuring sufficient ductility to enable the cable to be easily handled without rupture. The Acme Lead Cable will, we predict, share the general popularity accorded to to all the Okonite specialties put upon the market by the International Okonite Company, and like them, will prove well deserving of it.

Stut's Cable Grip.

A NEW form of cable grip has been invented by J. C. H. Stut, of San Francisco, which, when closed on the cable, exerts a gripping pressure on both sides, top and bottom, by which arrangement it is claimed the tendency to press the cable out of shape is greatly reduced. Steel dies are used which may be replaced when worn. The grip mechanism proper is covered with a metal roof which sheds all dirt.

Tests of the "Gearless" Motor.

URING the past month the "gearless" motor has been very thoroughly tested in Cleveland, being put to the hardest kind of work in regular commercial operation. Among some of the noteworthy tests may be mentioned the following:

In order to prove the power of the motor, it was attached to two other motor cars, and drew them without difficulty along a rough and dirty track, attaining a very fair rate of speed. The car was stopped at the commencement of a 40 foot curve, at the other end of which was a 3 per cent. grade. It was then started up and without difficulty drew the three cars around the curve and up the grade. This was one of the severest tests which could be put upon the motor under all the conditions. A prominent electric railway manager, who was present, stated that not a single motor on his line could do the same work.

The car was put into regular service on three of the Cleveland railway lines, carrying trail cars and drawing heavy loads without the slightest difficulty, and at speed far in advance of the ordinary schedule of the road. Current and volt motor readings were taken in each case, showing that the power consumed was never less than had been anticipated by the Short people themselves.

A comparative test was made on Tom Johnson's line, between the "gearless" motor drawing a trail car, and one of the best known of the "single reduction" motors now in the market, also drawing a trail car. The cars were run ten minutes apart over the same line for a distance of 22 miles, covering one round trip. This distance was made in two hours by both cars stopping to take on and let off passengers. The fare register showed eighty passengers carried by the Short motor, and forty-seven by the single reduction. Ampere and volt readings were taken at intervals of one-half minute for a long distance, the general averages showing that the Short "gearless" motor required about 25 per cent. less power than the single reduction motor. This was a complete surprise to all concerned, as the Short Company had hardly hoped to show any material advantage over other motors in the matter of current, its chief claim for the "gearless" being a large reduction in the repair account, owing to the extreme simplicity of the machine.

In one of these tests, the trail car run off the track at the curve. Its brakes were set and it was drawn on to and around the curve with the full load of passengers on both cars, and without the slightest difficulty.

At Detroit, last month, a sort of mild epidemic prevailed among the street car horses, causing their legs to swell, eyes to become sore, and the animal to act in a stupid manner generally. The *Detroit Journal* takes occasion to moralize thusly: "It may do no harm to remind the owners of these lines that the electric motors used to propel street cars in all progressive cities, do not have the influenza, nor swelled legs, nor swelled eyes. They do not require the attendance of veterinary surgeons, nor do they run on slow time."

ECHOES FROM THE TRADE.

THE RAILWAY REGISTER COMPANY, New York City, have just added several large roads to their already long list of patrons.

THE E. L. BUSINELL SPRING COMPANY report business flourishing and a large number of street car orders under contract.

THE ALLEN SAFETY BRAKE, for heavy grades, manufactured by W. W. Allen & Co., St. Paul, is meeting with great success.

THE NUTTALL COMPANY, Alleghany, Pa., find use for all their new gear-cutting machinery, which is the most complete in the country.

THE JOHNSON COMPANY, of Johnstown, Penn., report business very active and a continual extension of facilities made necessary by increased demand.

THERE has been a big demand for Hazleton Tripod Boilers and Roney Automatic Stokers, and both companies show a splendid increase in business over last year.

THE AMERICAN CAR COMPANY, St. Louis, which President Wm. Sutton is so rapidly pushing to the front, is in receipt of orders which will start their new works off with a rush.

THE MEAKER MANUFACTURING COMPANY, Chicago, find need of all the extensive room recently added to their large plant, and are turning out better and more registers than ever.

THE LIMA REGISTER COMPANY, of Lima, Ohio, is meeting with very gratifying success, and has been obliged to increase its facilities to keep up with the demands of the trade.

THE AMERICAN TRUST AND SAVINGS BANK, Chicago, one of the soundest financial institutions in the West, is in demand, as trustee and transfer agent for street railway securities of every kind.

THE LACLEDE CAR COMPANY, St. Louis, are very busy with new orders received during the past thirty days. They take great pains to turn work out promptly and yet without slighting it in any particular.

THE LEWIS & FOWLER Manufacturing Company report large and increasing orders in all departments of their street railway supply department, which include almost everything needed to construct and equip a road.

THE WESTERN BANK NOTE COMPANY are now nicely settled in their own new and magnificent seven-story building on Michigan ave., Chicago. They are doing a large amount of stock and bond work for street railways. Theirs is the second largest plant in the United States.

AMONG the orders of the Brownell Car Co., we find there have been electric cars shipped to the Houston City Street Railway Co., Houston, Texas, H. F. Mac

Gregor, General Manager; to the Baltimore Traction Co., Baltimore Md., and a new equipment for the Villard system, in Milwaukee.

THE J. M. JONES' SONS, of West Troy, New York, are continuing to carry on the building of all kinds of street cars in the same conscientious manner which has always characterized an establishment which has been in operation over fifty years. The quality and finish of their work is too well known to require other mention than that it is "Jones', of Troy."

THE ST. LOUIS CAR COMPANY is doing an immense business, among the orders of the last few weeks we note a palatial parlor car for the Union Depot line of St. Louis. This car is 35 feet over all, double track, with motor over each track and elegantly upholstered. 120 cars for the St. Louis and Suburban, and a 42 foot car for the Lindell line are among their orders.

THE BURTON ELECTRIC COMPANY has just obtained an order for their Electric Heaters to be placed on all the cars of the Westminster & Vancouver, B. C., Railway. The cars are being fitted up with these heaters at the works of J. G. Brill & Co., Philadelphia, who were authorized to procure the best heating appliances manufactured for such purposes. The heater is practically indestructible, and requires no repairs. It will outlast any car.

THE ELECTRIC MERCHANDISE COMPANY, of Chicago, has just secured a contract for all material necessary for the entire equipment of the Citizens' Traction Company, of Pittsburg, Pa. The Traction Company, gave careful inspection to all the different kinds of material manufactured and decided to give the order to the Merchandise Company, solely on the merits of their well known heaters.

THE BALL ENGINE COMPANY, Erie, Penn., has opened a branch office in Chicago, in the Rookery building, room 506. Mr. Albert Fisher, widely known as a successful salesman and an agreeable gentleman, has been appointed manager, and will be glad to see his friends, new and old, in his new quarters. Mr. Fisher has had a large experience in engines, and we predict for him success in his new connection.

THE JOHN STEPHENSON COMPANY, of New York, are as full of orders as when they are widely scattered over the work. At present they are building equipments for electric cars for Elmira, N. Y.; Cleveland, Ohio; Allentown, Pa.; Hamilton, Ohio; Salt Lake City, Utah; Altoona, Pa.; Anniston, Ala.; Baltimore, Md.; Leeds, England; and Rio de Janeiro, Brazil. Also horse cars for New Orleans, Asheville, N. C. and Vera Cruz, Mexico.

ON a recent visit to the extensive new works of the Walker Manufacturing Company, Cleveland, the writer found every department crowded with large work, among which may be mentioned four rope drive wheels, 32 feet in diameter and weighing 75 tons. Also four other

similar wheels of 22 feet diameter, and four of 9 feet. They are also building a 15-ton crane, for use in the new power station of the West Chicago Cable Road.

THE AMERICAN CASUALTY INSURANCE AND SECURITY Co., of Baltimore, of which Beecher, Schenck & Benedict, 120 Broadway, New York, are the general agents, report a constantly increasing number of inquiries from street railway companies. The financial ability of this institution, coupled with the eminently thorough manner with which all matters are managed, gives them a well deserved position before the railways of the country. They make special departments of insurance for street railway employes through the railway company itself, and also will assume all liabilities arising from accidents to passengers. The West End road of Boston is much pleased with the manner in which this troublesome branch of their business is handled by the Casualty Company.

THE UNIVERSAL ELECTRIC RAILWAY CONSTRUCTION COMPANY, whose extensive advertisement appears in this issue, brings us tidings from the Philadelphia office that their new clutch has been adopted by the Central Railway Company, of Atlantic City, N. J., and the superintendent of that road, after a test of several months, says that it has given satisfaction in every particular. The Duquesne Traction Company, of Pittsburg, with its heavy grades, will be also equipped, besides another order from the Federal Street & Pleasant Valley Railway of the convention city.

THE JONES POSITIVE NUTLOCK Co. is now ensconced in new quarters at 43 Washington street, where six new pieces of special machinery are installed to keep up with the demand for positive nutlocks. Three smaller machines for spurring have also been added and business is rushing. Branch manufactories are talked of south and east. Large orders have lately been received from the Peninsular Car Company, Chicago Street Railway Company, Michigan Car Company, and Crerar, Adams & Co. of Chicago. An exhibit will be given by the Jones' people at the Pittsburg convention.

JOSEPHINE D. SMITH, of 330 Pearl St., New York, reports their work as unusually full of orders, among which is one for 250 Combination Lamps for the West End Street Railway of Boston. These Combination Lamps are the standard Smith lamps, with the addition of a cluster of three incandescent lamps above the globe of the oil burner and the combination gives a very handsome and attractive effect. The Smith electric car headlight, known as No. 10, is having an enormous sale and is forcing that department of the works to its utmost capacity to keep up with orders.

THE FULTON FOUNDRY COMPANY, of Cleveland, are meeting with the most gratifying success with the performance of their new trucks, which have made a record of nine months' constant and hard service under electric cars in that city, without one cent of repairs having been

required. They are also sending out a large amount of special work in the way of railroad crossings, turn tables, transfer tables, wheels and axles for motor cars. Their steel-tired wheels are in use on most of the leading roads throughout the country. All of which is crowding each department of their large works with orders.

THE MCGUIRE MANUFACTURING COMPANY, of 122-132 North Sangamon street, Chicago, report trade flourishing. "In fact," said the manager, "we have more orders than we can attend to. For instance, here are a few orders we have just brought in, (handing down a book the size of Webster's Unabridged), and more to follow. The West Milwaukee Street Railway Company wants 55 trucks; the Citizens' Railway of Indianapolis, 17; Augusta Railway, Light & Motor people have a large order in; Pittsburg, Alleghany & Manchester wants 10; Little Rock, Ark., 28; Denver & Suburban Company, 20; the Point Defiance Railway, the Interstate, Sioux City, Denver, Lakewood & Golden Railway and a number of others are waiting their turn. Here comes another lot. Good day, sir."

RECENT shipments of the Ball Engines, of Erie, Penn., aggregated 3110-horse-power and numbered thirty-three engines and covering eleven states from New York west to Washington and California. Among them are the following: Johnstown, Penn., Johnson Company, 3 150-H.-P.; 1 300-H.-P., Cross compound engine; Allentown, Penn., Rapid Transit Company, 2 125-H.-P.; Pottsville, Penn., Schuylkill Electric Railway Company, 1 125-H.-P.; Amsterdam, N. Y., Amsterdam & Rockton Street Railway Company, 1 100-H.-P.; Corvaille, Wash. Electric Railway, 1 150-H.-P., tandem compound; Great Falls, Mont., Boston & Great Falls Electric Power Company, 1 150-H.-P.; Tacoma, Wash., Northwestern Electrical Supply Company, 1 25-H.-P.; Reading, Penn., Reading & Southwestern Street Railway Company, 2 125-H.-P.

THE SIOUX CITY ENGINE WORKS speaks of constant improvement in business and report the following engines now in process of construction: 2 18x42 and 1 12x36 Corliss for the Moline Plow Company, Moline, Ill.; 2 12-22x36 compound condensing engines for the Waco Electric Light & Railway Company, Waco, Texas; 1 16x36 to W. C. Ritchie & Co., Chicago, Ill.; 1 14x36 Corliss engine, Savannah Mo.; 1 9x14 Gidding's automatic, for electric lighting, at Sioux City, Iowa; 1 6-10x16 compound automatic for the factory of the New England Investment Company, Sioux City, Iowa; 1 9x14 Gidding's automatic, for the Pech Manufacturing Company, Leeds, Iowa; 1 18x36 to the North-Western Sewer Pipe & Tile Company, Sioux City, Iowa. Among the orders booked lately are: 1 18x36 for the Dubuque Electric Street Railway Company, Dubuque, Iowa; 1 18x36 for the Le Mars, Iowa, Water & Electric Light Company. They report several enquiries for their new 24x48 Corliss, which has been recently patterned especially stiff and heavy for electric railway work.

CAUGHT ON THE RUSH TRIP.

American Street Railway Association.

HENRY M. WATSON, PRESIDENT, Buffalo, N. Y.
 W. A. SMITH, FIRST VICE-PRESIDENT, Omaha, Neb.
 CHARLES ODELL, SECOND VICE-PRESIDENT, Newburyport, Mass.
 A. D. RODGERS, THIRD VICE-PRESIDENT, Columbus, Ohio.
 WM. J. RICHARDSON, SECRETARY AND TREASURER, Brooklyn, N. Y.
 EXECUTIVE COMMITTEE—THE PRESIDENT, VICE-PRESIDENTS, and THOMAS LOWRY, Minneapolis, Minn.; D. F. HENRY, Pittsburgh, Pa.; ALBERT E. THORN, Ton. Atlanta, Ga.; H. M. LITTELL, Cincinnati, O. and THOMAS C. KEFFER, Ottawa, Can.
 Next meeting will be held in Pittsburg, Pa., October 21st, 1891.

Massachusetts Street Railway Association.

President, CHAS. B. PRATT, Salem; Vice Presidents, H. M. WHITNEY, Boston
 AMOS F. BREED, Lynn. FRANK S. STEVENS; Secretary and Treasurer, J. H. EATON, Lawrence.
 Meets first Wednesday of each month.

Ohio State Tramway Association.

JOHN N. STEWART, Ashtabula, President; JOHN HARRIS, Cincinnati, Vice President; J. B. HANNA, Cleveland, Secretary and Treasurer; E. K. STEWART, Columbus, Chairman Executive Committee.

The Street Railway Association of the State of New Jersey.

President, JOHN H. BONN, Hoboken; Vice President, THOS. C. BARR, Newark, Secretary and Treasurer, CHARLES V. BAMFORD, Trenton; Executive Committee, OFFICERS and C. B. TURBOSTON, Jersey City; H. ROMAINE, Patterson; LEWIS PERRINE, JR., Trenton.

California.

ALAMEDA.—Theodore Meetz intends to equip his Alameda, Oakland & Piedmont road with electric motors, and for that purpose has given a deed of trust for \$100,000 to capitalists. He is corresponding with reference to the storage battery system now used at Dubuque, Iowa.

LOS ANGELES.—John W. Cross has been granted a franchise to build and operate, for the period of fifty years, a street railroad, the cars on which will be operated by electricity, cable or horses, and the line runs from the corner of Main and Commercial streets, along the present route of the Khurts Street Line of cars, to the city limits on the Mission road; it is the intention to continue the line on to Pasadena.

MONTEREY.—The street railway connecting Monterey and Pacific Grove has been completed and cars are now making regular trips between these two places and the Hotel del Monte.

OAKLAND.—A few days ago two masked robbers entered the office of the Electric Road on Grove street, at midnight, and compelled the receiver, at the point of their revolvers, to open the safe from which they took \$300 and escaped.

THE Oakland Consolidated Railway Company, the electric system, has been granted permission to mortgage its plant for \$500,000, to secure bonds for future construction.

PASO ROBLES.—The street railway extending from the depot through the town to the Mud Springs, a distance of two and one-half miles, is completed and in operation. The road was built and is owned by Geo. R. Adams of this place.

RIVERSIDE.—The Arlington Street Car Line has put on a sprinkling car, and henceforth the line will be kept free from dust.

SAN BERNARDINO.—The interest of local capitalists has been aroused and an effort will be made to put in a line of electric railway. It can be done for \$76,000.

SAN DIEGO.—The cable cars have electric push buttons by which passengers notify the gripman to stop. Dry batteries are cheaper than straps.

SAN JOSE.—The Board of Supervisors to-day granted the petition of Felix Chappellet et al., for a franchise for an electric railroad from Haywards to San Jose, and appointed a committee to draw up a franchise.

SAN FRANCISCO.—The San Francisco & San Mateo Electric Railway are building a power house and plant to cost \$40,000. Petitions are circulating for an extension to San Bernardino.

STOCKTON.—A San Francisco syndicate have purchased the street railway system and promise to make extensive improvements very soon. Ex-Senator James G. Fair is believed to be the big man in the syndicate.

Canada.

KINGSTON.—There is talk of an electric street railway system being established in Kingston.

TORONTO.—The deal between the city and the Kelly-Everett syndicate was formerly closed September 1st, and the road turned over. The company have organized as a copartnership and will operate the road under the title of the Toronto Railway; mileage is 68.72, horses 1,430, cars 260, busses and sleighs 200. The officers are: President, Geo. W. Kelly; Vice-President, W. McKinzie; General Manager, Henry A. Everett; Treasurer, Chauncy C. Woodworth, and Secretary, James Gunn. The general offices are at the corner of King and Church streets, Toronto.

Colorado.

DENVER.—The South Fourteenth street horse cars of the Denver Street Railway Company have stopped running and the line was abandoned. Men were set to work at various points along the line tearing up the track, and the Metropolitan Company will soon begin laying its tracks for the new electric lines.

THE rivalry which has existed between the Apex & Western Railway Company and the Denver, Lakewood & Golden Railway Company, has been decided in the courts in favor of the Golden Electric.

GEO. RUNYAN, who was the oldest gripman in the employ of the Denver Tramway Company, died recently of typhoid fever.

THE Denver Traction Company was incorporated September 2d, for \$300,000. The incorporators are: F. P. Earnest, J. B. Grant, J. S. Wolfe, Charles O. Thomas, Harry C. James and Ralph Voorhees.

WORK has been commenced on the Seventeenth Street Cable Line, and it is hoped to have the road completed and cars running by November 1st. Geo. B. Christie, of the firm of Christie & Lowe, of New York, is in charge of the work.

PUEBLO.—A new equipment of six motors has arrived, and work on the roadbed and wiring is being rushed forward.

Florida.

POLK.—The incorporation of the Bartow Street Railway by the following gentlemen, viz.: Frank Clark, J. W. Cox, W. F. Way, T. A. Wall, and T. L. Marquis, is an assured fact, and can be stamped as another enterprise added to the long list of laurels of the Phosphate City of Florida.

Georgia.

ATLANTA.—Some of the members of the Society for the Prevention of Cruelty to Animals do not believe in car drivers using whips, and have made such a fuss that the Atlantic Consolidated Road issued an order that none be used, with the result that a trip which formerly occupied twenty two minutes, now requires one hour and a quarter. Citizens are highly disgusted with the action of the society, and the matter will probably right itself very soon.

COLUMBUS.—E. P. Lynch, of New York, has been awarded the contract to build the electric line here and has begun work. The line is from Eleventh street to Highland Park.

DADEVILLE.—Dadeville is to have a street railway. The letters of incorporation have been granted and work is to be commenced soon.

SAVANNAH.—The legislative committee recommended that the bill pass to incorporate the Southover Street Railway Company of Savannah. Power was given the road to pass at a grade level over the Savannah & Charleston, and the Savannah, Florida & Western Railways.

Illinois.

ALTON.—The Middletown & Alton, and Alton & Upper Alton Street Railway is negotiating with a view to changing to electricity.

AURORA.—The street railway company is figuring on laying pipes and heating the business portion of the city by steam this winter.

BATAVIA.—There is some talk of an electric railway from this place to Chicago, passing through Warrensville. No definite arrangements have yet been made.

BELLEVILLE.—The new electric road to St. Louis is progressing and plans are nearly completed. It is proposed to run cars to St. Louis every thirty minutes. Single fare, 25 cents; round trip, 40 cents. It is hoped to have the line in operation in the city by March 1st, 1892, and to St. Louis by September of next year.

BLOOMINGTON.—Dr. David D. Law has just left the employ of the Bloomington & Normal Street Railway, after having been in its service for twenty consecutive years, with an absence of but two weeks in all that time.

CAIRO.—The Electric Street Railway Company has been granted franchises to run its lines on Thirty-fourth street and extending to block 14 of the fourth addition to the city of Cairo, and improvements have been made on the streets in accordance with the ordinance. The electric railway has been opened and five miles are already in operation.

COLLINSVILLE.—The secretary of state has licensed the Venice and East St. Louis Railroad to operate a street railway; capital stock \$300,000; incorporators, C. N. Travous, J. B. Sikking, C. G. Robinson, et al.

DANVILLE.—The electric road has triumphed and was opened to the public September 1st. It is already doing a large business.

EFFINGHAM.—A company has been organized to construct an electric line to Teutopolis.

KANKAKEE.—The city council, at a special meeting on Thursday night, granted the Enterprise Electric Light and Railway Company a franchise to use Schuyler avenue for a street railway. Work on this line will begin at once. The trolley system will be used.

ROCKFORD.—The West End Street Railway has formulated plans and secured the right of way for several new electric lines, which, it is believed, will be constructed very soon.

ROCK ISLAND.—It has been decided to put letter-boxes on the cars of the Central Street Line as soon as boxes can be secured.

SPRINGFIELD.—The street railway is making extensive improvements in its track, and has just received four handsome electric motor cars from the works of the St. Louis Car Company.

STERLING.—The street railway here is now considered an assured fact, as Messrs. Howland & Ellis have deposited a bond of \$5,000 to complete the road by the first of June next.

Indiana.

ANDERSON.—There is some hitch in getting the electric railway franchise, the company desiring additional concessions which the city refuses to grant. Cleveland parties stand ready to accept the ordinance and go ahead.

EVANSVILLE.—The Evansville Street Car Company, which now has a franchise that has fifteen years yet to run, moved thereunto by the demand of the people for more rapid transit than mules, has made to the council the following proposition: "To surrender their present horse-car franchise for a twenty-five year electricity or other motor franchise; to pay 2 per cent. of their annual gross receipts into the city treasury; to establish electricity within six months and have at least ten miles in operation in two years."

GREENCASTLE.—The Greencastle Street Railway has been sold to a syndicate of capitalists in this city, who will immediately apply for additional franchises and convert the road into an electric line. The new officers are: President, J. W. Weik; vice-president, J. S. Dowling; secretary, F. G. Gilmore; treasurer, Henry Miltzer; superintendent, Ewing McLean; director, Thomas Hanna.

VINCENNES.—The Vincennes Electrical and Thompson-Houston Electrical (Boston) companies have asked for a franchise to put in a new electrical railway line. Both companies have ample means and ask no bonus or pecuniary aid. The route proposed takes in the Catholic and City cemeteries, stove works, stock yards, the E. & T. H., I. & V. and Big Four depots, the St. John's German Catholic church and school, Court House, City Hall, Post Office, Grand Hotel, Opera House, in one block of business center and two blocks of manufacturing establishments on the river and O. & M. depot, the City Park, and Union depot, Coal Mines, Fair Ground and Salt Wells, besides all schools and churches. The city press and the public heartily second the idea.

Indian Territory.

EL RENO.—An ordinance has been passed granting a franchise to Thomas A. Osborn, James Geary and John F. Moffett, for the construction of street railways upon several streets. Power may be either electricity, compressed air, cable, steam, or soda motor. One mile must be completed within eight months from date. Double fare is allowed 10 P. M. TO 6 A. M.

Iowa.

BURLINGTON.—The tracks of the electric street railway have been extended north on Sunnyside avenue, a third of a mile beyond the original terminus. A similar extension of the Prospect Hill line is in contemplation.

CLINTON.—The entire stock of the Clinton & Lyons Horse Railway has finally been sold to the City Electric Company of Clinton.

DAVENPORT.—The electric lines in this city belonging to the Allen syndicate have been transferred to the Tri City Chicago Syndicate, who took possession September 1st, and who will operate the same hereafter. It is believed that several lines which parallel others within one block will be abandoned.

DES MOINES.—The Des Moines Street Railway have notified their conductors and drivers that they will give a prize of \$5.00 to the crew of every car which operates during the week of the State Fair in that city without accident to property or persons.

DUBUQUE.—The Dubuque Electric Railway, Light & Power Company will extend their line to South Dodge street and beyond at once, in accordance with the agreement of two years ago.

FT. MADISON.—It has been settled that Fort Madison is to have an electric street railway line. The mule cars have already disappeared from nearly every city in Iowa.

SIoux CITY.—The railway company will double track its Pierce street line from Sixth to Seventeenth streets this fall.

MONTICELLO.—Monticello is looking street-car-ward.

Kansas.

ARGENTINE.—The application to the city for a franchise for the elevated road on Hunter street has been voted down.

LEAVENWORTH.—The city council's action in declaring the charter of the Leavenworth & Suburban Railway void may lead to litigation. Some think that it is a scheme to secure better service from the line.

The solicitors for the Compressed Air Railway held an enthusiastic meeting, and no voice has been raised against the proposed subsidy.

TOPEKA.—Re-grading and improvements are daily being made on the railway line and the horses accommodated by a larger barn.

Kentucky.

LOUISVILLE.—The new electric line to Jacobs' Park is assured. Real estate is already rising at the prospect of rapid transit.

Louisiana.

NEW ORLEANS.—An injunction is asked by the New Orleans City & Lake Railway against the mayor granting further right of way and offering same for sale on streets now covered by their lines.

Maine.

AUGUSTA.—Col. Farrington and Mr. C. C. Hunt propose to run an electric line to their fine hotel at Hammond's Grove. The property has been bonded for this purpose.

Maryland.

BALTIMORE.—The Traction Company, whose first cable street railway in this city has proved a success, will immediately begin the laying of another cable line, to cost over \$2,000,000. The present cable line runs from Patterson park, on the eastern limits, to Druid Hill park, on the northwestern boundary. The new road will run through the western section. The old City Passenger Railway Company, forced by the competition of the cable line, will soon make a cable road of its principal line.

Massachusetts.

BROCKTON.—The Brockton Street Railway has been formally transferred the past week to the Industrial Improvement Company of Boston, of which ex-Gov. Ames is the president. Nine hundred shares of stock were sold, the largest block of 753 shares yielding the owner, Mr. W. W. Cross, between \$150,000 and \$175,000. The road has franchises for extension to eight neighboring towns, and it is proposed to have an electric equipment and a continuous line to Boston the coming spring.

DANVERS.—At a special town meeting tax-payers voted, 426 to 127, in favor of allowing the Naumkeag Street Railway Company to substitute electricity for horses. The work will be commenced at once.

CONWAY.—The people of Conway want to connect the town by electric railway to the nearest railroad station, which is 4 miles away.

LOWELL.—Mr. W. McQuesten, who built the line to Lakeview, has arrived in the city and will take a prominent part in superintending the construction of the entire electric system. He went from Lowell to St. Louis, where he put in a single-trolley system. He afterwards put in electric systems in New Orleans, Cleveland, and Aurora, Ill.

The Lowell & Suburban people are considering the prospect of uniting the proposed electric road and steamboat line between Lowell and Lawrence. The proposed line to Nassau is receiving more attention and will likely be built. Rapid transit will do wonders for the business and pleasure seekers in the named localities.

LYNN.—As the Lynn & Boston's petition for location of a power-house has been granted, it will be possible to go ahead at once on the building.

ROCKLAND.—It has been decided to postpone work on the electric line until next spring, at which time it will be pushed rapidly, and will connect with the neighboring towns of Whitman and Abington.

WORCESTER.—The new North End Street Railway has been opened and is doing nicely. W. P. Searles has been elected manager and superintendent.

WESTBORO.—It has been decided to form an association and apply for a charter to build an electric line to Marlboro.

Michigan.

BAY CITY.—Paul Rustling, recently connected with an electric rail way at Council Bluffs, Ia, has been appointed superintendent of the electric road here to succeed H. H. Alpin, resigned.

There is a strong prospect that in the near future the Union Street Railway of this place, the Electric Railway and the Wenona Beach Company will be consolidated and the electric lines largely increased.

DETROIT.—The new Healey motor made its trial trip on the Grosse Point line, and made the round trip of twenty miles in one hour.

The new syndicate has again changed its corporate name to the "Detroit Citizens' Railway Company." Following are the stockholders, Thomas M. Walter, New London, Ct., 80 shares; William W. Cook New York City, N. Y., 80 shares; Mills W. Barse, Buffalo, N. Y., 80 shares; Dwight Townsend, New York City, N. Y., 10 shares; Willard B. Ferguson, Newburyport, Mass., 10 shares; Hoyt Post, Detroit, Mich., 10 shares; John B. Mulliken, Detroit, Mich., 1100 shares.

GENERAL MANAGER MULLIKEN has requested the Board of Public Works to furnish him with the center grade of a number of streets and also to designate the kind of pavement the city will lay thereon. This information is requested to enable the company to perfect its plans for changing to electricity.

SINCE the organization of the Street Car Employees' Association, last April, there has been paid into the treasury the sum of \$1,714 13. Of this sum J. L. Hudson collected \$400. The association has now 700 members and contributed to the G. A. R. entertainment fund \$161.

MT. CLEMENS.—The Street Railway Company is putting in the switch on Gratiot street this week. When completed the two-horse car will be taken off and three one-horse cars put on, which will furnish adequate service.

SAGINAW.—One wall of the new Union street car house recently fell, completely destroying two cars. The loss is \$3,000.

At the annual meeting of the Union Street Railway it was shown that the receipts exceeded those of the previous year by \$25,000. The directors were increased to seven and the following were elected: F. E. Snow, J. M. Nicol, W. A. Jackson, David Wallace, W. H. Stevens, L. T. Durand, and Jacob Seligman. Officers: President, F. E. Snow; vice-president, L. T. Durand; secretary and treasurer, J. M. Nicol; general manager, W. J. Hart. The plant now embraces 22 miles of track, which with equipment are valued at \$500,000. During the year the company purchased ten open cars, seven motors, laid considerable double track, and started on the construction of a \$12,000 car house, which will include a fine new office. Seven new vestibule cars will be received in a few days. The improvements of the year cost \$90,000.

Minnesota.

DULUTH.—The Highland Improvement Company are going ahead with their work of grading the streets and have authorized the executive committee to secure figures for motor cars.

UNDER the organization of the Duluth Street Railway Company the following officers have been elected: L. Mendenhall, president; G. G. Hartley, vice president; T. W. Hoops, secretary and treasurer.

W. G. JORNS states that owners of property in Ironton will probably combine next year and build an electric line from West End to Ironton; a distance of 2 miles.

MINNEAPOLIS.—The Street Railway Company is receiving bids for changing the electric poles on the Washington avenue bridge and making other preparations for locating the poles outside of the sidewalks. Oil tanks are being constructed in the rear of the power house and a connecting switch with the Great Northern tracks is being built, over which the oil will be brought to the tanks.

The Minneapolis railway system was recently forced to shut down from 10 to 12 o'clock at night, by reason of the bursting of the city water main in front of their power house, completely flooding their boiler room.

ST. CLOUD.—By an act of the city council the Thomson-Houston people have been granted all rights asked for an overhead system. As the bonus has already been granted it is believed that cars will be run by November.

ST. PAUL.—The St. Paul City Railway have come off victorious in the matter of constructing an electric line on Marshall avenue, to which objection was made by a few residents.

WINONA.—Vice-President DeCelles of the Winona Street Car Company says that they will have electric motor cars of latest pattern and re-lay their entire track to keep pace with improvements already made and to accommodate the increasing traffic.

Missouri.

CARTHAGE.—Jerry Guinney has bought the street railway franchise and property for \$100,000. Mules will give place to electricity immediately. The franchise is to run 40 years. Connection will connect with Joplin, Cartersville and Webb City.

KANSAS CITY.—A Nevada street car mule fell down on the track and one wheel ran over his neck and another over his back. The car stopped when it got squarely over the unfortunate animal, holding him down. The occupants got out and pulled the car back, when the mule got up, shook himself and started off at the usual gait.

WEBB CITY.—The Commercial Club are talking up the matter of extending the South Allen street line to the Troup mines.

Montana.

BUTTE CITY.—The Flint Creek Electric Power company has been incorporated by Thomas T. Baker, Joseph H. Harper, and A. J. Bennett for the construction of a generating station to supply electric power to Granite, Runsey, Georgetown and other towns. Water power will be the initial force.

Nebraska.

LINCOLN.—The Lincoln Street Railway Co., will spend several thousand dollars to provide means of handling the crowd at the state fair. Trains with 2 and 3 cars will be run at three minutes headway. The new track part of it of permanent utility will cost \$50,000. 40,000 people per day are to be handled.

NORFOLK.—The contract for the Electric Road has been awarded to the Edison Electric Co. Work was begun Aug. 17, and completed Sept. 10. R. A. Stewart, C. A. Mast, Dr. A. Blair and others are interested.

OMAHA.—Considerable material has been received for the new line in South Omaha and work will be pushed rapidly.

New Jersey.

ASBURY PARK.—Contractor A. A. Taylor is rapidly completing the new power house of the Seashore Electric Railway plant, recently destroyed by fire.

NEWARK.—In the Chancery court the papers have been filed in suits between the Newark Passenger Railway Company and the Newark & South Orange Horse Railroad Company, in the matter of the use of the tracks of the former company between Plane street and the Market street railroad station. The owners of the tracks want to compel the South Orange Line to pay a tariff of 1 cent per passenger for the privilege of running its cars over the tracks.

ORANGE CITY.—G. F. Seward, of the Fidelity & Casualty Company, has bought the interest of Edward A. Pearson in the Orange, Crosstown & Bloomfield Railway Company. Important extensions are contemplated.

WOODBURY.—A determined effort is being made to put through the electric line between Woodbury and Camden. \$30,000 has been subscribed by citizens and it bears all the appearance of a "go."

New York.

BROOKLYN.—The Brooklyn & Coney Island Railroad Company has contracted for equipment with the Short Electric Railway Company.

LOCKPORT.—The Street Railroad stock has been bought in by the United States Railway Equipment and Construction Company, by C. H. Lawrence, general agent. The former stockholders say the deal is an advantageous one.

NEW YORK.—Fifth avenue residents in large numbers have given their consent to allow the company incorporated in 1885, to build its line along that aristocratic way. It is expected that the legislature will repeal all obstructing laws. Col. Elliot F. Shepard is the strongest opponent.

THE Broadway cars are now using the new cable track from the lower end as far up as Cortland street, and they will soon have the use of the line as far as the postoffice.

ERASTUS WYMAN proposes to build a large electric station on Staten Island, to operate by electricity the old Belt Line which recently failed and establish a large number of new lines, opening up territory at present without facilities.

ST. GEORGE.—A company has been organized to operate an electric road between Prohibition Park and Port Richmond. Dr. I. K. Funk, Col. Cheves and Calvin Detrick are among the promoters. They hope to open the line before next season.

SYRACUSE.—On October 1st, the railway on South Salina street will go into use. The railway will be double-tracked and equipped electrically. If practicable, storage batteries will be used. The new offices are on the site of the old waiting-room on North Salina street.

New Mexico.

ALBUQUERQUE.—The Electric Street Railway Company has bought the horse road out for \$26,000.

Ohio.

BEREA.—Engineers are now at work surveying for the proposed street railway between this city and Cleveland. The company is known as the Berea Street Railway Company. The grading will be done this month and the line equipped with electricity.

CINCINNATI.—The Pendleton, Mt. Lookout & East Walnut Hill Railway Company will change from dummy to electricity this fall, and add 2 miles of track.

AS SOON as the street improvement is finished, a new electric road will be operated. The road will run to Shillito street Sept. 1.

COLUMBUS.—The matter of crossing the Panhandle Road by the electric lines of the Consolidated Street Railway has finally been settled, and it has been decided to build a trestle 850 feet in length, which will carry a double track and enable cars to cross the tracks of the steam road in perfect safety. Some 250,000 feet of lumber will be required for the trestle, which will be for the exclusive use of street cars. It will be a great improvement over the old tunnel.

A NEW company has petitioned for a right of way to construct new lines on a number of streets in this city. The officers are President, H. M. Littell, Cincinnati, president and manager of the Cincinnati Incline Plane Railway Company; Secretary, James M. Doherty, Cincinnati; Treasurer, Edward Bultman, Cincinnati; directors, St. John Boyle and J. W. Gaulbert, of Louisville.

The proposed electric road connecting this place, New Albany, Johnstown and Granville has been incorporated with a capital stock of \$200,000. The following are the promoters. William Shepard and ex-Councilman Felix Jacobs of Columbus; Rufus Clark of Gahanna, S. H. Ewing of New Albany, W. R. Rusler and J. W. Lake of Johnstown.

The Columbus & Johnstown Electric Railway Company has been incorporated; capital \$200,000. The incorporators are W. Shepard, Felix A. Jacobs, Rufus S. Clark, S. H. Ewing, W. B. Rusler and J. W. Lake. The road will connect several to vns and carry freight and passengers.

CLEVELAND.—Engineers are now at work surveying the road-bed for the proposed street railroad between Cleveland and Berea, which is to be built by the Berea Street Railroad Company. The work of grading will be commenced during the present month and the tracks will be laid as soon as possible. The road will be equipped with electric motors of the latest design.

DEFIANCE.—The Electric Railway is considered a sure thing. The citizens are anxiously working for its success and the Chicago capitalists who are to buy out the Electric Light works will rush the matter through.

WARREN.—The franchise has been granted for electric lines to Niles. The road will be built on one side of the highway. J. Lathey of Cleveland and A. B. Camp of this place are interested.

EAST LIVERPOOL.—Messrs. Kelly and Hill of this place are succeeding nicely in securing right of way for the proposed electric railway to operate between this place and in the town of Wellsley.

YOUNGSTOWN.—An ordinance is pending in the city council for an electric line on Wood and Elm streets.

TOLEDO.—All the cars now running in East Toledo are electric.

Pennsylvania.

ASHLAND.—The Ashland-Centralia Electric Railway are taking subscriptions of \$50 per share to add a \$30,000 extension to Locust Dale.

HAZELTON.—Charter has been granted to the Hazelton and Suburban Street Railway Company, Hazelton, Luzerne county; capital \$30,000. Directors, E. P. Kisner, William Lauderbach, F. W. Cooper, Hazelton; J. E. Kerr, Jeansville; G. R. Bedford, Wilkesbarre.

LEBANON.—The Electric Railway is now running motor cars, having beaten all the cranks who tried to stop rapid transit. Seven cars are now on the track with 16 hours per day at a 5 cent fare.

PITTSBURG.—The Pittsburg, Alleghany & Manchester Railway will begin operations about October 1st.

PHILADELPHIA.—The Southwestern Passenger Railway has been granted its petition by the court of common pleas and allowed to surrender its charter. It was found inexpedient to construct the railway, and the money advanced has been proportioned among the grantors.

POTTSVILLE.—A movement is on foot to unite Tower City with the Brookside Colliery, 1½ miles away, by railway for freight and passenger.

THE Schuylkill Electric Railway Company show a net profit of 12 per cent. on the entire stock of the road, and the stockholders have authorized an issue of additional bonds to take care of the new work.

NORRISTOWN.—The Norristown Passenger Railway Company has been chartered. Capital stock is \$50,000. Passengers carried last year, 180,604, but no dividends declared. One accident occurred last year.

READING.—The city council defeated the permit for an ordinance for the Passenger Railway to change from horses to trolley on one of their lines.

SCRANTON.—The People's Street Railway is building a large powerhouse, which will be completed by December 1st.

SUNBERRY.—H. E. Davis has been elected president of the Northumberland Street Railway Company.

WASHINGTON.—The Electric Railway Company has issued tickets for working men at 50 for \$1 50, not good Sundays or holidays, and only from 6 to 7 A. M., 12 M. to 1 P. M., and 5 to 9:30 P. M.

Rhode Island.

NEWPORT.—The stockholders of the Westerly and Jewett City Railroad have accepted the charter granted at the recent session of the General Assembly, and elected directors.

PROVIDENCE.—The Interstate Electric Railroad is soon to be a reality. It will extend from Plainville, Mass., through North Attleboro, Attleboro, Pawtucket and East Providence to Bullock's Point.

Dakota.

HOT SPRINGS, S. D.—The electric light people talk of putting in an electric railway, to be driven by the same plant.

Tennessee.

CHATANOOGA.—The East Montgomery Electric Line has been opened and is already carrying a large business.

NASHVILLE.—Joseph Wheelless, Jr., has brought suit against the United Electric Railway for \$10,000 damages, alleged to have been sustained by being ejected from a car for refusing to pay fare in addition to a transfer ticket, which was not presented at the proper place.

Texas.

AUSTIN.—The Austin Rapid Transit Railway has been authorized to increase its capital from \$200,000 to \$350,000.

DALLAS.—The financial difficulties of the Dallas Cable Road have been settled and work will be resumed and completed without further loss of time.

GALVESTON.—A double electric railway track is being put down from Main to Caroline street. It is a few days' work.

HOUSTON.—The Houston City Street Railway has secured an injunction against the City of Houston and the Rapid Transit Company to prevent the latter from building or operating on any street in the city, and enjoining the city from building a tunnel under the Central Railway tracks for the exclusive use of the Rapid Transit Company.

Utah.

SALT LAKE CITY.—It is announced that the West Side Rapid Transit Company has secured \$500,000 of Eastern capitalists with which to extend to the Lake. Plans for the new power house are being made.

THE Hot Springs Railway Company, to encourage the building along its line of the houses of working men, has lowered the fare to a nickel before 8 A. M. and between 5:30 and 7:30 P. M. The "loop" at the Springs is completed and is being used.

Washington.

NEW WHATCOM.—The Dooley-Waity Electric Street Car Company has been awarded the contract for the construction of four miles of track to Whatcom lake, to be completed before January.

PORT TOWNSEND.—The rolling stock of the new Belt Line Street Railway in Port Townsend has arrived and cars commenced running on Thursday. The new street railway gives Port Townsend about 11 miles of electric line.

SPOKANE.—Minnehaha Park residents are backward about assisting the Ross Park Electric Railway people to build their line out to Minnehaha. The road will run cars every 30 minutes at 5 miles for 5 cents if the citizens will lay the track.

Wisconsin.

RACINE.—The Racine street railway system was sold to a St. Louis syndicate, represented by C. H. Holmes, for \$50,000. The property disposed of consists of 7 miles of track, 12 cars, 18 horses, and the barn and barn furnishings. The syndicate will ask a franchise for 5 miles of new track, and will entirely reconstruct its lines, making the track standard gauge. An electric plant will be put in and motor cars substituted for horses. The sum of \$100,000 will be spent in improvements.

ALLEN SHUMAN, the new superintendent of the Street Railway Company, formerly of St. Louis, entered upon his duties September 1st. He says the road will be run by electricity by the first of next June.

Chicago.

CHICAGO.—When in Europe recently, President Yerkes, of the North Chicago Street Railway, purchased a twenty-five ton cable, which arrived a few days ago. It is subject to a duty of sixty per cent, which amounts to \$1,600.

CONSIDERABLE excitement was occasioned recently by a report that the tunnels under the Chicago River used by the West and North Street railways were in an unsafe condition and liable to fall in at any time. Expert engineers have made a careful examination and have reported that there is no truth whatever in the report. The Washington tunnel especially is so dry it would make a passenger thirsty to ride through it.

THE West Chicago Street Railway will extend its Milwaukee Ave. cable line to West Forty eighth Street. Right of way has been secured.

RUMOR has it that a company is forming to build an Electric Railway to Riverside from the terminus of the Blue Island Ave. cable.

THE Chicago South Shore Railway Company has been incorporated, capital stock is \$500,000. The new company proposes to build and operate street car lines in the South Division of Chicago.

THE street railway companies made their quarterly contributions to the city exchequer at the rate of \$50 a year for each car making thirteen round trips a day. The amounts paid in were: Chicago City Street railway company, \$4,498 75; West Division Street Railway company, \$4,717 74; North Chicago Street Railway company, \$2,417 50.

THE Ogden Street Railway company has been incorporated, object, to build street railways in Cook, DuPage and Kane counties; capital stock, \$2,000,000; incorporators, Houston C. Adcock, Edward P. Towne and Nathan G. Moore.

JOHN CREPPA, a Greek fruit vender is held in default of \$3,000 to appear before the Criminal Court for tampering with the North Side cable switch.

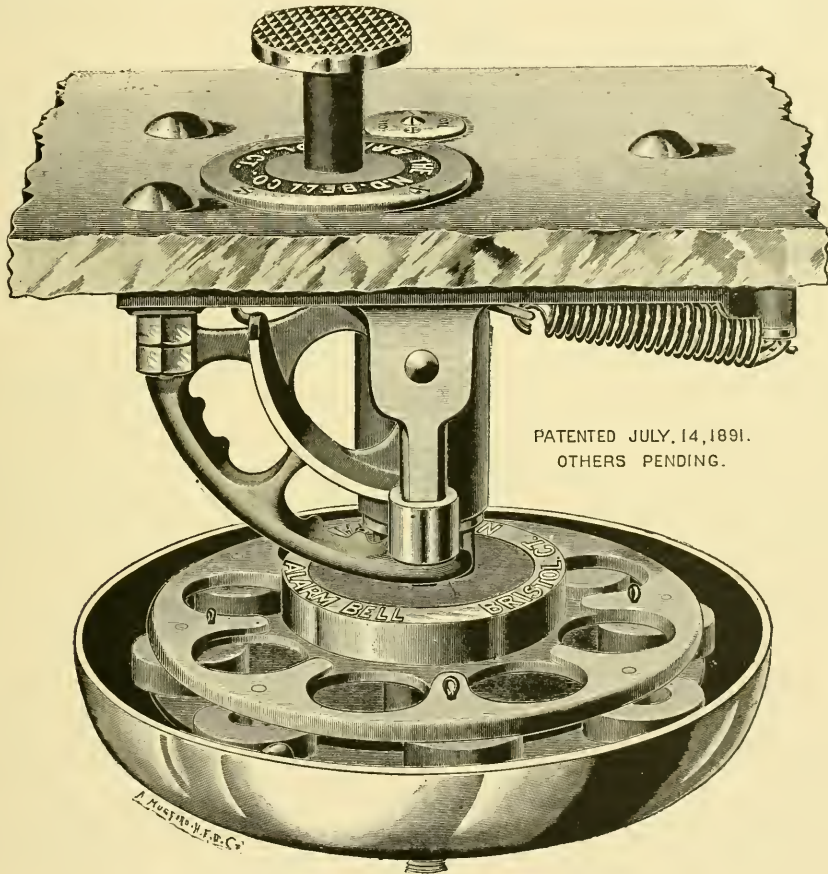
C. L. BONNEY, M. A. Bonney and L. C. Bonney are the incorporators of the West and South Towns Horse Railway Company, to construct a horse railway on Twenty-second and other streets from Lawndale to Lake Michigan. The capital stock of the new company is \$100,000.

THE Cicero and Proviso Electric Company has finished its Harlem extension. The first Sunday passengers were carried over it over 13,000 passengers were registered.

The New Departure Bell.

A better name could not have been chosen than the above, to describe the very novel bell illustrated herewith. When electric cars came into general use, and the speed of the horse cars was double, a necessity arose which had never existed, for a far sounding bell, whose warning notes would precede the car sufficiently to give ample time for people and vehicles on the track to clear the way before the car caught up with them and suffered a delay. In a degree which may be pronounced as perfect does the New Departure Bell accomplish this, for its operation is such that when the hammer strikes

fall on one point of the rim, thus producing crystallization and eventual cracking, but are equally distributed at every point, insures a long life that is practically without limit. The bell has sprung into popularity at a bound and has been endorsed by all who have tried it; while car builders pronounce it perfect. It is already in use on many of the largest cable and electric roads in the country. A single order for these bells amounting to \$12,000, was placed only a few days ago, undoubtedly the largest order ever given for street car gongs. The bell is simple and effective, not expensive in first cost and requires no repairs. It is meeting with phenomenal success, but fully deserves



PATENTED JULY 14, 1891.
OTHERS PENDING.

the gong the contact is for such an infinitesimal part of a second that the note is clear and sharp and remarkably penetrating. While the blows are rapid yet they are produced by the slightest touch and the strokes may be one or many at the will of the operator, who has only to touch his foot to the button and the response is as quick as if resulting from the closing of an electric circuit. There is none of the "treadle" motion which requires the operator to stand on one foot while striking the bell, and its use does not cause the least fatigue. The hammers are anti-friction and strike the gong with a sliding blow, which combined with the fact that the blows do not all

all the commendation received. The works are at Bristol, Conn., and the general office at 113 Chambers street, New York, where John H. Graham is in charge. Listen for the "New Departure" at Pittsburg, where it is already in service on some lines and will be on exhibition on the boat.

THE Philadelphia Traction Company, capital stock \$5,000,000, has filed its annual statement with the Secretary of Internal Affairs. The statement shows that the running expenses of all its car lines in Philadelphia were \$2,238,876.53, and the total receipts \$3,551,035.02.

PORTLAND POINTERS.

From our own correspondent.

PORTLAND, ORE., Sept. 9th, 1891.

The consolidation of the Willamette Bridge Railway Company and the Transcontinental Railway Company, under the name of the City & Suburban Railway Company, took place September 4th, with a capital stock of \$1,000,000. This places a trackage of 45 miles in the new company, and combines the two principal lines of the East and West Side. The Willamette Bridge Railway Company has been operating an electric line, consisting of the Waverly-Woodstock, the Mount Tabor and St. John's lines, while the Transcontinental has a horse-car line of about 21 miles. This will be changed to electric at once, most of the poles being already up. The system will be Thomson-Houston, and Pullman is building twenty-five closed cars, double trucks, for this road. All the cars of the East and West Sides will pass at Third and Morrison streets, Portland. The time set for the new deal to be in complete operation, is January 1st, 1892.

The officers of the new company are: Henry Failing, president of the First National Bank, president; C. F. Swigert, former secretary and treasurer of the Willamette Bridge Railway Company, secretary and treasurer; H. C. Campbell, former president of the Willamette Bridge Railway Company, general manager, and J. W. Campbell, general superintendent. The remaining directors are, C. A. Dolph, Rufus Mallory and Tyler Woodard.

The Portland & Vancouver Railroad is placing new street-rails of a heavier pattern on its road at the Columbia river.

The contract has been let for the extension of the Mt. Tabor Line 2 miles east of the present terminus, to be completed and in operation December 1st. Steam-power Baldwin motors will be used.

The Union Power Company will be completed the 15th inst. Five 500-horse-power dynamos will be used. The City & Suburban Railway Company will use power from that station.

The Cable Railway Company is extending its line to the City park. The Alder Street Line has been made a branch line and the main line extended down Fifth street to the Union depot.

Mr. Noble, formerly district engineer of the Edison Company, has gone to Vancouver, B. C., to take charge of an electric railway there. The new single-reduction Edison motors will be used on the cars.

The Mt. Tabor Railway Company has been ordered by the council to complete all its lines by January 1st, 1892.

The Metropolitan Railway Company has completed its track to River View cemetery and placed a funeral car on the line. It has been well patronized.

KANSAS CITY people can now ride eleven miles for a nickle, as transfer arrangements have been made between the Ninth street and L roads, and President Smith, of the Kansas City line, says that, "at a half cent a mile people ought not to wear out shoe leather in walking very far." The populace appreciate the favor.

STREET RAILWAY PATENTS.

Selected list of patents relating to Street Railway Inventions, granted during the past thirty days; reported especially for the "STREET RAILWAY REVIEW," by MUNN & Company, Patent Attorneys, 361 Broadway, New York.

ISSUE OF AUGUST 11, 1891.

Pole Trolley and Stand for Electric Street Railways	
.....T. E. Adams, Cleveland, Ohio,	457,334
Trolley Pole for Electric Railways, C. A. Lieb, New York, N. Y.	457,356
Electric Car Motor, C. O. Mailloux, New York, N. Y.	457,357
Friction Gear for Electric Motor Cars, C. O. Mailloux, New York, N. Y.	457,359
Trolley for Electric Railways, S. H. Short, Cleveland, Ohio	457,377
Trolley, S. H. Short, Cleveland, Ohio	457,378
Electric Railway, M. H. Smith, Halifax, England	457,382
Street Railway Switch, H. H. Olds, Indianapolis, Ind.	457,497
Fare Box, T. Mangan & J. P. Buckley, New Orleans, La.	457,545
Hanger for Trolley Wires, N. Newman, Springfield, Ill.	457,660
Electric Railway, R. M. Hunter, Philadelphia, Pa.	457,736

ISSUE OF AUGUST 18, 1891.

Closed Conduit System of Electric Propulsion, W. B. Heron, Brooklyn, N. Y.	457,778
Condenser, (for Street Car Motor), W. E. Prall, Washington, D. C.	457,791
Street Car Motor, W. E. Prall, Washington, D. C.	457,792
Street Car Motor, W. E. Prall, Washington, D. C.	457,793
Electric Car Truck, T. Tripp, Avon, Mass.	457,802
Electric Railway appliance, F. E. Degenhardt, Chicago, Ill.	457,836
Electric Railway System, M. Shoemaker, Sioux City, Iowa	457,870
Electric Railway System, S. E. Wheatley and J. W. Schlosser, Washington, D. C.	457,944
Car Replacer, J. A. McCray, New York, N. Y.	457,972

ISSUE OF AUGUST 25, 1891.

Sand Box for Street Cars, J. M. Harper, Peoria, Ill.	458,166
Motor Truck, G. M. Brill, Philadelphia, Pa.	458,216
Step Hanger for Street Cars, L. Pfingst, Boston, Mass.	458,373
Support for Trolley Wires, J. H. Palmer, Boston, Mass.	458,427

ISSUE OF SEPTEMBER 1, 1891.

Grip for Cable Cars, G. B. Hansell and M. S. Gill, San Francisco, Cal.	458,574
Electric Railway System, W. H. Knight, New York, N. Y.	458,582
Electric Railway, W. H. Knight, N. Y.	458,583
Electric Motor Truck, W. H. Knight, New York, N. Y.	458,584
Conduit for Electric Railways, F. E. Degenhardt, Chicago, Ill.	458,619
Electric Trolley or Contact Wheel, F. E. Degenhardt, Chicago, Ill.	458,620
Sand Box for Cars, G. T. Drew, Omaha, Neb.	458,621
Conduit for Electric Railways, E. E. Keller, Chicago, Ill.	458,630
Electric Railway, H. A. Seymour, Washington, D. C.	458,665
Electric Railway Conduit or Contact Device, W. H. Knight, New York, N. Y.	458,747
Street Railway Switch, A. Machalup, Leipsic, Germany	458,790
Electric Car Mechanism, W. E. Badger, West Quincy, Mass.	458,800
Electric Railway, L. A. Dion, Natick, Mass.	458,841
Closed Conduit for Electric Railways, C. J. Van DePoel, Chicago, Ill.	458,866
Electric Railway, W. C. Wright, Philadelphia, Pa.	458,931
Electric Railway, W. C. Wright, Philadelphia, Pa.	458,932
Controlling Dynamo Machines for Electric Railways, S. H. Short, Cleveland, Ohio	458,956
Apparatus for Warming and Ventilating Street Cars, J. B. Platt, Augusta, Ga.	458,982

In alighting from a horse car in New York City recently, a man slipped and went under the car. Although his name is Pepsin he may not die "jest yet."

An English victim of his own carelessness was decapitated by an elevator, and at the inquest, says a contemporary, naively, "the solicitor for the company said the latter sympathized with the friends of the deceased." English corporations, at least have souls. American relatives would have risen to ask "how much," to the solicitor's solicitude.

Electric Merchandise Company,

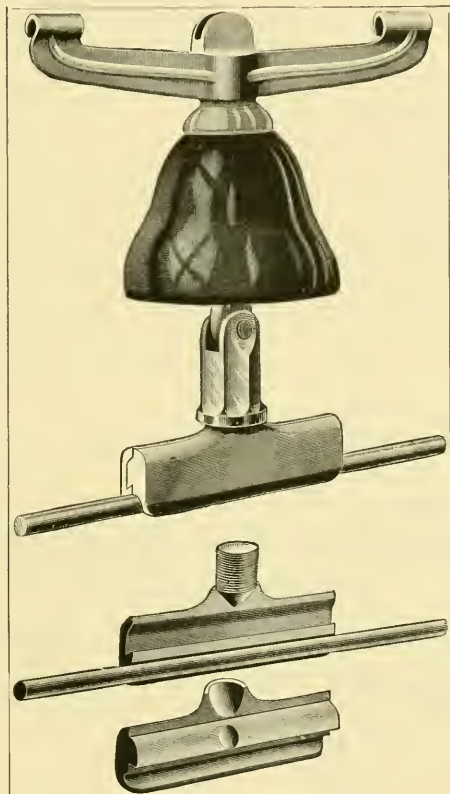
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W. R. MASON, General Manager.

THERE are, at the present date, 980 railway companies in the United States, and 26 in Canada. Of this total of 1,006, electric roads number 334 under the stars and stripes and eight in the Dominion, while the cable amount to 53, all of them in the states. Of this number, we are glad to say, but very few are not visited regularly by the STREET RAILWAY REVIEW.

NO STREET cars are to be seen in the city proper of London. The outlying districts, however, have 1,000 cars daily on 120 miles of track, but none are permitted on the crowded thoroughfares. The cars are all "double-deckers and as every passenger has a right to a seat, when the car is full no more are permitted on board.

DURING the excavation for the electric road to connect Jamestown, N. Y., with Lakewood, the workmen unearthed the bones of a man and woman of remarkable size: both plainly having been giants. A somewhat significant fact is that while the skeletons were well preserved, and the lower jaw of the man intact, that of the woman was entirely gone.

THE Columbia Coach people have succeeded beyond their expectations and wildest dreams in interesting the female world in the conductorship of their new vehicle.

Over fifty applications are now in from all over the United States. The Philadelphia fair are most numerous in their ambition to ring up fares.

THE SHORT ELECTRIC RAILWAY COMPANY will have a fine exhibit at Pittsburg and be represented by Prof. S. H. Short, president; Edward, E. Higgins, general manager; J. Potter, vice-president; J. H. Gibson, superintendent of construction; Wm. Hazelton, 3rd; R. C. Garhart, F. J. Willson, Alex. Kempt, F. F. Downes, W. S. Atchison, W. L. B. G. Allen, Frank A. Rogers, and others.

To Convention on the B. & O.

The Baltimore & Ohio has now on its one and a third reduction list the American Street Railway Association Convention at Pittsburg. To those who do extensive traveling it is needless to recommend the B. & O. route, and to those unacquainted as yet with its magnificent accommodations, quick time and general good service the nearest B. & O. agent can give him points. Pullman sleepers, dining cars and the best of service will give to any parties attending the Pittsburg convention a quick, comfortable and beautifully scenic trip.

Trains leave Chicago at 10:25 P. M., 6:15 P. M., arriving at Pittsburg at 7:30 P. M. and 11:55 A. M. respectively, or leave at 10:25 P. M. and 2:55, arriving at 8:50 and 8:25 P. M. following.

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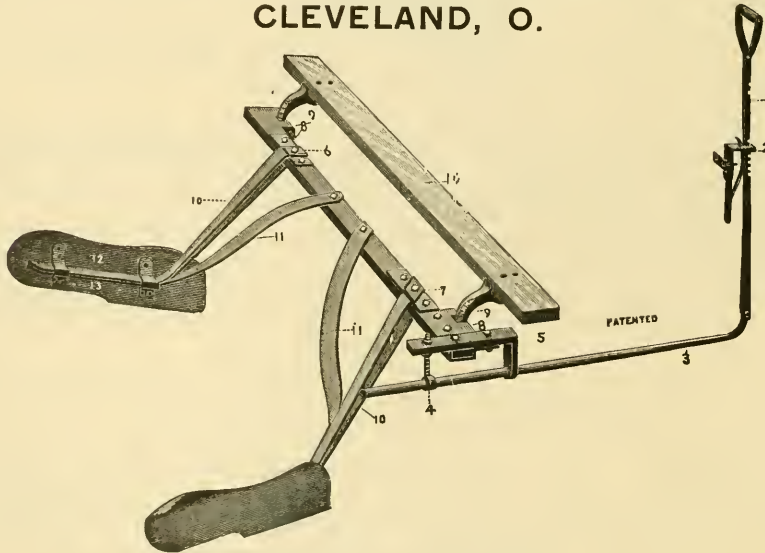
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H. H. WINDSOR, Editor. F. L. KENFIELD, Business Manager.

CORRESPONDENCE.

We cordially invite correspondence on all subjects of interest to those engaged in any branch of Street Railway work, and will gratefully appreciate any marked copies of papers or news items our street railway friends may send us, pertaining either to companies or officers. Address:

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VOL. 1. OCTOBER. NO. 10

Although the 15th is our publication day, the **STREET RAILWAY REVIEW** has been delayed a few days in order to contain a full report of the Tenth Annual Convention of the Street Railway Association, which will be found elsewhere.

THE committee appointed to recommend rapid transit for New York is still struggling with the problem and to all appearances is getting the worst of it. Papers and public are getting impatient for some sort of definite progress and decision.

THE attempt to induce the attorney general to use the name of the commonwealth in a proceeding to forfeit the franchise of the East Harrisburg railway, for operating its cars on Sunday, has failed, that gentleman refusing to be a party to such senseless action.

A PAPER in Detroit comments on what it terms the "divine right" of street railways. Some papers apparently are laboring under the delusion that railways have no rights at all. If there were no street railway lines in Detroit that paper would soon cease to exist.

AS in former years, the report of the Executive Committee was a brief summary of the progress of railway interests during the past twelve months, the most important feature being the recommendation to publish for examination in advance of meeting all papers to be read at the annual convention.

THE paper on "A Perfect Electric Motor," by H. A. Everett, was intensely interesting, and incidentally recounted the failure of his company with a conduit system early in 1883. Mr. Everett's road in Cleveland is one of the largest and best in the country and his paper

is full of suggestion. He predicts electrically propelled trains on two-hour headway between Chicago and New York, within a very few years.

THE report of the committee on the "Dependent System of Electric Motive Power," is an exceedingly valuable contribution and received many words of praise at the convention. Mr. Mansfield has treated the subject in a very able manner, and his paper throughout is full of suggestions to the progressive manager. His defense of the overhead wire is strong and convincing and should be published in every paper of the land.

WE note complaints from several parts of the country of injury to trainmen on moving freight cars, from being struck by trolley wires stretched across the railroad track. Such carelessness is as criminal as it is needless, and companies who do not want a nice string of damage suits, which will be hard to defend, will do well to raise their wires at such places before the jury lowers the dividends.

CLEVELAND, which has been chosen as the place of the next meeting of the American Street Railway Association, is a most beautiful city, centrally located, and is now operating successfully by cable and electricity. The gentlemen, on whose invitation the association has decided to go to Cleveland, promise every necessary facility to make the meeting a grand success, and there is no doubt that the eleventh annual will be the most important ever held.

THE paper by James C. Robinson, now of London, England, on "The Progress of Cable Motive Power" is the most comprehensive and thorough resume of the subject of cable traction which has yet been written. Mr. Robinson traces the development of the system from its incipiency to the present day, and shows 700 miles of cable road successfully operating at the present time; by far the greater part of which has been built within the past three years.

THE question of the storage battery certainly received more attention than on previous occasions, but there seemed but one opinion in the matter—viz.: the storage system has not yet reached a point commercially valuable for railway work. Mr. Holmes, of New York, summed the whole story up when he showed the storage battery to yield in actual propulsion of load but 53 per cent. net of power generated, against 68 per cent. net by trolley system. That 15 per cent. thus lost would alone do the work of a small road, and on a large one represents a big coal pile.

IN his most incisive and masterly discussion of "The State Treatment of Corporate Property" Mr. G. Hilton Scribner strikingly brings out the radical injustice which characterizes the exceptional burden of taxes as allotted corporations by the state of New York; and clearly portrays the oppressive discrimination as a step "in the direction of state distribution of wealth, without

regard to ownership." That one-fourth the property should bear the entire expense of the greater part of the state machinery; of which the one-fourth receives no more than, and in many cases none of the benefits enjoyed by the other three-fourths, is not only absurd but a positive wrong. Majorities may make laws but in this instance the laws are basely iniquitous.

ANNUAL address of the president was especially good and contained the result of a vast amount of research on his part, prominent among which are the following figures: Total number of miles in operation, 11,030, requiring 36,517 cars; companies, 1,003; companies building new lines, 75; number of horses withdrawn from service during the year on account of mechanical power, 28,681.

In his reference to street railway papers, Mr. Watson very kindly complimented the earnest endeavors of those engaged in this work and recommended that every company shall provide their local papers each with a copy of the street railway publications as missionary documents. His address throughout is dignified and reflects great credit upon the president and the Association. His address received hearty and deserved applause.

THE metropolitan influences which follow in the wake of extensions of existing lines, or the construction of new ones into a previously unoccupied territory, receive one of their best illustrations in the description of some of the Seattle street railways, found elsewhere in this issue. The Ranier avenue electric line is as essentially a pioneer as any steam road which ever penetrated an unknown and unsettled country. For several miles the road passes over a route which it was necessary to open by cutting through the forest, where wagon roads even did not exist. It is but another of the many instances which go to prove the enterprise, energy and far-sightedness so essential to the make-up of the successful street railway man of the present intensely active time.

THE general public express themselves more often and to a greater extent on how they would manage a street railway, than on any other business of which they know as little. On occasions of great public demonstrations and holidays passengers swarm upon the cars with a reckless disregard of safety, and compel the company to haul a load fully three times as great as on ordinary occasions. Then it is that each passenger is seized with jealousy on account of the enormous profits the road is supposed to be making. As a matter of fact, such days of abnormal travel are almost always less profitable to a road than an ordinarily fair day's regular business, for the reason that passengers are more apt to be injured, and under the excitement of the crowd and rush they take far less precautions than at other times, and when injured through their own criminal carelessness expect the road to compensate them with damages, reaching into tens of thousands. When to this is added the tremendous strain on rolling stock, often causing a greater depreciation than

a whole month of legitimate use; and the loss of fares which it is impossible to collect, it will be seen the "big days" are not the best for the street railway, as the over-wise and knowing passenger so confidently asserts.

ON another page will be found an illustrated description of a system of track placing which has proved remarkably successful in Rochester, N. Y. On a street 72 feet wide, half that distance is reserved in the center for driving, and the other half is divided into two strips of 18 feet each, and located between the sidewalk and the curb. On these strips which are nicely turfed, the car tracks are placed, and the combination is at once pleasing and practical. But for the rails which are scarcely seen, no one would suspect the presence of an electric line;—the poles and overhead wires being as effectually hidden by the trees and their branches. In a large number of our cities the streets are already laid out so as to permit of this plan's adoption. It would seem to be an urgent matter for managers to carefully examine the system and as new streets are laid out in their own cities, bring the question before their Board of Public Works and endeavor to secure the adoption of some such plan. The saving in paving alone, on a line for even a few miles would reach into the thousands; and when one reflects on the saving in repairs, and the ease with which joints can be reached, the prospect of that extra dividend is largely augmented.

CITIZENS of the place in which a convention is held, very naturally are attracted by the display of appliances, and at the last convention, at many hours of the day, so crowded the boats and halls that it was next to impossible for the delegates to get within several feet of the exhibit which was primarily intended for them. Many swarmed in who were drawn from curiosity alone, and who never had and never will have any direct interest in the business. While the citizens are undoubtedly entitled to a hearty welcome and will always be so received by supply men, they should expect to be allowed inspection at hours not otherwise occupied by delegates. To accomplish this it would be a very easy matter to announce that other than members will not be admitted except during those hours when convention is in session, or otherwise engaged as a body. Or, if ample room is at hand in the hall, then admission only by pass, which should be supplied at the headquarters of the local committee, to whom most, if not all, of the applicants would be personally known. Exhibitors, also, should be supplied with the same in such quantities as desired, that they might give them to any they specially desired to call. This, too, would put an additional attraction on the display, and would protect the exhibitors from losses by theft, which may not have occurred this year, on account of special watchfulness, but have at almost every other place where the convention has met. "Members by button; others by pass," would by no means be a bad scheme, and would prevent none from admission for whom the display is intended. The plan is respectfully commended to our Cleveland friends.

A most valuable contribution, the first of its kind which has been presented to the Association, was the paper by O. T. Crosby, on "Standards in Electric Street Railway Practice". Development in street railways has been so rapid, involving so many new inventions, with their necessarily new coined names, that their interpretation of many terms is very different with different companies; so that at the present time there is practically no absolute method of comparison in the various departments which constitute the operating expenses of electric roads.

Mr. Crosby recommends and suggests a system of accounts which, if universally adopted, in part or in whole, could not fail to yield results of incalculable value by the time another convention rolls round.

IT is but fair in justice to our Pittsburg friends to appreciate their unsparing efforts to provide for the multitudinous wants of so great an undertaking as the convention of the American Street Railway Association. But, in spite of all their efforts it cannot be denied that the dividing of the exhibits among several places is a most unfortunate alternative, which in their case could not be avoided. The exhibit of railway appliances marking as it does more forcibly than is set forth by any other means the mechanical and inventive progress of the year, which in these days is great almost beyond belief, is already conceded to be the most important feature of the meeting. It is not, then, asking too much to expect of those who invite the association to their city that they may be able to provide all the necessary facilities requisite to take care of the display in one place, and with easy access to headquarters. The time of the visiting delegate is so occupied, that every minute is extremely valuable, and unless the exhibits can be placed under one roof, he may either lose what may be to him the most important branch, or consume time in going from one place to another, and never feeling sure he has inspected all.

THE number and kind of appliances to be shown has doubled during each of the past three years, and will beyond question continue so for a long time. Where the exhibits are placed side by side the visitor's opportunity for making comparison one with another is immeasurably better, and he is sure of not having missed anything crowded out in some obscure corner. While on many accounts it is pleasant to have the exhibits in the rooms of the headquarters hotel, we believe that all exhibitors would be better placed, better cared for, and would secure very much better results if they confined their display to the exhibition hall, and reserved their parlors for reception purposes. All would then be on the same basis, and none would feel that others were having an unequal advantage by reason of their better location. In this way also exhibitors would save no small expense, and secure two or three times the space in exhibit hall that would be available in the rooms of the hotel under the best conditions even, while facilities for setting up and arranging appliances would be incomparably better. The time has

now come when no one hotel is sufficient to accommodate all those in attendance at the convention, so that an exhibition at the hotel rooms is no more convenient to a large number of delegates who are quartered elsewhere than would be the exhibit hall.

TIME was when a street railway could send out and buy its legal advice on as short notice as a crate of wooden pails, and in some cases the purchased article was worth just about as much. Now, owing to the general expansion in the business, the rapidly increasing number of patent rights interested, and the frequent action on the part of legislative and municipal bodies, the attorney who has not carefully prepared himself, or who fails to keep in touch with the numerous important decisions in all parts of the country, is poorly able to cope with the perplexities which constantly arise. In the larger companies, one or more high-priced attorneys find constant employment; and in all the larger cities will be found legal advisors, who make a specialty of street railway work just as some other lawyers do of patent law, as in the medical profession, specialists become famous as oculists, or for any other particular and common difficulty. A member of one of the largest law firms in New York recently said: "Our firm does a general corporation business, but the bulk of it is street railroad work. That is the only great branch of law practice at the present time, and it will hold the field for ten years or more. In real-estate law, which once was so profitable for lawyers, there is little now doing. A large company has been organized in New York to guarantee titles to land, and it has ruined real-estate law. Patent law requires a man who is a good mechanic as well as a lawyer, and very few can succeed in it. Street railroads offer the rich field. They are in the same condition that steam railroads were years ago, when Commodore Vanderbilt consolidated eleven railroads in forming the New York Central. It is the era of buying, selling, rearranging and consolidating. The steam railroads have largely passed the stage, and railroad law is now left to the salaried railroad attorneys. But street railroads have just entered upon that period, and the demand for specialists in that branch of law is great." In this connection we call attention to the law reports appearing each month in the STREET RAILWAY REVIEW, and which are conceded to be the best compilation obtainable on the subject. Every attorney who has occasion to transact any business for street railways, or who expects to, ought to peruse these reports, and street railway managers should see that their attorneys are thus supplied.

TO those who attended the earlier conventions it is quite amusing to recall the anxiety with which many delegates used to ask the question, "What will the Association have to discuss to keep it alive?" In those days, horse-colic, distemper, sour feed and corns were literally vital questions, and many were the learned papers relating experiences with epidemics and balky horses. Now, instead of lack of topics, three days are all too short to cover half the new issues that arise between conventions.

THE PRESIDENT ELECT.

A MORE fitting choice could not have been made for the chief executive of the American Street Railway Association than was consummated in the very hearty and unanimous election of Mr. Homes. He is a progressive, practical business man, a successful railway manager, and one who, while preserving the dignity of the office will be found a pleasant and agreeable gentleman. His untiring efforts as chairman of the local committee of arrangements were highly successful in insuring the comfort and convenience of the delegates and was fully appreciated.

John G. Holmes was born in Pittsburg and has spent the greater part of his life in that city. He attended Dickinson College at Carlisle, Pa. In 1866 he entered the banking house of N. Holman & Sons, which was established in 1822, and is now in the hands of the third generation with name unchanged. Mr. Holmes is now one of the members of the banking firm.

Mr. Holmes street railway experience began in 1859, when he affixed the ribbon to the first bonds of the Citizens' Passenger Railway Company, the first street railway west of the Alleghany mountains. This road began at the corner of Penn avenue and Sixth street, then the business heart of the city, and extended out from Penn avenue to Laurenceville where the United States Arsenal now is. In 1871 he was made the treasurer of the company, and in 1888 was elected president—an office which he has continued to hold ever since. In 1888 the entire system was converted into a cable line. (See article in September *STREET RAILWAY REVIEW* on Citizens' Company, for further data.)

Mr. Holmes attended the first meeting of the American Street Railway Association after the organization, and has missed very few of the annual gatherings, and served on the executive committee in 1883-4.

In addition to his banking and street railway connections Mr. Holmes is prominent in other public enterprises and regarded as one of the brightest and progressive young business men in the city. His many friends feel that they can share the honor which his election has brought to the city of Pittsburg.

THE South Staffordshire & Birmingham District Tramway Company have voted to adopt the overhead electric system. The mileage of this company last year was 500,000 on which they will effect a saving of \$30,000 annually by the change from horses to electricity.

W. W. DUNCAN, a leading London broker, has returned from a recent visit to the United States, and in his excellent monthly published report of stocks and bonds, has this to say on electric railways. "I know from my recent travels in America, that there is hardly a town of any size where the tramways, or at least a portion of them, are not worked by this overhead system of electric traction, and they appear to give every satisfaction, not only to the public generally, but also on the question of working expenses."

PERSONALS.

C. L. BULLIS has been elected superintendent of the electric road at Jackson, Mich.

N. T. STEELE, for several years past, superintendent of the Citizens' road in Indianapolis, has resigned.

W. R. MOORE, president of the Moline, Ill., railway, was in the city during the early part of the month.

DANIEL F. LEWIS, president of the Brooklyn City railroad, is being mentioned as a desirable candidate for mayor at the next election. Mr. Lewis would make an excellent mayor.

T. G. GRIBBLE, the engineer, of New York, was a recent caller. He is preparing an extensive article on rapid transit in its relation to augmenting travel and effect on determining the location of residence districts.

H. M. WHITNEY, president of the West End road, Boston, accompanied by S. E. Peabody, R. Hapgood and H. F. Woods, directors, paid a visit to Chicago, after which Mr. Whitney left for a trip to Pacific coast.

COL. FREEMAN, formerly of Chicago, now of Villaredo, Mexico, called recently, and announces his mule line of three miles is to be electrified, upon the occasion of which event, he proposes to astonish the natives.

A. BARTLETT, superintendent of the Syracuse, N. Y., Consolidated, accompanied by his wife, started on a western trip immediately after leaving the convention and will visit Tacoma, Portland and San Francisco before their return.

HERMAN F. ROGERS, who has been the efficient general manager of the Huntington, L. I., Horse Railway since the opening of the road, has resigned to occupy a more lucrative position in New York. The board of directors presented him with a handsome silver set.

A. BEVIER, who was for eight years general manager of the railway interests in Grand Rapids, Mich., and who on account of overwork, withdrew at the time the road was sold, is much improved in health and intends to enter the railway field again. His management of the lines there was a successful and popular one.

MR. W. H. BUTLER of Bristol, England, son of Wm. Butler Esq., chairman of the Bristol Tramways Company, was a caller at the *STREET RAILWAY REVIEW* office during the month. Mr. Butler has a very comprehensive knowledge of street-traction matters, and from his close observations and keen judgment has become well-informed in American railway matters during his brief visit.

A FRENCH inventor J. J. Heilmann, proposes to replace the existing steam train with one which shall generate its own electricity enroute from steam power and conducted to motors placed on every axle on the train. He expects to secure a speed of 80 miles per hour by this means.

A GREAT CONVENTION.

Big Attendance—Unbounded Enthusiasm—Magnificent Exhibit—Interesting and Comprehensive Papers
Showing the Wonderful Progress of a Year—Banquet, Excursion, and a Good Time Generally.

THE early morning train on Tuesday came in through a damp, drizzling atmosphere, bringing the advance guards. There were President Watson and Secretary Richardson, representatives of the street railway press, and a large number of supply men, who immediately set to work arranging and placing the exhibits. Further accessions were constant during the day, and at eleven in the evening the Lewis & Fowler special from New York came in with a large delegation. The corridors and halls presented a busy view as old friends welcomed one another—many for the first time since the parting of one year ago at Buffalo.

During the night the weather repented of its unseemly behavior, and Wednesday morning dawned clear and comfortably cool.

The view from headquarters, of the heights across the Monongahela river, as they rose majestically in the morning haze was a most inspiring one, and to the delegates from the west especially, called out many expressions of admiration.

The morning trains came in not only fully loaded, but in many cases composed of two sections, and the office of the local committee was a lively place; as fast as rooms could be assigned, the delegates returned to swell the throng which constantly grew in numbers until rapid transit was an impossibility. Most of the exhibits were ready for inspection at 9 o'clock, but represented lots of hard work and enterprise, many of the gentlemen having toiled all night in order to be in good shape for the opening day.

At 10:30 o'clock the convention hall, an oblong room, with the presiding officer's desk placed midway, was filled with representatives from street railways in every part of the country, Canada and even more remote places.

As a body the delegates present an unusually interesting, practical and intelligent class of men—men who are accustomed to grappling with the severest problems of modern street railway needs,—and surmounting them. A more manly, dignified and determined assemblage is rarely seen.

After President Watson had called the meeting to order the roll was called, after which the following companies applied for membership and joined the Association:

Schuylkill Electric Railway Company, Pottsville, Pa.
McKeesport & Reynoldton Passenger Railway Company, McKeesport, Pa.

Boston & Revere Electric Railway Company, Boston, Mass.

Second Avenue Passenger Railway Company, Pittsburg, Pa.

Allegheny Traction Company, Pittsburg, Pa.

Allentown & Bethlehem Rapid Transit Company, Allentown, Pa.

Amsterdam Street Railway Company, Amsterdam, N.Y.
Duquesne Traction Company, Pittsburg, Pa.

Lebanon & Annville Street Railway Company, Lebanon, Pa.

Shenandoah G. & A. Street Railway Company, Shenandoah, Pa.

Citizens' Street Railway Company, Pittsburg, Pa.

Vincennes, Indiana, Consolidated Street Railway.

Citizens' Street Railway Company, Vincennes, Ind.

Consolidated Street Railway Company, Syracuse, N.Y.

Pawtucket Street Railway Company, Pawtucket, R. I.

Citizens' Electric Railway Company, Mansfield, O.

Oil City Street Railway Company, Oil City, Pa.

Colorado Springs Rapid Transit Railway Company, Denver, Colo.

Letters from Past Presidents Julius S. Walsh, St. Louis, Mo.; C. B. Holmes, Chicago, Ill., and C. A. Richards, Boston, Mass., were read, expressing regret at their inability to be present at this meeting.

The address of the president followed.

The report of the committee was followed by the

OPENING ADDRESS OF PRESIDENT H. M. WATSON.

GENTLEMEN OF THE CONVENTION: The warmth of our reception, even in the preliminaries of this convention, proves that we made no mistake when we selected Pittsburg as the place of our tenth annual meeting. This city is famous for her hospitality. The glow of a thousand furnace-fires is reflected in the hearts of her people. Most of us learned this long ago. We are no strangers in Pittsburg. For years we have depended upon Western Pennsylvania for our iron, and in this new era of electric and cable power, very many of us must look to the Keystone state for our coal. A double reason, therefore, presents itself why we should cultivate the most cordial relations with the people of this section; but a deeper and more worthy sentiment than any motive of self-interest underlies our liking for this city—the bonds of fraternity. Six of the companies whose horse-car, cable and electric lines thread the valleys, and climb the hills which form the ups and downs of Pittsburg, are earnest and zealous members of our association, and while we are here, we hope to gather in the other companies also.

The most important matters to be discussed in convention will be the problems which arise in the application of electricity to street railway traffic. It is a source of no little satisfaction to us to know that in the development of the electric railway, America leads the world. Three years ago there were only thirteen electrical roads in the United States; now there are over four hundred, and the advices from every part of the country indicate that before the close of the present year, the number will be increased to five hundred. The capital now invested in American

electric railways exceeds \$75,000,000. "Horse sense" counts for but little in this age of rapid transit. We old dogs have been obliged to learn new tricks, and without the usual privilege of serving an apprenticeship. Our stables are being converted into power houses; the electrician has taken the place of the veterinary surgeon; our drivers are being educated as motor men, and most of us have horse cars for sale. It is well for us that at such a time, when a thousands unsettled questions perplex us, we can come together in this organization, with the memories of nine other gatherings still warm in our hearts, to exchange experiences, compare notes, and give to each other helpful information. Our cities and large towns are becoming as hungry for street railways as the people of the West are for steam roads, and the bulletins of the new census reports show that in fifty-four of the largest American cities, the mileage was nearly doubled between the years of 1880 and 1889—the figures being 1,683 miles in 1880, and 3,150 miles in 1889.

The following statistics have been compiled from returns made by street railway companies in the United States and Canada to the middle of September, and are believed to be as reliable as it is possible to make them.

Total number of miles,	- - - -	11,030
Number of miles operated by animal power,	-	5,443
" " " electricity,	-	3,009
" " " steam motors,	-	1,918
" " " cable,	- -	660
Total number of cars employed in St. R'y. traffic,		36,517
Number of cars operated by animal power,	-	25,424
" " " electricity,	-	6,732
" " " cable,	- -	3,317
" " " steam motors,	-	1,044
The number of horses employed,	- - -	88,114
" " " mules	- - -	12,002
" " " steam motors,	- - -	200
Number of companies operating St. R'y. lines,		1,003
" " " by animal power,		537
" " " by electricity,	-	412
" " " by cable,	- -	54
Number of companies engaged in building new lines, about	- - - -	75

It is interesting to note that since November, 1890, the number of horses employed on street railway lines, has fallen from 116,795 to 88,134; that is, 28,681 in one year. At this rate it will not take long to emancipate the horse from street railway business.

According to the official figures, taken from one of the street railway journals for the month of October, 1891, Philadelphia leads with 510 miles of single track. And after the Quaker City comes Chicago with 452 miles, New York with 289 miles, Brooklyn 285, Boston 283, St. Louis 275, Baltimore 207, San Francisco 205, Cleveland 192, Cincinnati 180, Pittsburg 168, Kansas City 141, New Orleans 139, Louisville 132, Buffalo 110, Minneapolis 101, Los Angeles 99, Detroit 94, Birmingham, Ala., 92, St. Paul 90, Washington 85.

The official figures of the census just completed show that in December, 1889, 476 cities and towns possessed

rapid transit facilities, and it is now difficult to find any town of 5,000 inhabitants without one or more street railways.

While a large majority of us are interested in electric street railways, electricity will not be permitted to monopolize this convention. One of the features prepared for us will be the report of a special committee on "A Year's Progress in Cable Motive Power." This is well. We should not become so deeply interested in any one form of rapid transit as to lose sight of the good points of all others. Where streets are straight, and grades are steep, and the traffic is limited only by the number of cars that can be operated, a well constructed cable system may have economic advantages that should be better understood. In our boyhood days a galvanic battery could always draw us away from the grindstone, and now, later in life, most of us find the dynamo, the engine, and the switch board of an electric power house far more attractive than the heavy machinery of a cable plant, but, if under any conditions the cable system will give the best possible service to the patrons of a road, and make a better showing than electricity on the balance sheets, we want to know it.

This convention is to be favored also with the third paper on the "Public Treatment of Corporations," by the Hon. G. Hilton Scribner, of New York. It is an old saying that corporations have no souls. Perhaps that is why they are prayed for so little and preyed upon so much. Most of us who have pooled our property, in the belief that we can accomplish more for the people whom we are seeking to serve, than by working, each with his individual capital, have felt often and most keenly the abuse and unjust burdens heaped upon our companies by those who seem to have no conception of what a corporation is, or why corporations are formed.

No doubt we would all be more than pleased if the ripe wisdom and sound common sense contained in these admirable papers by Mr. Scribner, preserved in book or pamphlet form, could be placed in every public library, and laid upon the table of every editorial room, where to promote justice is deemed an end more worthy than to nurse a prejudice.

The reports of the four special committees on electrical topics will certainly receive your closest attention, and should be discussed with the greatest freedom. If you have any well digested opinions, which do not accord with the conclusions of the committees, let us have the benefit of your thought and experience.

Since the introduction of cable and electric transit the Government, in its wisdom, has found a new use for the street cars. Some of our lines have been elevated to the dignity of United States Mail routes. The plan, in bold outline, is to place on all the cars convenient little boxes for the collection of mail, which is taken up and sorted at some central point, and the city letters sent to the substations, without any of the delays incident to the handling of the mails at the general post office. As an illustration of the workings of such a system there is on record a well authenticated instance of the travels of two letters, one of

which was dropped into a letter box on a lamp post in a large city, and the other sent from the same point at the same time, to the general post office on an electric car. A comparison of the envelopes, subsequently made, shows that the last named letter actually reached Washington, 400 miles away, at almost the same time that the letter dropped into the box was received at the general post office, only two miles away. In a city where all the cars come to a common centre the plan seems most feasible, and companies who have not given this matter due consideration will do well to consult their local postal authorities at an early day.

No doubt we shall all derive much pleasure, and reap great benefit, from the Columbian Exposition in Chicago in 1893. It will be learned with no little regret, that Mr. Charles B. Holmes has resigned from the World's Fair Committee. Mr. John B. Parsons of the West Chicago Street Railway has been asked to fill the vacancy, and happily for us, he has accepted the appointment. But, we shall not have to wait two years yet to learn what the inventors and manufacturers are doing. They are here with us in large numbers, and their exhibits are well worthy of a large share of your time and attention in the intervals of our business meetings.

Only those of us who at some time in the history of this organization have held the presidential office can have a clear conception of the large amount of dull routine work devolving upon the secretary and treasurer in the course of the year. If this Association grows and flourishes like a green bay tree, it is because he keeps the roots well watered. If our meetings prove rich feasts of good and wholesome things, it is because he is the caterer. We have been most fortunate in being able to continue in office for a term of years a gentleman so earnest and efficient in the discharge of all the duties of this important position as William J. Richardson.

This convention ought not to adjourn without expressing in some manner its appreciation of the able work of the street railway press. Never more eagerly than now have we watched for the coming of these ever-welcome monthly visitors. The development of new forms of rapid transit has sent us back to school again, and these are our text books. From title page to back cover we scan them through, advertisements and all, in our eagerness to learn the very latest advances in electric, cable and other forms of motive power. Their digests of the important decisions of the courts, their carefully tabulated statistics, their superb illustrations, their detailed descriptions of the power plants and equipments of the most progressive street railways of the world, their portraits and biographies of prominent street railway men, and their intelligent discussion of all the problems which confront us as a class, are all features which commend them to our heartiest support. They would do splendid missionary work in the editorial rooms of some of our leading daily papers, and the local companies would be acting wisely should they arrange to secure, at whatever cost, the exchange of their city papers with the several journals devoted to the street railway industry.

And now, in conclusion, let me thank you most heartily for your attention, and allow me to express the wish that you may enjoy to the utmost the good things prepared for us by the several committees having in charge the management of this meeting.

The report of the Executive committee was then read, as follows:

THE EXECUTIVE COMMITTEE'S REPORT.

To the American Street Railway Association. Gentlemen: Your executive committee respectfully submits the following report:

Membership: At the opening of the meeting, in the city of Buffalo, the membership numbered one hundred and sixty nine companies. At that meeting, and during the year, the following companies have become members: Asheville, N. C., Asheville Street Railway Company; Attleboro, Mass., Attleboro, North Attleboro & Wrentham Street Railway Company; Baltimore, Md., Baltimore City Passenger Railway Company; Denver, Colo., Denver Tramway Company; Erie, Pa., Erie Electric Motor Company; Evansville, Ind., Evansville Street Railway Company; Lancaster, Pa., Lancaster City Street Railway Company; Lawrence, Mass., Merrimac Valley Street Railway Company; Lexington, Ky., Passenger & Belt Railway Company; Newburyport, Mass., Black Rock & Salisbury Beach Street Railway Company; Newton, Mass., Newton Street Railway Company; Patterson, N. J., Patterson Railway Company; Pittsburgh, Pa., Schenly Park & Highland Railway Company; Portland, Ore., Willamette Bridge Railway Company; Raleigh, N. C., Raleigh Street Railway Company; San Antonio, Tex., San Antonio Street Railway Company; St. Joseph, Mich., St. Joseph & Benton Harbor Railway Company; Springfield, Mo., Metropolitan Electric Railway Company; Toledo, O., Toledo Electric Street Railway Company; Utica, N. Y., Utica Belt Line Railway Company; West Superior Wis., Douglas County Street Railway Company; Wheeling, W. Va., Wheeling Railway Company.

CHANGES BY CONSOLIDATING.

The Milwaukee Street Railway Company, of Milwaukee, Wis., in place of the Cream City Railway Company, and the Milwaukee City Railroad Company, both the latter companies having been members. The following companies being operated and controlled by other companies, in the same cities have withdrawn: Brooklyn, N. Y., The New Williamsburgh & Flatbush Railroad Company; Minneapolis, Minn., The Minneapolis, Lyndale & Minnetonka Railroad Company; Providence, R. I., The Providence Cable Tramway Company.

CHANGE OF NAMES.

The following changes of names of members have taken place: Atlanta, Ga., Atlanta Consolidated Street Railway Company, in place of the Atlanta Street Railroad Company; Augusta, Ga., Augusta Railway Company, in place of the Augusta & Summerville Railroad Company; Buffalo, N. Y., The Buffalo Railway Company, in place of the Buffalo Street Railroad Company; Grand

Rapids, Mich., Consolidated Street Railway Company, in place of Street Railway Company of Grand Rapids, Mich.; Lowell, Mass., Lowell & Suburban Railway Company, in place of Lowell Horse Railroad Company; Toronto, Can., Toronto Railway Company, in place of the Toronto Street Railroad Company. Members withdrawn. The following members have withdrawn: Asbury Park, N. J., Sea Shore Electric Railway Company; East Saginaw, Mich., Saginaw Union Street Railway Company; Ottawa, Ill., Ottawa Electric Street Railway Company; Richmond, Va., Richmond Railway and Electric Company. So, as the result of these changes the membership is now 180 companies.

At the close of this meeting the membership doubtless will exceed 200 companies.

SPECIAL REPORTS.

Committees have been appointed to report on the following subjects, viz.: A Perfect Electric Motor; A Year's Progress of Cable Motive Power; Public and State Treatment of Corporations; the Dependent Overhead or Underground System of Electric Motive Power, and the Independent Storage or Primary Battery System of Electric Motive Power.

It will be seen that unusual prominence has been given to the subject of electricity; indeed so much so, that this meeting may be fairly called an "electric meeting." The committee considered that electricity has rightly earned the consideration which has been accorded it for several subjects devoted to its consideration among different lines, and the report of the business during the current year has only tended to strengthen the committee in the filling of its allotment of so large a part of the time of this meeting to electrical consideration. The preparation of the reports covering the two distinctive systems, dependent and independent, were placed in the hands of men who were thoroughly competent to deal therewith, by reason of their intimate connection in each case with the respective systems. No limit whatever was placed upon the authors as to their statement of the subjects, and its behavior at consideration thereto will be exhaustive. The gentlemen to whom was referred the subject, "A Perfect Electric Motor," by reason of his long continued and varied experience with electric traffic, as well as his extensive knowledge of the street railway business, was considered to be eminently qualified to tell this association what were the requirements to carry on a perfect electric motor. A year's progress of cable motive power is a legacy from last year's meeting. The data upon which the report was to have been prepared for that meeting was not in hand at the time, and therefore, its preparation and presentation was deferred until this meeting, at the request of the committee, a gentlemen who has had extensive experience in cable traction. An exhaustive report has been prepared on the subject, and reflects great credit upon the committee. Its author has occasion to express regret that by reason of so much sickness in his family, which necessitated his return to Europe, and prevented him from being present at this meeting and participating in its interest. The papers hereto-

fore prepared upon the subject of "Public and State Treatment of Corporations" have been so universally different from the masterly way in which the subject has been treated, that committee considered it wise to have a third paper from the same able writer.

ADVANCE COPIES OF REPORTS.

A subject which has been under advisement of the executive committee is the printing of advance copies of the reports of the special committees. It has been deemed wise by some similar societies to have copies of reports of committees printed and distributed to the members from a week to a fortnight in advance of the general meeting, with a head-note, of which the following is a copy, namely:

"Advance Copy." This advance copy is subject to revision. It is sent to you personally for discussion only, and with the express understanding that it is not to be published or furnished for any publication in advance of its regular issue by the society.

(Signed by the secretary.)

It is contended that by the printing and circulation of the reports in advance of the meeting, valuable time which is taken up in reading of the papers, the contents of which up to that time are unknown to the listeners, could be better employed in the discussion that would take place on the subject and drawn out by the reports for this meeting. It was determined to be wiser to submit the question for the deliberation and determination of the Association at large.

STREET RAILWAY LAW.

The monthly publication of judicial decisions relating to the street railway business has been continued, and forms part of vols. vii. and viii., of "Street Railway Law." The numbers, according to issues and titles, are as follows: 1890—November, Patton v. Philadelphia Traction Company; December, Nivette v. New Orleans and Lake Railroad Company. 1891—January, Butler v. Pittsburg & Birmingham Traction Company; February, People v. Atlantic Avenue Railroad Company, of Brooklyn; March, Tippins v. North Side Street Railroad Company; April, Upham v. Detroit City Railway Company; May, Henry v. Pittsburg & Lake Erie Railroad Company; June, Cincinnati Inclined Plane Railway Company v. City and Pittsburg Telegraph Association; July, Wilmott v. Corrigan Consolidated Street Railway Company; August, Nichols v. Ann Harbor & Ypsilanti Street Railway Company; September, People's Passenger Company v. City of Memphis; October, Measles v. Fort Worth & Denver City Railway Company. The editors of the work, entitled

AMERICAN STREET RAILWAY DECISIONS,

having prepared and issued the first volume, report that they have a large amount in hand, and propose to facilitate the issue of the work when their manuscript has been completed for the entire publication of the street railway papers. We desire again to express our sincere appreciation of the many heartfelt and earnest



JOHN G. HOLMES.

PITTSBURG.

President-Elect, American Street Railway Association

words uttered by the editors of the journals devoted to the street railway industry, in commendation of the value of association to street railway companies, with appeals made for a membership, co-extensive with the street railway companies of America.

FELLOW WORKMEN.

From a consideration, two years ago, of the subject of "Capital and Labor," to a much milder consideration a year since of the same general subject, as "Employer and Employee," we give a moment, on passing, to a few words upon the subject, "Fellow Workmen."

Comment was made a year since, upon the fact that a number of mutual benefit associations had been organized among the employes of companies that are members of this association. We are pleased to note that considerable interest has been manifested by various companies during the year regarding these organizations, looking to the establishment of similar societies among their employes. The companies that have such societies under their patronage, and contribute to their support, know by experience how useful they are in bringing about and fostering pleasant relations between the managers and the men; whether in the office, upon the road, or in the shop, these mutual benefit associations tend to harmonize the interest of all, making all, employers as well as employes, feel that they are fellow workmen together. When the time shall arrive that the employe shall have vested interests in the business of the company, essential differences between employers and employes will no longer arise, for the interests of both will then be identical. We shall do well, as managers of great corporations; if we promise to do all that lies in our to hasten the coming of that day.

REDUCED RATES OF FARE.

All the traffic associations in the country but one, have, for the last two years, generously accorded to the delegates and others in attendance at meetings of this association, the courtesy of a fare and a third for the round-trip. We regret that this exception is made and shall continue our efforts to obtain the concession until it shall become co-extensive with the territory which includes our membership. At the next meeting, your committee desires to call attention to the fact that a hearty invitation has been tendered the association by the Rochester Railway Company, of Rochester, N. Y., to hold the next annual meeting in that city. In this connection the committee feels called upon to comment upon the fact that the association, with its attendant friends and business acquaintances, has become so large in number as to tax to the utmost the hotel accommodations of most cities. It has occurred to your committee that it might be advisable to refer each year the question of the selection of the next place of meeting to a special committee, whose duty it shall be to take under advisement the question of hotel accommodations and special rates as an incitement for the association to go to any certain city.

THE PITTSBURGH STREET RAILWAY COMPANIES.

The committee takes occasion to express its grateful recognition of the efforts that have been made by the Pittsburg street railway companies, and especially by their local committee, to have all the arrangements relative to the meeting as complete as possible in the matter of the street railway exposition, as well as in the entertainment of the delegates and their friends.

In closing this report we are glad to call attention to the fact that, although the year has been of unusual mortality, we have not been called upon to mourn the loss by death of any of our representatives. Respectfully submitted,

Henry M. Watson,	W. A. Smith,
Charles Odell.	A. D. Rodgers,
Thomas Lowrey.	D. F. Henry,
Albert T. Thornton,	H. M. Littell,
Thomas C. Keefer,	
Committee.	

On motion the report was received and placed on file, and copies ordered printed and sent to each company.

The treasurer's report was then read, a summary of which is given as follows:

RECEIPTS.	
Balance,	\$1,780.95
23 Admission fees,	575.00
1 Annual dues, 1887-8,	25.00
2 " " 1888-9,	50.00
2 " " 1889-90,	50.00
153 " " 1890-1,	3,825.00
5 " " 1891-2,	125.00
"American Street Railway Decisions,"	374.75
Banquet tickets, 1890,	310.00
Annual Reports,	7.00
	\$7,122.70

DISBURSEMENTS.	
Secretary's salary,	\$1,500.00
Ninth annual banquet,	1,250.00
Ninth annual report,	903.70
"American Street Railway Decisions,"	694.70
Expenses incident to 9th and 10th annual meetings,	255.76
Legal opinions—"Street Railway Law,"	202.00
Special committee reports,	200.00
Postage,	165.00
Miscellaneous printing,	(109.85) 108.85
"Public and State Treatment of Corporations, No. 2,"	67.75
Expressage,	21.58
Telegrams, stationery, insurance,	10.30
	\$5,380.64
Balance in bank,	1,742.06
	\$7,122.70

The report of the committee on "A Perfect Street Railway Motor" was then read, as follows:

A PERFECT MOTOR.

BY H. A. EVERETT,

Secretary East Cleveland Railroad Company, Cleveland, O'ia.

MR. PRESIDENT AND GENTLEMEN:—For the past eight years the writer has been very intensely interested in the perfection of electric motors. The first experiments were

made in the summer of 1883, but during the previous winter we had been carefully watching the operations of an electric system in the private premises of one of the large manufacturing companies, and had seen the motor operate under all conditions of weather, though, of course, experimentally. We had come to the conclusion that it was just the thing, and had hopes that it would revolutionize travel the world over. On application to the city government, we were given the right to build one and a half miles of railway, with an electric conduit. The troubles and vexations we experienced with the conduit are not covered by the title of my paper, and I will endeavor to confine myself to explaining the changes that were required in the motor. The first fundamental error made by the electricians was in the idea of increasing the voltage in proportion to the number of cars run, which, of course, would be impracticable in a system of any size, but we did not know that then. We got out our experimental car, and, quite frequently, for a few hours, it would work magnificently, giving a speed of 22 miles per hour with the utmost ease, and running forward or backward with one or two loaded trailers in fine shape. We were quite well satisfied with the experiment with the one car, but insisted on having a second and third car placed on the line before adopting it generally. We finally got the second car running, and were very much dispirited to find that the speed of both cars was immediately reduced to about four miles per hour. This result was, of course, very unfortunate for us. Returning to my subject,—in starting in with the motors, we tried wire rope transmission from the armature to a drum on the axle, but it did not work at all satisfactorily, the ropes oftentimes stretching too much. We then tried manilla rope transmission, but that also had its weak points, and the change to friction gear also proved unsuccessful. After these various trials, the late Richard N. Allen requested us to allow him to gear it at his own expense, with a set of cog gearing which he was quite sure would prove successful. We very gladly gave him permission to put in the gearing, and this style of gearing has been practically adopted by all the prominent electrical companies in the country. After trying to operate this line for about a year and three months, we gave the matter up for the time being, believing that it was impracticable either to operate a conduit, or to operate by the system as suggested at that time, though never losing faith in the final outcome of electric propulsion.

We examined a great many motors and traveled over a large part of the United States to observe tests made of storage batteries of various kinds, but we were not at all satisfied as to their successful practical operation, and until we saw the road operating at Richmond with overhead wires, we had no desire to again enter into the matter of electrical propulsion, although it must be admitted that some of our people were willing to put in a system similar to the one at Scranton, even before the Richmond system was in operation. An electrical motor of three years ago, should hardly be compared with the motors manufactured at the present time; and, on the

other hand, a motor that is considered perfect, or nearly so now, might be considered old-fashioned and obsolete within a much shorter period.

We have made several tests of storage-battery systems, and have watched with great interest the many tests made in that branch, and, candidly, we must admit that the practical, successful application of storage batteries for street railway propulsion, seems as far in the future as it did five years ago. Almost all street railway men admit that the storage system, if successful, would be the ideal system, and all hope for its ultimate achievement; and in this age of progress it would be very short-sighted and bigoted to say that it will never come.

All of the prominent companies are eager to perfect their motors in the matter of details, and have cheerfully co-operated with the practical men running electric roads to bring about the improvement of their machinery.

All of the well-known systems of to-day have some special points of advantage, but these I will not refer to, as it is not within my province to do so.

The motors when first constructed, were altogether too light, both mechanically and electrically, but these difficulties are being overcome very rapidly, as well as the serious difficulties of too rapid motion, which swelled the operating expenses very largely in maintaining the parts and replacing the gearing. The best motors manufactured hereafter, will be the most simple in the matter of the construction of the parts, and at the same time not consuming too great a quantity of electricity, so that in addition to being simple, they will also be economical.

The principle of winding armatures is, of course, a pretty old one now, and each company is anxious to give its patrons the most efficient and best armature. I think it would be an improvement if on all machines made, a better insulated wire were used, in both armatures and fields; a more reliable and positive fuse wire application—one that would not always burn out while still under the capacity of the motor, would also be a great improvement.

A great many corporations in operating motors, do not appear to be willing to give them proper attention or inspection, with the result that weak points are very apparent; but this is in no way the fault of the manufacturer.

The writer expects within a very few years, as the motors are perfected and their armature speed reduced, to see a line of railway from New York to Chicago, run on the basis of not more than a two-hour time-table for the through trip, and giving a transportation rate considered impossible with the present motive power.

A great diversity of opinion exists as to the proper size of motor cars, a good many companies holding to the principle that a very large car is desirable and practicable. From our experience in operating cars from 16 to 30 feet in length, I am of the opinion that on routes having a small patronage, where the earnings are under 20 cents per car mile run, it is unwise and undesirable to have a car exceeding 21 feet in length, inside, as it is much more economical to have trail cars when the traffic is heavy, rather than to be at the continuous daily expense of hauling a very large car of great weight.

I would again reiterate the fact that motors have been wonderfully perfected within the past year, and if as much progress is made during the coming year, there can be very little to ask in perfecting a motor, although it is very desirable that the mechanical application should be more carefully looked after.

I do not think it was the intention to have me criticise in any way the special weak points of any system, but simply to refer to the whole question in a general way.

If you will pardon a short divergence from the subject, I will relate an incident which occurred last spring. A gentleman largely interested in street railways made the remark that in the city of New York they would never permit the use of electric motor cars if accompanied with unsightly overhead wires. I asked him if it was quite consistent that so much objection should be made to a system which required but one copper wire not exceeding three-eighths of an inch in diameter, with posts on either side of the street 150 feet apart, with a diameter not greater than an ordinary hitching-post, after allowing on the streets that beautiful structure, the "New York Elevated Railway," with its perfect (?) odorless, smokeless, noiseless steam locomotives, shutting out both light and air to the people on the streets where the railway is operated. He candidly admitted that he did not know but that the elevated road was about as bad as the overhead wires.

To resume my subject: at the present time all of the prominent companies are devoting the time and intellects of their best men to the perfection of a gearless motor. They all now have the single reduction motor in the market, which is certainly a wonderful achievement in advance of the late countershaft machines, and which ought to make a splendid exhibit when compared, in the matter of operating expenses; but I have noticed one matter which the electrical companies seemed to have entirely overlooked in the manufacture of their apparatus, and I must say that this failure is universal. All of the prominent companies seem to have fallen into the same error, and seem to persistently and maliciously continue in their evil ways. I do not think that any one subject connected with electrical propulsion has received so much attention from the railways as this one, and with so little co-operation and assistance from the electric companies. I, of course, refer to the price of their equipment. It appears to me that the companies, instead of operating 4,000 motor cars, could be operating 40,000 within a very short time, if they would bring the price down to a reasonable figure, so that all companies could afford to purchase an equipment. I think it would also be desirable if the electric companies would supply all the extra parts from their shops, at a price allowing a reasonable margin for profit.

Before closing this paper, I desire to extend my sincere thanks to all the gentlemen connected with street railways, who have so kindly given me the benefit of their experience on this subject.

In summing up my idea of a perfect street railway

motor at the present time. I would say: Taking the trolley wheel, pole and stand, I think it desirable to have a wheel that is capable of following the wire at any angle, with a trolley pole brittle enough to break, should it become entangled in the wires, without pulling them down, and a trolley spring rigid enough to give good steady pressure on trolley wire, and so constructed that when the car is in the car house or going under a low bridge, the pole could come very close to the roof of the car, also flexible enough to give good pressure when the trolley has to be 21 or 22 feet high at the railway crossings.

The car should have a lamp circuit, with plenty of lamps distributed properly.

The perfect motor ought to have, as hereinbefore suggested, a reliable fuse plug, that will invariably blow before injury is done to the machines.

Have on each car the best lightning arrester that can be secured in the market.

In coming to the motor proper, it is desirable to use a controlling switch that is easily operated and readily reversed, in case of accidents. The simpler the controlling device the better, and it should be constructed with a view to guard against any possible disarrangement of the parts, so that it will be reliable in all cases, both electrically and mechanically.

The rheostat should also be carefully looked after, and properly protected to keep it from injury, by reason of water, snow or dirt getting upon it. It should only be available in starting the car to avoid the lunge of a start, and should be so arranged as to be cut out as soon as the car is started, and give the entire efficiency of the current of the motor proper.

The motor should be well protected in all its parts from any outside interference, so that in running along the street it will be impossible to pick up nails, wire, or anything that would short circuit it, at the same time observing that a motor must be properly ventilated to keep it from heating while in use. The cover should be made so as to be easily removed.

I deem it very advisable to have an armature of a large diameter, making a small number of revolutions per minute, with the bearings made of extreme width, with proper grease cups, and in such a condition that they can be readily rebabbited when slightly worn. The diameter of the commutator should also be large, and to have the brushes easy of access is very desirable. The winding of the armature ought to be of the simplest kind, and the size of the wire and insulation of the same should be carefully looked after. I think the insulation of wires in armatures, is at the present time, one of the weakest points in the motor.

The armature gears should have a wide face, and run in oil. The armature shaft ought to be of ample diameter, and there is nothing gained by having the keyway too small for the securing of the commutator to the shaft.

The commutator should be carefully insulated, so that there will be no grounds between it and the core.

The box in which this gear runs, ought to be constructed of copper, or some light material that is somewhat flexible, so that if struck from the outside, it will bend rather than break.

The fields should also be wound with a wire of better insulation, and of ample size to take the current. Of course in this particular, I do not intend that the wire of either the field or armature should be great enough to take more horse-power than ought to be used by the machine. To my mind it is very desirable to have the armature in such a condition that it can be readily taken out from the machine and put in again.

One of the serious disadvantages to operators of electric roads, is the expensive labor necessary in winding the armatures and fields, and also in regard to high-priced mechanics who ought to be employed to attend to the machines. There is nothing gained in employing a cheap class of labor to handle an electric equipment, either as electricians, armature or field men, or mechanics. This proposition is a self-evident truth, as can readily be observed in many roads now in operation.

At present, I think the single-reduction motor is the nearest perfection of any on the market.

I think it very desirable that the electric companies should devote some time to the perfection of an electric brake to stop the car with the same power that runs it. This could be readily done, and would be a satisfactory improvement.

Electric heaters are now used in quite a number of places, and I think it will prove quite satisfactory.

I have noticed electric signal bells on some of the cars, and they seem to work very well.

For a dasher gong on a motor car, I am in favor of a foot tread, as in testing an electric gong we found that our men used it altogether too freely.

I am in favor of an oil headlight, one that can be removed easily, so that in the event of a trolley being broken or anything happening to the electrical part of the car, or a light is desired underneath the car, the oil headlight can be used to better advantage than the electric. There ought also to be one oil light in every car for the same purpose.

There is no reason why an electric fare register cannot be made to work successfully.

The durability of the motor is a question which requires very careful attention. The single-reduction motors, when properly looked after, ought to last for many years. We have had one in operation for over ten months, and it appears to be in as good condition as when it first went on the road.

The car should be of moderate size, constructed with all modern conveniences, but without fancy decorations or any unnecessary display.

The cars should be run on frequent headway, and at all hours of the day and night, at as high a rate of speed as the civic authorities will permit.

The noise of the motors has been very largely done away with, and by careful attention the old counter-shaft machines can be used until worn out, by simply covering

the gear with an oil box, and by not attempting to run them too many miles without inspection.

Thanking the members of the convention for their attention to my paper, and trusting that it may prove of benefit to some.

Mr. Sage, of Easton: I move that the report be received and placed upon the minutes, and that the thanks of the Association be tendered to Mr. Everett for his able paper.

Mr. Henry, of Pittsburg, welcomed the association in a hearty manner and referred to various methods of operation and varieties of motors to be seen in daily service in the city. The convention, thereupon, passed a vote of thanks to the officers of the Pittsburg companies and the local committee. In the discussion of Mr. Everett's paper, Mr. Henry, of Pittsburg, said: "Our total cost, including conductors and motor men, all repairs, maintenance of way, general expenses and all other charges, amounted to 20.26 cents per mile. Separating this into strictly operating expenses, and fixed charges, we have an operating expense of 12.74 cents per car mile, and in comparing the same with the cost of operating the horse line, which was 10 cents per car mile, we must remember that we then paid but one man on a car, we now pay two or three cents per mile, against 6.60 cents now. This increased cost per mile for conductors and motor men is a necessary adjunct of rapid transit, and is not peculiar to the system. Allowing for this, we have a difference of 1.04 cents.

From our test we find that the amount of power consumed on a level track is very little more for the long car than with the short one: in fact, the weight which we have in the car seems to have little to do with the current consumed as long as the car is on a level track. From tests, we found that a long car empty, weighing perhaps eighteen thousand pounds, using a certain average amount of current, that the same car loaded with fifteen thousand pounds of weight used very little additional power until we came to a grade. We have experimented in this matter, and could hardly tell from the reading, which was the empty and which was the loaded car. That being the case it does not cost much more to operate long cars than short cars. Again, they carry nearly double the people, and do it with the same expense for conductors and drivers. Just how much more heavy cars will increase the track repairs, of course we cannot tell at present.

Mr. Ballard, of San Antonio, said: In the city of San Antonio, the entire line has been equipped within the last year. The total gross revenue of the old horse line running regularly, was about \$6,500 a month. We are now running at an average gross income of \$12,000 a month with only an increase of the population of about 2,000. Our increased receipts are nearly 100 per cent.

Mr. Sage: have you increased your mileage?

Mr. Ballard: Very little. The increase in traffic is enormous, while the increase in expenses is only 12 per cent, and we have to pay \$5.50 a ton for coal, too.

Convention then adjourned until evening.

REPORT OF THE COMMITTEE ON THE PROGRESS OF CABLE
MOTIVE POWER.

Report to the American Street Railway Association at its meeting at Pittsburg, Pa., on October 21st, 1891, by James Clifton Robinson, London, England, "Committee" of the Association on Cable Traction.

GENTLEMEN: When I was appointed as Committee to report upon the subject of Cable Motive Power at the meeting of the Association in 1889-90, it was proposed that I should deal only with the story of "one year's progress" in the application of this method of traction to the operations of Street Railways. But owing to my engagements in California. I was unfortunately prevented from preparing a report for presentation at the time appointed. By favor of the Convention, an extension of a year's time was kindly accorded to me, and by the courtesy of Mr. William J. Richardson, Secretary to the Association, I have been allowed so to extend the scope of my report as to make it more worthy, as a retrospect of the subject, and to give, along with information as to its latest developments, a sketch of the origin and rise of Cable traction in its application to Tramways.

It will be in the knowledge of many of the Members of the Convention that the plan of using a rope or cable as a means of traction is of old date, and no attempt need be made in this report to trace its origin. We find it has been in use for many years in mines and on railways and canals—sometimes as a continuous rope—sometimes on the reciprocal system—but in whatever form embodying the same idea, namely, that of effecting haulage by a traveling rope actuated by means of power at a distance from the object to be moved. In the use of a cable operated on a public roadway, whether urban or rural, it is essential that the road should be kept clear, and thus the power can only be utilized on such roads by appliances fixed overhead, or by a cable concealed in a conduit below the surface of the track. So far as I have been able to learn, an overhead cable has never yet been *successfully* used for passenger transportation on a public road, though it was attempted in the first New York Elevated Railway in 1868. A like plan has been recently proposed at Atlanta, Ga., and other efforts in the same direction are mentioned in a later page. Such an overhead system always appeared to be objectionable, both on grounds of amenity and for practical reasons, for though the presence of sheaves and a running rope above ground may be allowable in a mine or on a railway incline, for street use the cable should be concealed from view, and in the following report I propose to limit myself strictly to surface tramways fulfilling this condition.

FIRST IDEAS.

The construction of the Atmospheric Railway of half a century ago familiarized the mind with the idea of using an underground tube, having a longitudinal opening by which the cars could be connected with, and propelled by the concealed power within. The earliest suggestion for the use of a moving cable within such a conduit is found in a proposal by Mr. W. Brandling, in 1845, who described an underground pipe in which the rope should travel, with

a grip attachment capable of picking up or letting go the traveling cable. Thirteen years later, in 1858, an important invention was put forward by Mr. E. S. Gardiner of Philadelphia, Pa., who described in detail the use of a tube between the rails, having a narrow longitudinal opening, so to be used as not to impede the passage of the ordinary vehicles using the roadway. Although Mr. Gardiner went into no particulars as to the method of gripping, it appears clear that in his invention, as in that of Mr. Brandling, we have the first practical suggestions in the line of our present inquiry. In the following years a number of inventions were put forward for the operation of railways by overhead or underground cables, but no solid progress fails to be recorded until 1869-70, when, at a time when I happened to be in New Orleans, General Beaugard put forward an important invention in which the principles of the modern cable grip were first distinctly set forth. Although the plan with which the General's invention was connected was one for the use of an overhead cable, this does not detract from the value of his suggestion, furnishing as it did the ground work of all further development in the line of a side grip apparatus, with mechanically moving jaws. In 1872 mention is made of a patent granted to Mr. Thompson for a motor in a conduit, and his proposition merits notice, in so far that his truss to span the tunnel, used to hold the road-bed in position is, broadly, the first direct claim to the invention of the yoke.

PRACTICAL INAUGURATION.

While the inventor of a new idea is worthy of all honor, the men, who by the application of intelligence and administrative ability, bring the matter into practical and successful operation are worthy, of no less honor. And we now reach a point where those ideas which had been floating about somewhat aimlessly in the patent offices, or in the mechanical journals, were worked out into concrete shape in those inventions and practical applications with which the names of Hallidie, Eppelsheimer, Root, Hovey, Miller and Paine are indissolubly associated. It is to California and to the city of San Francisco in particular that the credit of the first great practical development of cable traction is due. The grades and configuration of San Francisco presented difficulties in the way of developing the horse railways in that city, and to this circumstance we may doubtless attribute the fact that there we find the cradle of the cable system. Necessity there, as elsewhere throughout human experience, became the mother of invention, and the solution of the city's difficulty was found in cable motive power. The heights there were inaccessible by any other means, and without the cable San Francisco would to this day be deprived of the facilities for rapid and comfortable internal transit now enjoyed by it in common with nearly every city and town of importance in the civilized world.

It was in 1872 that Mr. Hallidie's first patent in connection with a cable grip was registered, and in September, 1873, on Clay street in San Francisco, the pioneer cable railway in the world was brought into successful

operation. The remarkable results achieved in this experiment excited world-wide interest. Here was a road showing in some parts a gradient of 1 in 6, and rising in its course of about a mile to a height of 300 feet above its low level terminus. The problem of steep-grade street railways was solved, and as later developments show, even worse gradients than those in Clay street have been encountered and successfully operated with cable traction. As I shall hereafter endeavor to show, the value of the system is not confined to steep ascents—it has been applied with equally favorable results upon level lines. I may also here observe that the premier cable road, being straight throughout, presented none of those practical difficulties subsequently encountered, and so brilliantly treated in handling the problem of curved, depressed and tortuous routes.

It is remarkable to record, that with the important object-lesson presented to the world by the safe, continuous and successful operation of the Clay street road, the progress of the system was slow, and that nine years elapsed before a cable tramway was to be found in any other city than San Francisco. There was an impression, as already hinted, that the new method of traction was only intended for steep grades and straight lines, and that only in a fine open climate like that of California could the road be satisfactorily operated. But while the cable roads in San Francisco were being added to from time to time, in 1882 a second object-lesson of equally striking value was offered by the inauguration of cable tramways at Chicago, where, in the midst of frost and snow, and on the level roads, embracing curves of peculiar difficulty, the system was triumphantly demonstrated to be of general applicability. For this second remarkable illustration of the value of cable traction, the world is indebted to the admirable foresight, energy and ability of the Hon. C. B. Holmes, and from this event may be traced that continuous progress and development of cable motive power, which it is now my province to describe.

DEVELOPMENT OF THE SYSTEM.

In San Francisco the Clay street line was followed, in 1876 by the construction of a 5 feet gauge cable road on Sutter street, converted from a 3 feet 6-inch horse car line, and ultimately extended to a system of 14 miles in extent. The gradients in this line were less onerous than those in Clay street, but in 1878, by the opening of the California street track, a steeper grade, namely, 75 feet in 412½ feet as against 67 feet in 412½ feet in Clay street, was coped with. This was again exceeded on the Union street and Presidio line, opened in 1881, where a gradient of 78 feet in 412½ feet was surmounted; and on the Powell street line, opened in 1887, a still harder gradient has been successfully achieved. Other cable tramways in San Francisco are the Geary street, 12,500 feet, opened in 1880, and now being reconstructed and extended 6 miles to Golden Gate Park; and the Market Street Cable Railway opened in 1883, and now above 25 miles in extent. The last named is deserving of more special notice, as this was the first in San Francisco where, following the ex-

ample of Sutter street, many acute curves, cable crossings, auxiliary cable terminals, turn-tables and combination cars were largely introduced. The Powell street line, 11 miles, and the Omnibus Cable Company, 26 miles, followed in 1890, and completes the present system in San Francisco, which still maintains the lead in point of extent, having nearly 100 miles of cable roads in successful operation. The ramifications of the system are still being largely extended. The number of passengers carried annually has more than doubled, the travel now being nearly 900,000 per mile. Passengers are conveyed an average distance of 6 miles for 5 cents. The number of passengers carried in San Francisco during the past year amounted to 70,630,133, or over 200 times the estimated population of the city.

In 1882, as already mentioned, the first Chicago cable road was inaugurated. Here the lines were over level ground, so that no question of gradients arose; but the extreme variation of temperature, (from an almost tropical summer heat to winter frosts, sometimes recording 25 below zero), with sudden snowfalls, offered problems which promised to test the efficiency of the cable system under entirely new conditions. In point to constructional detail, the conversion of the Chicago lines presented some features not heretofore encountered, but as a plain matter of fact, it may be stated that each and every difficulty was triumphantly overcome as it arose. The Chicago City Railway Company now controls and operates a cable system over 35 miles in extent, comprising thirteen cables which are operated at speeds from 7½ miles to 14 miles per hour. Power to move these cables is furnished by three power houses, and as the power required on the days of heaviest traffic this year will, in a short time, be the average power consumed, arrangements have been made to provide for increasing demands by adding two engines capable of transmitting 1,800-horse-power each. As stated, the success attending this triumphant demonstration has led to the adoption and gradual extension of the cable motive power throughout the civilized world. In Chicago, the North Chicago and the West Chicago Railway Companies have, under the vigorous administration of President Charles T. Yerkes, added 33 miles to the above total, while important extensions still continue to be made. In an extension of 11 miles now under construction by the West Chicago Street Railroad Company on Blue Island Avenue, the business centre of the city will be reached by means of a subway under the Chicago river, constructed on plans specially prepared by Mr A. D. Whitton, the able engineer-in-chief of the company, for its exclusive use, at a cost of \$1,500,000. This is in itself a remarkable work, in connection with any street railway, and it is noticeable that only in connection with cable railway enterprise have works of this progressive character been undertaken.

Early in 1883 an experimental line of cable tramway was constructed in Philadelphia by the Union Passenger Railroad Company, now merged by lease in the Philadelphia Traction Company. This line, consisting of 2½

miles (single), introduced a novelty of construction in the use of a cast-iron conduit, but through faulty design the experiment proved a failure: however, a similar plan, in which wrought-iron has been employed instead of cast-iron, has been successfully utilized elsewhere.

New York followed in the adoption of cable traction, on the construction of the great Brooklyn bridge, opened in 1883. In this case, from the circumstance that the tracks were not also to be used for ordinary traffic, the cable was not put below the surface, so that the road does not directly fulfill the condition laid down in the opening paragraph of this report. But it is of great importance as an illustration of the capability of cable motive-power to accommodate itself to every possible requirement of railroad operation, providing means by which sudden and enormous influxes of traffic can, without cessation, be successfully handled. The Tenth Avenue, (the 125th street) Cable Road, completed in 1886, and extending to 11½ miles, presents in the line of progress yet another novelty in cable working. This line was principally constructed on what is known as the Miller system, on designs prepared by the late Col. Paine. Its speciality lay in the introduction of duplicate cables, the object being two-fold: firstly, to secure constant service during the greater part of the twenty-four hours, one cable being under all circumstances available; and next, that when the traffic became crowded it was possible to apply the full power of the system by running alternate cars on the two cables simultaneously. After an interval of five years the operations have met with such favor that the complete conversion of the whole of the Third Avenue system is now under way, representing an extension of about 12 miles, while the Broadway and Seventh Avenue Company are not only rapidly converting their Broadway lines, but extending the system to Lexington Avenue. The duplicate-cable form of construction is being adopted in the latter case, the conduits in this case also consisting of wrought-iron tubes supported by heavy cast-iron yokes embedded in solid concrete. This application of the cable system to the traffic of some of the most important and most congested thoroughfares in the world, may be claimed as the most decided evidence yet afforded of the value of cable haulage in providing for rapid transit. It is anticipated that the traffic will be greater, and, consequently, more exacting upon the road-bed and plant than any cable system hitherto inaugurated. The plans show that the duplicate cables may be operated either singly or together by the same engine, an arrangement of friction clutches and couplings providing facilities for connecting different engines; ample power is thus readily available for the tractive purposes of a system, any section of which may be called upon to bear the simultaneous strain of 100 loaded cars. Having waited, carefully watched, and considered what was best to be done to meet the case, the people of New York have given up their great and famous street for a few months' serious interruption in order to secure for all time the best accommodation for their traffic that modern invention can give. It is now proposed to cable Sixth Avenue, so that shortly New

York may occupy a foremost position as regards the extent and operation of its cable systems.

CABLE ROADS ABROAD.

The first appearance of cable tramway outside the United States of America was in New Zealand, where a firm of engineers—Messrs. Reid & Duncan—having had their attention drawn to the value of this system of traction, projected a line connecting the suburbs of Roslyn with Dunedin, which was opened in 1882. This tramway, as constructed, offers the first instance of the use of single track for traffic working both ways on a cable line. It consists of 3,500 feet of single track, with passing places, and in its course rises 500 feet, the gradient being in some places as steep as 1 in 4½ to 5. This proved a great success, and shortly afterwards a second line of similar length but with a double track throughout, was built to connect the suburb of Morningson with Dunedin. The steepest gradient in this line is 1 in 6¼.

We now come to the introduction of the cable tramway into Europe by the inauguration of the Highgate Hill Tramway in London, of the construction, equipment and practical operation of which I took control as general manager for the construction corporation. Associated with me as engineer-in-chief and designer of this road was Mr. William Eppelsheimer, of San Francisco, and Mr. Bucknell Smith, C. E., of London. Operations were begun in October, 1883, and the line was opened for traffic on the 29th of May, 1884, the opening ceremony being performed in state, by the late Sir Robert Fowler, then lord mayor of the city of London. This undertaking was intended as a practical demonstration of the system, for the instruction and information of the municipal authorities, tramway companies and engineers of the Old World, and in this respect may be said to have amply fulfilled its mission. Being alternately single and double track, mostly on a very steep grade, but with one level portion, and presenting difficult curves in its course, this line demonstrated in a very effective way the capabilities of the system. Being, however, less than a mile in length, and, owing to a difference in gauge, without through connection with the London system of horse tramways, it illustrates a point to be further referred to as to the condition of traffic, population, etc., essential to a perfect road and necessary to bring out all the advantages of the cable system.

I have found it to be advisable to reserve the consideration of the progress of the cable in the United States subsequent to the year 1886, in order that I may deal more in detail with the systems of construction then introduced, but the same necessity does not exist with regard to the history of cable traction abroad, and I shall therefore now proceed to exhaust it, although the completion of the lines referred to may fall within the period reserved for separate consideration. Next after London came the city of Edinburgh, where two lines have been constructed and are now in operation. The north side of Edinburgh presents a series of steep grades over which, although the routes were scheduled for the pur-

pose, it was found impossible to operate the proposed horse tramways. During my connection with Edinburgh, in 1883, the Northern Cable Company was incorporated, to furnish this part of the city with cable tramways. In all, the two lines give about 6 miles of a single track, each line being double track, about $1\frac{1}{2}$ mile long. The steep parts of both routes run parallel, and, as a consequence, one power-house is made to operate both. Both routes bring passengers to the business center of the city, but having no through, or transfer arrangements with the general tramway's organization of the city, as is the case at Highgate, the traffic is less than it would be were such connections provided. So far as design and construction are concerned, the Edinburgh roads approximate very closely to the methods adopted at Highgate.

Following on Edinburgh came the city of Birmingham, where a system 6 miles in length was completed about a year ago. This road is thoroughly well and substantially built and equipped, the engineers being Mr. Joseph Kincaid, of London, and Mr. Edward Pritchard, members of the Institute of Civil Engineers. The road in many of its leading details, modified and improved to comply with the local conditions, follows the principles observed in the construction of the Chicago city lines, and the operations are successfully conducted by the Birmingham Central Tramways Company. The attention of street railway men in Europe will probably be directed to the operations of this company, since it now includes in its system all of the four forms of animal, steam, electric and cable traction. From the returns just issued, which may be here given, although they refer more to the financial aspect of the question, I gather the results of the past year's operations to have been as follows:

	Average Cost.	Net Profit.
Steam	22 cents per mile run.	9 $\frac{1}{4}$ cents.
Electric, storage	19 $\frac{1}{2}$ " " " "	10 $\frac{1}{4}$ "
Horse	19 $\frac{1}{4}$ " " " "	1 $\frac{1}{4}$ "
Cable	12 $\frac{1}{4}$ " " " "	12 $\frac{7}{8}$ "

These figures speak volumes.

The restrictions placed by the government and local authorities upon street railways in Great Britain have not only retarded the progress of mechanical power, but from the official returns we gather the remarkable fact that there is now less mileage of tramways in operation in that country than in the preceding year. The number of passengers carried annually is about thirteen, as against one hundred times the population in the United States. The maximum speed attained on British tramways is 7 miles per hour, as against an average 9 miles per hour in America.

As indicating the direction of public opinion at this time, on the question of cable traction in the British Islands, I venture to quote the views recently expressed by Mr. W. W. Duncan, of London, the eminent tramway and financial expert, in reference to the subject: "I say, unhesitatingly from my study of the systems worked in Chicago and San Francisco, that where tramways are in a position to raise fresh capital for reconstruction, as they will be when they have come to an understanding with

the local authorities, there is bound to be a great extension of cable motive power throughout the kingdom."

Melbourne, Australia, has just completed a splendid system of cable roads, about 85 miles in extent, which is claimed to be not only the largest, but probably the most successful in the world, as it certainly is financially speaking the most prosperous; while Sidney, New South Wales; Bragga and Lisbon, Portugal; Constantinople and Hong Kong have inaugurated, or are in process of adopting the cable.

During the past year a short length of cable tramway has been constructed and put into operation from the Place de la Republique to the heights of Belleville, Paris. In a recent inspection of this road I found that here, too, the example of Highgate had been adhered to, but not without many singular defects, the construction and equipment leaving so much to be desired that I was not surprised to find that the operations were not being attended with any degree of success. At the time of writing, a practical start has been made to deal with the question of cable motive power seriously in Europe; for example, I have recently inspected and reported on the question of cabling the Continental Metropolitan tramways systems of the Southern Division of Paris, and that proposition is now under consideration.

The Brixton section of the London Tramways Company, is being converted to cable, and already, as I am informed, some 60 miles of horse tramways of the several London companies have been scheduled for a like transformation. Parliamentary powers have been obtained by the Bristol Tramways Company, and the first section, 5 miles of track, will be cabled in that city, with Mr. Joseph Kincaid, as engineer, during the coming year. In relation to Bristol, it is interesting to record that so long ago as 1878 I reported in favor of cabling the tramway lines on the hilly portions of this company's system; this, however, was far ahead of the times, and it was only this year that the company was enabled to obtain the necessary powers to proceed with the work. In Scotland, the city of Glasgow, which owns the horse lines and leases them to an operating company, has in view the early conversion of several branches of the system to cable traction, and in the negotiations now being conducted with the Edinburgh corporation for the renewal of the lease of the horse tramways there, conditions are being laid down by the municipality for the cabling of a large section of their more heavily graded lines. During the past few months I have been invited to visit Liverpool and Dublin, in view of the introduction, in the near future, of the cable traction in those cities; and I have also made a tour of a large number of the cities of France and Germany, with a view to practical action for the future development of that system.

¹ Mr. Clemmshaw, of Troy, then moved a vote of thanks to the author of the paper, and that the report be received and placed on file.

Mr. Robinson's report is the most complete and comprehensive resume of cable traction that has ever been presented before the Association. We regret its extreme

presented before the Association. We regret its extreme length prevents its publication complete in this issue, but in consideration of its thorough treatment of the question, have deemed best to continue it next month rather than omit any portion. In the balance of the report the history of the year's progress in the United States is taken up, and other branches of the subject treated, including "Practical Considerations," "Track Construction," "Location and Character of Power Houses," "Operation of the Road," "Franchises," and others. Thus taking into consideration some of the neglected points in this most important part of this inexhaustive subject.

The president then announced the next paper to be a report on

THE DEPENDENT—OVERHEAD OR UNDERGROUND—
SYSTEM OF ELECTRIC MOTIVE POWER.

BY GEO. W. MANSFIELD.

The title of my paper, which I have the honor to present to you, is somewhat broad in its scope. The committee undoubtedly meant by their selection that all systems whereby electricity is transmitted by electric conductors or devices to the moving cars should be included under one head. A moment's thought will, I think, convince any one of the breadth of a paper under such a heading. I felt somewhat as if the committee had given me too much of an undertaking to cover in one paper.

In looking over the field, therefore, I concluded that as there had been a great many specific papers within a year or two upon this very subject, I must in a broad and general way treat of the various "dependent" systems as they are to-day. Having decided this, I prepared a series of questions and sent them to every electric railroad in the country using the overhead system. I also undertook to examine into all other methods whereby the electric current is directly transmitted to the moving car.

In treating of the "dependent system," I have arranged the various applications of electricity to railroading under four headings, or I might say into four methods: First, the underground; second, the surface; third, the overhead, and, fourth, the storage battery. The first three are arranged in reference to the locality of the electric conductor, or transmitting devices. I am aware that one or two of these methods may in some particulars merge closely into each other, but I do not see that any more distinctive lines can be drawn, and will now proceed with the discussion.

FIRST, THE UNDERGROUND METHOD.

Under this heading I have classified all methods of conducting or transmitting electricity to the car by means of any conductors or devices placed underground. I might possibly divide into two classes: First, continuous bare conductors placed in an open-slotted conduit; and second, all other devices of automatic character which enable the contact piece or device on the car to take its electric current from sectional bare conductor, or from bare metallic points, automatically made alive. There have been in this country at least four practical experiments with the

first class, several hundred thousand dollars have been expended in testing it, and thousands additional in perfecting it, particular attention being given to the protection and insulation of the bare conductor. In spite, however, of all this refinement and study, practically nothing has been accomplished, and I have no hesitation in asserting that the continuous live conductor in an open-slotted conduit is to-day a failure, and that it cannot be made a success throughout our cities of to-day, its fatal weakness being our inability to prevent the conduit from becoming filled with water, mud, etc. The time may come when our sewerage systems will be perfect enough to enable us to overcome this fatal weakness. To-day, however, they are not, and even an optimistic view puts this time a long way distant.

No large practical experiments have been made with this second class, but a large number of patents have been issued, and evidently there has been a great deal of careful thought and study bestowed upon it. I have seen a number of models and elaborate drawings in various cities of the country exemplifying this class. I, however, have no hesitancy in asserting that this class also will never prove a success, nor can it be made to work successfully throughout any of our cities to-day. The reason for this is obvious. It is immaterial whether the automatic devices prevent the sections of contact points from being alive all of the time, or not, if the conduit is filled with water or mud, and the points are made alive just as the car passes, there is bound to be a momentary grounding from these points. In other words, a point made alive in water with the other side of the circuit grounded, is just about as dangerous and bad as if it remained alive. It is true that the grounding may not be as severe, but still it will occur, and with a large number of cars throughout the city moving at the same time, causing therefore a large number of points to be alive; if any number of points were grounded through water, it would cause a tremendous loss upon the central power station, and in all probability a complete grounding or short circuiting of the entire system. Numerous ingenious schemes have been devised to overcome this fatal weakness. None, however, have ever been put to trial. I have seen many, yet to-day there is no hope in this direction.

Several of these devices are very interesting and worth mentioning; one inventor placed his bare conductor in a rubber tube made something like a hose pipe. Arranged upon the upper side of this tube are the contact points, which might be likened to rivets punched or tapped through the tubing. The contact wheel or device rolls along the top of this tube, and is sufficiently heavy as it proceeds to press the tube together, so that the contact points or rivets come in contact with the conductor inside the tube. By this means the current is transmitted to the motors. Obviously, as the car proceeds, the tube behind the contact wheel springs back into its original position. Plainly, however, if the conduit was filled with water, there would be an inevitable grounding of the points made alive, with consequent trouble and disaster.

Another arrangement was to have inside the conduit a

large elastic tube with a bare conductor inside, this tube to be slit along its upper side. Attached to the car is a plow, with a contact device at its lower end, inside the tube and in contact with the conductor. This plow moves along with the car and slides through the slit. With this arrangement it is apparent that if the conduit were filled with water it would run in just before and behind the plow. Should this occur, the old, fatal trouble would be bound to follow. Furthermore, it would be exceedingly difficult to arrange the tube sufficiently rigid in position to withstand the action of the plow, and the sides of the slit sufficiently tough to withstand the friction. The question of turnouts would also be serious and troublesome.

Another inventor arranged on each side of his conduit slot rubber flaps, shod with steel, and held together by means of springs. Attached to the car is the plow as usual. As the plow passes along in the conduit it presses back the flaps. The objection to this is, of course, the liability of the water getting into the slit, before and behind the plow. To obviate this, the inventor ingeniously suggested that the whole conduit be kept under an air pressure, which air pressure would be sufficient to blow the water out at any of these open places where it tended to run in. I do not consider that any of these plans can ever be successful. We now come to the

SECOND, OR SURFACE METHOD.

The inventions covered by this method are somewhat similar to those employed in the conduit system, only in place of being in a conduit they are placed upon the surface of the street. By far, however, the larger number of arrangements are based upon what might be called the "Interval" or "Point" system. Primarily this arrangement consists of an underground insulated conductor connected by means of taps to contact points, on the surface of the ground, held in place by means of iron boxes and insulated therefrom by means of rubber, wood, fibre or other similar substance. Upon the car is swung a long contact plate, extending practically from one end to the other. This plate is carried close to the ground, and is arranged to touch the points as it passes along. It is plainly apparent that if these contact points are always alive, then every time the street is covered with water, short circuits are inevitable. To overcome this, many automatic arrangements have been devised to cut these contact points into circuit by the car as it passes along. One inventor had electro-magnets on his car, which imparted their magnetism to the iron contact pins or points. These becoming magnetized would lift a little armature inside the iron casing, which in turn moved a switch, and cut the iron contact points into circuit. Another inventor arranged a slot between his tracks, in which the plow passed. As this plow passed the contact points, it would tip a lever or some other automatic device, which would throw a switch and put the iron contact points into circuit. Obviously, all these arrangements have the same fatal weakness—a liability to ground or short circuits. I do not consider any of them practically possible. There is one more system

which practically combines all these methods, and which obviates many of the objections. The inventor has a slot between his rails and boxes with a contact device within, placed at proper intervals. Upon his car is a plow which passes along through the slot, and also a long contact plate or arrangement extending its entire length. The operation of the invention is as follows; the plow as it passes through the slot strikes a lever placed in connection with each box, which lifts for a distance of six or eight inches above the ground a piston carrying the contact piece proper. This is made in the shape of a right angle hook placed within a vertically moving piston, and thoroughly insulated from it. As this is raised up, the long contact plate under the car passes beneath the hook and holds it up. The current is taken into the car as the plate slides along under the live hook.

Naturally, as the car passes along, the hook slides off from the end of the contact bar and drops back into place. To protect this hook, or contact piece proper, it is covered with an extension of the cylinder, so that, as far as the street is concerned, the surface is perfectly smooth, and one sees nothing but a small round cover in the center of each of these boxes. The contact hook is alive only when it is resting on the contact plate of the car. Certainly, in so far as getting rid of all the troubles due to the street being covered with water, this is successful. The fatal weakness whereby the contact points remain permanently on the street surface, is obviated here by the contact point being practically lifted six or eight inches above the surface. In regard to the permanence and reliability of this system, I can say nothing, as no trials have been made. The inventor claims to have overcome every objection.

Summing up the general results of the underground and surface methods, it certainly looks as if we could not expect very much from them in the immediate future. Much perseverance and money must be expended before as practical and certain a method as our present overhead method is attained. We surely are all anxiously and hopefully waiting for it. In behalf of the struggling inventors and our common good, I beg that you, gentlemen, will expend all of the above two items you possibly can.

Our rival is the cable. It certainly does look as if for the enormous sums they expend in making their system feasible, we ought, for an equal sum, to make ours perfect. Mechanically it is an assured success, but electrically it has not so proven.

Is it not possible for some bright inventor to devise a scheme whereby the insulation of the live parts can be maintained? This is the sum of all the difficulties. A simple transposition of parts and the problem may be solved. Picture the result! No wires overhead. A welcome boon to millions of pent up suffering people in the great cities of our country; the almost complete annihilation of our rival, and electricity forever established as the great transportation agent throughout the length and breadth of our land. Personally, gentlemen, I have large holdings of a 10 per cent. cumulative, preferred hope,

and I sincerely trust you all will subscribe liberally, if you have not already done so. We now come to the

THIRD OR OVERHEAD METHOD.

It is, I suppose, somewhat conceited for me to suppose that I can give you practical gentlemen any information on this subject. I have had, however, somewhat extended experience, and many opportunities for observation. I also addressed to all of the electric street railroads throughout the country a circular letter, asking for certain detailed information. The results of my own experience, and the summation of the answers to these questions, I have the temerity to lay before you.

There are two general methods of operating the overhead system. One is by having a continuous trolley wire wherever the track runs, and the second is to have this trolley wire divided into sections. For towns and for suburban traffic, the former is almost invariably adopted and carried out. Practice would seem to indicate that but little trouble is experienced, and that there is practically no advantage in dividing the trolley wire into sections. In fact, a disadvantage, since you lose its conductive capacity.

The sectional trolley wire surely must be used for all city work. It would be practically impossible to operate in Boston without proper divisions. It is, however, almost impossible to originally fix all of these divisions once for all, as the topography of the city, the grades, location of power houses, routes, lines of traffic, etc., all have to be taken into consideration. It is bound to be a gradual growth to a large extent.

Obviously the methods of feeding the trolley wire vary with the method of arranging the trolley wire. With the first method mentioned (using a continuous trolley wire) the feeders are either extended from the station the entire length of the line, tapping into the line at intervals, or else separate feeders are run out from the station to certain predetermined distances, and there tapped into the trolley wire. When more than one feeder wire is needed in either case, a repetition of the scheme is carried out from feeder wire to feeder wire. There is little to choose between the two methods. Both are good.

With the second method (the divided trolley wire) there are two ways of accomplishing the feeding. First, to extend a feeder the entire length of the line and tap into the center of each section of trolley wire; or, second, to extend the feeder the entire length of the line and tap into both ends of each section. The advantages of the former are, that in time of trouble a man has to run to only one box to cut out a section, or the whole arrangement could be made automatic by putting a fuse or mechanical circuit-breaker in the box. The disadvantage is that you lose the value of the trolley wire as a conducting medium, which in the case of hard drawn copper wire is considerable.

In the latter method (tapping into the section at each end) obviously a man has to go to each end of the section to entirely cut out that section, and two sets of automatic

devices would have to be arranged to operate in case of trouble. You have, however, the advantage of utilizing the trolley wire as a conductor.

It is undeniably true that the question of feeder wires is one of great importance, and a difficult one to always economically solve for all conditions. The point, however, which the railroad corporations should watch above all others is that they have enough. I have visited many roads where I found that the larger part of the trouble which they were complaining of lay in the fact that they did not have either sufficient trolley wire or track-feeders. Railroad officials are very apt to object to feeders, because of first, their cost, and second, the placing of so many wires overhead, which is liable to bring them in conflict with the municipalities of the public. The question of having a sufficient number of feeders underground for the track, is one which can have no valid or reasonable excuse for. To illustrate how important a part the ground wires or ground plates play in a system, I would mention that not long ago I was told that in the city of Cambridge, Mass., the superintendent often telephoned to the electrician that he could not get enough current, and that his cars would not run well. The message would be transmitted to the proper official, and he would hasten over. By the time he could get there, however, possibly an hour or two would elapse, and when he did arrive he would find everything working all right, the potential having increased. After a great deal of careful searching, the trouble was found. One of the principal ground plates at the station had been thrown over the embankment of the Charles River. At times of very low tide this plate would become exposed, rendering valueless its functions as a ground plate. As soon as the ground plate was thrown farther out into the river, the trouble ceased.

I strongly recommend as many of these ground plates as it is possible to have, not only at the station, but also along the line; brooks, bog lands, water pipes, everything should be utilized for this ground circuit, wherever possible. The plates can be made of sheet copper or iron, preferably the latter, and should have a superficial area of several hundred square feet. The wire connecting them to the track should be of sufficient size and very solidly attached to the plate and the rails. The continuous supplementary wire should in all instances be employed, and the rails bonded at least once. In no instance do I think it necessary or wise to place the track feeders overhead. If this plan is adopted and carried out, and proper connections are made between the rails, I do not think the railroad companies will ever have any trouble with loss of power on their ground circuits.

Referring again to the overhead feeder system, I am strongly of the opinion that for large cities, all feeders should be placed underground. The cities in which this underground work has been adopted are Buffalo, Minneapolis and St. Paul. I cry, all praise to the courage of these railway corporations.

I firmly believe that the trolley wire system is here to stay for many decades, and although I hope for a successful underground system, it may never come.

Under these conditions I contend that whenever anything can be done to advance the interests of the overhead system it should be done. Now, will it not be materially assisting if you, when you go before your local municipal board and the public, petition for only the trolley wires, agreeing to place all other wires underground?

It is perfectly safe and sure. There is no reason whatever but the cost, why all other wires should not be underground to-day. Science or practice has not demonstrated as yet that this can be done with the trolley wire.

For railway companies the question is one almost entirely of construction. The cables alone will cost, in all probability, less than the overhead wires. This construction work can be done simultaneously with the track reconstruction, for it is my experience that whenever a large city adopts electric power it is almost absolutely necessary to rebuild its tracks. Under these circumstances I doubt if the cost of the conduits or ducts would be more than a few thousand dollars additional per mile.

In regard to the overhead devices and material used, I can only urge the advice that the most substantial and perfect apparatus that can be secured be used. Too much care and attention cannot be bestowed upon these devices. It does not pay to put in some little cheap 15-cent arrangement, when for 50 or 60 cents a substantial, reliable and standard device can be obtained. It is also well to consider the question of uniformity in apparatus. The only part that is liable to deterioration is the insulating material. Make this, therefore, of a uniform pattern and arrange the various holders for its reception. With such a system nothing can fall, and the insulation is maintained easily and perfectly. It would be like renewing a glass insulator on a telegraph pole.

I come now to the discussion of the answers to the forty questions I asked by circular letter.

Out of the 400 and odd circulars I sent out, some, however, being duplicates, I succeeded in getting answers from 137 roads, operating 1,546 miles of trolley wire and 1,657 motor cars. Of this number 71 were Thomson-Houston, and 66 Edison or miscellaneous. I wish very much I could have obtained answers to a greater proportion. I certainly wish to convey my sincere thanks to those who did answer, for I realize it must have taken time and sorely tried their patience. For the sake of convenience I have divided the various questions into the following topics: 1. Trolley wire. 2. Span and guard wires. 3. Feed wires. 4. Loads carried and conditions. 5. Tests. 6. Accidents. 7. Miscellaneous.

First. The trolley wire: Of the 137 roads, ninety-nine were using copper wire, twenty-eight silicon bronze wire, eight were using both, and two were using phosphor bronze.

Of those using copper, one used No. 000; five No. 00; three No. 1; two No. 2; one No. 5 hard drawn copper; one used No. 0, soft drawn copper, making thirteen in all and leaving eighty-six as the number using No. 0 hard drawn copper wire.

Of the twenty-eight using silicon bronze, sixteen used

No. 4; six No. 2; one No. 3, and the five remaining roads had combinations of two or more sizes.

Of the eight using both silicon bronze and hard drawn copper, six prefer the latter.

Out of all these ninety-nine using copper not one dis- sents, but of the twenty-eight using silicon bronze eleven advise copper. The proof is conclusively in favor of hard drawn copper wire and of the larger sizes, No. 0. B. & S. seeming to be the standard.

In regard to the wearing, the universal testimony is that it is exceedingly slight. What wearing is observable, is found to be at the switches or on the curves.

Serious mistakes have been made in the past by using iron flanged trolley wheels. These cut the trolley wire badly. Everything should be done to throw all the wear on to the trolley wheels. These are much less expensive than wire, and not so hazardous for the public if they give out.

From my own information and knowledge I can say that the life of the trolley wire is much longer than I had originally anticipated. The criterion is not the years that it has been up, but the number of times the trolley wheels have passed over it. It would seem that with the ordinary brass trolley wheel the wear is about .001 of an inch to the passage of 65,000 cars. This is at the rate of one in every 6 minutes, for 18 hours per day, for one year. With only this wear, the life of the wire would certainly be 20 years, unless through some process of crystallization it became more brittle. I anticipate but very little trouble in this direction, but eternal vigilance is nevertheless necessary. Undoubtedly, at curves and on switches the wear is somewhat greater. How much I cannot say.

The breaking of the trolley wire has been rare, the breaks occurring either at splices, or switches, or were due to some extraneous cause, such as falling trees, telephone poles or the catching of the trolley pole. One road reports a break as due to the striking of the trolley wire by a locomotive smoke-stack. In no instance was any casualty reported, excepting in one case where a mule was killed.

Forty-one roads have their trolley wires divided into sections, and considered it necessary and advisable. Analysis shows that these roads are in the largest cities or towns.

Regarding span wires, forty-nine report as using galvanized-iron wire, fifty-five as galvanized steel, twenty as using galvanized-iron cable and as shipping copper wire. The sizes range from No. 0 to No. 14. Comparatively few breaks are reported, and no casualties.

My own experience has led me to adopt No. 4 B. & S. soft galvanized-iron wire. Whenever a long span or a curve is to be constructed, I have had two or more of these wires twisted together into a cable.

I have found that a cable made of small wires is hard to joint, and it rusts much more quickly. Avoid joints, and use a ball-fastener in attaching span wire to eyebolt. On the whole, however, I have concluded that iron is not the proper material to use in any shape. It will rust, and

then your structure is weak. Pursuing my investigation into this matter nearly a year ago, I found that a certain special quality of silicon bronze wire was the best. Tests of this wire in comparison to iron showed the following result:

	Diam.	Breaking Weight.	Breaking weight per square inch.	Elongation in six feet.	Twists in six feet.
No. 1 silicon bronze,	.200	2,550	31,800	.8 per cent.	37.4
Galvanized iron,	.205	1,720	52,000	7.8 per cent.	19

I am aware that the price of this wire is five or six times as great as that of the iron wire, but as the total sum in either case per mile is small, I strongly recommend it. Some of this wire has been in service on the West End road in Boston for nearly a year. It certainly will never rust out. Guard wires are universally condemned, but are put up as a compulsory protection from existing evils.

Third. The descriptions of the various feeder systems are so vague I will not attempt to describe them. The average distance to which power is transmitted on these roads is about three miles. The greatest is 10.7 miles on the Tacoma & Steilacoom Railway, Tacoma, Wash. There are many, however, operating from eight to ten miles from the station.

Fourth. Loads and conditions. Under this heading I have included speeds, grades, number of tow cars hauled, passengers carried, etc. The average speed of all the roads is 8.7 miles per hour. The maximum is thirty. The average grade is 6.7 per cent., and but twelve roads report as having none, or very small ones. The maximum grade is thirteen and a half per cent., and this extends for 1,500 ft. The road suffering from such an infliction is in Amsterdam, N. Y. Thirteen roads report ten per cent. or over. Nashville, Tenn., reports an eleven and a half per cent. grade for 1,300 ft. and Burlington, Ia., an eight and a half per cent. for 1,500 ft. while Wilmington, Del., reports a seven and a half per cent. for 3,000 ft.

The loads carried up these grades by two fifteen H. P. motors are, to say the least, surprising. Amsterdam reports one motor car and fifty-two passengers. Nashville reports one motor car and seventy-seven grown passengers, Burlington, one motor car and seventy-five passengers, and Wilmington, Del., reports one motor car towing a disabled motor car. Several roads report as towing one car with both full of passengers up eight and even nine per cent. grades, but for short distances. Auburn, N. Y., reports as having towed five cars all loaded, with one motor car. The grades in this instance were slight. In all these instances unquestionably the motors were exerting power considerably beyond their rated capacity. Trains carrying 350 passengers have been moved by two fifteen H. P. motors, 200 passengers is an every day occurrence. Surely this is approaching steam railroad practice. Such information is certainly useful to the electric manufacturing companies.

Fifth. Tests. Out of the total number of 137 roads heard from, only thirty-two report as having made any

tests of either engines, dynamo or motors, and fifty-three upon the overhead work. Surely this is lamentable. There is nothing more essential to an electric railroad than a first-class voltmeter, ammeter, galvanometer, and, if possible, a wattmeter. Electric light, telegraph and telephone, and all other electric companies are supplied with necessary testing instruments, and in most instances a most rigid system is maintained. Every railroad should be continually testing its circuits, station and cars for leaks or grounds. By this means, and this means only, can they avoid trouble and consequent damage. Furthermore, for the sake of economy, these instruments should be used freely. Particularly is a wattmeter useful in a power station. I advise, urge and beseech every company to supply itself with these instruments, and to put them in the hands of a competent person or, if they can afford it, a thorough electrician.

Sixth. Accidents. I am happy to state that under this heading not one road reports as killed or even seriously injured an employe or passenger by the electric current, or falling trolley or span wire. Several report employes as receiving shocks, and one of a boy throwing a wire over the trolley wire and receiving the full potential of the current. None, however, were seriously injured. Several accidents are reported of collision and running over, but these cannot be entirely avoided and are inherent in any system.

Miscellaneous. Under this heading I asked the opinion of the railroads as to the reliability, permanency and safety of the electric system. All, but one, report most emphatically in its praise. I regret very much that this one prefers horses. Further evidence on this point is shown by the fact that forty-four roads report as never having been stopped by any cause, twenty-three were forced to stop because of the steam plant, failure of water, floods or fire, and twenty-six from electrical troubles, the main cause of these troubles being lightning. I consider this a very fair showing and feel confident that as the art advances, these tie-ups will grow less and less, and finally become of rare occurrence.

Now, gentlemen, I have reviewed in rather a haphazard manner the Dependent System.

I have said nothing in regard to the cost of operation. It is a difficult matter to handle and a delicate one to discuss. I feel that there has been already a sufficient number of statements published to enable any man to choose his own figure from. As there is to-day no generally accepted uniform system of accounting, it simply adds to the confusion to publish additional figures unless the most thorough detail is entered into. I take this opportunity to raise my voice and urge the adoption of some standard system.

Surely a basis of comparison with the Independent System is useless, since there is nothing of any value whatever to be found pertaining to the cost of this system. In all other respects also have I avoided comparison with this system.

There is not to my knowledge to-day a single railroad corporation owning and operating storage batteries solely

for what there is in them, nor do I believe there ever will be. It is now claimed that litigation has interfered with their development. This is absurd. With ideality written all over the system, do you think that the powerful corporations who have spent hundreds of thousands of dollars in experiment would finally abandon them, and devote their energies to a system for which they have had to spend almost an equal amount in introducing and exploiting, fighting their way inch by inch throughout the country? Had there been the slightest promise or intrinsic merit in the system, it would ere this have been in every city in the land, litigation, or no litigation. No gentlemen, such sophistries are for the blind and unthinking. For years I have believed that the storage-battery car should be relegated to where it belongs—a position with the air, gas and wind motors. I have no faith in them, nor hope for them.

I have now briefly reviewed the dependent system, or, as I should have preferred to call it, the direct system. There are some grounds for hope in the direction of an underground or surface system. There is universal praise and encomiums sounding on every side for the overhead system. Six thousand seven hundred cars operated over 3,000 miles of track in the streets of full 300 of our towns and cities, surely testify to its merits and value. Of this number of towns and cities fully one-third have absolutely no other means of transportation. What objections there are, are on purely sentimental grounds. Given, a city with all wires underground, where would be the objection to iron poles and a single wire for each track? The rails themselves would be a thousand times more of a nuisance and dangerous. The benefits to come from its introduction are incalculable. In the words of Parnell, "Hold on, fight on. A magnificent future is before you." The wonderful and marvellous development of the past is not to stop, but inevitably must continue. Electric railroading, city, town and suburban, is here for our upbuilding and natural prosperity as surely as steam railroading was fifty years ago. There are equally great opportunities for fame and fortune with this new agent as with the old. Let there be no uncertainty, no hesitancy.

Mr. Wm. Richardson moved that the report be entered in full on the minutes, and that the thanks of the association be tendered to the author.

Mr. Richardson inquired which road was referred to, that had given up the use of electricity and reverted to the use of horses and mules.

Mr. Mansfield: I refer to a road in the state of California; one of the early roads in that state.

Mr. MacGregor, of Houston: I would like information upon one point, and that is the matter of guard wires. Mr. Mansfield rather passed over the subject, stating that the guard wires are an abomination; but they represent a legal responsibility, and I would like to ascertain what has been found effective and simple, and not a nuisance in the way of an obstruction in the street. Of course, additional wires are objectionable, but we must have them; and if he or any other gentleman can give me the information, I will be glad to have it.

Mr. Mansfield: When there is only one trolley wire to protect, we extend two light wires, about No. 14 size, on each side of the trolley wire, and about 18 inches above it, and from 12 to 18 inches on either side. We suspend the longitudinal wires running parallel with the trolley wire upon an additional span wire. The additional span wire is insulated as perfectly as possible from the pole, and from the trolley span wire, and the longitudinal or guard wires proper, are also insulated as far as possible from the span wire. In the case of two trolley wires, the general practice, so far as I have observed, is to stretch three guard wires, two of them outside the two trolley wires and one over the center; all insulated perfectly from the other wires.

Mr. McGregor: Have you found any trouble from induction?

Mr. Mansfield: We have never had any trouble, for the reason that they are insulated from the trolley wire.

Mr. McGregor: What do you consider their value as a protection to life and property?

Mr. Mansfield: I think they amount to a great deal; they certainly do. I think it is necessary to put them up. Most municipalities require them to be put up, and as long as you keep them perfectly insulated from the trolley wire, any extraneous wire, which may fall, will strike them instead of the trolley wire, and will dangle in the street as a dead wire, which may be removed.

Mr. McGregor: Have your investigations led you to form an opinion as to the relative wear of sliding and rolling contact trolley?

Mr. Mansfield: No, sir; I believe only one road used a sliding contact trolley; I think that has been abandoned.

Mr. MacGregor: I live on the line of a road using the sliding contact.

Mr. Mansfield: I cannot say anything about the relative wear.

Mr. Bickford, of Salem: I do not agree with Mr. Mansfield on the size of his guard wire; number fourteen is too small. Nothing short of number ten should be put up as a guard wire.

Mr. Ramsay, of Pittsburg: I wish to ask Mr. Mansfield how long he considers a number fourteen iron guard wire will last without rusting, so that it will be liable to break; or the other gentleman how long a No. 10 wire will last, in an atmosphere like Pittsburg, for instance?

Mr. Mansfield: That is a troublesome question to answer; it might be several years.

Mr. Bickford: My idea in the use of a No. 10 wire is not so much a question of its life, as its additional strength in supporting fallen wires, especially when loaded with sleet in winter. On a portion of my lines I had fallen telephone and telegraph wires on my guard wires for a long distance, and through it all we operated our cars without interruption, by using a No. 10 steel wire.

Mr. Littell, of Buffalo: I wish to ask the gentleman if he does not think it advisable to cut up his guard wire into sections, of say, 1000 or 1500 feet, and put in circuit breakers; so that if any wire does fall, the current will not be sent a great distance.

Mr. Mansfield: I would advise it, and it is done on many roads; the West end road in Boston, I believe, do it every 500 feet.

Mr. Littell: It is done in Buffalo.

Mr. Wason, of Cleveland: Mr. McKinstry, who is manager of the telephone lines of Cleveland, informed me that his telephone wires in the center of the city did not last much over a year; sometimes a year and a half. In our span wires, we use a galvanized steel wire, and at the end of a year and a half, they were rusted to such an extent that we dared not tighten them up. We have a chemical works and oil works in Cleveland, and we do not know whether or not it is due to the gases that come from these factories. I believe our road was the first one to use the soft drawn copper wire for span wires. The reason of using this in preference to hard drawn wire, or silicon bronze, was due to the fact that the silicon bronze when first made was very brittle; strong if pulled straight, but if it became kinked or nicked, it would break like a pipe stem. We use a soft drawn No. 4, the same as for ground work that has been up now over a year, and there has been no perceptible elongation, stretching or siding. When the storage battery will enable us to take down the span wire we will have something for scrap; the steel for span wires will be worth little apparently, the copper wire will not corrode, and the only objection I have ever heard to it was the initial expense and the possibility of it stretching.

Mr. Richardson: I have had submitted to me a copper triangular tube if I may so call it, intended to cover over the trolley wire, and to guard it thoroughly from any interference with wires that might otherwise come in contact with it. I wish to ask what the gentleman's judgment is of that device.

Mr. Mansfield: I have looked into a great many methods of protecting the trolley wire outside of the stringing of additional wires, but I have not seen any, which in my judgment, would lead me to adopt it upon any road where my advice was asked.

The trouble is that most of these devices, if you can hold them in position over the trolley wire, they will walk and twist, and unless they are made very large, the trolley wire may swing to one side or the other, that they entail heavy span wires and an additional strain upon the side poles for their support.

In the winter time upon the top of these devices, there will be a large accumulation of ice and snow, which throws a greater weight upon the span wires and strain upon the side poles for their support, then again they are difficult to put in place and maintain in place, that is the result of my observations, and I do not think there is anything so good as what is generally accepted and used to-day.

On motion of Mr. Littell the session adjourned.

WEDNESDAY AFTERNOON

was devoted to an inspection of the exhibits, although to do them justice would have required almost as many days as there proved to be hours, available for the purpose. During the entire afternoon the delegates crowded the two boats, the Gusky and Mayflower, and also the parlors

of of the hotel, where a very considerable portion was to be seen.

Others accepted the invitation of the Short Company and took a ride on their special car equipped with the gearless motors. Many visited the mammoth electrical works of the Westinghouse Company; others visited Nuttall's factory in Allegheny, and large delegations went out in parties to the various power plants of the local companies, at which points polite attendants were waiting to show the visitors every attention. The power stations were found as neat as wax, and wearing a reception garb.

F. B. Brownell conducted a large party of ladies out to the glass and iron works, where the proprietors showed every courtesy, and the party returned laden with all sorts of glass souvenirs as a result of their visit. Quite a number went over to Allegheny and inspected the magnificent Carnegie library, while the corridors of the hotel, and every parlor, were crowded with little parties engaged in earnest conversation.

The Detroit Electric Company had a special car equipped with Rae motors, which started at frequent intervals from the post office, and was visited by large delegations. The Thomson-Houston Company had a large snow sweeper in operation, which attracted great attention as it moved along the street. The citizens of Pittsburg evidently enjoyed having the convention and visited the boats and hotel by hundreds. At times the throng was so dense it was almost an impossibility to get about. Every one in Pittsburg seemed glad to meet the delegates, and many were the courtesies tendered. Many prominent citizens visited the hotel to welcome and pay their respects to the visitors. They expressed unbounded surprise at the extent and magnitude not only of the association itself, but the exhibits, and went home loaded down with enough printed matter and souvenirs to furnish steady reading for a month.

THURSDAY MORNING SESSION.

The convention was called to order at 10:30 o'clock.

The first business of the session was the appointment of the nominating committee to nominate officers for the ensuing year, and select a place for the meeting of the association in 1892.

The following committee was appointed by the president: Messrs. Chas. Clemshaw, of Troy, N. Y.; Thos. C. Barr, of Newark, N. J.; Robt. McCulloch, of St. Louis, Mo.; Murry A. Verner, of Pittsburg, Pa.; H. A. Everett, of Cleveland, O., and T. J. Minary, of Louisville, Ky. The chairman of the committee then requested that, if any company desired to extend an invitation to the association to meet in their city, they would kindly do so immediately.

In response, invitations were made in behalf of Rochester, N. Y.; Boston, Mass.; Cleveland, O.; Houston, Tex., and Milwaukee, Wis.

The president then announced that the next order of business was the reading of the report on "Public and State Treatment of Corporations," by the Hon. G. Hilton Scribner, of New York city. In Mr. Scribner's absence Mr. C. D. Wyman read the report as follows:

STATE TREATMENT OF CORPORATE PROPERTY.

BY HON. G. HILTON SCRIBNER, OF NEW YORK.

The State of New York, containing a larger population than any other in the Union, embracing within its boundaries not only large and varied agricultural districts but the most important city on the American continent and one of the greatest cities of the world, blessed with a free school system more than a generation old, justly regarded as the pivotal state not only in deciding presidential contests, but in shaping the political policy of the nation, may at any time be fairly taken and used as an example and illustration of the trend of public thought and conviction, and, consequently, of either the social or governmental policy of this country.

To discover, therefore, the fixed purpose of a very large majority of the people of the State of New York, as to any matter within the lines indicated, especially in cases where there are no counter-currents of general opinion outside of the state, but all are following and adopting her illustrious example as fast and fully as they understand it, is to ascertain from the best source of information what may be reasonably expected in the immediate future.

It will not be the purpose of this paper to go further than to expose fairly the serious intentions, now for the first time set fully in view of the holders of, say, three-fourths of the property in this state in dealing with the owners of the other one-fourth; and if such exposure does not carry with it its own condemnation, no words of mine will be wasted in such a hopeless undertaking.

It is not my intention, at any rate, to go beyond showing the baseless character of the only alleged excuses of this three-fourths majority for its harsh treatment of the other one-fourth, which seems necessary to a full statement of the case as it now stands of record.

Several years since, when the state legislature began to discriminate seriously and widely against the owners of corporate property in the matter of taxation, those who were innocently and without provocation injured thereby at once examined that great safeguard from oppression and partiality, the State Constitution, and found, to their surprise and consternation, that it contained no word of requirement that taxes should be equal and uniform, but left the legislature wholly free to place all the burdens of the state upon any class of persons or property it might choose for such sacrifice, leaving the property of such other and privileged class or classes as it might select, or elect for such favors, to enjoy all the protection and advantages of the state government, legislative, executive and judicial, without any payment therefor whatever.

The writer predicted at that time that in a few years a minority class would be found, and so accurately set forth, described and labeled by statute, that they could be caught and compelled to pay the taxes for the majority who would unhesitatingly fasten this burden upon them under one pretext or another, and so go free themselves; and that this majority would permanently hold the government and enjoy all its advantages, not the least

among which would be this parasitical power of keeping its hands in the pockets of that minority class in which the prudent and thrifty are always found.

To get something for nothing is so strong a temptation to any class, that the simple fact that another class, (so situated that it cannot resist or effectually strike back), will be oppressed with the payment therefor, rarely proves a sufficient restraint to prevent the consummation of the wrong.

Since the date of this prediction, the taxes of a corporation with whose affairs the writer is familiar, and which has fared neither better nor worse than others in this respect, have risen from about \$5,250 to \$38,000 per annum, levied upon substantially the same property.

If the expenses of the state have increased in the meantime, say, 50 per cent., and were this increased burden equally distributed at this time, then the rise in the taxes of the corporate property in question should have been from \$5,250 to \$7,875, so that now \$30,125 represents the amount which the persons owning this property are forced to pay annually to and for those who have no interest in the property, except to prey upon it in this way.

In the meantime, too, the Supreme Court of the United States has reached the conclusion, that the levying and collection of taxes for state purposes, is a matter wholly within state jurisdiction and discretion, and that this tribunal of last resort will not consider appeals in such cases. From a legal standpoint, therefore, there is, to-day, no good reason why these owners of about one-fourth part of all the property in the state of New York (being in the minority), should not be annually lassoed, corraled, and compelled to pay all possible public expenses for the benefit of the owners of the other three-fourths, as they are now forced to do, in supporting all prisons, asylums and state courts, and for all the general purposes and uses of the state government.

Is there any existing sense of justice or propriety which will restrain the majority—the owners of the three-fourths—from doing such a thing? Is the conscience of this majority sensitive and responsive enough to resist the temptation to grasp and use the property of the minority for its own advantage, now that it has had a taste of blood and the way is clear and open for it to seize the property of the minority and feed upon it in this way, *ad libitum*? Is it possible, on the other hand, that this new fashioned class legislation—this shifting of burdens from the shoulders of the majority to those of the minority in numbers and ownership—can ever become so barefaced and defiant as to be publicly announced as an established and permanent purpose in governmental policy? Let us examine and see how nearly this majority has already reached this pachydermatous condition.

On the nineteenth day of last month, there was held at Rochester, New York, a state convention of the Republican party. In its platform of principles may be found the following, in a prominent section by itself: "Sixteenth—That there is this year no state tax for general purposes, and a consequent reduction of the tax levy,

(Continued on page 471.)

SEATTLE RAILWAY SYSTEMS.

PART II.

The great railway system of our city is that of the
SEATTLE CONSOLIDATED STREET RAILWAY,

with its 22½ miles of track and semi-dependent feeders in the North End. This system has been built up by L. H. Griffith, who is the father of electric railways in Seattle. The Consolidated is an outgrowth of the very first street railway of the city. That was organized in 1880, by Irving Ballard, James McNaught and Watson C. Squire. The last-mentioned was appointed territorial governor in 1884, and he is now in the United States senate. James McNaught is at St. Paul, as the general counsel of the Northern Pacific Railroad. All three were largely interested in realty here. They built a horse railway, running north and south on Second street—the second from the water front and parallel to it. Second street was then, as now, an important thoroughfare. The city was not then quite large enough to support much of a street railway, and a few old bobtailed cars answered all requirements. In 1888 another line was begun, the West Street and Lake Union. It was intended that the latter should extend along the wharves on West street, and thence out to Lake Union by a northeast route. Before construction had started on West street, both the Seattle Street Railway Company and the West Street and Lake Union were bought out by a new company, the Seattle Electric Railway. This corporation was formed by L. H. Griffith, a young man who came here well backed by Eastern capital. He is president of the L. H. Griffith Realty and Banking Company, and has large holdings of real estate in Seattle and vicinity. In the management of the railway he has shown remarkable energy and skill, as his success proves.

His company, with \$120,000 capital, took hold in February, 1889, and on April 7 of the same year, it began running electric cars on the 5½ miles of the two lines that had been purchased. Very little was done at that time except to put in an electric plant and arrange the old tracks for the electric cars. Since April, 1889, the advance of the road has been swift and steady. One franchise after another has been obtained: one extension after another built; improvements made here and there; additions to the rolling stock and electric plant; double

tracks laid. In order to do all this work, the capital stock of the company was doubled to \$240,000, and the money paid up.

Finally, in April, 1891, the Consolidated Street Railway Company was formed, with a capital stock of \$1,500,000, by Mr. Griffith and the stockholders of the Seattle Electric. The latter had been operating under half a dozen different franchises, some taken in the names of the old horse-car companies, some in the name of L. H. Griffith and some in the name of the road itself. The Consolidated issued \$1,200,000 of its stock to pay for the plant, rolling stock, all the various franchises and improvements for which the old company was still in debt. Some \$300,000 of the stock has been reserved for further improvements. The officers are: President, L. H. Griffith; vice-president, J. F. Hale; treasurer, E. C. Kilbourne; secretary, V. Hugo Smith; auditor, A. Dunn.

Comparatively little of the old horse railroad is now left in existence, for within fifteen months some \$304,000 has been spent in construction and \$81,527 in equipment. Along the eight blocks of Second street which are most frequented, the track, which is standard gauge, is doubled. At the south end a loop crosses the Union Trunk Line Cable, the Yesler Cable and the Rainier



SEATTLE CONSOLIDATED RAILWAY—PINE STREET POWER HOUSE.

Avenger Electric, then turning down into Front street, runs on the cable track for three blocks and up through Pioneer place and over the Trunk Line track on James street into Second again. All the cars run around this loop, and a turn-table is thus avoided. The Second Street Line also crosses the Madison street cable. At the north end of the eight blocks on Second street the road branches. One line goes to the northeast, joining with a feeder, that of the Rainier Power and Railway; another runs to the south end of Lake Union; another, along the west shore to Fremont, where connection is made with the Green Lake and the Woodland Lake roads; another to the northwest, into what is known as North Seattle; and still another follows this northwest branch for a distance and then turns to the east toward Lake Union. So the Consolidated has fairly gridironed the level region about the lake. Most of the North Seattle Line has been double-tracked, and long stretches of the other branches. Great advances in real estate was the result of these lines.

The track is laid with 40 and 45-pound girder and T rails—the latter on some of the branches on ungraded streets. The poles are all on the side.

The power house, situated a few blocks from the point where the branches come together is a substantial two-story brick structure, occupying a space 60 by 256 feet. The upper floor is used for car storage, and the lower for the engines and machinery. There are two engines of 250 horse-power each, built by the Ellis Company, and the Nagle boilers have a capacity of 500 horse-power. Five dynamos of 80 horse-power each, furnish the power. There is still another smaller power house for a reserve. It is supplied with engines, but no dynamos are in it. The old horse-car stables, situated on the North Seattle branch, have been turned into building and repair shops.

The rolling stock consists of 24 passenger and 2 freight cars. Since the cars from all the branches run down over the Second street line and around the loop, there is a three-minute service in the lower part of the

eastern edge of Green Lake, around the north side to a terminus half way down the west—making four and one-half miles of single standard gauge track. The company has a franchise for completing the circuit of the Lake and making a loop by adding a mile of track. Construction was begun in October, 1889, simply by extending the track of the Consolidated; April 1st, 1890, the road was opened for business. Since the object was to develop an almost absolutely unsettled tract, largely held by the owners of the road, there was no business at all at first, but now 12,000 passengers are carried a month, and the line just about pays its running expenses of between five and six hundred dollars a month. The Seattle Consolidated has made a joint 5-cent fare with this road, and the other two feeders as well.

The road bed cost \$60,000, but this sum was given the company in a subsidy of money and land; and the realty has since the opening of the road largely increased in value. The capital is \$150,000; but there are no bonds and no funded indebtedness.



BRIDGE 6,000 FEET IN LENGTH, OVER THE FLATS, FOR THE WEST STREET AND NORTH END ELECTRIC LINE.

city. Ten of these cars were built at the company's own shops.

The freight cars have no motors of their own, but are hitched to the passenger cars. They carry passengers and small freights into the suburbs, and do a general express business. One of them, a box car, makes three daily trips to Fremont, and on each trip lies there an hour to receive and discharge goods. The other car delivers wood from outlying clearings. During the past six months the Fremont freight has been operated at a net profit of \$385.69.

For the year ending June 30th, the company carried 3,136,633 passengers. The monthly pay roll is \$8,000.

The Consolidated road has three feeders in the north end of the city, the Green Lake Electric Railway Company, the Rainier Power & Railway Company, and the Woodland Park Electric Railway. The first of these starts from the northwest point of Lake Union, where one of the branches of the Consolidated ends. At this place there is a settlement called Fremont, recently taken within the city limits. From Fremont the line runs north, over easy grades of 4 and 5 per cent. at most, along the

The track is laid with 40 pound T rails. Two cars of 30-horse-power motors each, supplied with power from the Consolidated power house, give a thirty-minute service. Clearing is going on all along the line, and considerable lumber is hauled over it by locomotives. The company is planning to increase its traffic by improving the boating, bathing, and fishing facilities on the lake, and making small parks there.

The officers are: President, William D. Wood; Vice-President and Manager, E. C. Kilbourne; Secretary and Treasurer, V. Hugo Smith.

THE WOODLAND PARK ELECTRIC RAILWAY

is the sole property of Guy C. Phinney. He owns Woodland Park, a beautiful pleasure ground on the west shore of Green Lake, and he also owns considerable property adjoining. About the first of last July, he began construction at the end of the Fremont branch of the Consolidated. From there he built 6,400 feet north to the entrance of the park. The cost was considerable,—he puts it at over \$30,000,—for there was a good deal of grading and clearing. For 2,900 feet of the distance,

the road runs up a 7 per cent. grade. The gauge is standard; two-thirds of the rails are T, the rest girder—all weighing forty pounds to the yard. The work of construction was rushed, and on July 25, of this year—after about four weeks—the line was open. One car makes round trips every thirty minutes on week days, and every fifteen minutes on Sundays and holidays. Mr. Phinney has ordered two more combination cars, half opened and half closed. The Seattle Consolidated, according to its usual liberal policy, furnishes the road with power free for two years.

THE WEST STREET AND NORTH END ELECTRIC RAILWAY is one of the best built and equipped lines in the country. It runs through the city proper on West street—the thoroughfare between Front, the main artery of Seattle, and the wharves. Beginning at the busiest shipping point, it extends along the wharves to the north limit of the city, and then northeast through a low piece of ground, across the end of Salmon Bay into Ballard, Seattle's liveliest suburb. The whole distance is six miles, the last two and a half are double tracked, with the poles in the center. The grades are easy with the exception of a stretch of 300 feet of 8 per cent. More than 8,000 feet of the line is on piling or bridges—one bridge being 6,000 feet long. The consequence is that fast time is made, and the running time for the whole distance is only 40 minutes. Cars have covered it in 25 minutes, but such speed is not considered safe.

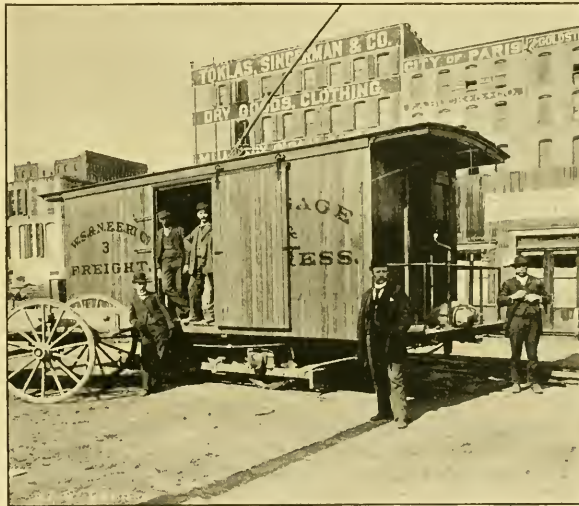
The first work was done in April, 1890, and in November of the same year cars were run with power from the Consolidated Company. On January 16, 1891, the power house, situated half way down the line, was completed, and since then the company has been absolutely independent. This power house is of brick, single story, in the shape of an L, 130 by 130 feet. It is equipped with two Hooven's engines of 300-horse-power each. There are a 500-horse-power Wicks boiler and three dynamos of 80-horse-power each. The track, which is standard gauge, is laid with 45 pound girder rails and 25 pound T rails. The power house and the road itself is of the best material, and provided with the latest improvements. There are thirteen passenger cars, one of them built at the company's own shop. Each has two 15-horse-power motors. About 70,000 passengers are now being carried each month and the traffic is steadily growing.

The West Street Line has the distinction of having built the first freight car to be equipped with electrical motors. The freight cars of the other lines are attached to the passenger cars, and there is no means of running them independently. This one—shown in the engraving—is provided with two 20-horse-power motors, and when loaded makes as good time as the passenger cars. The length is twenty-four feet over all, but each platform takes up two and one-half feet. It is a box car of Washington fir, with a sliding door on each side. The carrying capacity is from fifteen to twenty tons, and the rates charged are from 12 to 15 cents a hundred-weight, according to the class of goods. It makes two round trips daily, and the manager of the road declares that no car of the company is operated at a greater profit.

The capital stock of the company is \$1,000,000. Thus far \$200,000 has been spent on the construction of the road, and \$160,000 on the equipment. The officers are: president, D. H. Gilman; vice-president and treasurer, W. R. Ballard; secretary, C. L. F. Kellogg; superintendent and electrician, L. D. Tibbetts.

THE RAINIER AVENUE
ELECTRIC RAILWAY
COMPANY

operates the longest line of the city, though it has not so many miles of tracks as the Consolidated Road with its numerous branches. It starts on the water front and runs up the hill over Washington street, between the tracks of the Yesler Avenue Cable, one of which is on Yesler avenue and the other on Jackson street. At the top of the hill it cuts the Yesler Cable, and also the Union Trunk's south branch and extends southeast to the shores of Lake Washington, for the most of the distance over a projected, but unopened avenue, which points directly toward snow-capped Mount Rainier, sixty miles away. The road, which is single tracked is seven miles long. On the 1st of August, 1890, construction was begun a little back from the top of the hill, and the six miles from there to the lake was opened for traffic on the 1st of January. The difficulty of the work can be inferred from the fact that none of this long stretch is over a graded street, or even a country road. The company had to do all of its own cutting and filling, but fortunately the course is through a valley where the grades are comparatively easy. In addition to the grading the company also had to clear a heavy forest for a large part of the way. The line ran directly out into a wilderness where there were scarcely any houses.



WEST STREET AND NORTH END ELECTRIC FREIGHT CAR.

The officers of the company are: President, J. K. Edmiston; secretary and treasurer, J. B. Burrell.

Still another road, the Grant Street Electric Railway, is now under process of construction; and four miles of it will be opened within four months. It runs to the south, along the foot of the hill, on a street built for a long way on piles over the tideflats. It is intended to develop the south suburb. The rails, which will weigh 56 pounds to the yard, will be laid at a 42-inch gauge. The capital is \$200,000; and the officers are: President and manager, Fred E. Sander; vice-president, J. M. Frink; and secretary, Lewis D. Bruns.

There is but one line in the city on which the small motor engines are run, and that as yet is not doing a very heavy business. It begins on Seattle's main avenue, Commercial street, at the point where the Front Street Cable ends, and then extends, with a standard guage track, 2½ miles across the tideflats south of the mainland. For the whole of this distance Commercial street is built on piles. At the southern terminus is a small settlement which it is hoped that the road will build up. The company, which is seldom called by its official title, but it is more generally known as the Commercial street motor line, is really the

THE SOUTH SEATTLE CABLE RAILWAY.

It began construction in the fall of 1889, under a franchise requiring the operation of the road by electricity or cable within three years. Two miles of single track were open in 1890, and the motor with a car was run over it in order to hold the franchise. There was no traffic to speak of, because the line did not reach the land. It ended nowhere in particular. This spring, work was resumed and the extension completed and opened July 3. Within a year electricity will be made the motive power. The present equipment is one motor and two cars, which give a fifteen-minute service. The company, which is capitalized at \$450,000, has the following officers: President, A. P. Mitten; secretary, Maurice McMicken; treasurer, Jacob Furth; manager, E. Shepard.

THE UNION TRUNK LINE,

though it has been in operation but a few months, is already shown to be a system second only to that of the Consolidated Electric. In some ways it has an advantage, for it reaches around the west and south limits of the city,

as that does not. It combines both cable and electric power, and therein lies its strength. In most places the hill on which the city is built is too steep for electric cars to climb, and generally speaking the cable is too expensive to be used on light grades. So as a rule the cable companies have operated up and down the hills, while the electric companies have run through the level stretches along the bay. The Union Trunk has built from Front street down near the water, straight up the hill through James street, which lies between the Madison street cable on the north and the Yesler avenue cable on the south. The terminus of the West street electric is but two blocks away; the Front street cable runs directly past at right angles; the Ranier avenue line is but a block away; Yesler avenue and James street are not parallel but run together at Front street, so that the Yesler turn table and the terminus of the Union Trunk cable are but a few steps apart; and the Consolidated Electric company's loop for its southern end runs through James street

to Second, partly in the Union Trunk tracks: so the Union Trunk makes good connections with the other lines of the city. The cable extends three-quarters of a mile up the hill to the power house. From there one electric line stretches by easy grades two and one-half miles to the south limit of the city, another electric goes along the ridge two and three-quarters miles to the north; and another one to the west. By November that branch will be extended

two and a half miles more to Lake Washington. The cable used is double tracked, making one and one-half miles of track; there is half a mile of double on the south branch, making six and three-fourths miles of electric track—a total of eight and one quarter for the whole system.

The cable line is thoroughly constructed in every detail, the material being concrete and iron. There is one grade of 18 per cent, but the average is about twelve. The cable is an inch and a quarter in diameter. Between the tracks, which are narrow gauge, the pavement is concrete, which of course lasts very well as the street is not used for heavy teaming.

For the three electric branches the company had to do a good deal of its own grading, and in one or two places there are cuts deeper than the height of the car. The steepest grade is nine per cent for 950 feet on the west



UNION TRUNK LINE POWER HOUSE.

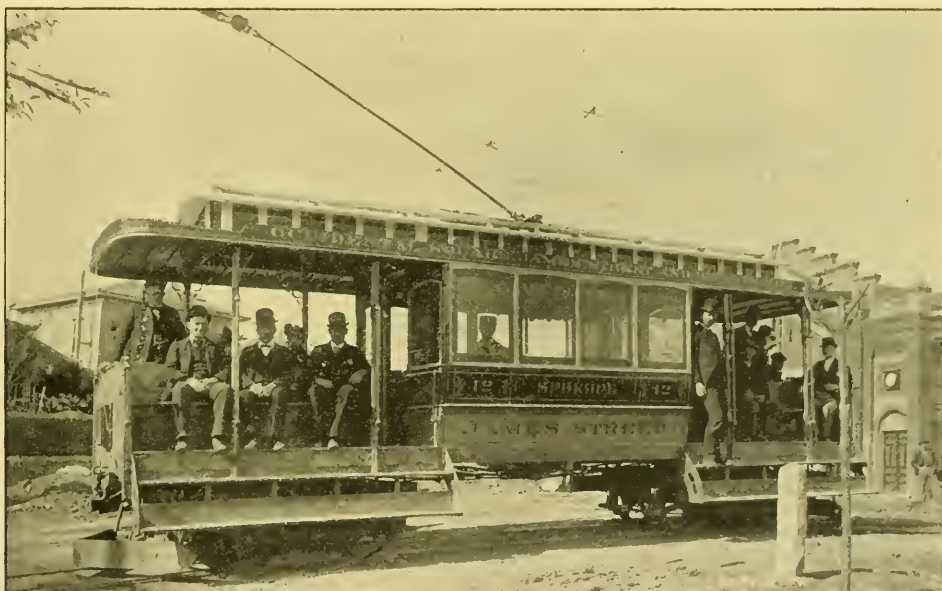
branch. Where the track is doubled, the poles are placed in the middle with iron brackets on each side to hold the wires; and where the track is single, the poles are placed for such an arrangement. The electric wires are run all the way down the hill, so that electric power may help draw the cars up, and that the electric lights may be kept burning. Though the opening of the road has led to the clearing of much land adjacent, and to the building of many suburban homes; nevertheless a workman who, on 7th of August, 1891, was building a small waiting station half way down the line, was chased by a bear that came out of the woods. It must be added, however, that such large game is rarely seen so near the city.

On August 10, 1891, the road down the hill was opened. For three blocks of the distance the grade is from 12 to

at an angle of 45 degrees, so that the cable is turned out not directly in the middle but at one side just within one of the tracks. The cable does not run out on the street, but underneath in a little slot like that of the cable roads. The grip which takes it is fastened to the car. A light cable upon which there is little or no strain, runs from the rear of the truck back up the conduit, and joins with the heavy cable in making a complete circuit. Air cushions like those used in elevators, are placed at each end of the course, to act as buffers for the truck.

The company has a small power house with a dynamo of 160 horse-power. There are now four cars, giving a twenty minutes service over half of the line, and a forty minutes service to the terminus.

Two more cars, to be fitted with single reduction motors, have been ordered. Small packages are carried



COMBINATION CAR UNION TRUNK LINE, SEATTLE.

15 per cent., and in order to overcome this, the engineer, J. P. F. Kuhlmann, has adopted a counter balance such as is sometimes used on mine tramways. The road is standard gauge. For the three blocks mentioned, there is between the tracks an excavation three feet deep. In this is laid a narrow track in which runs a long, low iron truck, loaded to weigh nearly seven tons. Attached to this is a steel cable just reaching to the top of the hill when the truck itself is at the bottom. At the top is a pulley wheel over which the cable runs. When a car starts to come down, this cable is hooked to the rear, and the descending car draws up the truck. When the car returns, the weight of the descending truck forms a counter-balance, so that by the electric power the car easily makes the climb. Of course the under track is planked over so that the street is not interrupted for ordinary wagon traffic. The wheel at the top is set in

by the conductors, to be delivered at points along the line, and two or three flat cars, which are attached to the regular passenger cars, are used for handling wood or heavier freights. The long stretch from the top of the hill to the Lake is laid with T rails, but the rest of the distance is with girder rails. The cost of the road and equipment was \$150,000, and the capital stock of the company is \$250,000. Before construction was begun the people owning property along the line gave a subsidy in land and money amounting to \$150,000. In spite of the stringency of the money market, the company has been remarkably successful in developing the country through which the line passes. J. K. Edmiston, the president, who is also interested in Spokane roads, owned a tract of about 150 acres half way down the line. He has started there, on the co-operative plan, a village called Columbia. Sixty families are already living there and

houses are building there for twenty more. The place has a water supply by gravitation, and a neat school house has been erected.

The company has a franchise for a branch line from near the top of the hill, running a mile and a half somewhat south of east to the lake. The plan is to complete it by the first of next April.

The power house is a two story brick structure 120 feet by 120. The upper part is used for storing and building cars, and the lower for the engines and machinery. One engine supplies the power for the cable and the dynamos. There are two of these engines of 300 horse power each, but one is kept for a reserve. No belting is used on the machinery, but rope transmission is wholly employed. The electric power is supplied by two Edison dynamos of 80,000 watt capacity each. The rolling stock consists of four grip cars, which run up and down the cable branch, and ten combination electric cars, six of them built at the company's own shop here. Hitherto the passengers have ridden up the hill to the power house on the dummies, and there have changed to the electric cars; but the plan is to have all these cars start from Front street and be drawn up the hill by the grip cars. A system of transfer checks is used and the fare from the end of any one branch to the end of any other is five cents.

The company was organized by E. F. Wittler, a St. Louis man, who has been very successful in business here. He has managed the affair with great energy and skill, and by securing the co-operation of property-holders, not only in the north end of the city, but in the south and west as well, he has obtained unusually strong backing for his company. The capital stock is \$1,000,000. Construction was begun June 13, 1890, and in spite of long delays in getting the machinery from the east the cable road was open March 19, 1891. Since that time the work of extending the electric branches has gone forward very steadily. The cost of construction thus far has been \$350,000. A subsidy of \$125,000 has been received. The road has been built from the money of the stock-holders, and no bonds are in the market. The officers of the company are: President, E. F. Wittler; secretary and manager, J. D. Lowman; vice-president, J. F. Mc-Naught; treasurer, R. R. Spencer. Fred. E. Sander owns one-fourth of the road and has assisted actively in promoting it.

TONY TONAWANDA.

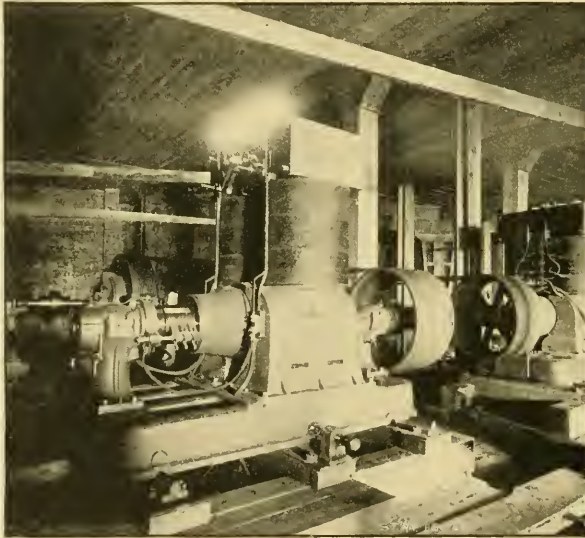
IT is a matter of no surprise that the city which entertained so royally the American Street Railway Convention should be one of the first cities in the world in the matter of palace-car, interurban traffic. Not resting content with the usual thing in suburban connection, the new line of electric railway to Tonawanda, a flourishing suburb, will be equipped with a luxurious disregard of expense that will make palace-car constructors look for something new.

The newly-opened suburb will eventually become the twenty-sixth ward of the city of Buffalo, and, thanks to the new railway, will be a favorite residence portion before many years for the inhabitants of the busy city.

The line ultimately will push through North Tonawanda, Whetville and La Salle to Niagara Falls, taking a route that will be popular with both tourists and travelers.

As to the construction, it is sufficient to say that the

Woodbridge & Turner Engineering Company of New York City have the contract and Mr. J. H. Baldwin is in charge. The roadbed is cinder ballasted and the rail is a 52 pound girder. The rolling stock is promised to be as complete as may be seen anywhere, and will compare favorably with the elegant cars on the Chautauqua road between Jamestown and Lakewood. The cars will be 20 feet long, vestibuled and elegant in every appointment. They can be thrown open as observation cars in summer, closed in winter and heated. The heating will be accomplished with



INTERIOR UNION TRUNK LINE POWER HOUSE.

water heated by electricity, a system in the use of which the Buffalo, Tonawanda & Niagara Falls road will be a pioneer.

Each car will contain a smoking vestibule, a comfortable innovation which is worthy of adoption.

Besides this, an absolutely new thing is contemplated—that of keeping a city and town directory and file of papers in a cabinet convenient for patrons.

The officers are: P. McNeil, president; E. H. Butler, vice-president; M. Nellany, treasurer; Clarence M. Howard, secretary; F. G. & G. R. Sikes, engineers; W. H. Archer, architect, and the capital is fixed at \$250,000, all of which is subscribed already.

W. H. Smith, of Peoria, Ill., will fill the position of superintendent and will have general management of the operation of the road, which it is expected will open December 1st.

STREET RAILWAY LAW.

EDITED BY MR. FRANK H. CLARK, ATTORNEY AT LAW, CHICAGO.

Injury to Person Riding on Front Platform.

Whether it is negligence in a street railway company not to guard its horse cars so as to prevent passengers from getting on or off the front platform, is a question of fact for the jury, notwithstanding that the city ordinances require such cars to be so guarded.

Whether a passenger on a crowded horse car is guilty of negligence in riding on the front platform, is a question of fact for the jury.

THE testimony introduced upon the trial showed that the complainant and his father took passage upon the car, and that the car was filled inside and the rear platform also, and that they were obliged to take passage upon the front platform; and that while riding in that place, with his back against the car and holding on to the guard rail at the right with his right hand, the driver struck the horses with his whip, which caused the car to swerve to the left; and, as he was standing on the right hand of the door of the car, his back was thrown against the end of the car, and he slipped down the step, striking his hip against it, and, hanging to the guard rail, his back was turned toward the horses. He tried to regain his footing, and did regain it, and tried to get back on the car, but slipped off the lower step and was swung around; and, still hanging by his right hand, was dragged along the ground, and his foot was caught under the wheel of the car, and run over; that he called to the driver to stop, and he testifies that the driver "appeared to be having all that he could do to attend to his horses; they were kind of unmanageable, and he did not see me, or didn't stop the car until I was run over." He testifies that he thought he shouted loud enough for him to hear, but he did not make any attempt to stop the car. He testifies that he did not go over ten or fifteen feet after the car ran over him until it was stopped.

Testimony was also introduced tending to show that the driver was behind time, and was endeavoring to make it up. The plaintiff introduced in evidence sections 4 and 5 of the Revised Ordinances of 1890, c. 107, as follows:

"SECTION 4. Every street railway company in the city of Detroit shall so inclose and guard the front platform of each car operated and run by any such company within the limits of the city as to prevent passengers from getting on and off such platform." Approved July 4, 1873.

"SECTION 5. No conductor or driver on any street railway car, while such car is in use, shall permit any person to enter or leave the same by way of the front or forward platform; and no person, when the forward platform of any street railway car in actual use is inclosed or guarded, as required in the preceding section, shall enter or leave, or attempt to enter or leave, such car by the forward platform; and no person under the age of 16 years shall ride on the rear platform of any street rail-

way car, or get on or in the same while said car is in motion." Approved May 4, 1876.

There was no testimony introduced upon the trial which tended to show that the car upon which the complainant was riding had a chain or other device for preventing persons from entering or leaving by way of the forward platform, or to protect them while riding thereon. The only testimony bearing upon the question of the negligence of the company or its agents, namely, the conductor and driver, in the management of the car, was the testimony showing that the car was filled with passengers inside, and the rear platform was also filled, so that the complainant could not obtain passage inside the car, and was thereby compelled, if he rode upon the car, to take passage upon the front platform. This he had a right to do, and it was not negligence on his part to so occupy the front platform under the circumstances. *Upham v. Railway Co.* (Mich.), 48 N. W. Rep. 199.

It does not appear from the complainant's own testimony that the car was driven at an unusual rate of speed, and it does appear that the accident happened upon a straight track, and that there was nothing calling upon the defendant and its agent to give any special warning that he was about to use his whip upon his horses. The complainant was in a position where he could observe the movements of the driver, and was well qualified to see and know when the whip was used. The position he occupied upon the car was one fraught with danger and called upon him to use diligence commensurate with the dangerous position he occupied. It is true that the railway company owed to him, while riding in that place, increased care not to so conduct and manage its cars as by their neglect to cause him injury, and it is a question of fact which ought to be submitted to a jury to determine whether or not the position of riding upon the front platform of a street car is so dangerous that the company, in discharging its duty to the public, should construct some kind of a guard to prevent persons from being thrown from the car.

It was said in the case last referred to that it was difficult to see upon what reason the courts can hold that platforms of cars are dangerous, and that persons who ride there assume all the risk, and thereby relieve such companies from all liability, except for gross, wilful and wanton misconduct; and, under the facts of that case, it was said that the question of negligence of the plaintiff, as well as of the defendant, belonged to the jury to determine, and should have been submitted to them under proper instructions. We think that this case comes within the ruling above referred to, and should have been submitted to the jury. The judgment will be reversed and a new trial ordered.

(Sup. Ct. Mich. *Archer v. Ft. Wayne & E. Ry. Co.* 24 Chi. Leg. News 10.

Street Railway Track Cleared of Snow—Person Walking in Cut—Negligence—Personal Injury—Evidence.

When a railway is laid upon a public highway, it is the duty, both of foot passengers and of the company's to be on the lookout for each other, but the right of the company is superior.

The fact that the company has cleared the snow from its tracks, thus making that part of the road more convenient to walk upon, does not change the relative rights of the parties.

When the plaintiff testifies that she looked along the track and saw no car coming, while all the rest of the evidence is to the effect that a car was in sight and must have been seen by any one who looked in that direction, the question should not be submitted to the jury.

(Sup. Ct. Pa. Warner v. People's Street R. W. Co., 48 Leg. Intel. 338.)

Street Railways—Additional Burden on Highway—Use of Electricity—Damage to Abutting Lots—Michigan Statutes.

A statute (Act Mich. 1855) entitled "An Act for the construction of train railways," authorizing the organization of corporations for the purpose of constructing a train railway to be operated by horse or other animal power, and providing for the use thereof by any person by paying certain tolls for every coal car, ore car, or other vehicle drawn over it, was amended by acts authorizing and regulating the operation of such railroads for the carriage of passengers through the streets of cities, under municipal regulation, and authorizing the use of steam or any other motive power than animal power, under the authority of the municipality. *Held*, that the act was not unconstitutional, as embracing more than one object, which is not expressed in its title, in that the original act provided for the carriage of freight while the amendments provided for railways for the transportation of passengers.

Though the operation of cars by electricity in the streets of a city may be *ultra vires*, because the Act (How. Stat. Mich. c. 94) under which the ordinance was passed, limits the street car companies to the use of such powers as were known at the time of the passage of the Act and the amendments thereto, such want of power is a question between the company and the state, and cannot be raised collaterally in a controversy between an adjoining lot-owner and the company, as to its right to erect poles for its wires in the street.

By Act Mich. 1867 (amendatory of the Act of 1855), the right to use any other than animal power was expressly conferred, to be exercised under the authority and direction of the municipal authorities. The Act of 1871, s. 1, provided for the operation of a train railway for the conveyance of persons or property, to be operated by horse or other animal power or by steam, or by pneumatic or any other motive power, or by any combination of them. (How. Stat. Mich. ss. 3495, 3533.) *Held*, that these provisions authorized the use of electric power, although not discovered until after their enactment.

The use of the street for an electric railway, operated by the single-trolley system of poles and wires in such a way as not to interfere with the right of a lot-owner, as one of the public, to pass and repass thereon, or with the right of ingress or egress to and from his lot, does not impose a burden and servitude additional to what was implied by the dedication which it is beyond the power of the city to authorize without additional compensation to the abutting lot-owners.

Since, in condemning land for the use of streets and highways the owner receives as damages the full market value of his land, there can be, after it has been condemned or dedicated, no such thing as damage to his reversionary interests caused by any use which is a public one.

It appearing that the poles do not interfere with the present occupancy of the land, it cannot be insisted that they are a detriment, because in platting lots and selling them it will be necessary to take them into consideration, since that is a contingency which may never happen, and for which, if it should happen, the lot-owners would have an ample remedy in the courts.

It is clearly within the discretion of the Court to limit the number of witnesses who may be called to testify to any particular fact.

(Sup. Ct. Mich. Detroit City Railway v. Mills, 10 Ry. & Corp. L. Jour. 104.)

NOTE.—In the case of Van Horne v. Newark Passenger Ry. Co., recently decided by the Court of Chancery of New Jersey, 10 Ry. & Corp. L. Jour. 234, the following is stated:

"A horse railway, constructed in a public highway by authority of law, does not impose a servitude upon the land in the highway, additional to that for which it was originally taken.

"When such a railway is constructed in a public highway without authority of law, it is a public nuisance, because it is an invasion of the public easement.

"In the latter case there is no invasion of the property rights of the owner of the fee of the land in the highway, and a court of equity will not interfere by injunction, at his instance, unless he suffers some special and serious injury from the existence of the railway there, distinct from that which is suffered by the public at large."

In a late case (Nichols v. Ann Arbor & Ypsilanti St. Ry. Co., 24 Chi. Leg. News 23), the Supreme Court of Michigan held that a street railway constructed by making cuts and fills, thereby obstructing access to abutting premises, creates an additional burden on the land from that implied by the dedication of the highway, and the abutting owner may enjoin its operation, where the road was constructed without making compensation for the injury done; a street railway, operated by a steam motor, creates an additional burden on the land (Grant and Long, J. J., dissenting); the fact that a street railway company has not complied with the statute in its organization does not authorize an abutting property-owner to bring suit to enjoin the laying of its track, unless property-rights are thereby affected, as the usurpation of a corporate franchise is a matter between the state and the company.—Ed.

ANOTHER INTER-URBAN.

THE new electric railway that is to connect Mahoney City, Shenandoah, Girardville and Ashland, all in Pennsylvania, is now fully assured of adequate financial backing. The incorporators ask no bonus of the citizens and will require nothing but the good will of the traveling public. The contracts will soon be let for equipment and construction so that before many months another interurban road will be added to the ever increasing list.

STREET RAILWAY FUNERAL CARS.

CHAPTER III.

IN our last article we gave the views of leading undertakers in Minneapolis, Detroit and St. Louis, as to the advantages and disadvantages of street cars for funeral purposes. In order to show with what favor the proposal is received in other parts of the country we offer the opinion of leading representatives of the business in other cities.

CINCINNATI.

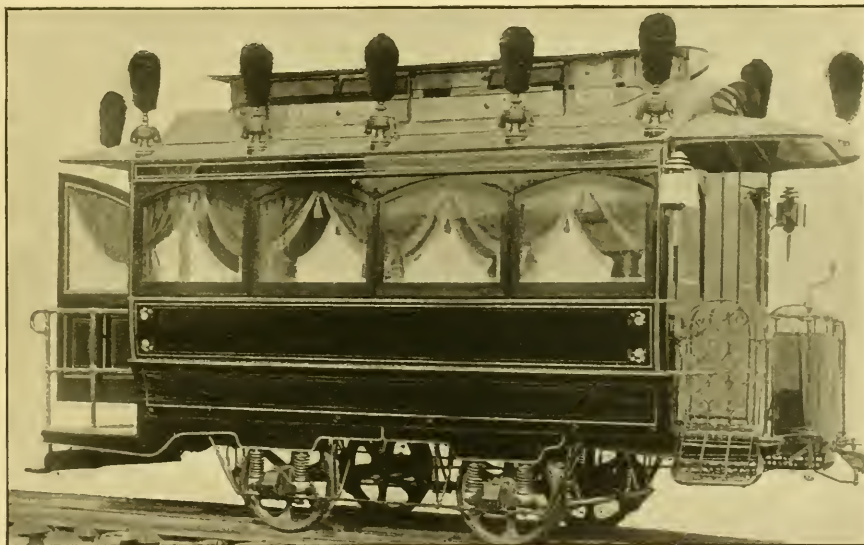
Mr. John T. Wiltsee, of Cincinnati, frankly states he "sees no reason for objection on the part of the undertaker. For persons not residing on the tracked street there would be the great objection of confusion, as the funeral train could not stand any great length of time to block the street; neither would it do to keep the family and corpse waiting on a corner for the car. This is the most objectionable feature of the whole matter. In this

680 acres inclosed, and the grounds most used at the present time are about $1\frac{1}{4}$ miles from the gate. All that need be said about this is, how would you like it yourself, say in a driving rain or snow storm?"

(Pleasant weather would be no inducement to us to locate permanently.—Ed.)

"The parade and exposure of a street car funeral would be opposed to the good taste and feelings of most people. Such publicity would be shocking to the feelings of refined persons."

As to delays on street railways, managers could in most cases handle their cars on time. The undertaker would not be called on to handle the cars. There would be no more publicity to the occupants of an elegantly finished, curtained car than in a carriage, and a great deal more comfort, especially in cold weather.



FIRST ELECTRIC FUNERAL CAR—ERIE, PA., ELECTRIC MOTOR COMPANY.

city it is not the custom for other than relatives and very immediate friends to accompany the remains to the cemetery, hence the expense for carriage hire is not great. As to the funeral car it should be an exclusive one of a single compartment, as many of the causes of death would be such that the Board of Health would not permit bearers or passengers to be carried in the same conveyance. One hearse car and two passenger cars would ordinarily furnish ample accommodations. Where the tracks reach the cemetery entrance the saving in time would be considerable. The undertaker's profit would not be affected by the use of cars instead of carriages."

Mr. Wiltsee sums up the whole question as follows:

"Now in this matter much depends upon the size of the cemetery. Spring Grove, our largest cemetery has

In Chicago, the cemetery companies have a hearse on the grounds to meet trains.

BOSTON.

B. F. Smith, undertaker at 251 Tremont street, seems to be struck all in a heap by the innovation, and to our several suggestive inquiries subscribes an emphatic "No." Does not favor the plan: sees serious difficulties at cemeteries; discerns no advantage to poor people in the reduced expenses; does not see any saving in time in an electric car over a hearse and horses; but admits the scheme would not affect the legitimate profit of his profession.

He would not have a funeral car, but if he did, recommends a two-compartment car, and one or two additional closed cars as sufficient for those attending.

IN CHICAGO

FIRST ELECTRIC FUNERAL CARS.

people never die when they can possibly avoid it, but such events do sometimes occur. A. H. Sheldon, a leading undertaker, says: "The idea of using street cars for conveying funeral parties to the cemeteries is a good one for very poor people, if only they could be made to look at it in the right light. But I am afraid it would be a difficult custom to establish, as the rich would not want it and the poor would not use it because the rich did not. The use of cars instead of carriages would not affect the undertaker. There are a great many advantages if the car service can be made practicable."

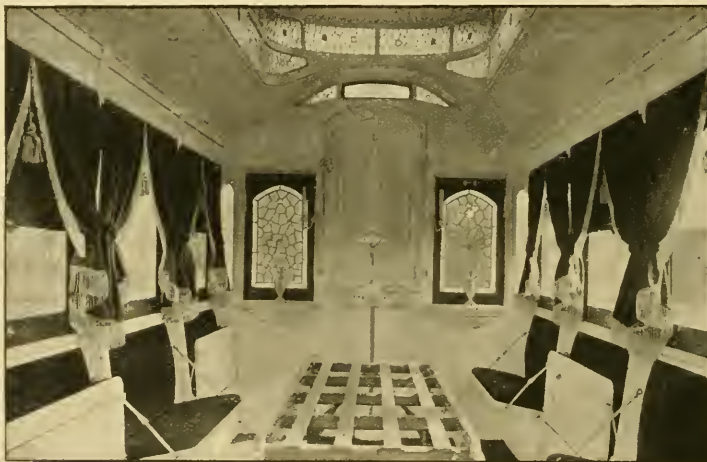
Another undertaking house in this city, C. H. Jordan & Co., express themselves thusly: "If the plan can be worked out we see no objections to the method. The difficulty would be the necessity for hearse from residence to car and at cemetery, and at the latter where distances are great. A hearse car should be of two compartments, and with one or two additional cars for the friends. There would be a saving in time, though as a rule people are not in a hurry at funerals, and do not care for time. The undertaker would be glad to be relieved of furnishing carriages, as we have to hire and pay for them whether we get our pay or not—in fact we lose money by furnishing carriages. As hearses and perhaps carriages would have to be provided at both ends they might just as well make the entire trip."

It must be borne in mind, however, that aside from furnishing a hearse at the cemetery, and possibly one and an occasional carriage at the residence, the objections raised are much greater in the eyes of the undertakers than exist in the experience of the railway manager. The topographical conditions of some cities doubtless render the undertaking impractical in those places, but in the great majority of cases it is both practical and desirable. The regular business of funeral trains on no less than four of the railroads running out of Chicago, of which mention was made in our first article, is not only very large, but is constantly increasing.

The systems of operating funeral street cars, described in the preceding papers, have been operated by horses, but the illustrations presented this month are of a different character, and afford facilities which go to make the plan of funeral cars more advantageous.

The Erie (Pa.) Electric Motor Company has an energetic manager in J. F. Pfetich, and he had the honor of instituting the first electric railway funeral car in the world. The distance from the heart of the city to cemetery is four and a half miles, and the tracks and switches are so distributed that the car can reach nearly all of the residence districts. Where the distance is considerable from house to track, the casket is carried in the undertaker's covered wagon, such as he uses to bring the coffin to the house:—the undertaker taking full charge of the funeral, outside of the car service, just as he would if a hearse was used. The charge for funeral car is only five dollars. Unless the motor car is chartered also, the company collects the regular 5-cent fare, though the usual custom is to charter one or more trains, in the first of which the funeral car is drawn. By this means a saving is effected of from ten to one hundred dollars, while the

service is better, especially in winter, at which time the cars are nicely heated. Considerable opposition was at first raised by the liverymen and a few undertakers, who owned expensive hearses and wanted to get large prices for their use, but the Catholic bishop and the clergymen of the city generally were strong advocates of the system.



INTERIOR ELECTRIC FUNERAL CAR, ERIE, PA.

Among the very first funerals hauled were people who belonged to the well-to-do classes of society, and who used the cars, not because they needed to select a cheaper method, but on account of its being so much more comfortable and convenient. The poorer classes have also used the cars, but at first were influenced by the fear people would think they could not afford carriages. This, however, is rapidly disappearing, as the advantages become better understood and appreciated. The company furnish a conductor for each car and one man to oversee the movement of the train and superintend the service. The time saved in Erie, over carriages, is from one to three hours, depending on the condition of the roads, which are at times very heavy.

In the few cities where street car funerals have been tried, the companies have taken steps to have a car built. The Erie cars were made by the J. G. Brill Company, of Philadelphia, to whom we are indebted for photographs.

The funeral car problem is well worth considering and, we believe, can be made both acceptable and profitable.

ROCHESTER RAILWAY WRINKLE.

A DECIDEDLY novel, and yet practical innovation in track placing, has been adopted on Lake avenue, one of the most delightful residence streets in the city of Rochester, N. Y. The avenue has always been a popular one for pleasure driving, and when the necessity arose for a double track electric line on the street, the property owners proposed a plan which has proved of equal satisfaction to them and to the company.

The street measurements are as follows:

Sidewalk to sidewalk	- - - - -	72 feet.
Sidewalk to curb	- - - - -	18 "
Curb to curb	- - - - -	36 "

A single track is laid on each side of the street between the walk and curb and nearer the latter, leaving some three feet between the curb and the curbstone. The space between curb and walk, including that between rails is nicely sodded, and as the avenue is handsomely shaded, the cars have a route practically through a park. The freedom from dust and the greatly increased speed, owing to the absence of vehicles on the track, are highly appreciated by the public, while in wet weather the necessity of walking to the center of a muddy street is wholly avoided. For the company there is an immense saving in paving both in first

cost and repairs, and the increased life of the rail. This latter item is much greater than is generally believed; in many cities the wagon-wear is from two to three times as great as that of the actual service of the company's cars. Cars pass up one side of the street and return on the opposite side. It is found that liability to accident is greatly lessened, especially in the matter of stepping from behind one car in front of another on the other track. The wires and poles are hid among the trees, cars are never in the way of the fire department, and the danger of being run into by careless drivers or unmanageable horses is removed. The advantages are evident and numerous and thus far no objection has been found to the plan.

The photograph above illustrated is a scene on Lake avenue in the northern suburban part of the city. The

line extends from the village of Charlotte, a pretty suburb on Lake Ontario, down to the business center. The tracks are placed on the side of the street and sodded for a distance of nearly eight miles. When the business district is reached the tracks lead out into the middle of the street, but upon again entering the residence district they resume the park-side location. Some other lines in the city are similarly placed, and all others where streets permit of so doing, are being relaid in the same manner. Managers of electric lines will do well to examine their own streets with a view to adopting this method when relaying or building new tracks, and especially where new streets are being laid out, to take such measures as will make the scheme possible when the time shall arrive

to lay tracks thereon. Of course where cars are operated by horses the arrangement would not be as advantageous, as there would be the clatter of hoofs and a pavement to lay and maintain. Other cities are already favorably considering the system. The Indianapolis Board of Public Works has decided to utilize the plan in future railway construction. By its use the only objection to the overhead system, that of the poles and visible cross wires is wholly removed, the poles and wires being entirely hid among the trees.



ELECTRIC LINE AT SIDE OF STREET, ROCHESTER, N. Y.

TRICKS WITH TRANSFERS.

A WHOLESALE system of spoilation has been practiced on the Brooklyn, N. Y., City Railroad Company by a number of its oldest and most trusted employes.

The transfer tickets issued to passengers were taken in quantities by the employes in question and sold, or traded for beer, cigars and small articles of like value. How long this has been going on it is impossible to tell, but by the assistance of private detectives the fraud was discovered and nine conductors relieved of duty and the entire force of the transfer station changed or reduced to lower positions.

Secretary Thompson says it is impossible to estimate the loss. It seems strange that men with good positions become so short-sighted. Detection inevitably follows.

FROM FLESH TO FUEL.

TWO of the heaviest property owners along the route petitioned the board of street and water commissioners praying that the trolley supersede the horse on the Jersey City & Bergen Railway.

The board immediately gave its consent and President Thurston, of the Jersey City & Bergen Railway, set a gang of fifty men at work placing poles and wires from Cortlandt Street Ferry, Montgomery street, to Varick street. From Varick street to Bergen avenue, on the Heights, the poles and wires are in place and electric cars were run for a year and taken off.

There has been a long fight over a legal technicality, but the prospect is now bright for better things.

JOYOUS JAMESTOWN.

ON the event of the opening of the very complete electric railway system at Jamestown, N. Y., the city took a general holiday. In the language of the local papers, "bands played, whistles blew, men cheered and women waved their parasols and handkerchiefs; the babies cried and the boys yelled, and everybody rode on the cars free of charge."

The accompanying engraving represents a small part of the general jubilee that possessed the populace; and the entire scene is one that is oft repeated as city after city hail rapid transit, not only as a harbinger of pleasure, but as the only escape from the inconveniences of city life.



STREET SCENE—JAMESTOWN, N. Y., RAILWAY COMPANY.

THE BOGIE MAN.

THE syndicate represented by Waller, Cook & Wagner, of New York City, has gathered into its all-absorbing tentacles another street railway—the Winchester Avenue Road, at New Haven, Connecticut. The same powerful organization recently bought in the Detroit road for \$7,000,000, and last May gathered up the West Haven road at a less figure. They have improved the West Haven road to the extent of \$50,000, and after getting control, the Fairhaven and Westville road, and thus, with the Winchester franchise a complete system of first-class rapid transit. No pains will be spared to make the system all that it ought to be, and although nothing has been said, not less than \$300,000 is the sum already involved in the transaction.

The length of the entire line is 20 miles, built under the severest conditions, which make construction difficult. The route is a succession of grades, running 10 per cent. in several places, and numerous sharp curves. The gauge of the track is standard and laid with 30 and 35-pound T and 48 and 52-pound girder rails.

The rolling stock consists of a sufficient number of 18-foot-body vestibule cars 27 feet over all, seating 38 people and weighing between 6 and 7 tons equipped. The Short double-reduction motors are exclusively used, and the management is so well pleased that they have placed three more orders for equipment. The motors, two 15-horse-power on each car, are called upon to do the most difficult work in propelling the heavy cars up the steep grades. The magnificent success of the line is

a telling recommendation of these motors. The Short Company also furnished the generators, which give the best of results.

The power station has 3 150-horse-power compound condensing engines from the Phoenix Iron Works, Meadville, Pa., and 4 150-horse-power boilers, 2 of Sterling and 2 of the Manning manufacture. Three Jewell belts drive the machinery. The power-house is 125x62 feet, with a coal storage of 24x50 feet in dimension, giving ample room for the engines and fuel.

The interior of the power-house is sketched very fairly in our second engraving, showing the great switch-board on the left with the Short generators under full headway, while across on the opposite side the engines mentioned above are doing yeoman service in driving the three 65-foot belts.

ner; secretary, W. S. Cameron; treasurer, F. E. Gifford; superintendent and purchasing agent, G. E. Maltby. To these gentlemen much credit belongs, and if the citizens of Jamestown patronize the road as well in the future as the present traffic indicates, the noble plant will be financially as well as mechanically a grand success.

The route of the line is over as beautiful a country as any twenty miles of track could well be. The lovely Chautauqua Lake is reached by it. Here, 1,579 feet above the level of the sea and 725 feet above Lake Erie, the learning and piety of the nation gathers every year to spend a few weeks in congenial intercourse. Not far from this place is a point of high ground from which the great salt sea and the great fresh-water sea can both be seen. It is amid this region that the road runs and will no doubt become one of the most popular routes for



SHORT GENERATORS—POWER HOUSE OF JAMESTOWN, N. Y., ELECTRIC RAILWAY.

The third illustration shows the switch-board, also built by the Short Electric Railway Company, one of the most complete in the country, nothing being left undone to make it perfect in every detail. It is equipped with the latest that science has devised, and permits of cutting out any one line without interfering with the operation of any of the others. The location of the various meters and circular breakers can be readily discerned from the illustration. The whole is of elaborate and attractive workmanship and a most attractive ornament to the neatly arranged power-house.

The greatest credit is due to the Jamestown Railway Company in this new and expensive addition to the attractions of the city. The officers of the road are: President, A. N. Broadhead; vice-president, L. B. War-

tourists as well as a convenience for the general public. One of the not least interesting objects along the way is the bridge that spans the N. Y., P. & O. tracks for 650 feet at a height of 50 feet.

THE editor of the Clinton, Iowa, Herald evidently entertains an earnest desire to translate the truth to his readers, pure and simple and free from puzzling technicalities. His abbreviation for a safety car gate is—"A cross between a hat rack and a sawbuck has been placed on the off side of the new electric cars, probably to prevent passengers from being carried away bodily by the hack drivers when the cars get to Main street." There is nothing like the heated imagination coupled onto a lead to bring forth poetic descriptions.

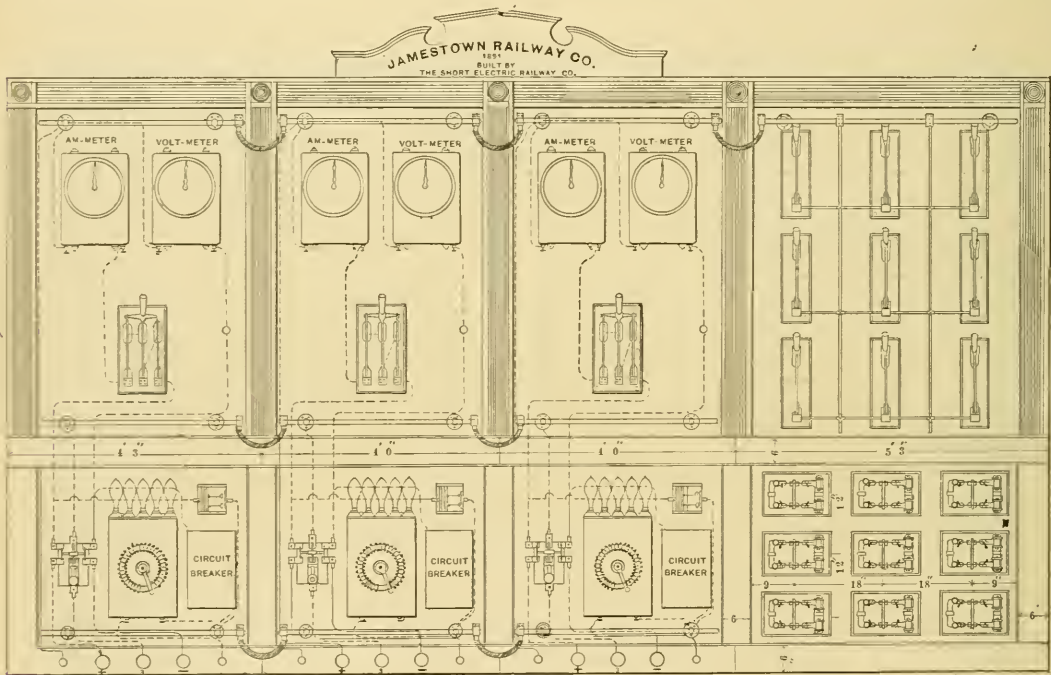
BUYING BELTS.

BELTING for a street railway plant is as important an item as goes into the plant, for on that depends the perfect working of the generators. Buyers should at all times secure the belt that will give them the best results. It is too often the case that the people starting an electric street railway plant are not acquainted with the different grades of belting, and we do not wonder that a buyer hardly knows what to do when he comes in contact with all manner of prices, and all kinds of belts. But it is safe to say that of the many kinds of belts there are none that give perfect satisfaction except the very best leather: the cotton, camel's hair, cotton and leather combined, wire belts, and ropes have been experimented with more or less, and in each case, when a

well remember the experiments that were tried with belting when dynamos first came into use. It has been the experience up to the present time that a light double belt gives better satisfaction, when properly made, than anything else; but now that large generators and large pulleys are being made, it is found that a medium, or even a full weight double belt is the thing to use. Many buyers are to-day making the mistake of still putting on light weight belts for street railway work, though this is necessary with a generator that has a small pulley; but the more recent and improved generators are having large pulleys, therefore it is unnecessary to use the light double belts, and a buyer should stipulate that he should have at least a medium weight belt.

CLEVELAND, OHIO.

A BELT USER.



MAIN SWITCH-BOARD JAMESTOWN RAILWAY COMPANY.

thorough trial has been given, the buyer has been glad to go back to leather belting, and it is a conclusion reached by the best minds that good leather belting is the only reliable thing to use. When this conclusion is reached, the next thing for a buyer to decide is which leather belt is the best for their work. He will find prices having a range of about 40 per cent., with the cheapest guaranteed fully as well as the highest priced. The dissatisfaction that has been given by leather belts is natural under the circumstances. Many cheap belts have been bought on account of price; many have been put in by contractors because they were cheap; and many of the kinds of belts outside of leather have been put in by contractors because they were cheaper than the cheapest leather, consequently the dissatisfaction. A strictly first-class leather belt is sure to give satisfaction every time. We

WILL GO IT ALONE.

OVER 30,000 shares were voted at the special meeting of the Baltimore City Passenger Railway, authorizing an issue of two million of twenty-year 5 per cent. gold bonds. A surplus of over \$500,000, which has been accumulating since 1875, but spent in actual construction work instead of being paid to stock-holders in dividends, will shortly be paid the holders in an issue of new stock to that amount. An effort was made by a 500-share minority to secure an amalgamation with the Traction Company, but was promptly voted down, which means the City Passenger will proceed on its own account to cable its lines at once, and will have, when finished a magnificent system of rapid transit.

The preliminary work of changing water and gas pipes will be done this fall and winter.

ELECTRICS IN THE CANADIAN CAPITAL.

THE Canadian railways, although few in number, are generally well managed, but thus far have been very backward in adopting modern rapid transit methods, preferring to retain the time-honored horse system. One of the best conducted, as it is practically most important electric system in Canada, is that of the Ottawa Electric Street Railway, which is the main artery of transportation for the capital city. In the list of officers of this road are found the following well known names: President, I. W. McRae; vice-president, Geo. P. Brophy; treasurer, William Scott; secretary, D. C. Dewar; superintendent, J. E. Hutcheson. The equipment consists of 16 motor cars, 4 of them 18-foot-bodied vestibules and 2 open cars for summer use. The road operates at present 10 miles of track, laid with 56-pound T rail and 52-pound girder. The car bodies were made by Patterson & Corbin, of St. Catherines. Walker & Co. supplied the water-power machinery that runs two 125-horse-power gener-

In connection with the opening ceremonies, private car No. 23, a handsome vestibule, elegantly furnished with fur rugs and decorated with flowers and flags was placed at the disposal of Lord Stanley and party, and occupied by them on the opening trip.

THE SITUATION IN TORONTO.

THE Toronto Street Railway has been operated by the new syndicate through the whole month of September. The gross receipts aggregated for the month, not including Sundays, \$89,025.27. The rates of fare are as follows, viz: From midnight until morning 10 cents, at all other hours 5 cents cash, six tickets for 25 cents, twenty-five for \$1.00, and special tickets good between 5:30 and 8:00 a. m., and 5:00 and 6:30 p. m., at the rate of eight for 25 cents. The company pays the city 8 per cent. of its gross receipts for the exclusive surface street railway right of the city of Toronto for thirty years. Since taking hold of the property the lines have



OPENING THE OTTAWA ELECTRIC—PARLIAMENT BUILDINGS IN BACKGROUND.

ators. The line covers the principal streets between the depots and directly in front of the principal hotels, and thus makes a convenient system of transportation. On July 1, this line accommodated 9,000 passengers in six 16-foot cars.

The generators and motors were furnished by the Westinghouse Company, have attracted a great deal of attention, and have operated beautifully from the start.

The Lewis & Fowler fare register is also a new feature in Canada, where heretofore, the old hand teapop register has been in vogue.

We are able to present in this number of the STREET RAILWAY REVIEW a very fine engraving of an interesting scene on the line, showing the members of parliament as that dignified body was on a tour of inspection over the line. The parliament buildings are to be seen in the background.

The road is very successful and already is being spoken of in Montreal and other large cities as a necessity which cannot long be ignored.

been extended several miles, notably across Bloor Street and out King Street. Three of the lines have been united into one, called "The Belt Line," by way of Sherbourne, King, Spadina and Bloor. The application for a change to electricity has been made to the city government and as soon as the proper by-law is passed, authorizing this change, the work will be hurried forward with the utmost dispatch, and it is expected that at least half the mileage will be completed by October 1st of next year. The traffic on the lines has been very satisfactory to the new owners, who very reasonably expect much better returns when motive power is changed.

THE Humane Society of Toronto, Canada, at its recent annual meeting, adopted two important resolutions. One was an appropriation of \$300 to build a patent "lethal chamber for the suffocation of vagrant dogs." The other to address a petition to H. A. Everett to hang a "car full" sign on the outside when the seats are all occupied. The dog measure is a good one.

GOOD AS GOLD.

IT will be remembered by the older citizens of Chicago, and doubtless other cities of size in the country, that at times during the war, sufficient small change of convenient bulk and invariable value was unobtainable from the government, and many curious devices were resorted to in lieu of coin of the realm. The most convenient of the substitutes and very extensively used in Chicago, was the street car ticket; principally because they were always available, always useful, and meant in every case an equivalent value in the well known quantity of intramural transit. To the railway companies this rather illegal but imperative necessity was the source of some revenue, as thousands of these tickets were lost, worn out, or carried away by transients, and which the company were never called upon to redeem. No objection, however, was ever made at that time by the government. Hence it was a matter of no small surprise to the Rochester, N. Y., Railway, as it will be to our readers, that the secret service branch of the treasury department should take advantage of the action of residents of that city using the railway tickets as small tender, to swoop down and confiscate all on which they could lay hands. As long as the tickets were used only in the payment of car fares and redeemed by the company all was well. But when the community and small tradesmen began accepting them as other legal tender, the law was violated. It is a no small compliment to the management of the road that their obligations were so universally honored and respected, though in this particular instance it worked a positive hardship and prevented the use of the stock remaining in the company's possession and compelled the delivery to the government of the dies from which they were made.

The management gracefully obeyed the directions of the department and took immediate steps to call in and redeem at their office all the obnoxious checks possible. The checks in question were of metal and about the size and appearance of a nickel, and were sold at the rate of eleven for 50 cents, which made them circulate at a 5 cent face, while costing about 4.5 cents each.

James McSweeney, special agent, gathered all he could lay hands on of the non-law-abiding checks, packed them in a strong box, which was sealed with Mc's great seal, and duly forwarded to Washington.

The railway company has ordered a new style of ticket, destined to replace the checks. These tickets will be made up in packages of ten, twenty and 100, and will be sold at 5 cents each. Conductors will have them for sale in packages of ten and twenty. It is expected that they will be on sale by the 1st of November. Five millions have been ordered.

In Cleveland the electric lines are radiating out and tapping a large country. The Euclid avenue line already reaches Callamer on the lake shore, and four other suburban lines are building: one of which extends eight miles from the city, while another is projected to Berea, 13 miles distant.

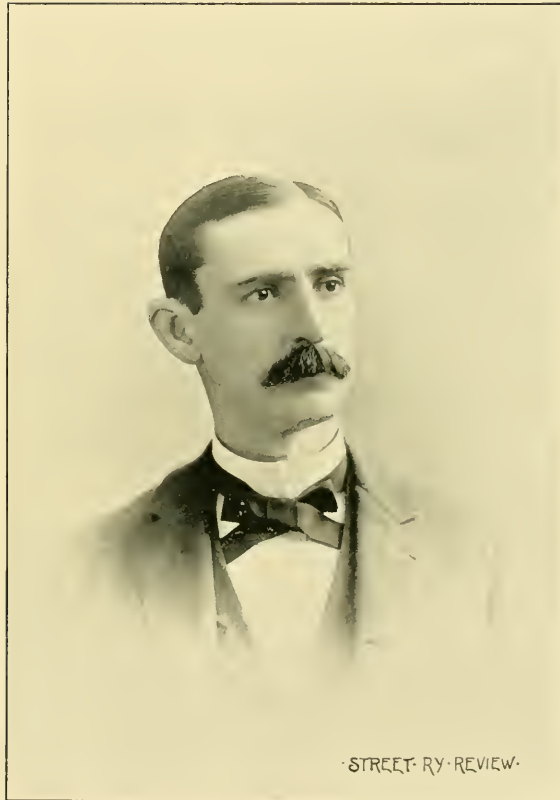
A BRILLIANT CAREER.

SIDNEY HOWE SHORT was born in Columbus, Ohio, October 8th, 1858. He attended the public schools there until 13 years of age, when he entered the German University, of Columbus, where he remained for three years. On the opening of the Ohio State University, with T. C. Mendenhall and Sidney Norton at the head of the departments of Physics and Chemistry, Mr. Short began the special training which has led to his brilliant success in the electrical railway field. In 1878-79, Prof. Mendenhall was called to the University of Tokio, Japan, and Mr. Short, then in his junior year, was placed in charge of the Physical Laboratory. His success during this year, led to a call from the Denver University, where he went immediately after taking his degree in 1880. He remained in Denver University at the head of the departments of Physics and Chemistry, and as vice-president of the University, until 1885, during which time he first directed his attention to electric traction and constructed on the University grounds a short electric railway, which attracted wide-spread attention as one of the first electric railways to be operated successfully. After leaving the University, he devoted his time for two years to experiments with the conduit system, abandoning it at length for the simpler and more practical over-head methods. In '87 he came east and organized a company under the firm name of "S. H. Short & Co.," in Columbus, Ohio. This company contracted for electric roads in Columbus, Ohio, St. Louis, Mo., Huntington, W. Va., and other places, and its success was assured from the start. In '89, the Brush Electric Company became large stockholders in the company. The company name was changed to "The Short Electric Railway Company," and its headquarters were moved to Cleveland, with Mr Short as President.

Mr. Short is an enthusiast in the best sense of the word, making several allied branches of scientific knowledge contribute to the one which claims his closest attention. He is a chemist of no mean ability, and in addition to this is an all-round business man. Under his able management the business of the railway company has grown in two years to a surprising figure, and his bold and shrewd business methods have made him from the start a formidable competitor of the older electric railway companies. His work as general electrician is being closely watched by hundreds of experts all over the country, and the steadily increasing popularity of the Short apparatus is ample evidence of his faithful and conscientious attendance to the details of this part of his business.

He is a prodigious worker, is thoroughly in love with his work, and while yet a young man, has made achievements any one of which might well satisfy an ordinarily ambitious individual as the result of a whole lifetime of study and investigations. With the splendid experiences of the past, his future cannot but be watched with interest.

Mr. Short is a quiet and genial companion, and numbers among his friends and admirers the brightest and most progressive men in his chosen profession.



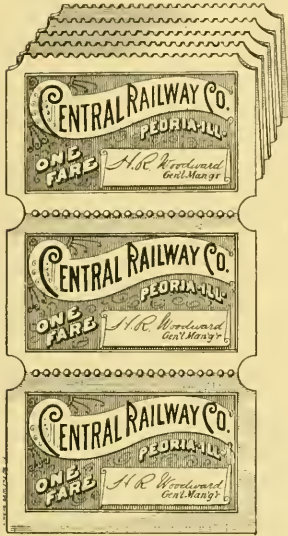
PROFESSOR SIDNEY H. SHORT,

President Short Electric Railway Company,

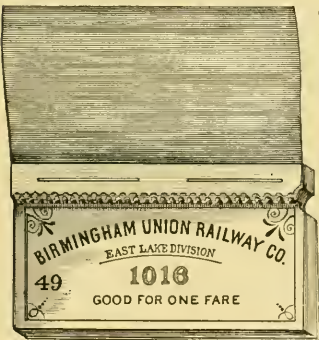
CLEVELAND.

STREET RAILWAY TICKETS.

MENTION has been made in previous issues of this paper of the success of the Harper Street Car Tickets, which have been adopted and are now in daily use on more than 100 roads. It has been found that the use of tickets has



many advantages both to the company and the public. Even where there is no reduction made, and tickets are sold at the regular trip fare, very many people are glad to purchase them to save the annoyance in making change on the car. Many business houses use them in sending out messenger boys, who often, when given a cash fare spend the money and then either walk or catch rides on cars and wagons and thus consume a great deal of time in making the errand. Companies who use tickets also find that



people are much more apt to ride if they are supplied with tickets, as while it is the same thing, it does not strike them so forcibly as an expenditure of money in using them—as they are already part with the actual coin of the realm each time they board a car. Then too, there is always more or less waste in tickets accidentally lost or destroyed, which the company are never called on to redeem and which goes quite a ways towards maintaining the expense of the tickets. Individual tickets are quite apt to be lost, and have to be counted out when sold; and in many cities there is strong objection to the use of individual tickets being used more than once unless they are made of metal, rubber or celluloid. To provide a strip and book ticket at reasonable cost, and which would tear quickly and accurately, leads Mr. Harper, of Peoria, Ill., to take out a patent and manufacture his street railway tickets, which are here illustrated.

THE most remarkable deed of the all-renovating electric tramway is its application for admission to the city of Smyrna, Damascus, the oldest city in the world.

HON. W. H. KEMBLE.

THERE died at Philadelphia, during the last month, a man well known to the street railway world. His life is the story of so many of the prominent men of our age and country,—that of the poor boy, the self-made man, the sagacious business man, and the successful politician. Sixty-three years ago William H. Kemble was born. The oldest of nine children of a poor cooper, he, as soon as his school days were finished, at the age of 15, started for the city of Philadelphia, from his father's home at Woodbury, N. J., to seek his fortune. Here a series of business enterprises found him a country merchant at the age of 20. After a year he came back to the city and entered the lace and embroidery trade and took to wife Miss Francis Walker, daughter of a prominent Montgomery county farmer. With this good fortune his business interests increased and he turned his attention to politics, becoming, at the age of 26, treasurer of the State committee, and holding later the office of stamp agent under Lincoln.

Later in life, in company with the late William V. McGrath and Jacob B. Ridgway, he projected the first of his successful system of street railroads, under the name of the Union Passenger Railway Company of this city. Mr. Kemble was secretary and treasurer of the corporation, but as his wealth increased, he gradually obtained its entire control and became the president. Twice he was elected State treasurer. What is now the great traction railway system, with its numerous ramifications, a business combination which has given birth to great railway enterprises in the cities of New York, Chicago, Baltimore and other places, owes its origin to the conception of Mr. Kemble, after the Union Railway Company had been such a success as to give him marked prestige as one of the ablest and most far-seeing of the street railway managers of the country. The alliance with P. A. B. Widener and William L. Elkins brought money into the combination, and the syndicate, which has since revolutionized street railway travel in the great cities of the East, made millions of dollars and achieved fame for brilliant business tactics. Mr. Kemble's wealth is variously estimated at from \$3,000,000 to \$6,000,000. Of late years he has been a liberal giver to charity. His gifts, however, were always made in a quiet, unostentatious way that kept them from public notice.

At the time of his death he was widely interested in Chicago, Boston, New York, Baltimore, Pittsburg, and elsewhere.

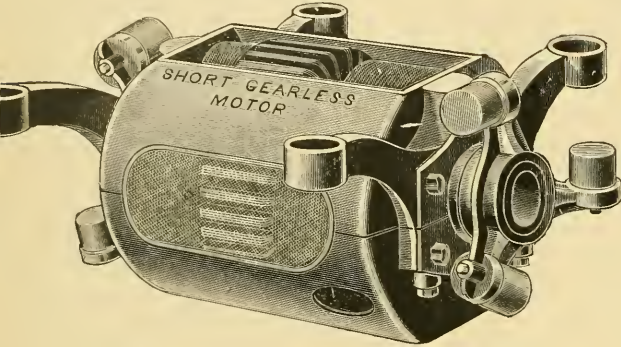
In Mr. Kemble's death the street railway world loses a brilliant man and the world a benevolent citizen.

MRS. JOHN W. FOWLER.

AT Northport, Long Island, on September 24th, occurred the death of Mrs. John W. Fowler, wife of the well known member of the firm of Lewis & Fowler. Mrs. Fowler had been very much of an invalid for some time, and the news of her death, while not altogether unexpected, carried sadness to a large circle of friends who sympathize with Mr. Fowler in his great loss.

THE THREE SHORT RAILWAY MOTORS.

ACTUAL daily service with the Short Gearless Motor, since its announcement some seven months ago, has demonstrated all that was claimed for it, having proved efficient, reliable and entirely successful. The salient features of this machine are considered by Prof. Short, after the most careful study, as the indispensable requirements of a gearless motor for railway work, and are: the multipolar field; the small magnetic gap; and a ring armature of comparatively large diameter. A brief description will be of interest.



SHORT GEARLESS MOTOR.

From the cut, it will be seen that all gearing is eliminated from the machine. The number of bearings is reduced to two on each motor, making four in a car equipment. The armature speed has been reduced to the minimum, viz.: that of the car axles in practical operation. The noise of gearing and the "squealing" of commutator brushes are entirely obviated, and there are but three wearing parts on each motor. The armature is of the ring type, of comparatively large diameter and increased "leverage." It is keyed to the hollow steel shaft, which is concentric with the axle of the truck, and an inside clearance of one inch all around is provided for. The coils of the armature are in this, as in all Short machines, entirely independent and perfectly ventilated.

The motor has eight field magnets, four on each side of the armature. They face each other at a distance of only ten inches and thus form a most intense magnetic field. They are bolted to the frame work of the motor, in the center of which are the bearings which carry the hollow armature shaft.

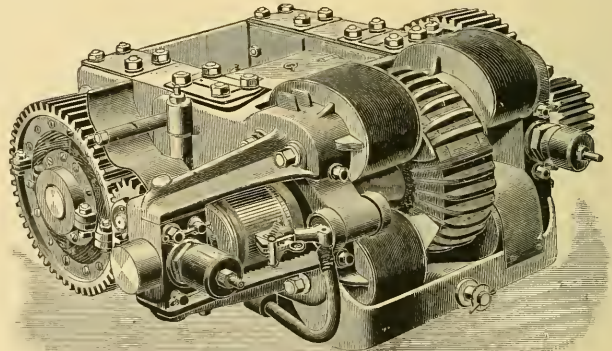
Mounted upon the hollow shaft, close to the armature, is the commutator, which is protected from injury by the surrounding pole pieces. It is massive in construction and much larger than any commutator heretofore used, the idea being that because of its massiveness and slow speed, the wear would be reduced to a minimum. Six months' operation of these motors has proved the correctness of this idea and disclosed other distinct advantages in the use of the enlarged commutator.

A glance at the cut will show the method of mounting this simple machine. A three-armed spider is placed upon each end of the hollow shaft. Each arm is provided at the extremity with a socket to receive a rubber cushion or spring. These cushions bear upon lugs cast on the car wheels, and as the armature shaft and spider revolve, the action is imparted to the car wheels. This rubber cushion serves the double purpose of insulation and easy starting.

Great care is taken in insulating the motors from the truck. At a speed of 12 miles an hour, the armature revolves at 94 revolutions per minute, turning a 36-inch wheel. The equivalent speed of the single reduction motor is about 400 and of the double reduction 800 revolutions per minute.

As a result of several thousand readings taken on Cleveland lines, the following average electrical output has been noted: Average volts, 480; amperes, 24; E. H. P., 15.44; passengers, 48.

Figure 2 shows the Short "Double Reduction" or Geared Motor, which is already familiar to every reader of the REVIEW. This motor was the first put out by the Short Company, and in it were developed the characteristics which are now always associated with Short electrical machines. For instance, the ring armature, multiple fields, large size commutator and such an arrangement of parts as admits of their perfect ventilation. This and the "Water Tight" are the only motors on the market having wooden web gearing, by means of which the perfect insulation of the motor from its frame and truck have been secured. The pinions are of solid steel, of



SHORT DOUBLE REDUCTION MOTOR.

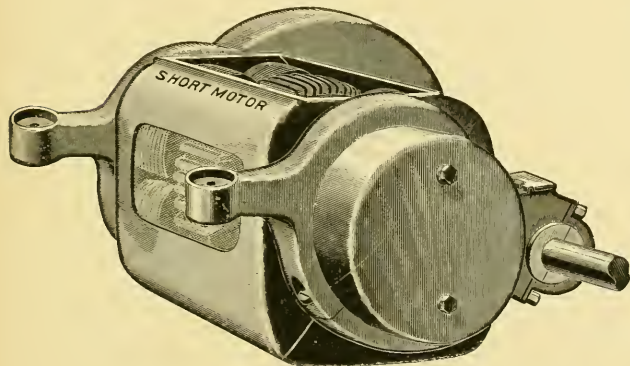
large diameter and with large teeth. The rim of the wooden web gear is of cast steel. The motor frame in this, as in the other two forms of motor, is in one piece and is held by flexible supports.

The Short Company has made no mistake in calling this motor its "Standard" motor, the advent of the "Gearless" motor with its obvious improvements not having lessened in any way the popularity of the "Standard" equipment.

The "Single Reduction" or "Water Tight" motor is shown in figure 3. One pinion and one gear have been

dispensed with and arrangements made to run the remaining gear in oil. The machines are practically the same, and a series of efficiency tests show that in economy of current and output of power, there is little choice between them. The "W. T." motor, however, is smaller than the "Standard" motor and it is claimed is the lightest and smallest street car motor thus far constructed. It weighs something less than 1,800 pounds. It is encased in and entirely protected by its iron frame and can be operated on 30, 33 and 36-inch wheels, and on any gauge of track down to 3 feet. It is in great demand for narrow gauge roads and for mining and other electrical haulage purposes. It is made in two standard sizes, 15 and 20 H. P.

Carefully kept records of the operation of electric cars on the many roads equipped with Short geared motors show that the cost per car mile ranges from 2 to 4 mills. In this connection, it will be interesting to our readers to compare the official report of the Rochester Railway Company, published in our last issue, with reports from other large railways in various parts of the country operating electrical apparatus of other systems. The



SHORT WATER-TIGHT, SINGLE REDUCTION MOTOR.

small, direct cost of repairing those motors is, however, only one part of the problem. The length of time consumed in making repairs enters into every record kept by street railway companies, and one of the most valuable features of all Short machines is the facility with which they can be repaired in case of necessity. By loosening four bolts in the motor frame work and taking off the iron strips below the wheel box, a car equipped with "Gearless" motor may be jacked up, and axle, wheels and armature complete, run out from under the car. The armature coils may be rewound without removing the armature from the car axle. Field coils can be repaired as easily. The commutator may be reached and dressed while the machine is running.

With the geared motors it is not necessary to remove the motor and car wheels. A car can be run over a pit and every part of the motor reached without difficulty. The commutator, field coils and armature are easy of access, and the armature can be removed in case of necessity by two men in eight minutes, its weight being only 198 pounds. In fact every part of the motor can be removed without taking the machine to pieces. The

bearings of the car motors are twice oiled and the comparatively slow revolution of the armature reduces natural wear to a minimum.

The Jamestown (N. Y.) Street Railway operated ten cars a period of eleven weeks, with a total loss of but two car days. On the Rochester (N. Y.) Railway, during eight months of operation, the total cost of repairs, including material and repairs to electrical machinery, was but 4 mills per car mile, and the average loss per car was but 4 per cent. of the total mileage.

It is not surprising, with such results as these, that the Short Company express the confidence they feel that they manufacture the most successful and economical electric railway apparatus to be purchased to-day.

FOREIGN FACTS.

THE City & South London Railway receipts are increasing at the rate of a hundred pounds (\$500) per week.

THE municipal government of Auld Reekie has refused to allow a trial electric road to be constructed at Edinburgh.

THE Roundhay Electric Tramway is ready for service. The supplies were bought from an American company's English agency.

THE Electrical Engineer, of London, publishes Hon. John W. Beckley's valuable paper before the New York convention, in its issue of October 2.

CAPTAIN JOHN MARSHALL GILLIES died recently at his home in London. He, too, was chairman of two large roads and director in four others. He was a very successful manager.

THE Isle of Guernsey has had a steam street railway line since 1879, but the omnibuses have so cut into their traffic that electricity will replace steam with hopes of regaining lost patronage.

THE Hawaiian government has granted an English company the right to construct electric railways on the island when the traffic calls for the discontinuance of the horses. The horse service costs 4.46 d per mile.

MR. T. SMITH, a prominent English electrician, five years with the Inmush works at Kentish Town, has been appointed secretary of the General Electric Traction Company, vice Secretary Mackenzie, deceased.

THE death of Alfred J. Lambert, one of the prominent English tramway managers, has occurred. He was chairman of the Anglo-Argentine & Imperial Tramway Companies, and director in several other lines, and an energetic promotor.

SIEMENS & HALSKE, of Berlin, have overcome all difficulties menacing the success of the projected Barmen-Elberfeld Elevated Electric Railway. The road in question will parallel the Wupper river a long distance, finally crossing it on a massive wrought iron bridge.

ACCELERATOR.

IN choosing the above title for their latest in street cars, the Brownell Car Company, of St. Louis, has selected a most appropriate name. Speed has been attained by cable and electricity in the propulsion of the car itself, but a corresponding advance has not been made in methods of car building, which will permit quicker trips by reduced delays in boarding and leaving the car.

The car built, illustrated herewith, is a 20-foot body, 7 feet 2½ inches wide, with a 5-foot platform at each



end. Length over all, 30 feet. Instead of one, this car has two doors in each end, only one of which, however, that next the sidewalk, being ordinarily kept open. The seats, while running lengthwise along the sides, terminate about 2 feet from the end, which prevents clogging up the doorway. On the old-style car, with fifteen people standing on rear platform, it is a slow and difficult process for a passenger to enter or leave the car, while, with the Accelerator, as high as twenty-nine persons have occupied the rear platform at one time, and still left easy passage room for a man to enter the car, holding a large



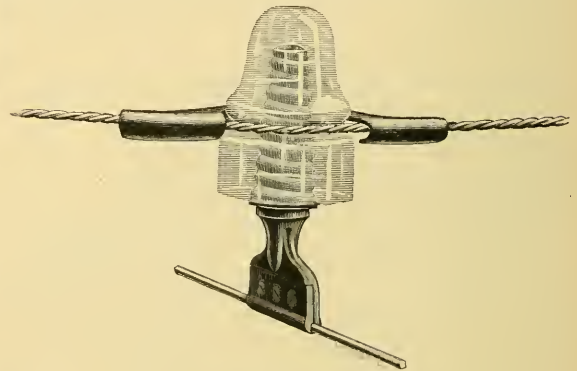
clothes basket before him as he did so. In this car have also been embodied all the latest improvements in car building, making it in every sense a strictly modern street car, and is as far in advance of the old-style cars of a few years ago, as rapid transit is ahead of the bob-tail schedules. The car has the remarkable capacity of 129 passengers, without obstructing the exit through door and step, and yet weighs, when empty, but 6,000 pounds. The idea is

an entirely novel one, but simple and practical, and will commend itself to all street railway men. President Brownell has carefully studied the needs of present demand, and in working out the "Accelerator" has done so on thoroughly scientific and logical principles, and has good reason to feel proud of his unqualified success.

THE CREGHEAD INSULATOR.

THE well known qualities of glass as an insulator have been further illustrated by the Creghead Engineering Company. This new type, herewith shown, has several points of superiority. This insulator consists of a grooved glass insulator into which is screwed a wooden plug. The bolt has a round head at the top and a thread at the bottom and is screwed into the clamp.

The method of connecting the insulator to the span wire is very simple and secure. The yoke, as shown, fits loosely in the groove of the insulator. The inner curve of the yoke coming in contact with the insulator is



a half circle with a slightly larger radius than that of the smallest circle of the groove. It is necessary to remove the yoke from the insulator about ¼ of an inch before it becomes disengaged from the groove. The yoke can be

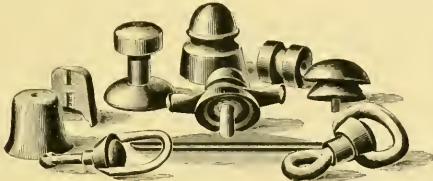


put on and taken off of the span wire easily and without tools. All strains on the insulator tend to increase the hold of the yoke and span wire on the insulation. While the attachment of yoke and trolley wire is secure, it is at the same time flexible and will adjust itself to unequal expansion of materials.

THE first electric car ever built in Oregon made its trial trip recently over the lines of the Portland Second street road. It is a triple combination and can be used as open, closed, or as a funeral car. We are not advised, but assume the buffet feature has also been provided for. The car is a new type and is the invention of Mr. Heacock, president of the Vulcan Iron Works.

ÆTNA INSULATING MATERIAL.

WE are able to present to the street traction public in this issue, a new set of devices for electric railway insulation, well introduced by the firm of A. & J. M. Anderson, of Boston. These devices include methods of insulating trolley wires, besides strain insulators, pull-offs, pole insulators, and curve insulators. These goods are constructed from a new substance known

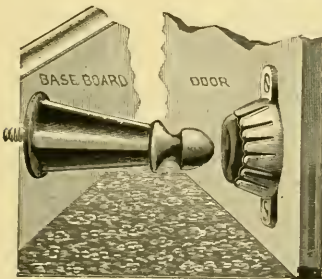
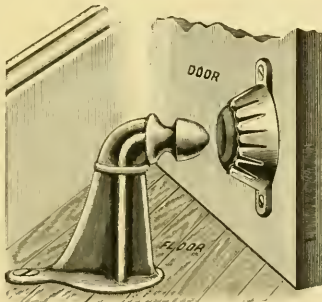


as Ætina Insulating Material, which is susceptible of a high finish and easily molded, besides having the advantage of not being affected by heat.

With such an introduction and so many points of advantage, this new line of power savers can not but be of great interest to all electric railway men. A large number of roads are already equipped with this new material, among them the West End Road, of Buffalo, and the demand is steadily growing for this style of insulation.

DOOR STOP AND HOLD BACK.

WITH the introduction of vestibuled street cars has come, in many cases, a change from sliding to swinging doors. John H. Graham & Co., of 113 Chambers street, New York, are introducing a hold back designed to use either on cars or in office. They are



attractively made, and will be fully understood from the illustrations. There are two styles, one for floor attachment, the other for wall attachment, and have a firm rubber socket which not only securely holds

the door piece, but prevents rattling. They are easily attached, the floor and the wall pieces having a single screw, while the door piece is put on with two screws.

THE Bloomington City Railway Company emphatically denies the newspaper report of its sale to Eastern parties.

STREET RAILWAY PATENTS.

Selected list of patents relating to Street Railway Inventions, granted during the past thirty days; reported especially for the STREET RAILWAY REVIEW, by Munn & Co., Patent Attorneys, 361 Broadway, N. Y.

ISSUE OF SEPTEMBER 8, 1891.

Mounting for Motors of Electric Cars, S. H. Short, Cleveland, O.	459,024
Cable Grip Attachment, A. O. Werner, Kansas City, Mo.	459,073
Ratchet Handle for Car Brakes, M. Weber, St. Louis, Mo.	459,101
Hand Strap for Street Cars, C. J. Phillips, Philadelphia, Pa.	459,256

ISSUE OF SEPTEMBER 15, 1891.

Street Railway Switching Device, R. T. Smith, Nashua, N. H.	459,418
Street Railway Switching Device, R. T. Smith, Nashua, N. H.	459,419
Motor Car Fender, E. Tiemann, Chicago, Ill.	459,425
Trolley Wire Connection, R. L. Caldwell, Rochester, N. Y.	459,485
Slide Shoe Trolley, S. H. Short, Cleveland, O.	459,689
Rheostat for Electric Motor Cars, S. H. Short, Cleveland, O.	459,690

ISSUE OF SEPTEMBER 22, 1891.

Electric Railway Conductor Support, E. M. Bentley, New York	459,737
Trolley Line Circuit Breaker, R. M. Jones, Salt Lake City, Utah	459,753
Electric Railway, R. M. Hunter, Philadelphia, Pa.	459,815
Automatic Disconnecter for Overhead Conductors, A. L. Johnston, Richmond, Va.	459,839
Automatic Disconnecter for Overhead Conductors, A. L. Johnston, Richmond, Va.	459,840
Fare Register, B. W. Jeffrey, East Orange, and G. F. Giering, Newark, N. J.	459,895
Motor Mechanism for Electric Cars, S. H. Short, Cleveland, O.	460,040
Car Guard, M. J. Daly, Alleghany, Pa.	460,082
Trolley Wheel for Electric Railways, J. A. Wetmore, Brooklyn, N. Y.	459,858

ISSUE OF SEPTEMBER 29, 1891.

Car Brake, H. E. Collett, Lynn, Mass.	460,113
Automatic Street Railway Switch, W. T. Merriman, Minneapolis, Minn.	460,146
Trolley for Electric Railways, F. T. Smith, Woburn, Mass.	460,163
Self-Lubricating Trolley, W. Hoen, Cleveland, O.	460,232
Cable Lifter, R. McCulloch and J. Volk, St. Louis, Mo.	460,484
Trolley Switch, H. L. Pierce, Leominster, Mass.	460,488

ISSUE OF OCTOBER 6, 1891.

Turnout or Switch for Trolley Wires, D. W. Edwards, Saginaw, Mich.	460,571
Regulating the Speed of Electric Motors, M. J. Wightman, Scranton, Pa.	460,614
Rail Connection for Electric Railways, M. J. Wightman, Scranton, Pa.	460,615
Trolley Wire Support, T. Fricker, Ashtabula, O.	460,634
Trolley Wire Support, N. Weeks, Jr., Long Island City, N. Y.	460,735
Underground Railway Conduit, E. E. Keller, Chicago, Ill.	460,780
Electric Railway Trolley, E. E. Keller, Chicago, Ill.	460,781
Driving Mechanism for Cable Railways, J. Walker, Cleveland, O.	460,791
Electric Railroad, Ira Robbins, Sheffield, Ala.	460,887
Cable Crossing, J. Dunott, Philadelphia, Pa.	460,912
Girder Rail Track for Street Railways, W. C. Wood, Brooklyn, N. Y.	460,927

A LICHTERFELD conductor left his car to investigate the stoppage of the current, but while at some distance the electric agent returned to the wire and sent the car off down the track at a rattling speed, dumping it finally into the buffers at the end of the line. No one was hurt but that conductor was scared.

THE chairman of the Birmingham, Eng., Central Tramways Company, recently made the statement that steam street traction must go and that cable or electric locomotion be substituted. In England the cable construction is much more expensive than electric, but is considered more economical to operate.

DIRECT-COUPLED, MULTIPOLAR RAILWAY GENERATOR.

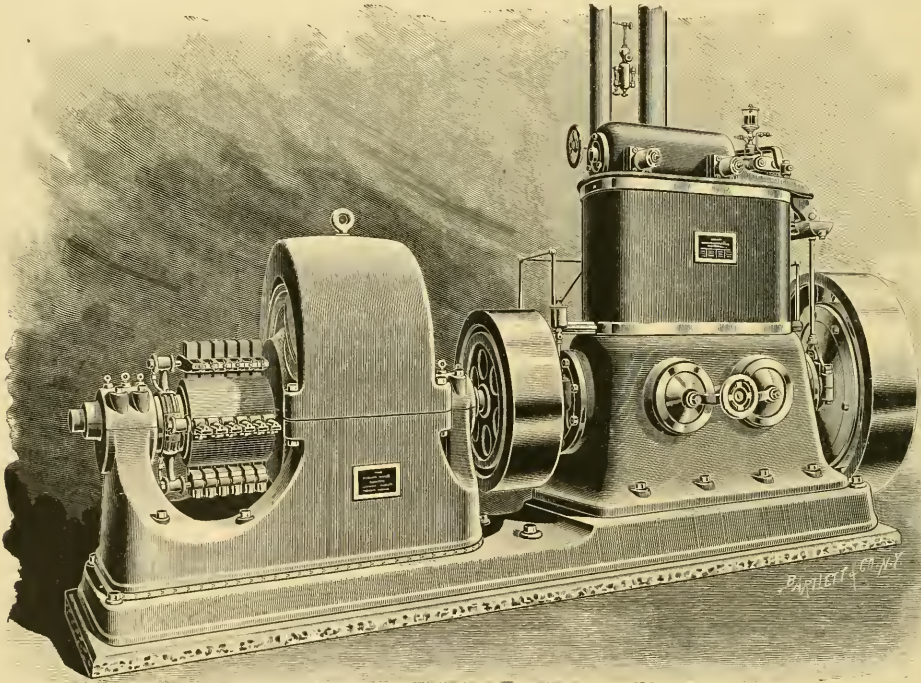
WITH a view to save ground space, and all loss of power through the medium of belts, shafting and pulleys in the transmission of power from engine to dynamo, Westinghouse, Church, Kerr & Company have constructed a direct coupled multipolar generator, in which the engine crank-shaft is coupled directly to the armature-shaft, and drives without other intermediate agency. The engraving represents a 250-horse-power generator for railway work coupled to a compound engine capable of developing 250-horse-power on 100 pounds of steam—non-condensing—the speed being 250 revolutions. The design is that of a single machine, carried upon a massive bed-plate requiring only moderate

manufactured correspond to 125, 250 and 500-horse-power, with 1,000-horse-power to follow. The sizes of engines required for the given power will vary according to the steam-pressure carried, 180 pounds being contemplated as a maximum and 100 pounds as a minimum.

The same concern has also completed the preliminary work of a design for a third high-pressure cylinder for converting the compound engine into triple-expansion.

NEW YORK HORSE CARS.

THE horse-car tracks within the city of New York, if placed in one continuous line, would provide a double-track road nearly as far as Albany. The exact length of city lines is 140 miles. The rolling-stock of this aggregate of twenty companies totals up to 2,209



DIRECT-COUPLED, SLOW-SPEED, MULTIPOLAR RAILWAY GENERATOR.

foundation. The generator is thoroughly insulated from the bed-plate by a sheeting of tarred plank, the bolts being insulated by bushings and washers of non-conducting material. The insulation is completed at the coupling, in which the non-conducting material is interposed to prevent the possibility of metallic contact. The electrician will recognize the value of this protection. The coupling is further so designed that it will yield fully to any misalignment of the two shafts, either as to angle or position of centers. The larger engines are provided with unhooking gear in the valve motion so that they can be handled with a starting-bar, and are also fitted with a gallery sole-plate and stairway protected by hand-rails, so that the throttle-valve and lubricator are conveniently accessible.

The same general design is carried out for direct coupling to heavy alternating dynamos. The sizes at present

cars, while the army of horses reaches over 15,000 in number. With one cable road and not a single electric road, the city is the wonder of horse-car managers in its laggardness behind the times in railroad matters. The double city of Minneapolis and St. Paul has nearly as much street-car mileage as New York and not a single horse in service.

A STREET car conductor meets so many phases of life daily that he learns to act quickly and in a very practical manner. A passenger bounded a Philadelphia car late at night and undertook to convert the car into a hearse by taking an ounce of laudanum. When the conductor noticed the man become unconscious he ran his car at full speed to the nearest police station, where the patient was "bailed out" and afterward sent to a hospital, and his life saved.

THE PULLMAN DOUBLE-DECK CAR.

FOR some months past it has been known that the ever progressive Pullman Company were evolving something in the mysterious private apartments of their extensive street car shops, which, when it should be brought forth, would at once astonish the world and solve the problem of passenger travel, especially in the large cities, where additional surface tracks are absolutely a lost art. And so it was that when a few days ago a distinguished party, including Geo. M. Pullman, Henry Villard, and many of the heaviest capitalists in the city, to the number of nearly fifty, received invitations to visit the Pullman shops, two special cars were required to transport the party. On arrival, Mr. Patton had his gas-electric motor in waiting to transport them to the scene, and the way that motor car was loaded down with street railway magnates, hanging to foot and dash boards, would have meant a small fortune had there been any collectable fares. On arriving at the point where the overhead wires began, surprise spoke forth in every face.

The car differs from anything ever built in the shape of a double-decker, and at once captivated every one by its elegance and beauty. It combines some of the features of the Session's double-decker, with a great many other improvements, the joint invention of C. L. Pullman and H. H. Sessions. It is 33 feet, 8 inches long, 7 feet, 4 inches wide over all, and 14 feet, 9½ inches high from track over canopy. The entrances, of which there are four, are at the side, and placed in the middle of the car. Permanent safety gates can be swung to close the side next the other track. A roomy platform leads to front and rear, and conducts the passenger into a commodious room, in which the seat extends continuously around both sides and the semi-circular end, from the windows of which one may look in all directions, there being nothing to obstruct the vision, as there are no end platforms. These two compartments, similar in size and arrangement, each seating twenty passengers. From the central platform the upper deck is reached by four gently winding and quite ornamental light iron stairways of seven steps

each, and the room afforded and the ease with which the ascent is made is really astonishing. The upper seats are placed back to back, with abundant room between the seat and railing, and extend from the stairway to the driver's stand. These resemble a small pilot house, being placed at the extreme ends, and has glass sides, allowing driver to look in every direction and at the same time affording entire protection from the weather and any temptation to visit with the passengers. The trolley poles are short, not more than 5 feet in length, and are controlled by the driver by a pair of ropes passing under small pulleys, but easily handled. The canopy is as wide as the car, is supported by neat brass posts, and at the edge has spring roller canvas curtains which draw down and hook to the top of the guard rail, making the upper deck even better protected than the ordinary open car under like circumstances.

Clusters of incandescent lamps and oil lamps make the upper deck and the two compartments below as light as a drawing room. Push buttons permit the passenger to signal the conductor from any part of the car, and he in turn communicates in the same manner to the driver. The car is elegantly finished, ornamented and upholstered.

Among its special attractive features are the Stanwood steps, which attracted general attention, and the Burton electric heaters, which furnished an abundance of warmth from their



INTERIOR VIEW OF THE PULLMAN DOUBLE DECKER.

hiding place beneath the seats. Allen paper car wheels are used, and the brake and truck, the joint invention of H. H. Session and H. G. Bird, was a genuine surprise, stopping the car easily in its own length, without a jerk, when running 12 miles per hour. The ease with which the car took the most severe curves and the entire absence of any suggestion of oscillation, with the upper deck loaded and the lower floor empty, was wonderful. The car seats eighty passengers, but will carry 160 with standing loads. The motors used were two 25-horse-power Westinghouse and ran smoothly, firmly and without noise. Altogether, this latest palace car of the Pullman Company is a prodigy, and it is not strange that an order on sight was the result of the visit of Mr.

Whitney, of Boston. The model car cost \$3,500, which amount can be greatly reduced in less expensive decorations. As an answer to the vexed and increasingly perplexing rapid transit question this is an emphatic reply.

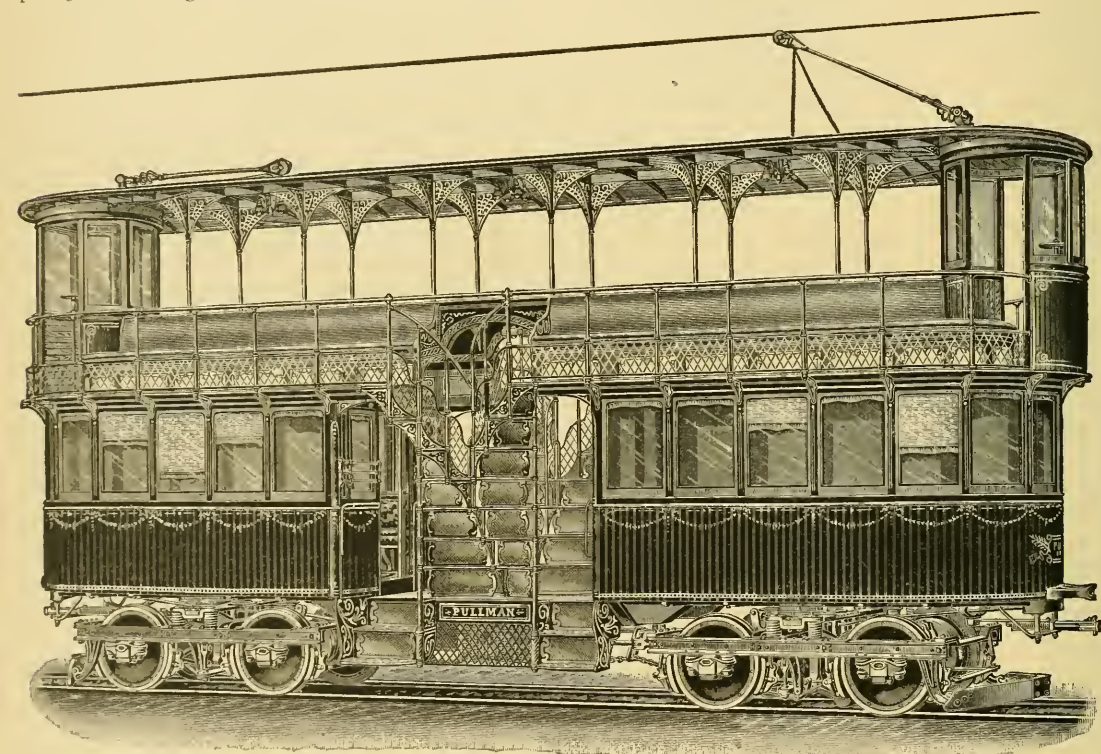
LARGEST CAR ORDER EVER GIVEN.

THE largest single order for street cars ever booked has come into the hands of western manufacturers for construction. Messrs. Kiley and Cook, of the Laclede Car Company, of St. Louis, have obtained the contract to build for the Third Avenue Cable Line, New York City, 375 cars. Of this number 200 are to be closed cars, 22 feet long and 30 feet over all, and 175 open, 30 feet in length and 38 feet over all. The open

able to turn out the contract number of cars per month, in addition to their regular business, which will not be slighted or interfered with in the least.

A SUPERIOR ROAD.

AT West Superior, Wis., the street railway company, as is usual with street railway companies everywhere, has improved the appearance of the town by an elegantly constructed power house at the corners of two principal streets. The building is a solid brick structure, two stories in height and 50x150 in dimension. The interior is handsomely finished and the local papers give numerous compliments upon the taste displayed by the directors.



THE PULLMAN DOUBLE-DECK CAR—EXTERIOR.

cars are to be latticed from the top of the seat-back to the floor, thus insuring against accident. The entrances are at the platforms and there is a center aisle with twelve reversible seats on either side. The gripman stands upon the extra long platform, and as there is a grip lever and a brake lever at each platform, the driver simply changes his position instead of turning the car at the end of the route.

The Laclede people will use their own trucks on the order, and are very justly proud of the victory in bringing the order to the West. The work called for is for as fine an equipment as can be placed on wheels, and delivery commences March 1st. The facilities of the Laclede Company are such, however, that they will be

Three large Babcock-Wilcox boilers furnish a combined output of 450-horse-power, and the floor and wall of the engine room is of solid cement. Three 80-horse-power Reynolds-Corliss engines and a large water pump have also been installed. The entire plant will be lighted incandescently by its own electricity. The amount of power that will be furnished by the company themselves is over three times as great as they are now using, and the cars will gain a much faster rate of speed with the new system.

AN ingenious German has invented an electric "car stopper" which is warranted to stop 'er on any grade or at any speed.

ANOTHER RAILWAY MOTOR.

CHANGES and improvements, resulting from experiments and experience, are constantly being made in street railway motors. Among the most recent is one devised by Gordon J. Scott, the chief electrician of the extensive Minneapolis Street Railway. Mr. Scott is a believer in strong, massive motors and has made this one of cast iron in the magnets, and iron wire core in the armature—the motor complete weighing 5,000 pounds.

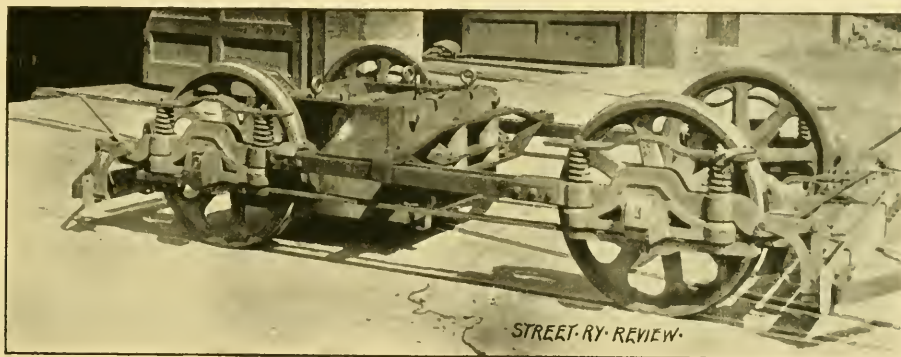
The motor is made of cast iron in the magnets and iron wire core in the armature. Weight about 5,000 pounds total. Mr. Scott advocates good, heavy machinery of all kinds and consequently this motor is made on these lines. Massive and strong in every part, it will stand almost any kind of hard usage.

The motor is built on the salient pole type and as a consequence has but one field coil. This form gives a double magnetic circuit and these circuits also serve for

Single reduction gears are used. The speed of armature with 100 amperes at 500 volts is 186 revolutions, and car wheels turn at forty-five revolutions per minute, and of course, with the resistance in the circuit and the active E. M. F. cut down, the car barely moves but with tremendous power. The advantage in this is evident, permitting the car or cars to run into switches and curves with a positive motion, slow, yet powerful.

The maximum speed that the motor will give on one car is 30 miles an hour with an armature speed of 1,200 revolutions. It does not spark with heavy loads or with running at full speed with light loads. This is attributed to the very broad neutral space between poles, together with the cast iron poles. The magnetism cannot shift so readily in cast iron on account of saturation being more quickly reached. As to speeding the car up faster it is only a matter of changing gears.

Tests of the motor on the Minneapolis lines are reported as highly satisfactory.



SCOTT'S ELECTRIC MOTOR AND TRUCK.

holding the armature brasses in place. There are two pieces, wedge-shape, one on each side, that can be removed when armature is to be taken out. These pieces are held in place by large bolts and are pressed down tightly into place, making the joint come up snug.

Theory points out that bearings should not be placed in magnetic circuits, though in this case no bad results have been met with owing to the construction, which is such as to allow the length and diameter of the armature to be of equal dimensions. This has also the effect of allowing a large armature diameter without making the axle gear very large, as the difference between centers of armature shaft and car axle is reduced to a minimum. The inventor states that, theoretically, objections will be plenty to the cast iron magnet, but adds that this was done for a purpose.

The motor has been made heavy that the adhesion between wheels and track would be sufficient to easily draw a loaded trailer with an empty motor car—on the same principle that locomotive engineers desire their engines to be capable of pulling large loads without carrying much of the load.

FIRE IN BOSTON.

THE West End Road of Boston has suffered the loss of about \$30,000 by fire. The stable situated at 320 to 324 Meridian street, East Boston, were discovered to be in flames about 9 o'clock. The alarm was promptly turned in, calling out a large detail of police and the fire department. The fire was located in the second story near the hay cutters, and spread with great rapidity in the rear of the buildings and into the surrounding structures. Ninety horses stabled on the first floor were turned loose on the street and escaped injury. The cars, to the number of 27 were damaged more or less, 15 being badly burned. In the loft there were 20 tons of hay and nearly 7 tons of other feed. The harness was saved by the active efforts of the employees. The entire structure, which is a total loss, was built in 1850, and ran 265 feet deep with a 65 foot front. The blacksmith shop was also here. The fire is supposed to have originated from the pipes of careless employees. The only consolation for the company is a good insurance, and the thought that it is only big companies that can have big fires.

CAUGHT ON THE RUSH TRIP.

Massachusetts Street Railway Association.

President, CHAS. B. PRATT, Salem; Vice-Presidents, H. M. WHITNEY, Boston, AMOS F. BREED, Lynn, FRANK S. STEVENS; Secretary and Treasurer, J. H. EATON Lawrence.

Meets first Wednesday of each month.

Ohio State Tramway Association.

JOHN N. STEWART, Ashtabula, President; JOHN HARRIS, Cincinnati, Vice President; J. B. HANNA, Cleveland, Secretary and Treasurer; E. K. STEWART, Columbus, Chairman Executive Committee.

The Street Railway Association of the State of New Jersey.

President, JOHN H. BONN, Hoboken; Vice President, THOS. C. BARR, Newark, Secretary and Treasurer, CHARLES Y. BAMFORD, Trenton; Executive Committee, OFFICERS and C. B. THURSTON, Jersey City; H. ROMAINE, Patterson; LEWIS PERINE, JR., Trenton.

The Street Railway Association of the State of New York.

JOHN N. BECKLEY, President, Rochester, N. Y.
THOS. H. McLEAN, Vice President, New York, N. Y.
GEO. LAW, Second Vice President, New York, N. Y.
WM. J. RICHARDSON, Secretary and Treasurer, Brooklyn, N. Y.
EXECUTIVE COMMITTEE—D. F. LEWIS, Brooklyn, N. Y.; C. DENSMORE WYMAN, New York, N. Y.; CHAS. CLEMINSHAW, Troy, N. Y.
The next meeting will be held at Saratoga, September 20, 1892.

Alabama.

ANNISTON.—The Anniston Street Railway has been sold at sheriff's sale for \$47,500. Mr. W. W. Stringfellow bid it in as trustee for O. E. Edwards and the First National Bank. A new company will be organized at once and as early as possible the road will be equipped with electric cars.

BIRMINGHAM.—The Birmingham Railway & Electric Company has moved its offices from the Morris building to the Watts building on Twentieth street.

HARTSELL.—The Moulton Heights Improvement Company has expended \$100,000 on the street railroad and improvements at the Heights. They have 2 miles of road.

PIEDMONT.—The Oxford Lake Electric Railway from Anniston to the lake is completed.

California.

LOS ANGELES.—The war between cable and electric companies in Los Angeles culminated in a riot which required forty-two policemen to quell.

THE Los Angeles Consolidated Electric Railway has commenced running electric cars on the road to Vernon, a distance of about 3 miles.

NAPA.—An undertaking is being talked of to construct an electric railroad from tide water at Napa to Calistoga, a distance of twenty-eight miles, with cars running every hour. The trains will carry light freight besides passengers.

OAKLAND.—The Twenty-third Avenue, Piedmont & Alameda Railway Company, has been incorporated. The capital stock is \$100,000, of which \$20,000 has been subscribed.

It is rumored that the Southern Pacific is considering the change of the Seventh Street Steam Line to an electric.

SAN FRANCISCO.—The Castro Street Cable Line is to be extended from its present terminus at Twenty-sixth street, along Diamond to the San Jose Road, there to connect with the San Francisco & San Mateo Electric Railway.

ALBERT MEYER, president of the North Beach & Mission Railway, says that the Folsom Street Line will be converted into an electric line from the Ferry to Precita street. A fine power house will be erected at the present site of the stables.

THE Ferries & Cliff House Cable Company has bought a lot 137½ x 137½ for \$12,000, and the brick building will be completed in a few weeks. It will accommodate forty-five cars and have four pits with various switches.

SAN JOSE.—J. Rich has been granted a franchise to build an electric line to the cemetery. Every care has been exercised to make the scheme a "go," and work must begin within thirty days after grant.

Colorado.

BOULDER.—The street car line have opened up with a grand free ride. A good business seems assured.

DENVER.—A local company is being formed for the purpose of constructing a car line from the Larimer street cable at Gibson street, through Colfax to Barnum, and possibly to Valverde.

THE Denver Traction Company has applied for a franchise. The company is a strong one, will give bonds of \$500,000 to protect the city, want overhead wires, and has \$300,000 capital with F. P. Ernest at the head.

THE Tramway Company has bought Rocky Mountain Lake and will make it a pleasure resort on the line, which will be changed from motor to electricity.

DENVER and South Denver men, Mr. Coery, et al., are considering the advisability of running an independent electric line to Littleton with power house at South Denver.

Connecticut.

NEW HAVEN.—A. Brooks, by means of a line and hook, has fished out a large number of fare envelopes from the receiving box at the company's office. He is now in jail for a short time.

THE Winchester road has elected new directors and officers. The officials are as follows: Israel A. Kelsey, president; Samuel A. Stevens, secretary and Frank H. Kelley, treasurer.

T. WALKER, of Walker, Cook & Wagner, New York, has purchased the New Haven & West Haven Horse Railroad company's plant and also the Winchester Avenue road. The new men will equip with electricity and begin running cars January 1, 1892.

NORWICH.—It is semi-officially stated that the Norwich Street Railway Company intend to use electric cars on their system next season.

Florida.

ST. AUGUSTINE.—Work upon the street railway has begun, and soon St. Augustine will have a road of which she will have reason to be proud.

Georgia.

AMERICUS.—Active steps are being taken to reorganize and operate the electric street railway. A canvas of the city resulted in securing nearly the amount required.

COLUMBIA.—President Marshall, of the electric railway, says that the cars will run by January 1st.

Idaho.

BOISE CITY.—The building of an electric road on the old grade between Boise and Caldwell, Idaho, is being agitated.

Illinois.

AURORA.—The Downers Place addition to the electric railway will be built this fall. Orton & Drake are the contractors.

CHARLESTON.—Charleston and Mattoon will be connected electrically before snow flies. Bonds are to be issued and taken by citizens of both cities. I. E. Brooks is chairman of the local committee.

GALESBURG.—Galesburg people are recalcitrating—Anglice, kicking—for electric traction.

LINCOLN.—Lincoln is to have a car line from the Illinois Central depot. Work has begun.

MOLINE—The Central Street Railway Company reports that during the past year the road has carried 247,606 passengers, the fares amounting to \$11,260.62. This is an increase of 64,585 passengers over last year or a trifle over 33 $\frac{1}{2}$ per cent. gain, while the average daily receipts have been increased \$7.56 per day.

ROCK FALLS—Messrs. Howland & Ellis have deposited \$5,000 as guarantee that the new road will be in operation by June 1, '92.

TAYLORVILLE—An electric railway company has been organized for the purpose of connecting this city with Grove City, twelve miles north. A site for the plant has been purchased and work will be commenced at once.

WAUKEGAN—The Waukegan & North Shore Rapid Transit Company, Chicago, has been incorporated to build street railways in the city of Waukegan and other towns in Lake county bordering on Lake Michigan. Capital stock \$100,000; incorporators, George P. Washburn Alfred E. Holt, William O. Jones, and Frederick B. Benton.

Indiana.

INDIANAPOLIS—The Citizens' Road will make Fairview Park a winter pleasure ground.

The North Indianapolis cars are now running.

PRESIDENT FRENZEL says that the company agrees to build a line on South Meridian street as soon as the way is improved.

The street car men, by committee, have adjusted differences with the company and a strike is averted.

The Great Western Electric Supply Company has just completed the delivery of the steel poles for the Citizens' Street Railway Company of this city, the contract for which they were awarded a few months ago. The Citizens' Street Railway Company express great satisfaction with their poles, and consider them an ornament to the streets through which the lines pass.

KOKOMO—Kokomo's electric railway will be in operation November 1st.

LA FAYETTE—The city council notifies the electric line that the service must be improved or the contract forfeited. \$18,000 improvements have been ordered.

RICHMOND—J. C. SHAFER is authority and says that the South City extension will be constructed next season.

SEYMOUR—The Seymour Steam Street Railway Line is being extended to Rockford where a summer resort is to be located.

Iowa.

DUBUQUE—The Dubuque Street Railway Company have petitioned the board of supervisors for a franchise to build out over the Dubuque & Sageville Road.

HOLDERS of Key City Motor Company's first mortgage bonds seek a compromise with creditors whose liens were filed in time to give them court standing. \$47,000 is the amount of the mortgage, and the road which cost \$80,000 will probably bring about \$30,000—less than half enough to pay claims.

SIoux CITY—The South Sioux City Street Railway stockholders held a meeting recently at which the following officers were elected: President, Frank Hunt; vice-president, P. L. Griffey; secretary, J. M. Moan; treasurer, C. F. Smiley. Considerable new track will be laid in the Spring.

Kentucky.

LOUISVILLE—Fully 10,000 people got up by 6 o'clock to see the new electric line in the 12th ward make its first trip. A celebration attended the opening.

Louisiana.

NEW ORLEANS—Extensive additions will be made to the street railway systems as soon as the council can settle the route proposed. Further action will be taken next month.

The City Council of New Orleans has passed an ordinance forbidding street car companies to work their employes more than twelve hours per day, under penalty of a fine of not less than \$25 nor more than \$100 for each offense.

Maine.

BANGOR—The union of the Waterville & Fairfield Electric Light Plant and the railway of the same name is talked of. Electricity will be applied to the cars, at any rate, and the road extended.

Maryland.

BALTIMORE—Work will shortly begin on the South Baltimore Electric Railway, between Baltimore and Curtis Bay.

CUMBERLAND—A new town is to be started in West Virginia. The Pocahontas Development Company is at the head of the deal, and a street railway will be built. The principal office is at Grafton.

Massachusetts.

BOSTON—The full bench of the supreme court sent down an opinion dismissing the petition of the plaintiff in the case of the Onset Street Railway Company v. the County Commissioners of Plymouth County. The case was a petition for a writ of certiorari, the plaintiff complaining that warrants of distress had been issued by the county commissioners for land damages awarded to owners of lots which abut on streets through which its railway, operated by steam power, is constructed.

BROCKTON—The Brockton Street Railway Company has voted to increase its capital stock \$50,000 additional, for the purpose of defraying the expense of adding electric appliances to the road and building a double track in Brockton as far as the Avon line.

CLINTON—The Clinton road has voted to increase its capital to \$30,000. Horses will be replaced by electricity soon.

LAWRENCE—Ward 5 petitions the Merimac Valley Street Railway for an extension of that road into the ward.

LYNN—The suburbs of Woburn, Stoneham, Melrose, Malden and Chelsea have decided to have electric when the newly-determined-upon electric equipment is used by the East Middlesex road. Petitions have been sent in to this effect.

MARTHA'S VINEYARD—The Duker Street Railway Company is incorporated to build 25 miles of electric road from Cottage City to Gay Head.

NEWTON—Citizens will give a bonus if the West End Road, of Boston, will extend tracks to Newton.

WORCESTER—The Street Railway and the Worcester, Leicester & Spencer Road are both bidding for the right of way on Front street in case the consolidated road scheme is granted. The speed of electric cars has been fixed at 6 miles per hour in, 8 miles out, of the business parts.

Michigan.

DETROIT—A \$3,000,000 mortgage has been given the Washington Trust Company of New York, by the Citizens' Road.

The Citizens' Road has elected the following officers: D. M. Ferry, president; W. C. Colburn, vice-president, and George H. Russell secretary and treasurer. Ex President Cook says that the controlling capital is held by Detroiters, and that the Eastern syndicate has sold its interest to that effect. The \$2,000,000 preferred stock will not be issued until next year.

EAST SAGINAW—The storage battery car has been successfully run on the City of Saginaw Company's rails at a fair speed.

GRAND HAVEN—Grand Haven capitalists are talking of building an electric road from Grand Haven to Ferrysburg, Fruitport, Mona Lake and Muskegon Heights.

JACKSON—The new electric road is a grand success. The speed attained on the trial trip was 20 miles per hour.

GRAND RAPIDS—The Consolidated Street Railway Company has been granted a change of grade on several streets and permission to double track others.

MENOMINEE—The Mayor and other celebrities participated in opening the electric railway, and everybody was delighted.

RED JACKET.—Hon. Edward Ryan, of Hancock, says the electric line to Red Jacket will surely be built.

SAGINAW.—The West Bay City road directors favor the building of a hotel at Wenona Beach. There is now a three minute service between the Bay Cities.

WEST BAY CITY.—The street railway company has elected officers as follows: President, S. O. Fisher; Vice-President, T. F. Shepard; Treasurer, H. H. Norrington.

Minnesota.

DULUTH.—An agreement has been made between the Duluth Street Car Company and the St. Paul & Duluth Road for the proposed viaduct over the latter's line near Hazelwood Park. The plans are now in the hands of the Street Car Company and will be pushed at once.

The Duluth Street Railway Company has filed a petition for the appointment of commissioners to appraise land wanted for railway purposes in connection with the new extension of the motor line track.

MANKATO.—The negotiations for an electric railway at Mankato are about consummated, and it is expected it will be in working order late in November. J. S. Hughes, of Minneapolis, represents the capital and W. R. O'Key, engineer, and J. C. Noe of this place, the local interest.

ST. CLOUD.—The street railway has been sold to the Thomson-Houston Company, who will put in electricity. This is the fifth city in the state to secure an electric line. Work will commence within 30 days and 3 miles are to be completed within one year. The road has been operated some two years by horse.

RED WING.—A franchise is asked for an extensive line of railway here.

WINONA.—Work is advancing rapidly on the electric line. The poles are from the Walworth Company and are very nearly all set.

Missouri.

KANSAS CITY.—The Ivanhoe Park Electric line was sold at a foreclosure sale to-day. The company has been in default in payment of interest on \$100,000 issue of bonds since January 1, 1891. The Central Trust Company of New York was the trustee. J. W. Phillips of St. Louis, attorney for the Central Company, conducted the sale. The property consists of a single track, poles and wire, running from Eighthteenth street 3 miles south to Ivanhoe Park, and four electric cars.

The West Side Electric road application for a franchise on Wyandotte avenue has been approved by the city engineer, and will now come before the council with good prospects.

THREE masked bandits robbed the cable cashier's office of \$400 lately. No clue.

J. W. PHILLIPS, of St. Louis, attorney for the Central Trust Company has sold the Ivanhoe Park electric line under foreclosure of a deed of trust for \$100,000. The line was bought in by the Thomson-Houston Company for \$25,000.

ST. LOUIS.—Clayton, a suburb, will probably be connected electrically over St. Louis & Suburban tracks. The Clayton & Forest Park Railroad Company asks the franchise.

Montana.

BUTTE CITY.—The Consolidated Road has elected directors.

GREAT FALLS.—Anderson & Lund, contractors, will spend \$60,000 on the new extension of the electric street railway.

HELENA.—The Northwestern Guarantee & Loan Company of St. Paul, owners of the bonds of the Helena steam motor line, has decided to make it an electric plant.

Nebraska.

LINCOLN.—K. K. Hayden, representing 123 bond holders of first mortgage bonds of the Lincoln Electric Street Railway Company, began suit in the district court to-day to foreclose one of the mortgages. He represents that the road is not worth \$60,000, and that it is not paying expenses, and is deteriorating in value. He asked that Geo. K. Brown be appointed as receiver. It is alleged that the company is over \$4,000 in default of its interest coupons. This is not the Lincoln street railway which owns the principal lines in the city, but a line that ran from North Lincoln to Eighteenth and South streets.

New Jersey.

ASBURY PARK.—J. C. Shaffer, of Richmond, Ind., has bought the railway here. The road will be extended to Long Branch.

NEWARK.—A janitor in the general offices, working through two conductors, has been detected in stealing and selling the company's tickets which he was supposed to destroy. The janitor received 1 cent each for them from the conductors, who in turn sold them for 3 cents. The company are having all the guilty parties, including the passengers who were party to the scheme, put through, and do not expect a repetition of the fraud at any immediate date. One of the parties buying from the conductors is a wealthy and influential gentleman, and no small surprise is occasioned by the discovery.

MONTCLAIR.—President Francis M. Eppley, of the Orange & Bloomfield Cross Town Railway Company, is actively engaged in securing the consents of property owners for the extension of the road to Montclair.

PLAINFIELD.—The eyes of capitalists are turned towards the Plainfield Suburban railway scheme. A franchise has been asked for three routes by the Columbia Navigation & Commercial Company of New York City.

New York.

NEW YORK CITY.—A petition has been presented to the council by Chas. P. Shaw, for permission to construct cable roads in seventy miles of city streets. The petition recited that the company had filed revised articles with the county clerk. It was referred to the railroad committee.

The balance sheet of the Manhattan Elevated Railroad for the year ended June 30, 1891, shows: Gross earnings, \$9,846,709; net earnings, \$4,871,568; gross income, \$4,984,568; net income, \$2,506,586; profit and loss (surplus), \$2,675,845. Dividends on \$26,000,000 for nine months ended April 1, 1891, \$1,170,000, and on \$30,000,000 for quarter ended June 1, 1891, \$450,000.

A CALL has been issued by D. A. 226, for a convention to be held October 25th. Delegates will attend from New York, Albany, Brooklyn, Troy, Rochester, Elmira, Buffalo, Syracuse, Cleveland, Cincinnati, Milwaukee, Chicago, Detroit, Boston, Salem, Lynn, Columbus, Omaha, Minneapolis, St. Paul, Louisville, Philadelphia, Jersey City, Newark, and Toronto. The convention is called to discuss plans for pushing the organization of car drivers and conductors in the different cities, and to elect the annual officers.

The Kings County Elevated Railroad, which was the first to introduce night trains and smoking cars in Brooklyn, is being extended from Van Sicklen avenue to near Montauk avenue. The work will be finished in about three months.

The Union Elevated road in Brooklyn has not yet decided to run night trains.

The North New York Junction Railroad Company has been incorporated at \$250,000 to construct a railway in the city along Willis avenue. The directors are, G. H. Ackerman, B. G. Hughes, et al.

CITIZENS want the railway facilities extended through to Clarkson and Watts streets.

ROCHESTER.—A resurvey of the suburban line through Pittsfield and Crystal Rock Springs is ordered.

STATEN ISLAND.—As soon as a franchise is granted, the promoters of the electric railway project on Staten Island say they will begin work on three belt-line roads, parallel with the Staten Island Rapid Transit Railroad. The cars will be double-decked, with a seating capacity of seventy persons.

TROY.—Citizens resident beyond Mill street are anxious for an electric road. John Morgan is chief of the agitators and a committee will interview the council. The street has never been deeded to the city and a road will undoubtedly be built.

North Carolina.

GREENSBORO.—At a meeting of the directors of the Greensboro Street Railway Company, the following officers were elected: President, R. M. Douglas; vice-president, J. M. Jordan; secretary and treasurer, G. S. Sergeant; attorney, R. R. King.

Ohio.

AKRON.—A. L. Johnson, S. H. Street and C. E. Grover, of Cleveland, ask the right to put in an electric system. The line will be 7 miles long and cost \$13,000 per mile.

BUCYRUS.—An electric road between Bucyrus and Galion is proposed. Martin Deal is the prime mover.

CINCINNATI.—The new electric line to Norwood is now complete and gives a 2-mile trip to that suburb for 5 cents. Besides completing this line the Eden Park Company has purchased 34 motors and 20 trail-cars and put a new incline on Mt. Adams.

DELAWARE.—Ex-Mayor J. K. Newcomer has asked for a franchise for the construction of an electric street railway in our city. The proposed railway route covers all the principal streets in the city and connects with the depots.

EAST LIVERPOOL.—The street railway being built by the Johnsons, of Cleveland, from East Liverpool to Wellsville, is nearly 9 miles in length.

FINDLAY.—J. Ramsey, Jr., president of the Belt Line says the road will be completed by the first of the year. A bridge must be built and other heavy expenses met.

FOSTORIA.—Fostoria and Tiffin want electric connection. At this rate all towns in Ohio will be connected.

MIDDLEPORT.—A construction company offers to build a line between Middleport and Pomeroy, without bonus.

MARION.—D. Babst, Jr., of Crestline, asks for a franchise to operate an electric road. It will probably be granted.

WARREN.—A. L. Johnson has a scheme to unite Akron, Cuyahoga Falls, Ravenna and Barbertown by electricity.

WESTERVILLE.—Westerville people are trying to get an electric line from Westerville to Columbus. Much enthusiasm is manifested.

ZANESVILLE.—A new electric road is incorporated, with \$150,000 stock. The T. B. Townsend Brick Company is largely interested. This company has a suit against the Zanesville Street Railway for \$2,500 for material and labor furnished.

The Citizens' Street Railway Company has been organized at Zanesville, Ohio, with a capital of \$150,000, and F. M. Townsend as president. The road will be 5 miles in length and may be extended to points outside the city. Motive power will be electricity.

Pennsylvania.

ALLEGHENY CITY.—A charter has been granted to the North End Passenger Railway Company, of Allegheny City; capital \$200,000. The president is Francis Torrance. The line will extend from the corner of Fremont street and Washington avenue to Woods Run avenue.

ERIE.—The Mayor has signed the ordinance extending the Erie Motor Company's track. Work begins at once.

BRADDOCK.—The Braddock & Turtle Creek Street Railway Company is to extend its line to Keating station.

CRAFTON.—Residents of the West End, Sheridan, Ingram, Crafton, Idlewild, Mansfield, and Chartiers, held a meeting at Crafton to agitate the building of an electric street railway to Pittsburgh. About \$1,000 was subscribed, and shares were subscribed at \$50.

HARRISBURG.—The Nickle Plate Street Railway of Scottdale has been granted a charter. Length of line, two miles; route, from a point on the S. W. P. R. R. tracks, on Pittsburg street, to the Stoneville road, thence to the Pine Tree Farm Addition to Scottdale; motive power, electricity; President, David P. Lowe, of Mt. Pleasant; capital stock, \$12,000.

MANCHESTER.—The electric cars of the Pittsburg, Allegheny & Manchester Road have made a successful trial trip, and are now running regularly.

McKEESPORT.—House & Borter, of Braddock, have commenced to build the street railway company's power house.

ANOTHER electric line is organized to run to Chester Park at a cost of \$100,000.

LEBANON.—The Lebanon & Annville Electric Street Railway will increase its capital to \$100,000.

PHILADELPHIA.—The Philadelphia Traction Company will shortly issue 20,000 shares of new stock at \$10 per share. The proceeds will be used in paying for extensive improvements in that city. This will make the capital stock of the company \$6,000,000, of which \$1,800,000 will have been paid in. The profits of the company for July and August were \$206,800, an increase of \$41,558 over the same period last year.

PRESIDENT ESSLER, of the Northeastern Elevated, says that the road has \$3,000,000 to begin work with on October 25th. The route is a double track road from that part of the county line known as Cheltenham avenue, over property hereafter to be purchased by the company, to Butler and Mascher streets; on Mascher street to Tusculum street to Kensington avenue, on Kensington avenue to Lehigh avenue, on Lehigh avenue to Amber street, on Amber street to Front street, on Front street to Pollock street. Electricity may be used.

PITTSBON.—The Pittston Street Car Road has sold out to a company of Wilkesbarre capitalists, including Isaac M. Thomas, John G. Wood, George K. Powell, George W. Shonk and A. A. Sterling. The money was paid down in cold cash and the transfer made.

South Carolina.

ANDERSON.—The Anderson Electric Light Company talks of putting in an electric line.

Tennessee.

CHATTANOOGA.—The electric company here operates 33½ miles of track.

KNOXVILLE.—In the case of the Knoxville Street Railway Company vs. the Knoxville turnpike, the investigating committee has adjudged that the railway pay the turnpike \$825 for right of way and use of approaches over an intervening creek.

The Knoxville Electric Railway Company has filed a mortgage for \$700,000 to the American Loan & Trust Company of Boston.

It is reported that electricity will take the place of horses on the Mary Street Line and the line be extended.

MEMPHIS.—Electric cars have commenced running on Vance and Papear avenues, power being supplied by the Memphis Higher Power Company, the company's own power station not yet being finished.

SOUTH PITTSBURG.—The street railway line is now under construction. A proposal is in to make it a dummy line.

Texas.

FORT WORTH.—The City Railway Company issues half-rate tickets to school children with the stipulation that the kids keep on the inside of the car.

DENNISON.—B. J. Derby, general manager for the Dennison street car lines, is in New England in the interest of the Land and Investment Company.

DALLAS.—C. W. Batsell is arranging in St. Louis for changing the City Railway motive power to electricity.

The cable road has filed a deed of trust for the benefit of creditors. A mechanics' lien encumbers the power house.

PALESTINE.—A street car line is talked here as a necessity.

SAN ANTONIO.—300 street car men recently went out on a strike at 9:00 a. m. and remained off until 4:00 p. m., when matters were adjusted and everybody made happy.

SHERMAN.—The City Railway is to change from the mule to electricity, thus giving two roads with ten miles of track.

GALVESTON.—The Galveston City Railroad has just added a 250-horse-power Edison generator, and have sold an entire equipment of cars, harness, mules, rails, etc., for the new road at Lake Charles, La.

Virginia.

MANCHESTER.—The electric cars were running on the Decatur street line yesterday and operated very successfully. This road has given good service from the start.

West Virginia.

MOUNDSVILLE.—Glenn Cook, W. H. Hunter and others of the Moundsville Mining and Manufacturing Company have proposed an ordinance granting rights of way through the streets for an electric street railway company.

WHEELING.—The new repair shops and barn of the street railway company are completed. The main building is 50x300 feet, with five tracks. The shop is 15x30 feet. Both buildings are brick.

Washington.

TACOMA.—The Tacoma Street Railway Company has begun suit against J. H. Cummings, ex manager of the company, to recover \$60,000 said to be due Cummings files a counter-claim for a like amount for expert services, use of patents, etc.

Wisconsin.

APPLETON.—The Appleton street car system, rebuilt and refitted at an expense of \$60,000, has been successfully tested.

MILWAUKEE.—The Becker street car power-house was damaged by fire to the extent of \$75.

AS SOON as the street railway company has enough power to spare it is probable that the city will ask for enough electricity to turn the bridges. The company now has tracks on Pleasant, Martin, Huron, East Water, West Water street and Kinnickinnic avenue bridges. Additional tracks will probably be laid on First avenue and Broadway bridges.

NOTES FROM PUGET SOUND.

From our own correspondent.

SEATTLE, WASH., October 10, 1891.

The first funeral on street cars in Seattle recently occurred, and was in every way satisfactory. The Yesler Company fitted one of its grip dummies so that a coffin could be carried on the front, and in this way the body was taken to the junction with the Union Trunk, on its south branch. There a regular funeral train was waiting. A small platform-car had been fixed up as a catafalque. Four black posts at the corners held a black canopy, and the sides were draped in black and white. This catafalque was coupled in front of a regular electric car. Two more cars followed, and thus the body and 175 friends were carried to the cemetery. The whole charge made by the Trunk Line for the train was \$30, while an undertaker usually charges \$10 for a hearse alone. The Trunk Line will have a funeral car built at once, in the style of a regular hearse with black mountings and French plate-glass sides. The charge for it will be \$5, and for each additional car, \$5, regardless of the number of passengers carried. While the funeral car is building, this temporary catafalque will be used. A set of draperies has been bought to put on cars which may be used in the funeral train.

The city organization would have fixed the valuation on the street car companies as follows: Seattle City Railway (Yesler avenue cable) \$40,000; Seattle Consolidated, \$90,000; Madison street cable, \$75,000; Front street cable, \$25,000; West street, \$15,000; Rainier avenue, \$5,000. The Seattle Consolidated railroad makes a vigorous objection and declares its intention to submit to a lawsuit rather than accept the valuation. The company will accept a valuation of \$60,000.

The Rainier Power and Electric Company which now runs in the north end a short line merely serving as a feeder for the Seattle Consolidated, is planning a system which will make the company, when the extensions are completed, a rival of the Consolidated. The present line is on the east side of Lake Union. The plan is to extend it around to the west and up in the hill overlooking the water in the northwest section of the city. For this work franchises were obtained some time ago. The company has also filed an application for a new franchise which runs through the heart of the city north and south on Third street, one block east of the main trunk of the Consolidated system. This extension will cover the Yesler avenue, the Union Trunk, and the Madison cable lines. The intention is to complete this part, if franchises can be obtained,

before the streets covered by the old franchises are built in. D. T. Denny, the president, says: "The reason why the line mapped out in the original franchise has not been pushed is that the streets over which most of the road is to run have not been graded, and hence the company must bear all that expense, in addition to the cost of the road building, if it would proceed to finish the line at present. As soon as the streets are graded we will build quickly. In laying the two and a quarter miles of track from Brooklyn to Alma street the company had to expend \$7,000 for grading alone. The franchise applied for, passes through a new and fine residence section and has the advantage of down-town connections."

The Rainier Power and Electric Company has also been brought into the courts by a suit of C. N. Brundage for \$10,000 damages. Brundage alleges that on August 4th he presented a commutation ticket to the conductor of the car on which he was riding. The ticket was rejected and he was put off the car by force. In consequence of the extreme mortification he thinks he is damaged to the extent of \$10,000.

The Seattle Consolidated Railway Company is building a 40 x 50 brick power house at Fremont, a northern suburb, to supply power for the Green Lake and Fremont Lines. The power plant, which was formerly located in the old and abandoned power house at the foot of Pike street, is to be used in the new house at Fremont. It consists of one 100-horsepower engine and another of 80-horsepower, with the necessary dynamos. The steam necessary to run the engines will come from the engine room of the Fremont Mill Company.

W. H. Lewis has been appointed assistant superintendent of the Tacoma Railway and Motor Company, vice Frank B. Gamble. Mr. Lewis has been a special officer on the Northern Pacific for four years and was on the Gerry Park & Ocean line of San Francisco for four years.

A proposition to consolidate the traffic business of the Tacoma Railway and Motor Company and the Peninsular Railway Company, is meeting with favor and will probably be consummated. The latter company operates the electric lines to Steilacoom.

The Abbott Company is preparing to give the Tacoma Railway and Motor Company a sharp competition, and is laying its tracks in lively fashion on C street between Eleventh and Gypsum. The former company is laying double tracks past the new Exposition building to North Tacoma. The more circuitous road to North Tacoma will then be abandoned and a saving of four blocks effected.

The "one fare" street car line problem is worrying Whatcom and Fairhaven citizens. At present each city has an independent line connecting at the boundary between the two cities, but the public will be compelled to pay two fares in traveling from one city to the other unless the companies consolidate.

J. C. Anderson has petitioned the Seattle council for a route from Lake Union north to city limits.

L. H. Griffith, president of the Seattle Consolidated Railway, has applied to the county commissioners for authority to run his electric railway along the county road south toward Tacoma. This is the scheme for an electric road.

There have been two accidents with the counterbalance weight of the Rainier avenue electric line, at the point where the dummy car, going the opposite direction, helps the passenger car to climb the hill. On one occasion the dummy was found at the top of the hill, and the car attempted to come down without it. The car got away from the brakeman and ran a block at the bottom of the hill before it could be stopped. On the second occasion the dummy got loose and came down the hill, tearing up the track, when it struck the bottom.

Fred W. Woodsman has erected a car factory two stories high, and covering a space 120x80 feet. He has built some Yesler cable cars, and is now building six for the Grant street electric.

Rohlf's & Schoder are also building cars for the Union Trunk Line.

The Monroe street extension, of the Spokane Street Railway, has been completed, and a fifteen-minute service will be given. James A. Clark had the contract for building the road, H. D. Scribner the contract for the overhead construction, while B. C. Riblet, who has constructed the entire system, is the engineer in charge.

THE sub-committee of the Glasgow Tramways Committee recommends that the horses be retired and electricity or compressed air be used instead. The report was adopted and developments will be heard from.

MESSRS. SIEVRENS & HALSKE, of Berlin, have proposed to the Berlin municipality that they be allowed to construct 40 miles of elevated electric railway in the city, at a cost of \$4,000 marks.

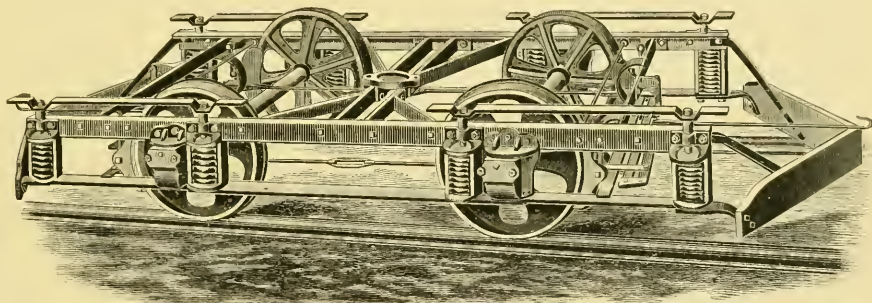
THE DAY ELEVATED RAILWAY.

THE immense amount of street passenger traffic that will crowd the avenues of Chicago in the next few years, and afterwards, will make something besides surface transit imperative. Elevated transit is the most prominent bidder for place. The principal objections brought against elevated railways are three: First, the unsightliness of the construction and obstruction of the streets used; second, the noise caused by the rigidity of the construction, and third, the obscuration of light and the noise arising from the use of engines and ordinary cars.

Civil Engineer St. John V. Day has in his plans a new answer to these questions as is explained in this article.

The Day Elevated Railway system postulates an elevated structure of sufficient strength but at the same time with the stresses so arranged that the structure is extremely light yet accommodating a series of trains.

In a recent interview with Mr. Day at his office in the Adams Express Building, he explained, as far as his limited time would allow, his plan to THE STREET RAILWAY REVIEW, which now for the first time is officially made public.



SEIBERLING'S TRUCK.

To begin with, it is almost unnecessary to state that the plan is very simple, taking into consideration fundamental principles of mechanics. The construction consists of a series of long spans of suspension cable, which cable is continuous for any section or the entire length of the railway. A span of 300 feet is said to work out more economically, but spans of 500 feet have been successfully run. The new principle of stiffening suspension cables which constitutes the essential part of the system, is the means used to dispense with the heavy dead weight of the suspension structure in carrying safely the moving load. Mr. Day has effected this by means of under cables curved in the opposite direction to the upper continuous cable. These two sets of cables are tied to each other by vertical ties at intervals of twelve to fifteen feet so that whatever tension stress is applied by means of weights, is immediately transmitted to the upper cable by means of the ties, thus producing a succession of spans of flexible material which is made rigid by tension applied to the under cable. The completed structure may have two, three or more such bays of cables in width, according to the number of tracks on the same level, having usually two pairs of tracks

between each bay of cables. Each bay of cables is connected transversely by means of frames attached to the vertical or inclined ties, thus forming a horizontal support throughout the length of the railway for the stringers by which they are connected to the rails above them. The ends of the cables are anchored in the earth, as those of the Brooklyn bridge. The long upper cable is carried by saddles upon steel piers at regular intervals and these saddles are so arranged that they communicate the horizontal component of stress due to the live load instantly to the lower cables as a moving train passes, stiffening the structure in advance of the moving train. This latter point is the crowning peculiarity of the system. From this it follows that, as the live load passes from span to span the structure is locally stiffened by the communication of the live load stress to the lower cables. So far we have described the system as applied to one or more tracks at the same level. But to insure the maximum stiffness with minimum cost, the different classes of traffic may be arranged above one another. For instance, a city requiring rapid transit between the center and suburbs should not have through traffic stopped at intervals of less than one and a half or two miles. If stops are more

frequent it is not rapid transit. To accommodate way-side and local traffic it is equally necessary to have stops every two blocks. This is impossible on two tracks, so four tracks are used,—the upper rapid transit, and the lower way-traffic service.

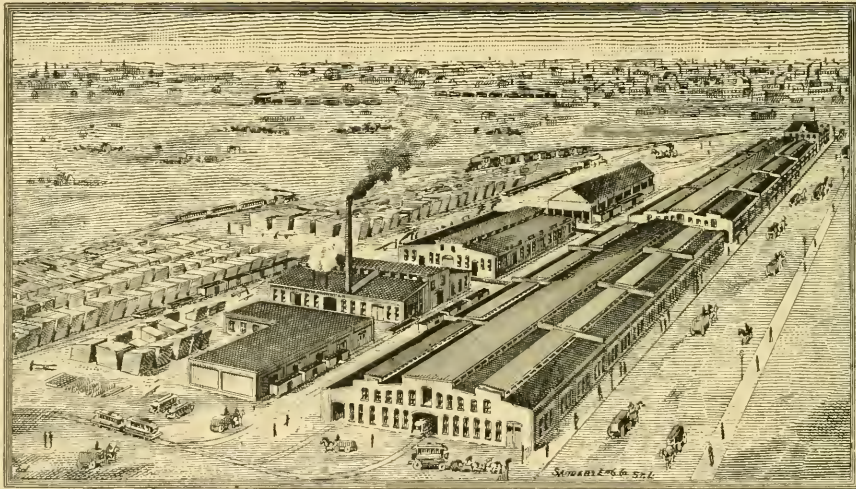
A NEW TRUCK.

THAT prominent agricultural implement man, J. F. Seiberling, of Akron, Ohio, has patented an all-steel truck that claims several points in favor of its use. In the first place it is adapted to all styles of electric motors, and of very few parts and these few simple in construction. The journals and boxes are dust proof, and powerful brakes are located outside of the electrical gears. It possesses moreover an extended spring base, while the wheels and axles are readily detached by the removal of four bolts at each end. The motors or armatures can be removed without interfering with the substantially braced body frame. The motor is to be manufactured at Akron and claims the attention of the street railway fraternity.

AMERICAN CAR COMPANY'S PLANT.

THE vim with which enterprises start into the financial world is a good presage of future prosperity. By vim, we do not mean bluster, but the determined, well-planned and well-forwarded action taken by such enterprises when they find themselves upon the cold world of reality with their living to make. With this definition of vim, we congratulate the American Car Company, of St. Louis, upon having this valuable characteristic of longevity and usefulness. Although but a few months old, the American Car Company has orders in progress of construction amounting to 150 cars, 50 of which number are near completion in the paint shops of the company.

It is, therefore, not only on account of the promise of future greatness, but because of present deeds, that we take pleasure in presenting the following cut of the factory:



WORKS OF THE AMERICAN CAR COMPANY, ST. LOUIS.

The factory is situated on the Old Manchester road, near Tower Grove avenue, 1,200 feet front by 150 wide. The main building contains four departments of work—erecting shop, mill, cabinet and paint shops—while to the rear come the blacksmithing, machine shops, boiler and engine room, and lumber and storage yards.

The officers are: William Sutton, president; Theophile Papin, Jr., 1st vice-president; Ferdinand Meyer, 2d vice-president; Emil Alexander, secretary; Louis H. Tontrup, treasurer.

All are men of ample experience, taste and ability. The company has achieved success at one bound, and we confidently expect great things of them in the future.

The shops are of the following dimensions: Cabinet shop, 100 x 150 feet; mill, 125 x 150; erecting shop, the same; varnish room, 50 x 150; paint shop, 150 x 300; blacksmith shop, 100 x 100; machine shop, 100 x 100; store-room, 100 x 150.

TWO AND TWO MAKE ONE.

THE Trenton Passenger Railway Company is the rebaptized, reorganized union of the Trenton Horse Railroad Company, the City Railway Company, the Hamilton Township Street Railway Company, and the South Clinton Avenue & Broad Street Railway Company. The directors have instructed the following list of officers to adopt electricity as soon as possible: President and general manager, Col. Louis Perrine, Jr.; vice-president, S. K. Wilson; secretary, J. Howard Solomon; treasurer, G. H. Parker.

CAPACIOUS CAR HOUSE.

AN immense car house for the Charlestown district is planned by the West End Street Railway, Boston. It will be located on Main Street, just beyond Sullivan Square. It will be one story high, 74 feet across the front and spreading out to 117 feet in the rear,

with a depth of 431 feet on one side and 401 on the other, giving an irregular-shaped building. The material of the main walls will be brick, but wood will be used on the front of the house. Along the entire length of the building will be a high monitor roof, divided into two parts, the smaller being over the rooms in the front part of the house, and the other over the car house proper. The sides of this monitor roof will be nearly all windows, which, with a row of closely set windows just under the eaves, will flood the interior with light.

RAISED THE RECORD.

THE record has again been broken by what is undoubtedly the greatest day's work ever accomplished with a single car. During the recent State Fair at Des Moines, Fred. Bauder, a conductor on the Fair Grounds Line of the Des Moines Street Railroad, collected in a single day 2,883 fares, or \$144.15. Next.

(Continued from page 435)

which fixes the lowest rate of state tax in thirty-six years, is the result of wise and far-seeing Republican legislation, under which already direct taxation has been lessened more than \$20,000,000, directly benefiting real estate and personal property and at the same time establishing the state and municipal credit at the highest level. This work of equalizing and relieving the burden of taxation should be continued to completion on the same lines."

Is it to be understood by this declaration that a sufficient surplus has been accumulated, during the previous year of Democratic rule, to run the state government for a year to come? Or, what is less probable, that during the ensuing year the state government is to be run without expense to any one, beyond the one or two millions now in the treasury for that purpose? It means neither of these absurd things, but something more absurd and preposterous than either.

In this section a great party is posing before and bragging to the owners of three-fourths of the property in this state, that for the first time in history it has succeeded in fastening upon the owners of the other one-fourth, all the expenses of the state government except what is received from collateral legacies, so that this majority in numbers and ownership may have all the advantages of the state government at the expense of the minority in numbers and ownership; and that more than \$20,000,000 has already been realized in this way.

This great but shameful achievement, the Republican party (with which the writer has been associated since its formation) itself puts forth and holds aloft as a praiseworthy deed, and by reason of this class legislation and the accomplishment of this manifest wrong, it asks the majority, which is to reap the benefits of such legislative rapacity, to elect its candidates and help it to place and power once more.

Now, on the fifteenth day of last month, there was also held at Saratoga a Democratic state convention. In its platform will be found the following statement:

"It" (the Democratic party) "gave the state the lowest tax rate in thirty-six years, and, for the first time in a generation, freedom from taxation for the general purposes of the government."

But, the Democratic party, not satisfied with pluming itself upon having had its full share in this injustice, later on, in its platform, holds out as a promise of future and further efforts in the same direction, the following:

"We favor a revision of the tax laws, whereby personal and corporate property shall be made to bear its full and just burdens."

Thus, for once and in one matter, the two great parties of the state are in unison, and the only disagreement or contention between them, is in the claim of each that it has had more to do in accomplishing this piece of injustice and partiality than the other.

Can it be imagined why these two parties did not state explicitly in their platform that statutes had been framed, passed, and were now being relentlessly enforced, whereby the state was now grasping and wrenching from the owners of one-fourth of the property in this state, a suffi-

cient annual sum to take care of the whole? Why did these great parties not say in set terms, that at last a minority in numbers and ownership of the people of this state are compelled by law to pay all the expenses of supporting the criminals and the unfortunate, and of protecting the persons and property of the majority? Why did they not proclaim what would have been equally true and would have seemed more thrifty still, that one-fourth part of the property itself in this state has at length been so selected, condemned and fastened upon, that it must forever, hereafter, furnish means to protect in all ordinary and extraordinary emergencies both itself and the other three-fourths free of all cost to, and contribution from, such other three-fourths? Is it possible that there is a lingering suspicion that the public conscience has not yet been sufficiently hardened and debased to approve of such bare-faced imposition?

At the risk of being tedious, let us look at this matter a moment as a business proposition or arrangement. The only excuse, as all political economists justly hold, for the existence of any government at all is, that it insures the protection and enforcement of personal and proprietary rights. This insurance, like all others, involves expense and costs a premium, which is raised by such taxation as a majority of the people, through their agents in the legislature shall decide upon. From this decision of the majority, so expressed, there is in this state, as before stated, no appeal except to God and their own consciences. In other words, it is an act of sovereignty. Now this majority in the state of New York, so represented and their representatives duly convened, has decided by the passage of several laws and at various times during the last decade, that about one-fourth part of the whole property in the state, and owned by a still less proportion of the whole number of persons to be so insured in their personal and proprietary rights, shall pay the entire cost or premium for the insurance of the whole. Now all that saves this from being an infamous crime is that sovereignty cannot commit one.

More than this, the two great political parties constituting this majority are vying with each other in open day, and on the eve of a great state election, for the credit, as they seem to regard it, of having accomplished this feat. Under this parasitic arrangement, as above stated, the owners of the corporate property before referred to as an example, are paying over \$30,000 every year to insure the protection and enforcement of the personal and proprietary rights of other people not interested with them, and in whom, or in whose affairs, they have no interest, except that of fellow citizenship.

No means are at hand to determine what proportion of the state rate is levied for general purposes: but having regard to the full rate for all purposes, and remembering that general purposes include all the expenses of the state, except those connected with the canals and the schools, it is safe to say that this \$30,000 pays the taxes upon several millions of property belonging to many thousands of the favored class, who thus get all the benefits of the state government and have all the

criminals and unfortunates belonging to their own class supported free of any cost whatever to themselves

It will be observed that both of the great parties whose recent platforms touching this question have been quoted, not only pride themselves upon what they have already accomplished by this class legislation, but each promises to pursue the same course to further and more profitable results in the future. The excuses for this policy are numerous and varied, but without exception are untrue or unworthy, and generally both. When the legislator, the executive or the jurist, for instance, claims that there is a widespread prejudice against corporations, with which he sympathizes, he plants his feet upon an undeniable and existing condition; but when in the next breath, he insists, for the purpose of discriminating against them and getting a whack at them, that all corporations are simply the creatures of the state, he fails to see the absurdity and inconsistency of his own position and that of all others who are prejudiced against them. Yet, as we shall see later, this furnishes the most enlightened and justifiable ground for the oppression and punishment of that class of citizens who own corporate property.

It can hardly be claimed by the most ignorant or superficial statesman that when a well-directed blow is aimed at a corporation, and which being delivered *con amore*, does thorough execution, that it causes any unpleasantness to that "fictitious person" described in law as "having the power to sue and be sued," or any pain to any one except those whose capital and industry have been united in this case under a common name, by the authority of the state, and for a good and lawful purpose.

If any prejudice, therefore, is justifiable in this connection, it should be against the authorities which invented and created all corporations, and not against the owners of corporate property, for any other animosity under such circumstances is insane and inconsequential to the last degree.

There is a popular belief that those people who group themselves, and unite their capital and do business under a corporate name, acquire by so doing, and hold some sort of a monopoly, and are doing something either in matter or method which others are not permitted to do. But so soon as it is observed that all corporations are now formed under general laws, so broad in their application that any other like number of citizens may group themselves and unite their capital and industry in the same way and for a like purpose "without regard to race, color or previous conditions of servitude," it is seen that this flimsy excuse for class legislation against owners of corporate property has no foundation whatever in fact.

One other excuse for such partial and tyrannical legislation, weaker and more transparently unjustifiable than any other, completes the list. The legislature insists that it has often been corrupted in the interest of corporations.

Now to claim that improper influences in former times and in some cases, alleged to have been used and to have caused the state's own servants and agents to grant charters more liberal in their terms than they should have been, or to claim that in exceptional cases liabilities and

obligations are not met and fulfilled as they should be under corporate management, can for a moment justify as a measure of retribution an indiscriminate, universal, perpetual and equal punishment of the guilty and the innocent together by special taxation or otherwise, visited upon all the owners of corporate property, without distinction, throughout the state, shows the lack of a sense of justice and the want of a sentiment of fairness which would discredit a Chinese mandarin or an Arab sheik.

This is especially true when we remember that the legislature has in all cases reserved to itself the right to modify or annul corporate charters, and therefore has reserved the full power to review its own misdeeds, and also to make "the punishment fit the crime" if any corporate agency has contributed thereto, by repealing the right of any such one or more corporations to do any and everything whatsoever which is not for the public good, and at the same time of enforcing by suitable statutes whatever the public convenience may fairly require.

No other pretended excuses have been offered so far either by the press of the state for this partial and unjust treatment of corporate property and this cruel class legislation against its owners.

This, then, is a brief but truthful statement of the case. It might be added, however, that the majority in numbers and ownership, in nearly all the states, are indulging in the same cheap and dishonest methods of bearing their burdens and of paying their taxes by proxy, and in some cases the entire state expenses have been so paid for years. One conclusion is unavoidable upon a full consideration of the whole subject; it is that either corporations should be abolished altogether or corporate property should share exactly the rights and liabilities of all other property.

He who does not perceive that in a short time counties, towns and municipalities will claim for their respective majorities in numbers and ownership, the same privilege of preying upon the minority, must think that the parts are better than the whole; while he who does not discover in this established tendency the prophecy of national class legislation of a discriminating and most oppressive order, later on, must believe that the whole is better than its parts. That it is, if not the first step, at least a long one, in the direction of state distribution of wealth, without regard to ownership, no one who is well informed and impartial can deny.

On motion the report was received, ordered on the minutes and a vote of thanks tendered the author for the able paper he had presented.

Mr. Scribner's paper, it will be remembered, is his third contribution, at as many conventions, on this all-important subject. It has been looked forward to each year with increasing interest, and is unquestionably the most concise and straightforward presenting of street railway rights ever contributed to railway literature, and the corporations of the country are greatly indebted for the same.

The next business was the report of the committee on the Independent Primary or Storage Battery System of Electric Motive Power, as follows:

THE INDEPENDENT STORAGE OR PRIMARY BATTERY
SYSTEM OF ELECTRIC MOTIVE POWER.

BY KNIGHT NEFFTEL.

MR. PRESIDENT AND GENTLEMEN: Owing to a variety of causes, the system, which was assigned to me at the last convention, to report on, has made less material progress, in a commercial way, than its competitors.

PRIMARY BATTERIES.

So far, primary batteries have been applied only to the operation of the smallest stationary motors. Their application, in the near future, to traction may, I think, be entirely disregarded. Were it not a purely technical matter, it might be easily demonstrated without knowledge of electro-chemistry, that such an arrangement as an electric primary battery driving a car is an impossibility.

In view of the claims of certain inventors, I regret to be obliged to make so absolute a statement; but the results, so far, have produced nothing of value.

SECONDARY BATTERIES.

The application of secondary, or storage batteries, to electrical traction, has been accomplished in a number of cities, with a varying amount of success.

Roads equipped by batteries have now been sufficiently long in operation to allow us to draw some conclusions as to the practical results obtained and what is possible in the near future.

The advantages which have been demonstrated on Madison avenue, in New York, Dubuque, Ia., Washington, D. C., and elsewhere, may be summarized as follows:

First. The independent feature of the system: The cars are independent of each other and free from drawbacks of broken trolley wires, temporary stoppages at the power station, the grounding of one motor affecting other motors, and sudden and severe strains upon the machinery at the power station, such as frequently occur in direct systems, the absence of all street structures and repairs to the same, and the loss by grounds and leakages are also very considerable advantage, both as to economy and satisfactory operation.

Second. The comparatively small space required for the power station: Each car being provided with two or more batteries, the same can be charged at a uniform rate without undue strain on the machinery of the power station, and as it can be done more rapidly than the discharge required for the operation of the motors, a less amount of general machinery is necessary for a given amount of work.

Another and important advantage of the system is the low pressure of the current used to supply the motors and the consequent increased durability of the motor and practically absolute safety to life from electrical shock.

It has been demonstrated also that the cars can be easily handled in the street, run at any desired speed, and reversed with far more safety to the armature of the motor than in the direct system. The increased weight requires simply more brake leverage.

The modern battery, improved in many of its details during the last year, is still an unknown quantity as to durability. There is the same doubt concerning this as there was at the time incandescant lamps were first introduced. At that time, some phenomenal records were made by lamps grouped with other lamps.

Similarly, some plates appear to be almost indestructible, while others, made practically in the same manner, deteriorate within a very short time. It is consequently very difficult to exactly and fairly place a limit on the life of the positive plates as yet. Speaking simply from observation of a large number of plates of various kinds, I am inclined to the limit of about 8 months, though it is claimed by some of the most prominent manufacturers, and undoubtedly it is true in special cases, that entire elements have lasted 10 months and even longer.

It must be remembered, however, that the jolting and handling to which these batteries are subjected in traction work, increase the tendency to disintegrate, buckle and short circuit, and that the record of durability for this application can never be the same as for stationary work.

A serious inconvenience for the use of batteries in traction work, is the necessary presence of the liquid in the jars. This causes the whole equipment to be somewhat cumbersome, and unless arranged with great care, and with a variety of devices, lately designed, a source of considerable annoyance.

The connections between the plates, which formerly gave so much trouble by breaking off, have been perfected so as to prevent this difficulty, and the shape of the jars has been designed to prevent the spilling of the acid while the car is running. The car seats are now practically hermetically sealed, so that the escaping gases are not offensive to the passengers.

The handling of the batteries is an exceedingly important consideration. Many devices have been invented to render this easy and cheap. I have witnessed the changing of batteries in a car, one set being taken out and a charged set replaced by four men in the short space of 3 minutes. This is accomplished by electrical elevators, which move the batteries opposite the car, and upon the platforms of which the discharged elements are again charged.

The general conclusion which the year's experience and progress have afforded us an opportunity to make, may be summarized as follows:

Storage battery cars are as yet applicable only to those roads which are practically level: where the direct system can not be used, and where cable traction can not be used; and applicable to these roads only at about the same cost as horse traction.

I feel justified in making this statement in view of the guarantees which some of the most prominent manufacturers of batteries are willing to enter into, and which practically insures the customer against loss due to deterioration of plates: leaving the question of the responsibility of the company the only one for him to look into.

On motion, the report of Mr. Neffel was ordered placed on the minutes and filed.

Mr. Baumbhof, of St. Louis: The company which I represent have experimented with the storage battery, and I must say we have had no success. I believe our company was the second west of the Atlantic ocean, to undertake these experiments; we had two cars, each equipped with 120 cells, on an average grade of $2\frac{1}{2}$ per cent., the steepest grade not over $3\frac{1}{2}$ per cent. We were unable to get a greater mileage than from eighteen to twenty-two miles out of each charge; the charging of the cars required from eight to twelve hours; we found also, that aside from the leakage and the spilling of the liquid from cells, the cells buckled and corroded, caused possibly by the acids. We expended a large sum of money in these experiments, but finally gave them up as a hopeless undertaking. The storage battery is certainly not a commercial success.

Mr. Neftel: I believe the experiments the gentleman refers to must have been made at least four years ago. In the past few years a great change has come over everything connected with the storage battery—in the plates, the type of the batteries, the combining of materials for the plates, and the shape has changed completely, and the storage battery of this day as manufactured by the leading companies is an entirely new thing. Great progress is going on in this direction, and we are not justified in throwing the thing aside as a failure. I remember five years ago receiving a letter from the Thomson-Houston Company, which I have preserved as a curiosity, asking me whether I thought electric traction would ever be successful, and whether it would pay an electric light company to manufacture motors for electric traction. In the light of developments made in the past in the general field of electric traction, we should not cast discredit on the storage battery.

Mr. Barr, of Newark: On this question of storage battery, I only wish to refer to the road in Philadelphia, of which Mr. Sullivan is president. The Lehigh Avenue Passenger Railway was built to operate storage battery cars. In May, 1890, the road started with six storage battery cars. In October, 1890, application was made to the city council, of Philadelphia, for the use of the overhead system, claiming that unless they could use it, they would have to abandon the road. The council refused permission to the company to use the overhead wire, and on the 1st of January, 1891, the storage battery cars were abandoned and the road has since been operated by horse power.

Mr. Vhay, of Detroit, then related his experience with Woodward Storage, the plates of which were of tubes, which did not deteriorate. Cars ran at 14 miles an hour, but expense for coal was \$10 per day per car, and from seven to ten hours were required to charge batteries for a run of thirty-five miles—four trips. Sometimes they got into the house; sometimes not. No grades but sharp curves. We are now experimenting with compressed air, conducted through an underground pipe, from which the car receives sufficient supply for a half mile run. We found as long a time was required to charge a battery as was consumed in its operation.

Mr. Neftel: I think it is a mistake to expect batteries to make a long run, and that the perfected system will be one in which the batteries are changed each trip.

E. A. Scott, of Philadelphia, spoke of the operation of storage in Dubuque and Washington, recommending a change of batteries every twenty or twenty-five miles. Nine cars have been running in Dubuque since May 1st, and six cars in Washington for three months. We have no figures to show, but believe it cheaper than horses, and that in one year it can be run in economical competition with any overhead system.

Mr. Montague, of Yonkers, mentioned a storage car, not the Edco, of which six cars are running, which requires about an hour and a half to charge for a 20 mile run. Have seen a 16 foot car, carry 85 passengers up a 5 per cent. grade, at a speed faster than a man could walk, and on Decoration day of this year three of the cars ran respectively 42, 46 and 48 miles with one charging, and had sufficient power left to get into the power house next morning.

Mr. Holmes, of New York: I think the gentlemen have not stated the difference between the power that is put into storage batteries and that taken out, as compared with power generated for trolley use. Assuming that 100 horse-power is developed at the generator, it will not be denied that a loss of 10 per cent. will be made in the transmission of the power to the motor in the street. There is also a loss of 25 per cent. of this 90 per cent. at the motor, which, it will readily be seen, reduces the 100 horse power at the generator to about 68 horse-power for actual use. With the storage as I understand it there is a loss of nearly 30 per cent. in passing the current through the batteries, leaving only 70 per cent. of original power generated available for motor use in the street, from which must be deducted 25 per cent. of the 70 per cent. leaving 53 per cent. net of power for the battery against 68 in the trolley. The difference in the battery and the trolley is vastly in favor of the latter, the relation being about 115 to 215, in other words the power you must have to move the battery car is nearly twice that for the trolley car, and therefore the consumption of coal is twice as much.

It is but fair to the storage system to state that many delegates entertained the belief that some day the system would become practical, but there can be no doubt that the convention, as a whole, is fully convinced, the storage of to-day is not as economical by a large per cent. as the direct overhead wire, and that the necessity of hauling the heavy dead weight of batteries is a great objection. It cannot be said that the storage system has greatly advanced during the past year.

Mr. Wrenn then offered a resolution that a committee of five be appointed to report by February 1st, 1892, on the character of engine that gives the best results in power plants, for traction purposes.

Mr. Littell, of Buffalo, offered a resolution that the executive committee be requested to cooperate with Special Census Agent Allan R. Foote, with respect to compiling complete reports of the electric railway interests to date.

The convention then listened to the paper on

STANDARDS IN ELECTRIC STREET RAILWAY PRACTICE.

BY O. T. CROSBY

MR. PRESIDENT AND GENTLEMEN: The object of this paper is to present some suggestions concerning a standard rating for electrical machinery, standard dimensions for parts of car apparatus, standard nomenclature for methods and parts, and standard methods of keeping accounts.

I shall not go into any discussion of the value of standardizing methods and things, feeling confident that there is a very general appreciation of the value of uniformity in so far as it can be attained without sacrifice in other directions.

First, let us consider the rating of electrical machinery. Thus far it has been common to speak of a machine as a 15 H. P. or 25 H. P. motor, with scarcely any further suggestion of conditions under which it is supposed to operate. It must be borne in mind that an electrical motor, like any other machine, a man for instance, is capable of performing work at widely varying rates and widely varying efficiencies, and with widely varying factors of safety with respect to indefinite continuance of such a rate of work. It should further be borne in mind that an electric motor in particular, is known to do its maximum rate of work when its efficiency is only 50 per cent.; that is, if 20 H. P. represents the maximum rate of work, then 40 electric H. P. will be required to perform this work. A series motor, such as is commonly used for railway work, also must vary very widely in its speed, while varying the quantity of work it performs per second. Now, this maximum quantity of work and the efficiency at which it is performed, and the speed of the car connected with it, are all matters of importance when we endeavor to get a really serviceable idea of what the machine can do, that is, of how nearly it can meet the conditions required by the particular service to which we wish to put it.

Will it serve the purpose best if we rate the machine according to its maximum capacity when its efficiency is 50 per cent., or according to some lower capacity at high efficiency, and at some speed, as nearly as possible that at which the motor must be run during the greater part of its time at service? Should we use the maximum rating, we have the advantage of knowing at once very nearly what is the limit of service which the motor can perform; but, on the other hand, we fail to be told by such rating what the capacity of the machine is when doing the average work of our service.

There is at present no conventional uniformity controlling either the manufacturer or purchaser of electrical machinery in regard to these matters, which can be determined only by the custom of the trade, as it may grow up through years of uncertainty or as it may be directed to more rapid maturity by the action of such an association as this. We shall not, of course, be able at once, by any such formal action as we might take, to bring everybody

concerned to an immediate acceptance of such standards as we might adopt. Yet, we will certainly go far towards hastening the time when some really definite and valuable information will be given to the purchaser when he is told that a motor is rated thus or so.

The first condition, which, in my opinion, should be connected by implication with any rating whatever, is this: That the machine in question shall be able to perform its rated work indefinitely and under any condition of atmospheric temperature. There is, of course, room for honest differences of opinion in regard to this point. It is well known that the maximum demands for power in street railway service are not those which last for a considerable length of time. A certain manufacturer may thus argue to himself; "This machine which I am about to advertise is able to do twenty H. P. of work for half an hour, when the atmospheric temperature is ninety degrees. In my opinion this rate and time and temperature will not be exceeded in the conditions of regular service. Why, then, may I not call this a twenty H. P. motor? It is true, if I were building it for stationery work, in which generally the load to be carried is much more constant, I should adopt a different rating." Another manufacturer produces perhaps a machine of identical capacity with the one just considered, but taking a more conservative view of the matter, may feel it proper to give a rating in the neighborhood of fifteen or sixteen H. P., having a view that the machine shall be able to work at its normal capacity for an indefinite length of time, even if it were in service on the hottest day of the year known in the famous Fort Yuma. Machines of equal capacity are thus honestly put on the market at different ratings; and they may be in service on the same road without being actually subjected to such tests as would show their equality, the man who has rated high all the while getting credit for giving a more powerful piece of machinery than his competitor.

It would be possible to express this condition thus: That whatever the rate, it shall be possible to maintain that rate indefinitely under all conditions of atmospheric temperature, by stating that the windings of the armature shall never show more than a given excess of heat over atmospheric temperature. A more general way of stating it, however, seems to me to serve the purpose quite as well.

There is again further room for honest difference of opinion in regard to the efficiency with which a motor can do its rated work. Suppose the manufacturer has produced a machine which can do its maximum work for an indefinite time without undue rise of temperature. There is to-day no custom of the trade distinctly understood which would prevent him from rating the machines by this maximum capacity. And, again, in stating that the machine is of 15-horse-power capacity, even if there be agreement concerning efficiency and durability, there might be disagreement of much importance in regard to speed at which its work can be performed by the motor. If it has been so constructed that it can do 15-horse-power of work only at some armature speed corresponding to a linear speed of car, either much above or much

below the average speed of the car, then the formation and motor may both be of little value for street railway service. Indeed, the use of the term "horse power" then has necessarily this uncertainty in it: The total number of foot pounds per minute, namely 33,000, may be made up in an infinite number of ways by an infinite number of combinations of feet of travel and pounds of pull. But for hour service we should have some known relation between these two.

It seems to me that that which the purchaser has in mind to obtain is such horizontal effort exerted at such a speed and at such an efficiency as will do the work in view. Now, the work in view varies very widely, and we cannot, therefore, obtain a convenient rating which will express this relation throughout the range of the total capacity of the motor. We may, however, select some particular conditions, say that approaching as nearly as possible to the average, and tell by a method of rating, which I will propose, what the machine can do for such condition.

Let us first consider the speed at which it is desirable to know the capacity of the motor. I think ten miles per hour is not far from the speed at which cars will be found most frequently running. If, then, we state concerning a motor that it can develop so much horizontal effort at that speed, we at once have a pretty close approximation as to what load of a car and passengers it can handle at that speed, since we know that twenty-five pounds per ton is a fair approximation to the average traction co-efficient. Suppose, then, we are told that a motor can produce a horizontal effort of 500 pounds at ten miles an hour: it is then a quick inference that a car weighing twenty tons can be carried by such a motor at the rate of ten miles per hour on a level. We may then conveniently call this motor a "500 x 10."

If we further desire to get an approximate idea of what it will cost to do this work with a particular motor, we should know something of its efficiency. This can be conveniently expressed by adding another dimension. Thus, say the motor is "500 x 10 x 60." The "60" indicates the efficiency percentage with which electrical energy from the line is transmitted into mechanical energy, and horizontal effort applied to the car.

It may, of course, at once be objected that such a method does not distinguish between efficiency of motor proper and the efficiency of its gearing. For a great many reasons this is not very objectionable. We buy the motor with its gearing, and I can see no particular reason why the manufacturer should not get the benefit or the blame of the good or bad gearing which he may use with his efficient or inefficient motor. Furthermore, in the single reduction motors now so widely used for ordinary street railway work, the loss by gearing transmission is very small, and probably not widely variant between the different manufacturers. And again, in whatever high speed work which it may be feasible to do by gearless motors, the question of the efficiency or inefficiency of the gear is eliminated.

Again, it may be objected that such a method supposes

uniform diameter of wheel, which must be known to the manufacturer in order that he may calculate what his motor is doing for a given car speed. Should there be no considerable variation from the 30-inch wheel now so largely used, such a diameter might be taken for granted as having entered the calculation; and if a different wheel, say 33-inch, becomes general, then that diameter may be assumed in the rating. I am not sure that the *most frequent* speed, supposed above to be ten miles per hour, is that which should enter into the service rating. It may be best to assume some lower speed at which the work is considerably heavier, and concerning the performance of which the purchaser is most doubtful.

These particular points need further consideration than it has been possible for me to give them in the limited time of the preparation of this paper; and, indeed, I shall propose at the proper time that the whole matter of standards, which I endeavor to treat here only suggestively, shall be referred to a standardizing committee of this Association.

In using such a method of rating as is here suggested, it may be well to leave the selection of conditions which he prefers to express to the manufacturers, who, of course must, in turn, always be ready to express the performances of his motor for other conditions of speed and efficiency which may seem important to the purchaser. The important point is that expression shall be given to the *horizontal effort* and *speed* at which it is developed, and to the *efficiency* of development.

It would, of course, in any such rating, be assumed that the machine is working under a pressure of 450 volts, which is not far from that found on most of the lines throughout the country. In the necessary regulation to which these motors are subjected, a part of this pressure is practically applied to some resistance, external or internal, with respect to the motor; but I can see no convenient way of taking this into account in determining upon a rating. Indeed, the action of a series motor in street railway service is very complex, and it is much more difficult than is sometimes supposed to determine upon a rating which shall give the greatest amount of valuable information. The very difficulty, however, is warrant for approaching the subject seriously and industriously.

I think it useless to attempt any change in the rating of dynamos. Their work is so much more regular than the work of a motor that the present rating in horse-powers or watts seem to answer the purpose fairly well. Nor has it occurred to me as advisable to extend this rating of watts to motors, as it will be a matter of difficulty to introduce a comparatively unfamiliar term and apply it to a machine whose capacity must constantly be talked about, and which, as above stated, works under very complex conditions.

Second: I feel that the time has now come when some of the physical dimensions of electric cars may, with benefit to all, be standardized. As to how far such standardization should go, committees of this association can best determine. The guiding principle, it seems to me, should be this: That standardization of parts should be so di-

rected as not to interfere with the progress of invention. Bearing this in mind, may we not at this stage of development have a standard axle diameter for cars of a given weight? Also standard key weights for gears? And while there is some uncertainty in my mind on this point, may we not have a standard gearing? It, of course, involves uniformity in the reduction ratio between speed of the armature and speed of the car. There is, however, now no very great difference in this respect, and the possibility of uniformity is at least worth considering.

Coming to trolley apparatus, we might have uniform poles, pole sockets, and uniform diameter of pole at the butt; also uniform length of pole and uniform diameter of trolley wheel.

It may be possible to go further into this standardization of dimensions of parts of the truck, which are not directly connected with the electric apparatus. I think it best, however, to leave that to those more familiar with truck manufacture.

It will be seen that the suggested number of standard dimensions in electrical apparatus, which thus far seems possible, is not large. Yet certainly uniformity of axle diameter and key weights alone would be found of much value to all interested in the business. Should this association adopt such standards, it is, of course, understood that any manufacturer, who thinks he has good reason to vary from them, will do so, presenting to the trade his justification for such action. It seems, however, beyond question, that a number of these points, in which there is no mystery whatever, may just as well be determined by the direct users of apparatus as by the designers, and may thus be determined once for all.

Third: In regard to standardizing nomenclature, the object is to save what may be called "lost motion" in the verbal and written correspondence incident to our business. The importance of some such effort was emphasized to me some months ago when, on reading a carefully drawn set of instructions to line men, prepared by an engineer of the Thomson-Houston Electric Company, I could see that those instructions would scarcely be intelligible to a man whose experience had been confined to the material of another company, say, that of the Edison Company, although the things talked about might be entirely familiar to him. Besides causing annoying repetition and much explanation between men really understanding very well the thing in question, this uncertainty of nomenclature may, at times, stand seriously in the way of the proper interpretation of written contracts, or of orders received by dealers.

While the adoption of a set of definitions by this Association would in no sense be binding, it would yet tend to make definite that which is now indefinite. As a basis upon which some further and better work in this direction should be done, I give herewith a table showing list of proposed terms, with various term heretofore used as equivalents, and definitions properly limiting the proposed terms. In some cases when there has been satisfactory uniformity, no equivalents are given, but definitions are suggested. The list can, with benefit, be considerably extended.

NOMENCLATURE OF ELECTRIC RAILWAY TERMS.

Generator.—Generator-dynamo.—Machine in which the electric current is generated.

Motor.—Motor.—Machine in which the electric current is transformed into mechanical power.

Frame.—Frame.—Iron body of machine, including pole pieces and standards or side arms, if any, but not including base plates and bearings.

Standards.—Standard bracket.—Supports of the bearings of generator.

Side Arms.—Side arms, check pieces, armature bracket.—Supports of bearings of railway motors.

Pole Pieces.—Pole pieces.—That part of frame from whose surface lines of force may pass directly to the armature.

Field Coil.—Field coil, spool.—Coils of wire wound on frame in such a way that a current passing through these coils makes magnets of the frame and pole pieces.

Brush Holder.—Devices for holding the brushes in contact with the commutator, including the insulation used in its support.

Rocker Arm.—Yoke, rocker arm.—Device for holding brush holders in position on commutator while attaching it directly or indirectly to the frame.

Fuse.—Fuse, fusible plug.—A metal device for opening circuit when the current becomes abnormally large, the soft metal being melted by a current of fixed quantity.

Switch.—A device for closing or opening a circuit of one or more points.

Rheostat.—Resistance box rheostat.—Wire or other material suitably protected and conveniently arranged to be introduced in more or less proportion into a circuit.

Trolley.—Trolley contact bar.—A device used to transmit the electric current from the overhead wire to the cars, consisting usually of a—

Trolley Wheel.—A small metal wheel making rolling contact with the overhead wire.

Trolley Fork.—Mechanically connecting trolley wheel to—

Trolley Pole.—Supporting the trolley fork and wheel and resting in a socket, which is part of the—

Trolley Base Frame.

Trolley Wire.—Wire from which the trolley wheel directly receives current.

Trolley Frog.—Frog; overhead switch; trolley switch.—A device used to fasten or hold together the trolley wires at a point where the trolley wire branches, and to guide ordinarily, automatically, the trolley wheel along the wire over the track taken by the car.

Trolley Frog.—Standard frog.—A frog designed for use at a point where two branch lines make equal convergent angles with the main line.

Right Hand Trolley Frog.—A trolley frog designed for use at a point where a branch trolley wire leaves the main line to the right in the going direction.

Three Way Trolley Frog.—A trolley frog for use at a point where the line branches in three directions.

Draw Bridge Cross Over.—A device permitting the easy passage of a trolley wheel from one to the other of two adjacent wires in a continuous direction.

Trolley Crossing.—Crossing frog; cross over.—A device placed at the crossing of two trolley wires by which the trolley wheel running on one wire may cross the other; the device also holding the two trolley wires together.

Insulated Trolley Crossing.—A device placed at the crossing of two trolley wires, by which the two wires are insulated from each other and by which the trolley wheel running on one line may cross the other.

Hanger.—Line insulator; line suspension; trolley insulator.—A device for supporting and insulating the trolley wire.

Straight Line Hanger.—The hanger used on a stright line and supported from a span wire, the strain on same being essentially vertical.

Single Curve Hanger.—The hanger supported by a lateral strain in one direction and ordinarily on single track curves, except at ends and the inside curve of double track.

Double Curve Hanger.—The hanger supported by lateral strain in opposite directions, used ordinarily at ends of both single and double curves and at intermediat points, and on double track curves.

Feeder Clamp.—Clamp with a device by which a feed wire may be connected to the trolley wire.

Feeder.—A wire usually insulated, used for transmitting current from the power station to the mains or the trolley wire descent.

Mains.—Wires usually insulated, serving for the distributing of current from the feeders to the trolley wire through tap wires.

Tap Wires.—Wires to convey current from feeders or mains at the pole to a near point of the trolley wire.

Trolley Section.—A length of one trolley wire with or without branches but continuous electricity.

Line Section.—A part of the overhead conducting system so insulated from other parts as to permit the supply of power to be separately controlled.

Section Box.—A box containing section switches and fuses used for control of a trolley section or line section.

Fourth: In regard to standard methods of keeping accounts, I am permitted to present herewith information prepared by Mr. W. E. Baker, of the Thomson-Houston Electric Company, long in charge of their work of maintaining of motors and lines for the West End Street Railway Company. Whether or not this association should take any action, such as recommending one or another method of keeping accounts, I feel sure that Mr. Baker's suggestions will be of value to those who will consult them. There is no special reason why the association should act with a view to obtaining standards in this respects, save that it will certainly facilitate in a great measure the obtaining of reliable statistics. Any one who will endeavor, as I have recently done, to get together a considerable volume of actual, reliable data on the operation of street railways, will be convinced that much remains to be done in this respect. Of the value of such garnered information, I think there can be no doubt; and I am quite satisfied that this association will

find itself thoroughly repaid for any efforts it may make towards accumulation of street railway statistics. Mr. Baker writes as follows:

“Accounts and Organization of Electric Street Railways.”

“In presenting this paper, it is not offered us a treatise covering the ground of a rather pretentious title. There are many excellent and extensive works on railroad accounts in existence, which ably discuss this large and important question in all its general aspects, and which apply as well to electric as to steam roads. This paper is offered rather from the standpoint of the superintendent or manager than the auditor, and in the hope only that it will prove a practical aid to the keeping of expense accounts of electric railways of about the extent and organization of the average of those at present in existence, although it is believed that the principles herein outlined are correct, and their extension to a road of any size is only a matter of increasing the details.

It is also hoped that some of the blanks and forms for reports furnished herewith will be an aid to some who the author knows have found some trouble in this direction.

From the superintendent or manager's point of view, the matter to be arrived at is to have presented to him in a concise and correct form, such a statement of the operating expenses as will enable him by careful study of the figures to reduce expenses, to compare the operation of his road with that of others, and in general, to enable him to exercise such care and watchfulness over the outgo and income as will render the enterprise a commercial success. The price to be paid for the success of an electric road is eternal vigilance and “a stitch in time.”

The first and most important matter in the expense accounts is the classification or division of expenses, and the second practical matter is how to separate into these divisions the expenses, without too much detail or clerical labor. For this purpose a manual should be prepared.

In this manual there should appear four general divisions of expenses, namely: general expense, transportation expense, maintenance of way and buildings, and maintenance of equipment. Under these are subdivisions, and under each are clearly expressed the proper labor or material to be charged to them.

Statements are frequently seen about as follows:

Motive power at so much per mile; car repair at so much per mile; and frequently conductor's and motor-men's wages, being a very large single item, appears by itself, and the statement winds up with “other expenses” at so much per car mile.

Now unless it is clearly understood what is included in the term “motive power,” or the term “car repairs,” or the term “other expenses,” such statements are apt to be very misleading.

Does “motive power” include the power house expenses only? It may or may not. Does “car repairs” include the repairs on the car bodies only, or the repairs also on the motors? It is clearly necessary to have these matters defined, and in the manual before referred to all this should appear in detail.

If, then, the classification in this manual is followed, and a statement is presented that general expenses, transportation expenses, maintenance of way and building expenses and maintenance of equipment expenses, are each so much per car mile or per month, it will be found

eral divisions include those expenses that do so add in some degree to the value of the property.

For instance, it adds nothing to the value of the property to pay conductors, and motor men, wages, although it may add to its earnings. It adds nothing to pay clerks?

"A"
UTICA BELT LINE STREET RAILWAY COMPANY.

Daily account of trips run and Monthly Report of Revenue Mileage of S..... } Motor Electric Car No.....
and Cars towed by it, for the Month of 189 D..... }

		REVENUE MOTOR TRIPS.							REVENUE TOWED TRIPS.									
Date	Route																	
		1																
2																		
TOTAL.																		

SUMMARY OF MILEAGE.

Motor trips on Route No.	@	=	Towed Trips on Route No.	@	=
"			"		
"			"		
"			"		
"			"		
"			"		
"			"		
"			"		
Total Motor Mileage,			Total Towed Mileage,		

Form P.

UTICA BELT LINE STREET R. R. CO.

TIME WORKED by..... Occupation,.....
for week ending..... 189 Rate per day or month, \$.....

Specification of Work	Sun.	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Sun.	Mon.	Total Hours.	Amount.	Charge Acct.

Form 86. 10-91. 5M. □

WEST END STREET RAILWAY COMPANY.

DEPARTMENT.

Foreman's Report of Material Used in Month of..... 189

DATE.	LOCATION AND DESCRIPTION OF WORK.	QUANTITY AND KIND USED.	Foreman will leave these columns Blank.	
			COST.	TOTAL COST.

by reference to the manual just what expenses are included in each of these items. It will also be found advisable that in a general way the divisions of expenses in this manual should be made in such a way that the first two general divisions include those expenses which do not add to the value of the property, and the last two gen-

salaries, insurance, or to pay for wrecking or getting derailed cars on the tracks; while it does add to the value of the property more or less to renew the rails and ties, paving, to repair the armatures and steam plant. Or, it would perhaps be better to express it in this way: That the expenses of the two last divisions tend to keep the

the road in its original state of completeness as when first equipped. In whatever way the expenses are kept, for an intelligent understanding of them, they should be based on a written manual of this nature.

and can be studied by the management with advantage. It will be seen on this form C the final result of a month's operation is expressed in four different manners, namely: per cent. of expenses to earnings, net earnings,

"E."

UTICA BELT LINE STREET R. R. CO. MATERIAL RECEIVED.

DATE.	KIND AND AMOUNT OF MATERIAL.	PRICE.	AMOUNT.	FROM WHOM.	HOW RECEIVED.	BILL CHECKED.

"S."

Form 5.

THOMSON-HOUSTON ELECTRIC COMPANY, RAILWAY DEPARTMENT.

On Acct. WEST END STREET RAILWAY COMPANY.

Daily Report of condition of Motor Cars on Division.

189

Div. Clerk.

CAR NUMBER.	IN SHOPS.		OUT SHOPS.		REMARKS.
	DATE.	TIME.	DATE.	TIME.	

"D."

UTICA BELT LINE STREET R. R. CO. MATERIAL USED.

DATE.	KIND AND AMOUNT OF MATERIAL.	PRICE.	AMOUNT.	CHARGE ACCOUNT.	WHERE USED.	TO WHOM DELIVERED.

"F."

Form F. 6-2-91-1m.

UTICA BELT LINE STREET R. R. CO.

Utica, N. Y., 189

Shopkeeper :

Please furnish the following material for use on

With this as a basis and by following methods similar to those outlined below, a comprehensive and correct statement can be made on a form similar to the form C herewith submitted of the expenses of an electrical road,

expense per car mile, and expense per passenger. All these have a certain value for comparison. Neither alone tells the whole story.

There has been considerable discussion of late in re-

gard to a standard unit for the comparison of expenses on electric roads. I may be doubtful if such standard unit can be satisfactorily agreed upon or will satisfactorily express the result; but at any rate, it must be composed of some function of the results of operation as expressed in this blank.

The next matter is how to arrive at and keep these expenses sufficiently accurate and without too much clerical labor; and this brings us primarily to the stock or supply account. All material while in the stock room and until used, evidently bears the same relation to the company, as cash in the till or bank, except for availability, and should be so treated. Materials should not be charged to the expenses of the road until used, and should be charged when used, regardless of the bill for this material being received or paid.

A careful record should be kept of all material received and all material used, on blanks somewhat similar to forms "E" and "D," bound in book form and herewith presented. It is sometimes considered better to have the form "D" on loose sheets instead of bound, and there are variations to be made in the blank to suit the individual cases that will be apparent.

The material received book or form "E," will be found to pay for itself in checking bills and preventing duplication. The material used is arrived at by charging it out of the stock room on foreman's requisition in small quantities as usual, or obliging a foreman to make a daily or weekly or monthly report of the material he uses on a proper form. A simple form is that of form "F" herewith. One man should receive all the material for the road; he may of course be a storekeeper for this purpose, if the road is sufficiently extensive; or if not, this duty may be added to the other duties of the clerk.

An invoice book with copies of all bills should be kept, and a monthly summary of both books will be made, giving from the Invoice Book all the charges to stock, and from the material used all the credit to stock and all the charges of material to expense properly classified. If, in addition, a stock ledger is kept, it will be found that all errors and mistakes in foremen's and in clerk's pricing, etc., will correct themselves, and it will be easy at any time to check up the ledger with the material actually on hand in the stock room.

In regard to the labor, there are many forms of time books used; the one here presented as form "P" is convenient, and the foremen soon learn to classify their time with little trouble and few mistakes. On the pay roll should be classified these expenses, and the total of all expenses is easily arrived at.

The mileage sheets, form "A," will be found very complete, and will give a record of the mileage of each car per month. The original records can be taken from the conductor's reports most easily on a blank book and transferred to these reports monthly. The conductor's reports should cover a report of the number of passengers carried on each trip, the number of trips made and the route. There are many excellent forms of these."

To summarize: If the superintendent, as is frequently

the case, has an office distinct from the office of the company, he would be required to have the following books: stock ledger, time books, pay rolls, material used and material received books; and copy books as follows will be a convenient arrangement: A letter book, a copy book for pay rolls, a requisition book, unless he buys his own supplies wholly, when this becomes an order book, a daily report of earnings' book or deposit book, a motor book for copying reports made on a blank form "S," and a statement and bill copying book for bills made against other parties, and the monthly reports to be made will be about as follows: mileage report, material used report, balance stock ledger, receipts report, invoice summary. The daily reports would be of daily earnings and of condition of motor cars.

No treatment has been attempted of the general books of the company, the income accounts, etc., as these are generally well understood, and the remarks generally are only elementary; but I have been led to make them by some examples I have had the misfortune to examine when endeavoring to arrive at the expenses of a road."

Under Mr. Baker's direction a manual for the classification of expenditures was used with very excellent results. This manual will be presented to the public in print at a later day. Although that which has been said above both by Mr. Baker and myself cannot be considered as more than a series of suggestions, this paper has evidently reached the limit of its proper length for presentation before this body.

At the conclusion of the report Mr. Crosby moved that a Committee on standardizing of ratings, nomenclature, dimensions and accounts for electric street railway be appointed by the association.

The motion was adopted, the committee to consist of seven members, including the president and secretary.

On motion of Mr. Eppley, of Orange, the following resolution was adopted.

RESOLVED, that the secretary be authorized to have printed and circulated advance copies of the reports of the special committees for distribution to the members of companies with the notice printed thereon, as recommended by the executive committee.

The committee on nominations reported in favor of the following officers for the year 1891-2:

For President, John G. Holmes, Pittsburgh, Pa.

First vice-president, Thomas H. McLean, New York, N. Y.

Second vice-president, James B. Speed, Louisville, Ky.

Third vice-president, Albion E. Lang, Toledo, O.

Secretary and treasurer, Wm. J. Richardson, Brooklyn, N. Y.

EXECUTIVE COMMITTEE.

Henry M. Watson, Buffalo, N. Y.

Lewis Perrine, Jr. Trenton, N. J.

W. Worth Bean, St. Joseph, Mich.

Murry A. Verner, Pittsburgh, Pa.

Thomas C. Penington, Chicago, Ill.

The committee also recommended Cleveland, O. as the place for the next meeting.

Messrs. Henry of Pittsburgh and Crosby of Utica, were appointed tellers, and Mr. Kerper of Cincinnati was empowered to cast the ballot of the members for the gentlemen named.

The president declared the above gentlemen the duly elected officers of the association for the ensuing year.

There was a lively competition from Kansas City, Boston, Rochester, Houston, Milwaukee and Cleveland, the roll-call resulting in the choice of Cleveland as the place of the next meeting.

The Chair appointed Messrs. Littell, of Buffalo, and Richardson, of Brooklyn, a committee to escort the newly-elected president to the chair.

Mr. Watson, the retiring president, presented Mr. Holmes to the Association, who said:

GENTLEMEN OF THE AMERICAN STREET RAILWAY ASSOCIATION: I thank you for the honor you have conferred upon me. I am not prepared to make a speech. I hope, however, I may be able to do as well as my worthy predecessor; if I succeed in doing that, I shall have accomplished a great deal. I thank you again for your kindness.

On motion, the meeting adjourned.

BANQUET.

The annual dinner of the Association was held on Thursday evening. The large dining hall of the hotel was decorated profusely and everything provided that could in any way add to the enjoyment of the occasion. An orchestra discoursed music during the evening. Three hundred plates were spread, and a large number of handsome toilets were to be seen.

MENU.

OYSTERS.

Blue Points and Deep Shell.

SOUP.

Consomme in Cups.

Canapee a la Russ.

RELISHES.

Cellery, Olives, Salted Almonds, Pickles, Chow Chow.

FISH.

Deviled Lobster, Farcy.

Pom. Dolphin, Cucumbers.

ENTREE.

Diamond Back Terrapin en Caisse.

Compo of Reed Birds. Belmont.

Roman Punch.

ROAST.

Young Turkey, Chestnut Stuffing, Cranberry Sauce.

Cauliflower aux gratin, Julienne Potatoes.

GAME.

Quail on Toast, Stuffed with Oysters.

Lettuce and Tomato Salad, French Dressing.

DESSERT.

Pyramids of Macaroons.

Pisque Glace en Caisse, Fancy Cakes.

Champagne Jelly.

SELECT CALIFORNIA FRUIT.

Nuts and Raisins, Bon Bons.

French Confections.

CHEESE.

Roquefort, Cream.

Toasted Crackers.

Demi Tass.

WINES.

Sherry, Sauterne, Claret, Champagne, Burgundy, Cognac, Chartreuse.

Cigars, Cigarettes.

TOASTS.

Address of Welcome, Mayor H. I. Gourley.

Our Two Cities, Mr. William J. Moreland.

"Two souls with but a single thought,
Two hearts that beat as one."

Home, Sweet Home, Rt. Rev. Cortlandt Whitehead.

"Mid pleasures and palaces though we may roam,
Be it ever so humble, there's no place like home."

Street Railways:—What they were, are, and may be, Mr. John S. Wise.

"Large streams from little fountains flow,
Tall oaks from little acorns grow."

Our Growing Republic, Mr. George C. Wilson.

"Westward the course of empire takes its way."

The Press, Mr. C. L. Magee.

"This is the very coinage of your brain."

The New Public Sentiment—Quick Time, Mr. Wm. A. Stone.

"In hoc signo vinces."

EXCURSION.

On Friday morning, at 10:30, a large party of delegates and others in attendance, accepted the hospitality of the local companies, who had chartered the steamer Mayflower, and enjoyed a delightful excursion up the Allegheny river to McKeesport, visiting several points of interest, including the celebrated Carnegie Iron Works, and then went down the Ohio to the Davis Island dam, containing the largest steamboat lock in the world, and recently completed by the government at a cost of \$1,000,000. The Grand Army band furnished music for the trip, and a superb lunch was served on board during the trip, which was one of the most elaborate ever tendered the convention visitors on such previous occasions.

The Friday evening trains all went out heavily loaded, though quite a large number remained over and spent Saturday in visiting the many points of interest in and around the wonderful Iron City. The hotel presented an appearance very like the ground from which a circus had just struck tents and gone, and quiet began to settle down where for three days the most intense animation and unremitting activity had reigned supreme.

THE EXHIBITS.

Headquarters Hotel looked as if a dozen rival shows had struck town all at once. The energy with which the various selling agents took possession of every wall, stairway and available nook and corner, and posted advertising cards, dodgers and wall paper of every conceivable shape, size and color, gave the house the appearance of a recent cyclone. The house-keeper, a somewhat eccentric old lady, somehow did not seem to enter into the true spirit of the enterprise, and spent the entire first day pulling down the offensive wall adornments and cleaning mirrors, which reflected luminous signs. But the boys were too much for her, and she finally gave up the battle, and the good work went bravely on.

The exhibit was unfortunately divided into three locations:—on two boats, and that in the hotel corridors and rooms. Could it have been concentrated in one, the display would have astonished even those who were the largest exhibitors. It was far in advance of that of any previous year, and proved that this department of the convention is fully as important as the reading and discuss-

ing of papers. More than one delegate when forced to choose between the hearing of some paper, and the inspection of the most recent product of inventive genius as displayed in some device of which he was in need, did not hesitate to accept the latter, saying he could read the paper any day. Not only was the exhibit entered into with great spirit by the various houses contributing to it, but the arrangement under the circumstances reflected great credit on those in charge. It was an exposition in itself of railway appliances, and there is little wonder that the citizens of Pittsburg by the thousands crowded the boats and rooms, almost to the exclusion of the delegates themselves. The local committee exerted themselves to the utmost to care for the displays, but labored under the misfortune of a city so fully occupied in its business districts that not a vacant foot of land was available upon which to build, and so general a prosperity that no vacant store or warehouse was to be found. This condition of affairs somewhat hampered the exhibitors, but all did the best they could and the result was quite satisfactory.

Among the most prominent exhibits may be mentioned the following:

THE NEW DEPARTURE BELL COMPANY

was one of the prime attractions on the boat and kept Mr. Hoagland busy working both feet at once, as the different styles sounded their own praises. Quite a number of orders were given on the spot. J. H. Graham, of New York, general agent, was also present and renewing old acquaintances and making lots of new ones.

HALE & KILBURN.

At the elevator entrance on the parlor floor, the architect evidently expected Hale & Kilburne would some day need just that space to show their car seats, which were in three styles, rattan, plush and canvas lined slat. They afforded a grateful rest for the weary and were duly appreciated.

MEAKER MANUFACTURING COMPANY,

Chicago, had some of their new style registers, accompanied by their own style conductors' trip sheets, introducing several valuable features. President Meaker and Secretary Norton, of Chicago, were both present and each constantly busy ringing up imaginary fares in the most positive manner possible.

THE LEWIS & FOWLER MANUFACTURING COMPANY

held a continual reception in Parlor 8 presided over by L. E. Robert, and assisted by Geo. W. Myers, F. A. Morrill, Geo. S. Whipp, Chas. S. Mead and John England. Their registers in the parlor hall were under constant inspection. Their most interesting exhibit was the new sweeper and the elegant white car built for the Milwaukee Consolidated. In this car no expense whatever was spared to make it a perfect palace car, being equipped with the L. & F. heater and upholstered in true drawing room style. Their own fare register and other specialties were noticed. The metal trimmings are all of polished brass and a large crowd surrounded the car until late every night.

The Lewis & Fowler sweeper was so neatly and compactly built as to be somewhat deceptive as to its strength which is unusually great. It has a roomy inclosed cab with windows for the operators, and the brushes are protected with heavy canvass curtains. Nineteen of these sweepers were sold last winter and in every case made splendid records and gave the very best of satisfaction.

THE LEWIS & FOWLER GIRDER RAIL

was to be seen in various forms of special work and sections in the main hall and was represented by W. H. Delaney and W. C. Wood;—the latter being the inventor.

THE NEW YORK CAR WHEEL WORKS

of Buffalo, had a handsome set of axles and wheels in parlor hall, and other attractive exhibits in their headquarters parlor, which were presided over by J. R. Ellicott with Chesterfeldian grace. E. Packer, and Mr. Hand also assisted him.

THE STANWOOD MANUFACTURING COMPANY,

Chicago, was looked after by President Stanwood, who exhibited one double-tread step, three styles single-tread, and half section of step for open car. His largest exhibit, however, was on the cars of the Pittsburg & Birmingham Traction Company, Federal Street & Pleasant Valley, Duquesne Traction Company, Pittsburg, Allegheny, Manchester & Central Traction, all of which lines have been equipped with the Stanwood step for a long time. The Stanwood step is considered one of the prime essentials in railway operations in the convention city.

THE JOHN STEPHENSON COMPANY

was represented by D. W. Pugh, who made his friends happy with a very neat pocket note-book bound in Russia leather and bearing a golden image of the Stephenson car on the cover. The order for 75 cars for the Washington & Georgetown road has just been awarded the Stephenson Company. Without the thoughtful attention of Mr. Pugh, half the pleasure of the convention to the ladies would be lacking.

THE ST. LOUIS CAR COMPANY

exhibited a handsome model of their new style double-length car, which was examined by a large number of railway men. General Manager Kling was in charge and received many calls from his friends, representing a large number of roads.

THE BROWNELL CAR COMPANY,

St. Louis, was represented by President F. B. Brownell, who was accompanied by his wife, to both of whom the ladies of the convention are under many obligations for favors shown. The Brownell car, this year, was the "Accelerator," described elsewhere. The large, ample platform proved even more capacious than a printed description would suggest, and as a means of taking care of unusual crowds in a short space of time is a great success. The interior of the car suggests a much greater width than in other cars of the same size, and the construction is such that heavy platform loads in no way endanger the safety of the car. It occupied a prominent position on a platform immediately in front of the hotel

and was filled with delegates most of the time. The design is Mr. Brownell's own idea, and the car is handsomely worked out in all details.

THE BALTIMORE CAR WHEEL

and the truck made by that well known company occupied a conspicuous position on the boat. J. Paul Baker was present and, of course, John Pugh, who expatiated on the merits of the "Baltimore" in his own inimitable style, carrying conviction to the minds of even the most hardened. The Baltimore has just been adopted for 375 new cars for the Third Avenue line, New York, and 75 cars for the Washington & Georgetown.

THE SHORT ELECTRIC RAILWAY

Company had the finest exhibit ever made at convention by that company, and required a large portion of the barge to accommodate it.

One double-reduction motor was driving a 200-horse-power generator, which furnished current for a single-reduction and a "water-tight," all in operation. Their switchboard showing station and line appliances was of the latest improvements. The Short car, operated throughout the convention by two 20-horse-power gearless motors, created general interest, and was crowded all the time with interested inquirers. The tests proved highly pleasing in every way, and the presence of Prof. Short greatly added to the interest of the exhibit.

The most tasty and elaborate souvenir of the meeting was that issued by the Short people, illustrating the various types of motors and station and line material. It is tied with broad ribbons, and is a real work of art that would grace the table of any library. Representatives of the company present were: J. H. Gibson, Pittsburg; J. Potter, vice-president; Edward E. Higgins, general manager; J. H. Gibson, superintendent of construction; C. C. Curtis, confidential agent; Frank A. Rogers, special agent, of Cleveland; Wm. Hazleton 3d, Philadelphia; M. K. Bowen, New York; John E. Riddall, Pittsburg, and Geo. P. Roe, San Francisco.

ELECTRIC MERCHANDISE COMPANY

had one of the liveliest headquarters at the hotel at parlor 5, where they displayed a very complete line of their many specialties. The Burton heater was made a specially attractive feature and was the constant object of inquiry and examination, showing the interest taken in electric heating. Dr. Burton, the inventor, was in great demand, while W. R. Mason, general manager of the Electric Merchandise Company, did the honors, assisted by Secretary England, Salesmen D. B. Dean and F. X. Cicott.

GOULD & WATSON.

The Gould & Watson Company, of Boston and Chicago, had in the main parlor hall a fine exhibit of molded mica insulators for street railway work, besides showing fine specimens of sheet mica for electrical purposes. They were represented by R. P. Pierpont, resident agent, Chicago, C. Tennant Lee and E. P. Sharp, of Boston. During the past ten weeks they have sold 10,850 of their molded mica insulators.

WALKER MANUFACTURING COMPANY.

John Walker, of the Walker Manufacturing Company, Cleveland, had a handsome model of gearing and driving drums for cable railways and mounted with his famous differential rims. He was kept busy explaining the philosophy of that most valued invention.

THE MUNSON BELTING COMPANY.

The belt exhibit of the Charles Munson Company included a huge pile of 48-inch belts consigned to the Pittsburg Traction Company, and were of the standard make of this standard house. Col. Shay, as usual, was the life of a large circle of acquaintances, and like the Munson belt, was everywhere at at once.

ELECTRICAL SUPPLY COMPANY.

of Chicago, made a very complete and interesting exhibit of electrical railway material in parlor 37 and in hall leading to convention headquarters.

Electric railway men expressed themselves as well pleased with the improvements shown in construction material, special interest being manifested in Wood's trolley catcher, Wood's car connector, and a number of late inventions this company has recently brought out.

The Electrical Supply Company's souvenir badge proved extremely popular, and as much disappointment was expressed by railway men who were not fortunate enough to procure one before the supply was exhausted, the Electrical Supply Company has promised to have some more made up and forwarded to all electric railway men who write for them.

Parlor 37 contained many new inventions in railway material, was well arranged, handsomely decorated and crowded with visitors from the opening to the closing of the convention.

GRIFFIN CAR WHEEL.

The Griffin car wheels, which occupied one of the best locations in the convention, were placed at the head of the main stairway and represented the standard product of their well known product. Secretary A. G. Welling-ton, assisted by Mr. Newberg, was present.

CALORIFIC HEATER.

The Calorific Ventilating Heater Company, Chicago, had a pleasant parlor on the first floor, where President Garson Myers and his brother were kept busy showing the "New Standard" and their other heaters to a room-full. Judging by the number of visitors, heated cars will be certain to be enjoyed in more cities than ever before.

SAWYER, MANNING & COMPANY.

C. L. Bowler, manager uniform department of Sawyer, Manning & Co., New York, had the only display of uniforms and uniform cloths for conductors and drivers. Their new gray "West End Cadet," that has made so good a record in street car use, was greatly admired.

THE DETROIT ELECTRICAL WORKS

represented by General Manager Warfield, C. A. Benton, manager street railway department, and Mr. Frank Rae, occupied space upon the boat, besides having a car in operation upon one of the lines, which made frequent trips and received much attention from the delegates.

THE FULTON FOUNDRY,

of Cleveland, exhibited their new motor truck, designed for very heavy work, and which was of unusual strength. Its weight was 4,100 pounds, including the company's own 36-inch wheels, and impressed all observers with its excellent lasting qualities. It was on the barge leading to the Mayflower, and was seen by all who boarded the latter, besides showing gears and pinions and the interchangeable wheel, which is made by them and is receiving much attention from all roads using electricity. They were ably represented by Mr. C. T. Langdon, and Salesman W. E. Haycox.

R. D. NUTTALL COMPANY,

of Allegheny, had their whole factory on exhibition and many delegates gladly availed themselves of the invitation to accompany Mr. Nuttall and his representatives across the river to the works. They also had a very complete line in their parlor, where Mr. Nuttall received, assisted by Mr. Mayer and others. Their line of sample gears was especially attractive, and the pressed rawhide pinion which was used as a souvenir will be cherished as a very attractive paper weight by all of Mr. Nuttall's friends.

PRICE RAILWAY APPLIANCE COMPANY,

of Philadelphia, had an exhibit of sections of rails, and other track specialties, which was in charge of J. M. Price, president of the company, who constantly entertained a large and interested audience who were interested in the display made,

THE WIGHTMAN ELECTRIC MANUFACTURING COMPANY,

of Scranton, Pa., was presided over by M. J. Wightman, president, assisted by H. Bergholtz and E. S. Kennedy. They exhibited one of their new trucks mounted with 20 horse-power motors, and controlled by their special operating device. The motors were running constantly, and the display of this company was the scene of a large and interested crowd throughout the whole convention. They also displayed a full line of station and line materials.

THE PECKHAM MOTOR TRUCK & WHEEL COMPANY

had a triple display, using space on the Mayflower, in the main parlor hall of the hotel and in their room. Their Cantalever Extension Truck frame with radial gear was specially attractive, as also their interchangeable wheels. In addition to complete trucks, parts of frames and wheels were shown, making a fine exhibit. President Peckham was present and assisted by E. C. Stark.

THE ELLIS CAR COMPANY

of Amesbury, Mass., was represented by George Ellis, junior member of the firm who had a full line of photographs of the different styles of cars and snow plows of which that firm make a specialty.

THE BODFIELD BELTING COMPANY

of Cleveland, showed a very large line of belting, under the care of J. F. Sweeten, Secretary of the company. Their display included a number of large belts, one 48 inch., made especially for electric railway service.

THE BEMIS CAR BOX COMPANY

of Springfield, Mass., was represented by C. G. Stearns, Secretary, who had two handsome trucks on the platform directly in front of headquarters. where they were visited by all who went to and from the boat. One truck was for a four wheel car, the other for large combination cars. The trucks are simple, and strong, and were very favorably commented on.

CHAS. A. SCHIEREN & CO.,

were represented by F. A. M. Berrell, and who found many old friends among the railway delegates, with whom they are doing business in the belt line.

THE DUPLEX STREET RAILWAY TRACK

were on the Guskys, their interests being in charge of John D. Elwell, general manager, of New York, and Luther E. Shinn. They were greatly disappointed in not receiving the whole of their exhibit, which was delayed through fault of the express company, but had a most interesting section of a frog of cast iron, designed especially for construction in connection with their rail. The frog is quite new, bearing patent date of September 19, 1891, but by its exceeding simplicity of design, and evident wearing qualities, earned many commendations. One of its best features is the ability to make rail renewals without trouble or loss of time.

THE JOHNSON COMPANY

had an exhibit on the boat well worthy of that institution, and included sections of many of their standard rails, together with a large number of pieces of special work, switches, chairs, and electric welded rail, which was specially attractive, many present seeing this work for the first time. The compliments of the company were tendered their friends by Vice-President Dan. Coolidge, Maj. H. C. Evans and A. S. Littlefield.

THE UNIVERSAL CLUTCH

was the only exhibit of its kind, and was constantly surrounded by a large and curious crowd. On inspection it proved to be much more simple than many had expected, indeed, it would seem hard to suggest a point of improvement. The clutch exhibited was one of the equipment which has been running on the Atlantic City road since May 1st, last. The truck was elevated and the wheels allowed to run free, illustrating its action. One motion of the lever sets the brake and throws the clutch out of contact, stopping the wheels immediately and allowing the motor to run constantly. A reverse motion of the lever releases the brake and throws the car wheels in motion. Secretary W. C. McCurdy was present with assistants, who were kept busy explaining and operating the clutch.

THE NEWBURYPORT CAR MANUFACTURING COMPANY.

The Newburyport Car Manufacturing Company was represented by Mr. Jas. F. Shaw, son of the proprietor, who also is eastern selling agent for a number of important specialties used by street railway companies including the equipment manufactured by Dornier & Dutton, Cleveland.

THE WESTINGHOUSE ELECTRIC COMPANY

had a big exhibit on the barge, where their several styles of motors were in full operation, including a 25 H. P., single reduction, which, incased in a water-tight jacket, was operating in a big tank of water, in which the motor was nearly immersed. This was one of the most interesting of all the exhibits and constantly drew a large crowd. At the factory the entire plant was at the disposal of visitors for inspection, and carriages flew thick and fast between the works and the hotel, carrying delegates back and forth. The Westinghouse also had numberless exhibits in the shape of motors in service on the Pittsburg lines, the cars of which bore big banners, announcing the fact. At the hotel one of the best in the house, Parlor 12, was headquarters, where they distributed a very attractive souvenir in the shape of a miniature motor of aluminium, which was eagerly sought for and proved one of the most unique of the many souvenirs. General Manager Bannister did the honors at the works, assisted by Mr. Harding, manager railway department, and J. L. Barclay, of Chicago, manager railway department for the West. A large number of others, connected with the company, were in attendance at the boat, hotel, and to show the visitors about the works. The attractions at the works were numberless, showing motors and generators in all stages of manufacture, and many in operation. The big generator for Terre Haute was a surprise to most of the visitors and is a massive piece of machinery. It will be shipped to its destination in a few days.

THE EDISON GENERAL ELECTRIC

was satisfied with nothing less than a big parlor on the ground floor, and by an enterprising stroke of work set up and had in full operation a complete motor mounted on a heavy truck. A handsome switchboard at one side of the room was overhung by an illuminated sign of several hundred colored incandescent lamps, in which the company's name was spelled, and with other line material made an exhibit which was rewarded with a crowded house at all times. The company had a large representation on the ground, including S. D. Greene, Manager New York Office, and Geo. Silsby, M. J. Sullivan, F. R. Chinnock, E. B. Whitmore, General Manager Beggs, of Chicago office. There were thirty-nine in all when the full list of the Edison representatives answered to the roll call.

AMERICAN CASUALTY, INSURANCE & SECURITY

Company of New York and Baltimore, was ably represented by W. L. Brown, who found many old acquaintances among representatives of the 100 roads which are now secured against damage claims from passengers, by this excellent institution. Mr. Brown was kept busy giving details of the company's plan of securing against loss of this kind, and also their plan by which employes by a small payment monthly may also receive the benefits of accident insurance through the medium of their own company at small expense.

THE DETROIT ELECTRICAL WORKS

had a most satisfactory exhibit in the motors in daily ser-

vice on the line of the Duquesne Traction Company upon which the delegates had frequent occasion to ride. They also exhibited working models and their new brush holders on the Mayflower. The company was represented by General Manager Warfield, C. A. Benton, manager railway department, J. E. Lockwood, and F. B. Rae, inventor of the motor of that name.

THE GISHOLT MACHINE COMPANY,

of Madison, Wis., had something new in the way of interchangeable motor gears, samples of which were exhibited on the boat. The rim which constitutes the gear is removable, made in two styles, whole and split, allowing the worn portion to be easily removed and effecting a saving of the body of the gear. C. M. Conradson, superintendent, was present to explain the invention.

HARPER'S SAND BOX,

of Peoria, was represented by Special Agent Pennoyer, who carried working models and was busy at all times illustrating the automatic cleaning feature of this box, which is being adopted on many roads and is endorsed by a large number of car builders.

THE BALL ENGINE COMPANY,

of Erie, did not attempt to bring an entire steam plant, but did show a number of very handsome photographs of engines now in service in street railway work. The exhibit occupied a good location on the boat, and the views were artistically arranged.

HALE & KILBRUN

reversible car seats, could not have chosen a better location for their exhibit than their space in the parlor hall at the elevator entrance. Here the tired delegate sat in comfort while Edwin S. Canman, of Chicago, discoursed on the merits of the H. & K. seat, as a place of rest for the weary.

A. G. HATHAWAY

of Cleveland, whose transfer tables are as well known as the multiplication table, was present, meeting friends, and welcomed by a large number of acquaintances.

HOLMES, BOOTH & HAYDENS

had a neat exhibit on the parlor floor; where all who passed into the convention hall could see. Lafayette Cole, of New York, was in charge.

ILLINOIS STEEL COMPANY

made no exhibit, but was represented by Assistant Selling Agent Brown of Chicago.

THE PULLMAN COMPANY

was present in the person of Contracting Agent C. L. Pullman, and Mr. Loutit, who had special cars bringing a large party of friends, who used the cars as a dwelling place during the convention.

THE M'GUIRE MANUFACTURING COMPANY

of Chicago, was represented by Mr. W. J. Cook and Hubbard mechanical engine. They had no special display as one can see. The well known McGuire truck is in operation upon almost every line in Pittsburg.

OTHER EXHIBITORS WERE,

Pittsburg Trolley Company, trolleys.
 Michigan Stove Works, Detroit, heaters.
 A. Whitney & Sons, Philadelphia, car wheels.
 Bryant & Barbey, Boston, rail saw.
 Pomeroy & Fischer, New York, paints.
 Eastern Electric Company, Boston.
 Benedict & Bernham, trolley poles.
 M. Daly, Allegheny, brake and safety gate.
 Carpenter Electric Heating Company, St. Paul.
 Alexander, Barney & Chapin, electric supplies.
 Walworth Pole Company, Boston, poles.
 Security Register Company, Boston, registers.
 J. G. Schneider, Chicago, combination cars.
 American Tube & Iron Works, Pittsburg, poles.
 Williams' Radial Truck, Rochester, N. Y.
 Pierce Bros. & Co., Leominster, Mass., line material.
 Bridgeport Brass Company, copper wire.
 W. H. Weston & Co., Philadelphia, switches.
 Pittsburg Steel Hollow Ware Company, bells.
 Johnson Automatic Electric Disconnecter.
 John White, Alleghany, trolley hangers.
 Standard Paint Company, New York.
 Revere Rubber Company, Boston.
 U. S. Graphite Company.
 Morton Safety Heating Company, heaters, by Eugene Carrington.
 Doud Gravity Track Cleaner, Cambridgeport, Mass.
 Reliance Safety Alarm.
 Mansfield Electric Tramway Company, New York.
 The Eastern Electrical Cable Company, of Boston, was represented by President H. E. Eustis.
 Messrs. Reed & McKibbin, electricians and contractors at 2 Wall street, New York, were both on hand. These gentlemen have recently contracted for the construction of a new electric railway at Olean, N. Y.
 The Three Rivers Velocipede Works at Three Rivers, Mich., was represented by Secretary Linsey, who told of the merits of their new truck.
 Solar Carbon Manufacturing Company, Pittsburg, carbons.
 The New Process Raw Hide Company, of Syracuse, N. Y., had a parlor on the second floor, where President F. W. Meacham and Secretary A. C. Vosburgh entertained their patrons.
 Dorner & Dutton, of Cleveland, O., were represented by Mr. William Dutton, who spent his time greeting his many friends.
 The Gilbert Car Manufacturing Company, of Troy, N. Y., were represented by Wm. J. E. Whittlesey, general selling agent.
 The Hill Clutch Works, of Cleveland, were represented by Mr. S. S. Leonard, general manager.
 The American Electrical Works, Providence, were represented by P. C. Ackerman.
 Carleton & Kisseem, advertising agency of Boston and Chicago, represented by Mr. Kisseem, showed the patented advertising ranks manufactured by I. H. Randall of Boston.

Walter C. Kerr, represented Westinghouse, Kent & Co., of Boston, and Chicago.

J. G. Brill Company, Philadelphia, had a new car on exhibition, being one of an order now being delivered to the aristocratic Euclid Avenue line, Cleveland. It is an eight wheel, two motor car, with safety gates, handsome interior and specially large windows.

The Jewell Belting Company of Hartford, displayed a large belt, recently made by them for the Toledo Electric Street Railway Company. It was a 48-inch double belt, 110 feet long and weighed 1,800 pounds.

The Rochester Car Wheel Works were represented by President Chapin and F. D. Russell, manager, New York office.

Post & Co., of Cincinnati, had one of the finest displays they have ever made at the convention. It was artistically arranged and very complete, and in charge of President Hensey.

The Genett Air Brake was in operation on a number of cars and represented by Mr. Rothschilds and D. A. Reid of Chicago.

Fairbanks, Morse & Co., Chicago, showed a new and quick operating jack for raising cars, in charge of Geo. J. Akers.

Geo. H. Keating, of Bay City, Mich., was active in the interests of the trolley poles manufactured by H. M. Loud & Sons Lumber Company, Osceola, Mich.

Wm. Sutton, president of the American Car Company, of St. Louis, made no attempt at an exhibit, on account of his company just starting its new plant, but having been in the field so many years, was recognized and welcomed by all convention goers.

The Milbourn Wagon Company, Toledo, O., had a handsome repair wagon, well built, and with large platform below and guarded one above. It was a very compact and convenient vehicle.

Albert & J. M. Anderson, of Boston, had a full line of their street railway specialties, including the well known Boston Trolley. They were to be found with the displays of their selling agents, the Electric Supply Company, of Chicago and the Engineering Equipment Company, of New York.

The Electrical Supply & Construction Company, of Pittsburg, was represented by Mr. John C. Henry.

The H. W. Johns Manufacturing Company, of New York, was there, represented by E. B. Hatch, secretary, and Mr. Fred B. Patrick.

The Lomokin Car Company, of Chester, Pa., was represented by Mr. Henry Cochran.

The Burton Electric Heater, of Richmond, Va., under the management of President W. R. Mason, had an attractive display in parlor 5. They were also represented by Dr. Burton, from the factory.

The Western Electric Company, of Chicago, displayed a fine line of electrical supplies, in charge of M. B. Austin and S. A. Chase.

The Adams & Westlake Company, Chicago, were on time, in charge of Mr. Ward Willetts, manager of their railway department, assisted by Messrs. Jones and Gray.

A huge pile of Jewell belts from the Hartford factory were cared for by F. D. Ball and C. L. Talles.

The Eastern Electric supply Company, of Boston and Chicago, had a parlor on the second floor at the hotel, where they displayed a very complete line of railway supplies manufactured by them. They were represented by M. W. Brown, president and general manager.

The Robinson Radial Truck & Supply Company, of Boston, was represented by General Manager Robinson.

Richard Vose Spring Company was represented by Mr. Gus. Suckow, who knows every street railway man he meets.

The Valentine Varnish Company was represented by Nat. P. Lane, who has not missed a convention in years.

The Railway Register Manufacturing Company, of New York, was there without a display, but their ever congenial general manager, Mr. Edward Beadle, was on hand to receive his many friends.

The Sioux City Engine Company, of Sioux City, Iowa, could not well display an engine, so had a beautiful hanger, conspicuously hung, showing the many types of engines and boilers made by them especially adapted for street railway work.

The Falls Rivet and Machine Company, Cuyahoga Falls, Ohio, was represented by President Babcock.

The A. French Spring Company was represented by General Manager Morris and D. C. Noble.

The Equitable Engineering Company, of Philadelphia, had a full line of line and power station material supplies.

W. A. Stadelman and S. A. Hand, representing the Brooklyn Supply Company, had a well-built snow-plow on the boat, occupying a good position.

Alexander, Barney & Chapin, of New York, was represented by C. C. Chapin, and H. G. Issertel, manager railway department.

The National Fare Register Company, Nashville, had their new registers on exhibition, and presented a good display. Treasurer T. E. Allison was in charge.

The Interior Conduit & Insulating Company, New York, exhibited sections of their conduit.

The Standard Underground Conduit Company had sections of conduit used in many cities for carrying feeder wires.

The Thomson-Houston Company had a good exhibit on the boat, and Mr. Cahill, of Boston, Howard Wheeler of Pittsburg, and T. P. Bailey, and M. Wheeler, of Chicago, kept open house at their parlor in the hotel.

The Robinson Electric Truck, patented August of this year, is a new candidate for favor, and was in charge of E. A. Hay. Three springs are used with each wheel preventing rocking of car. The truck is extremely simple and strong, and is manufactured at Bellwood, Pa.

The Lieb Machine Works of New York, had a full line of street railway supplies in a small house on the way from the hotel to the boat. Mr. Chas. Lieb was there to receive their many customers.

The Pennsylvania Steel Company, Steelton, displayed sections of rail and switches.

P. Wall Manufacturing Company, Alleghany, had a nice line of track torches and bells of all kinds.

Washburn-Moen Company, of Worcester, Mass., had a handsome case of samples of all kinds of wire, which occupied a prominent space on the Gusky.

The Engineering Equipment Company, of New York and Boston, had an excellent display in charge of W. F. D. Crane. As this firm is the general agents for the Anderson trolley, a large number of visitors were those who are already using this excellent trolley.

THE PATTON MOTOR COMPANY, OF CHICAGO, represented by W. H. Patton, superintendent, had little to show, but Mr. Patton found many that are anxious to know more of this new invention.

THE OKONITE COMPANY was represented by Mr. T. McConbray, who was welcomed by his many friends.



LEWIS & FOWLER following with their established custom, brought their New York special into the convention city on Tuesday evening at 11:55 p. m., having left Jersey City at 9:25 in the morning with a magnificent train of Pullman sleepers filled with prominent street railway and supply men from the New England states, Maryland and other eastern points. The trip throughout was pronounced a great occasion by the hundred participants who accepted the kindness extended. Both dinner and supper were served on the train besides the finest of liquid refreshments. Whist, singing and good stories made the party as jolly a set of brethren as can be seen on an October day anywhere.

The party was piloted by Mr. Louis E. Roberts of Brooklyn, and ten of his associates whose sole end and aim was to make the trip one of pleasure and profit to the guests.

This is not the first or even the second time that Lewis and Fowler have afforded the eastern brethren an opportunity to come together at the national convention, and it is safe to assert it will not be the last.

F. C. Randall, Boston, showed a new truck and his improved roller bearing.

DELEGATES IN ATTENDANCE.

Attleboro, Mass., C. F. Guild, president, H. M. Bogarto, Geo. W. Mansfield, directors, Attleboro, North Attleboro & Wrentham Street Railway Company.

Baltimore, Md., William A. House, Jr., General Manager, Baltimore Traction Company.

Birmingham, Conn., H. Holton Wood, president, and B. W. Porter, superintendent, Derby Street Railway Company.

Bridgeport, Conn., F. Hurd, president, and T. B. Lasher, secretary and treasurer, Bridgeport Horse Railway Company.

Brockton, Mass., Allston Burr, Brockton Street Railway Company.

Brooklyn, N. Y., William Richardson, president; William J. Richardson, secretary, and John G. Jenkins, director Atlantic Avenue Railroad Company. John G. Jenkins, director, Broadway Railroad Company; A. W. Dickie, superintendent, and M. G. Sterrett, Electric Engineer, Brooklyn City Railroad Company.

Buffalo, N. Y., Henry M. Watson, president and H. H. Littell, vice-president and general manager, Buffalo Railway Company.

Camden, N. J., William S. Scull, president; G. George Browning, treasurer; J. J. Burleigh, electrician, and Samuel J. Fenner, superintendent, Camden Horse Railroad Company.

Chicago, Ill., D. J. Kennedy, president, and A. H. Quaid, superintendent, Cicero and Proviso Street Railway Company, T. C. Penington, treasurer, Chicago City Railway Company, Charles F. Nagl, superintendent, West Chicago Street Railroad Company.

Cincinnati, O., H. H. Littell, president, and H. M. Littell, general manager, Cincinnati Inclined Plane Railway Company, John Harris, superintendent, and George Bullock, director, Cincinnati Street Railway Company, Henry Martin, president, Mt. Auburn Railway Company, and E. F. Abbott, president, and T. M. Jenkins, superintendent, Covington and Cincinnati Street Railway Company.

Covington, Ky., George Bullock, vice-president, and T. M. Jenkins, superintendent, South Covington and Cincinnati Street Railway Company.

Cleveland, O., A. Everett, president, Charles W. Wason, vice-president, H. A. Everett, secretary and treasurer, and Edwin Duty, superintendent, East Cleveland Railroad Company, M. A. Hanna, president and J. B. Hanna, secretary, Woodland Avenue & West Side Street Railroad Company, H. J. Davis, secretary and treasurer, Brooklyn Street Railway Company, Charles Hathaway, Cleveland City Cable Railway Company.

Columbus, O., A. D. Rogers, president, Columbus Consolidated Railway Company.

Dallas, Tex., Dallas Consolidated Railway Company.

Dayton, O., C. B. Clegg, president, Oakwood Street Railway Company.

Des Moines, Iowa, J. S. Polk, president, G. B. Hippee, secretary, Des Moines Street Railroad Company.

Denver, Colo., C. K. Durbin, superintendent, Denver Tramway Company.

Detroit, Mich., James H. Vhay, president; S. Schloss, vice-president, N. W. Goodwin, secretary, and E. S. Hineman, treasurer, Fort Wayne and Elmwood Railway Company; H. M. Campbell, attorney, and E. W. Cottrell, superintendent, of Detroit Citizens' Street Railway Company.

Dover, N. H., William D. Sawyer, president; Henry W. Burgett vice-president and treasurer, Union Street Railroad Company.

Duluth, Minn., F. S. Wardell, general manager, Duluth Street Railway Company.

Erie, Pa., John C. Brady, vice-president and J. F. Pletch, general manager, Erie Electric Motor Company.

Easton, Pa., Henry A. Sage, president, Easton, S. E. & W. E. Passenger Railway Company.

Findlay, O., George B. Kerper, president and Charles Smith, superintendent, Findlay Street Railway Company.

Galveston, Tex., W. H. Sinclair, president, Galveston City Railway Company.

Grand Rapids, Mich., James R. Chapman, vice-president and J. J. Odell, director, Consolidated Street Railway Company.

Hamilton, Ont., B. E. Charlton, president and T. B. Griffith, secretary, Hamilton, Street Railway Company.

Hartford, Conn., E. S. Goodrich, president, Hartford & W. Horse Railway Company.

Houston, Tex., H. F. MacGregor, General Manager Houston City Street Railway Company.

Indianapolis, Ind., W. S. Jewell, superintendent Citizens Street Railway.

Lexington, Ky., C. H. Stoll, president, W. J. Loughridge, vice-president, R. H. Smith, superintendent, Passenger and Belt Railway Company.

London, Canada. V. Cronyn, president and Thomas H. Smallman, director, London Street Railway.

Louisville, Ky., J. B. Speed, president, and T. J. Minary, general manager, Louisville Railway Company.

Manchester, N. H., Charles Williams, president, Chas. H. Bartlett, treasurer, and N. H. Walker, superintendent, Manchester Street Railway Company.

Milwaukee, Wis., Henry C. Paine, vice president, Geo. S. Jones, director, Milwaukee Street Railway Company.

Minneapolis, Minn., Thomas Lowry, president, Minneapolis Street Railway Company.

Nashville, Tenn., United Electric Railway Company.

Newark, N. J., Thomas C. Barr, president, John Akarman, superintendent, and C. J. Field, Elec. Eng. Newark Pass. Railway Company, Newark and South Orange Railroad Company.

New York, N. Y., C. Densmore Wyman, vice-president; C. P., N. and E. R. R. Company. L. H. McIntire, engineer and manager, Har-

lem Budge, M. and F. Railway Company. Wm. Richardson, acting vice-president D. D. E. B. and R. R. Company. Thomas H. McLean, secretary, Twenty-third street R. R. Company A. D. Field, president, Forty-second street and Grand Street Ferry Railway, D. B. Hasbrouck, secretary, Houston & W. Pavana Railway Company, W. H. Delany, director, North and East River Railroad, Milton S. Mason, secretary, Central Crosstown Railway Company.

Newburyport, Mass., Charles Odell, president, Thomas H. Johnson and B. W. Russell, directors, Newburyport and Amesbury Horse Railroad Company, E. P. Shaw, Jr., general manager, Black Rock & Salisbury Railway.

Lancaster, Pa., John A. Coyle, president, and W. M. Franklin, director, Lancaster City Railway Company.

Lawrence, Mass., N. E. Morton, superintendent Merrimac V. H. Railway Company.

Lowell, Mass., P. F. Sullivan, secretary, Lowell City Railway Company.

Mansfield, Ohio, Clark Rude, president, and Reid Carpenter, treasurer, Citizens' Electric Railway, L. & P. Company.

McKeesport, Pa., J. C. Smith, president; E. P. Douglass, director, McKeesport and Reynoldion Passenger Railway Company.

Nashua, N. H., G. H. Knowles, general manager, and John A. Fisher, treasurer, Nashua Street Railway.

New Brunswick, N. J., G. M. Price, secretary, New Brunswick City Railway Company.

Norfolk, Va., James W. McCarrick, director, and N. G. Miller, director, Norfolk City Railroad Company.

Omaha, Neb., W. W. Marsh, treasurer; W. A. Smith, general manager, and Frank Marsh, cashier, Omaha Street Railway Company.

Orange, N. J., Francis M. Eppley, president, Orange Cross-Town and B. Railway Company.

Paterson, N. J., H. Romaine, vice president, and T. H. Bakewell, director, Paterson Railway Company.

Peoria, Ill., H. R. Woodward, vice-president, Central Railway Company.

Philadelphia, Pa., Charles E. Ellis, president, and Thomas S. Manning, director, Citizens' Passenger Railway Company, E. J. Moore, president, Lombard and South Street Railway Company.

Petersburg, Va., George Beadle, proprietor, Petersburg Street Railway Company.

Providence, R. I., W. H. Bronsdon, general superintendent, Union Railroad Company.

Philadelphia, Pa., E. B. Edwards, president, Ridge Avenue Passenger Railway Company; Charles D. Matlack, secretary, and Thos. D. Rulon, superintendent, car department, Second and Third Street Railway Company, and J. J. Sullivan, president, Fifth and Sixth Street Passenger Railway; T. Potts, president, Second and Third Street Railway.

Pittsburg, Pa., John G. Holmes, president, C. M. Gormly, secretary; and J. E. Rugg, superintendent, Citizens' Traction Company; D. F. Henry, president, Wm. H. Graham, secretary, Wm. Mc C. Ramsay, electric superintendent, and Wm. A. Stone, solicitor, Federal Street & Pleasant Valley Passenger Railway Company; S. J. MacFarren, secretary and general manager, Schenley Park & Highlands Railway Company; George W. Elkins, president, Thomas S. Bigelow, vice-president, E. W. Davis, superintendent, J. W. Reed, auditor, Pittsburg Traction Company; C. L. Magee, president, Duquesne Traction Company; Geo. I. Whitney, president, Central Traction Company.

Raleigh, N. C., John C. George, president, Raleigh Street Railway.

Reading, Pa., B. J. Owen, president, and Albert Welheimer, director, Reading City Passenger Railway Company.

Rochester, N. Y., C. K. Minary, general manager, H. Sellers McKee, chairman executive committee, and Murray A. Verner, director, Rochester Railway Company.

Salt Lake City, Utah, W. R. Reid, superintendent, Salt Lake City Railway Company.

Salem, Mass., Nathan E. Morton, superintendent, Naumkeag Street Railway Company.

Seranton, Pa., J. H. Vandever, general manager, and J. H. Biehford, engineer, Seranton Street Railway Company.

San Antonio, Texas, W. H. Weiss, president, San Antonio Street Railway Company.

Savannah, Ga., J. H. Johnson, president, George Parsons, director and Harry Parsons, engineer, City and Suburban Railway Company.

Sioux City, Iowa, James F. Peavey, president, Sioux City Street Railway Company.

Syracuse, N. Y., A. Bartlett, superintendent Consolidated Street Railway Company.

St. Paul, Minn., Thomas Lowry, president, St. Paul City Railway Company.

St. Joseph, Mich., W. Worth Bean, president, St. Joseph and Benton Harbor Railway Company.

St. Louis, Mo., Robert McCulloch, vice-president, Benton Bellefontaine Railway Company, Cass Avenue & Fair Grounds Railway Company Citizens' Railway Company, and general manager, St. Louis Railroad Company; James Adkins, secretary and George W. Baumhoff, superintendent Lindell Railway Company; John Mahony, vice-president, People's Railway Company; John Scullin, president, Union Depot Railway Company; D. R. Hamilton, president and Smith B. Galt, director, St. Louis Railway Company.

Springfield, Mo., Frank B. Smith, secretary and A. H. Rogers, director Metropolitan Railway Company.

Taunton, Mass., George C. Morse, superintendent, Taunton Street Railway Company.

Terre Haute, Ind., Willard Kidder, vice-president and C. Kidder, director, Terre Haute Street Railway Company.

Toledo, O., Albion E. Lang, vice-president and Fred. H. Lincoln, electric engineer, Toledo Consolidated Street Railway Company; D. Robinson, Jr., president, J. J. Robinson, secretary, and G. B. Perkins, director, Toledo Electric Street Railway Company.

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Toronto, Can. George W. Kiely, President, William McKenzie, vice-president, James Gunn, secretary, C. C. Woodworth, treasurer, and H. H. Everett, general manager, Toronto Railway Company.

Trenton, N. J. P. E. Hurley, assistant superintendent, Jonathan H. Blackwell, director, F. W. Roebeling and Chas. Y. Bamhard, directors, City Railway Company; Lewis Perrine, junior, president, and B. V. Hill, superintendent, Trenton Horse Railroad Company.

Troy, N. Y. Charles Cleminshaw, general manager, and Charles H. Smith, superintendent, Troy and Lonsingburg Railway Company.

Utica, N. Y. O. T. Crosby, president, and W. E. Baker, vice-president, Utica Belt Line Railway Company.

Washington, D. C., Wm. J. Stephenson, president, and R. F. Baker, treasurer, Columbia Railway Company; G. T. Dunlows, Washington & Georgetown Railway Company; W. J. Stephenson, president, and R. F. Parker, treasurer, Columbia Railway Company; George Truesdale, president, and F. H. Clark, director, Eckington & S. H. Railway Company.

Waterbury, Conn., Waterbury Street Railway Company.

West Haven, Conn., Israel A. Kelsey, president, and Sam'l. A. Stevens, secretary and treasurer, New Haven & West Haven Horse Railroad Company.

West Superior, Wis., S. T. Norvell, president, Douglas County Street Railway Company.

Wilmington, Del., Preston Lee, vice-president, and H. H. Archer, superintendent, Wilmington City Railway Company.

Williamsport, Pa., H. R. Rhoads, president, and Wm. Haines, superintendent, Williamsport Passenger Railway Company.

Worcester, Mass., J. B. Chapin, superintendent, Worcester Consolidated Street Railroad Company; Samuel Winslow, president, W. B. Ferguson, director, Worcester, Leicester & Spencer Railroad Company

Wheeling, W. Va., J. M. Sweeney, president, and W. E. Harrington, superintendent, Wheeling Railway Company.

York, Pa., William H. Lanius, president, D. K. Trimmer and Frank Geise, directors, York Street Railway Company.

LADIES PRESENT.

Among the ladies present were the following: Mrs. Wm. Richardson, and daughter, Brooklyn; Mrs. F. B. Brownell, St. Louis; Mrs. W. J. Richardson, Brooklyn; Mrs. H. B. Payne, and niece, Miss Jones, Milwaukee; Mrs. Osgood, Atlanta, Ga.; Mrs. and the Misses Jenkins, Brooklyn; Mrs. J. A. Kelsey, New Haven; Mrs. L. D. Thomas, Terre Haute, Ind.; Miss Tindorph, Vincennes, Ind.; Mrs. H. A. Sage, Easton, Pa.; Mrs. Lockwood, Detroit; Miss Edith S. Kenfield, Chicago; Mrs. H. H. Windsor, Chicago.

THE street car companies of San Bernardino, California, have thrown up their franchises rather than pave their tracks.

DENVER DOINGS.

A DEED of trust, in favor of the Mercantile Trust Company, of New York, has been filed by the Metropolitan.

Very extensive improvements will be made, and the road-bed straightened in several places. In addition to the West Denver electric power house, to cost \$30,000, two Corliss engines will be installed and a new car house, 300 x 150 feet, will be built, to cost about \$30,000. Denver seems determined to keep its place up near the head of the procession in street railway facilities.

WEDDINGS.

ROBINSON-LOWRY.

The most elaborate social event, which ever occurred in Minneapolis, was the recent wedding of Miss Mary A. Lowry, eldest daughter of Thomas Lowry, to Harry P. Robinson, of Chicago. The ceremony took place at St. Mark's Church and a reception followed at the palatial mansion of the bride's parents, which eclipsed anything of the kind ever held in the Northwest. The house was lavishly decorated with flowers, made brilliant by hundreds of incandescent lights. The whole occasion was characterized by that generous hospitality for which Mr. Lowry is famous. Mr. Robinson is the publisher of the *Railway Age*, and numbers his friends by legion in every part of the United States. On their return from the bridal trip they will reside in Chicago.

DEAN-SISSON.

On Wednesday, October 7th, at the residence of the bride's parents, 3241 Michigan Avenue, Chicago, Mr. Dwight B. Dean to Miss Mary E. Sisson. The ceremony was witnessed by only the immediate relatives and one or two specially intimate friends. Mr. Dean for the past year has been connected with the Electrical Merchandise Company, of the city, and has made a splendid record in handling large contracts for street railway materials. The bride is one of the most attractive of the many charming young ladies, whose homes are on Michigan Avenue, and both Mr. and Mrs. Dean have a large circle of friends and admirers, who will join with us in warmest congratulations and best wishes. On their return from the bridal tour they will reside in Chicago.

GREENE-THOMPSON.

Frank R. Greene, the popular young secretary of the Chicago City Railway, was married September 24th, at the residence of the bride's parents, Monticello, Illinois, to Miss Berinthia M. Thompson. Quite a large party of Chicago people were present and the whole occasion was a very pleasant one. After a two weeks' trip through the East, Mr. and Mrs. Greene returned to Chicago and will reside at 3311 Forest Avenue. Mr. Greene is making an enviable record among the street railway fraternity and his many friends will join us in congratulations and best wishes for continued success and prosperity.

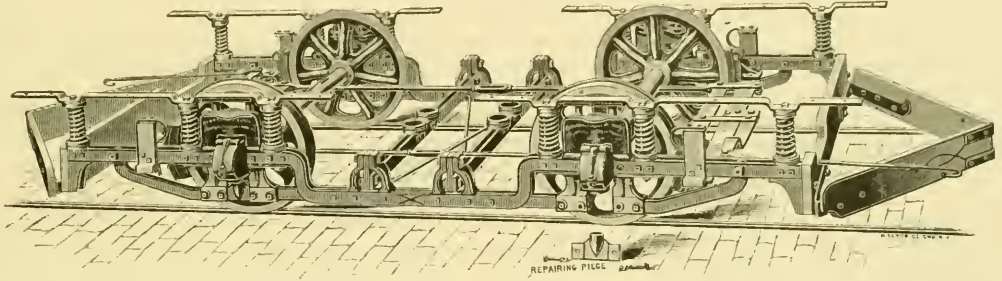
PECKHAM'S PERFECT CANTILEVER TRUCKS.

The history of an invention is the story of triumph over difficulties after the first attempt has advertised the strong points and showed the weaknesses of the idea.

The Peckham truck has been no exception to this universal rule of improvement. This new truck as here-

cessary to remove wheels or axles. The gear claims immunity from shocks, ready adjustment, easy removal of parts and firmness of carrying.

The flexible motor support is also a new feature. This hanger consists of two parallel steel bars provided with one or more spring sockets to sustain the rubber or steel springs used to support and sustain the rear end of the motor-frame. The two parallel crossbars are sus-



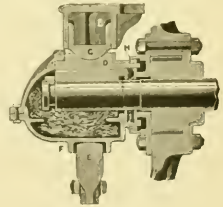
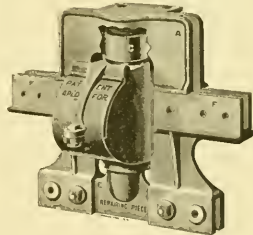
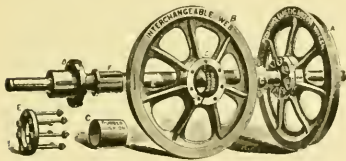
with represented, embodies the salient features of the original cantilever truck introduced nearly two years ago, but also includes the radical and important improvements invented by Mr. Peckham for the purpose stated at the head of this article.

The list of improvements may well begin with the radial gear, (see illustrations below) which gear has shown several valuable features, radically new in con-

struction, and known as the cantilever extension side-frames. These frames are several iron and wrought-steel bars, riveted together so that they make practically one piece. To finish this list of improvements, we must mention the interchangeable cushioned wheels and the life-guards justly famous. This latter is self adjustable.

These trucks as above described, have received flattering receptions from the Syracuse, N. Y., Consolidated

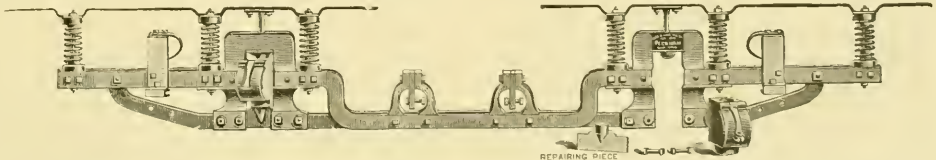
Street Railway Company, from the Rapid Transit Company of Newark, N. J., and from the Lancaster City & West End Company, Pa. These trials have substantiated the claims that it will prevent both end and side oscillation of electric cars running at a high rate of speed, giving flexibility to journal-box, motor-support connections, and that he has reduced the cost of repairs to a minimum.



struction. It consists of a malleable-iron or steel yoke, provided at its upper cross section with a pocket, into which is inserted, first, a rubber cushion which sustains the entire weight of the side-frame to which the yoke is riveted. The lower section of the rubber cushion rests upon the hollow bearings which curves in contact with the journal-box. This is a ball bearing and fitting into a ball-socket, a flexible connection. The lower sections of

the yokes are riveted on one side of the end truss extension, and at the other to a center steel for connecting the two yokes together. The center cross-section of the yoke, underneath the journal boxes, known as the repairing piece, is provided with a projection that fits into a socket in the under side, and is secured in the jaws of the yoke by bolts, which can be readily removed when nec-

cessary to remove wheels or axles. The gear claims immunity from shocks, ready adjustment, easy removal of parts and firmness of carrying.



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The flexible motor support is also a new feature. This hanger consists of two parallel steel bars provided with one or more spring sockets to sustain the rubber or steel springs used to support and sustain the rear end of the motor-frame. The two parallel crossbars are sus-

ECHOES FROM THE TRADE.

THE electric cars built by the John Stephenson Company for the Roundhay Electric Tramway at Leeds, England, have reached their destination and are exciting universal comment and admiration.

THE SIOUX CITY ENGINE WORKS have been so crowded with orders they have been obliged to work nights for the past four months. Their railway engines for electric roads are giving splendid satisfaction.

THE HEINE SAFETY BOILER COMPANY, St. Louis, has just closed a contract for eighteen of their boilers, aggregating 4,500 H. P., for the Broadway and Seventh Avenue cable railways. This is another road added to the number using the Heine Safety.



RETURNING FROM THE CONVENTION.

THE Gisholt Machine Company, at Madison, Wisconsin, was represented by their superintendent, C. M. Conradson, who had space on the boat where he showed their patent movable rim gear wheel. It is entirely new and received much attention from street railway men.

THE BURTON ELECTRIC HEATER is rapidly being recognized by electric railway managers. Recent roads equipped are at Amsterdam, N. Y., West Superior, Wis., Milwaukee, Wis., Escanaba, Mich., Defiance, Ohio, Dallas, Texas, Newton, Mass., Champaign, Ill., Salina, Montana, and Ann Arbor, Mich.

THE BALL ENGINE COMPANY, Erie, Pa., shipped the Buffalo Street Railway Company a few days ago, a 300-H. P. Cross compound engine, being the fourth of the same size built by them for the Buffalo Street Railway Company. Also a 100-horse-power tandem compound for the electric road, Beatrice, Neb.

THE WALTON ARCHITECTURAL IRON COMPANY, on account of increased business, has moved its factories from Cincinnati to Covington, where the plant has four times as much space as formerly. The strong steel tubular pole and brackets are meeting with wide favor, recent bills of these going to Buffalo, Pittsburg and to southern points.

THE SHULTZ BELTING COMPANY is still with the advance guard of power savers. A cogent, comprehensive and fitting argument is presented for the use of power users by means of a pamphlet issued from the Philadelphia office. The testimonials are weighty and very flattering in their opinion of the Schultz woven leather belts.

CHAS. A. SCHIEREN & Co. are still doing an immense business in their belts, now known throughout the country. Some of their late sales are: The Diamond Electric Company, Philadelphia; Davenport, Ia., Gas Company; South Bend, Ind., Electric Company, aggregating nearly 500 feet. The patent perforated electric belting is in large demand and gives the best of satisfaction.

THE DUPLEX STREET RAILWAY TRACK COMPANY is meeting with very encouraging success and since the recent re-organization has made a number of contracts for rail, one of which is the Bowery and Fourth Avenue line, New York. Several other roads have given small orders for the purpose of testing the system with a view of adopting it in re-construction work in the spring.

THE GREAT WESTERN ELECTRIC SUPPLY COMPANY report large sales of K. K. wire in the central and western districts. Among them are sales to the Citizens' Street Railway Company of Indianapolis, Ind., Des Moines Street Railway Company, Des Moines, Ia., the Eau Claire Street Railway Company, Eau Claire, Wis., and the Des Moines Water Power Company, Des Moines, Ia. Their sales of the Sun arc lamp, for lighting barns and power houses, are very large and the lamps giving splendid service, being from 1,200 to 2,000 candle power each.

ONE of the largest recent electric railway contracts has just been closed by the Short Electric Railway Company, covering the equipment of four or five street railways, in and around Wilkesbarre, Pa. The Wilkesbarre & Wyoming Valley Traction Company, of which Mr. F. F. Meyers, of Harrisburg, is president, has been formed to consolidate the railways in Wilkesbarre. The roads are to be equipped electrically at a cost of over \$200,000 and the Short Company has secured the contract for dynamos, motors, "Gearless" type, of which about forty will be required for present necessities.

C. A. HOAGLAND, of the New Departure Bell Company, during the past month has placed his bell equipment on the Cincinnati Street Railroad, Union Depot and Lindell lines, and with La Clede Car Company, St. Louis, Grand Avenue, of Kansas City, Omaha and Council Bluffs Bridge line and Omaha City Railway, Lincoln, Neb., Street Railway, Sioux City Railroad, St. Paul and Minneapolis lines, Northern Car Company, Minneapolis, and the Milwaukee, and Milwaukee Electric roads. A \$1,000 order was also received in Chicago. These bells are bound to be heard from.

THE CUSHION CAR WHEEL COMPANY of Indianapolis, to keep pace with their largely increasing business have found it necessary to establish a Chicago office at Club room 9, Grand Pacific Hotel. There will be on exhibition at this office a car wheel that shows the surprising result of 3-32 wear in a 60,000 miles service. The other seven wheels of the car were in even better condition than the wheel exhibited. This is a splendid recommendation for this company. Mr. P. F. Leach has charge of the Chicago office and will be happy to give any other data that may be required in connection with questions of wheels.

H. WARD LEONARD & COMPANY report that their subscriptions for Electrical Intelligence are coming in an extremely satisfactory manner. Owners of central stations and isolated plants seem to quickly appreciate the great advantages to be derived by securing information from a concern such as this, at such moderate rates. Quite a large number of supply houses and even electrical manufacturing companies are among the subscribers. For special information on such as is called for by concerns of the latter description, special rates are quoted by H. Ward Leonard & Co.

THE BODIFIELD BELTING COMPANY, although this concern has only been in existence a little less than three years, has established a large trade and is turning out a large amount and of a most excellent quality. They manufacture under a new process, by which they leave the grain of the leather in a perfectly natural state, while compressing the grain and fibre to secure solidity. Their filling is such as to insure a specially pliable belt, which at the same time prevents absorption of mineral oils after put in service. They claim to be able to drive fully 20 per cent. more than machine hardened belts. Among the recent large contracts taken is the equipment of the new power house for the East Cleveland road, which requires two belts 48 inches wide and each 106 feet long. Also six belts 25 inches wide and 65 feet in length.

LIFE PRESERVERS.

THE improved fender and quick acting brake of the Brownell Car Company, really deserve the above name as the two following little incidents show: Two children one 3 and the other 5 years old, were in the street and starting to run from the near approach of a wagon, ran in front of the car about 6 feet distant. The operator of the car applied the brakes and stopped the train of two cars in a few feet. When the children were found, one was on top of the fender or pilot, and the other in front of it—the latter being only slightly bruised and the other not hurt at all.

A few days before on the same line, a lady was picked up by the same kind of fender and carried 45 feet with but slight bruises.

A little money expended in the way of fenders will often save a large damage suit with its corresponding disagreeable incidents.

THE B. G. Electrical Supply Company at 401 Fore street, Portland, Me., is a new but vigorous organization making an improved line of couplers, switch keys, and mast arms for arc electric lamps. The part of their work most interesting to our readers is perhaps the complete and efficient Jordan system of lighting electrically, steam and street cars of all kinds. The system is economical, efficient and safe, and the number of orders already in is a very flattering recommendation of the merits of this method of lighting. The car couplers of which they turn out 1,200 per month, are meeting with a kindly reception from the practical street railway men who are acquainted with them, and it is to be hoped that this acquaintance may broaden. Mr. H. B. Bennett, is president. and Mr. G. F. Gould treasurer of the company.

A GREAT COUNTRY.

Owing to the great amount of interest shown in the Northwestern states, and especially in Montana and Washington, the Northern Pacific Railroad has prepared two folders, entitled "Golden Montana" and "Fruitful Washington," which contain a great many interesting and valuable details in reference to climate, topography, agriculture, stock-raising, mining, lumbering, government and railroad lands, homesteads, and other subjects of interest to the capitalist, business man or settler. These folders can now be obtained on application to the General Passenger Agent of the road.

It should be borne in mind by travelers to the Northwest that, among other things, the Northern Pacific Railroad offers the following advantages: It is the direct line to principal points in Minnesota, North Dakota, Montana, Idaho, Oregon and Washington; it has two trains daily to Helena, and Butte, Mont., Spokane, Tacoma and Seattle, Wash., and Portland, Ore.; it has complete equipment of Pullman first class sleeping cars, dining cars, day coaches, Pullman tourist and free colonist sleepers, the cars being new, comfortable and neat; it has through sleeping car service every day from Chicago, Ill., to Montana and Pacific Coast points, of Pullman first-class and tourist sleeping cars in connection with the Wisconsin Central Line, and vestibuled first-class sleepers via C. M. & St. P. Ry.; it passes through the grandest scenery of seven states and the great young cities of the Northwest. The service is complete in every respect, the "Yellowstone Park and Dining Car Route" being, in fact, a thoroughly first-class line to travel over.

District Passenger Agents of the company will supply publications referred to above, with maps, time tables, rates or other special information may be had by addressing Chas. S. Fee, G.P. & T.A., St. Paul, Minn.

A POPULAR ROUTE.

The rapidly diminishing discomforts attending long railroad journeys reach almost a vanishing point on the new Wabash trains running out of Chicago for the south and southwest.

During the last month the train service to Saint Louis and return have been altered to the following effect: train number 5 leaves Chicago at 9:05 A. M. and arrives in Saint Louis at 6:15, making a 9-hour trip through by daylight, and the return, number 4, leaves Saint Louis at 7:55 A. M. to arrive in the World's Fair City at 6 in the evening. Both of these elegantly equipped trains have the finest Wagner parlor car service in the world. On night trains the magnificent Wagner compartment sleepers will be continued. On these cars every section is a drawing room complete, with closets, hot and cold water and the best of service in addition.

Train number 3 for St. Louis and the southwest leaves Chicago daily at 9:20 P. M., arriving at St. Louis at 7:25 A. M. Trains 1 and 6 leave Chicago at 2:30 and arrive at 1 P. M. respectively, discontinued as a Sunday train between Chicago and Decatur, but will run as usual daily, between Decatur and Kansas City. Night trains also include elegant reclining chair cars, for which no extra charge is made.

AS USUAL

The Baltimore & Ohio comes to the front and has made arrangements for a special car for all Chicago supply men that wish to attend the convention to be held at Akron next month, and will arrange for a special low rate.

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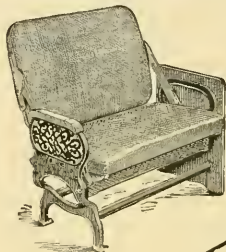
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CORRESPONDENCE.

We cordially invite correspondence on all subjects of interest to those engaged in any branch of Street Railway work, and will gratefully appreciate any marked copies of papers or news items our street railway friends may send us, pertaining either to companies or officers. Address:

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IN his annual address the president of the Ohio State Tramway Association said, "The value of the bonds of street railroads should not be less than that of the cities in which they are located. Often they are the most desirable of the two, for the reason that private management develops greater business judgment, while the increasing debt and liability of state and municipal management do not commend its business methods." It would seem that this alone should be a sufficient answer to those who, while knowing nothing of the practical workings of a railway system, profess to believe the public would be better served through municipal ownership and operation of the intramural lines. The selfish policy of self-interest is alone sufficient in these days to insure the best possible service the business can afford, and even were it possible for the city to better operate the roads, which it is not, a business conducted at a loss, to be paid for from public taxes, would be a positive injustice to every person who did not constantly use the cars.

IN a recent verdict by a coroner's jury in the East, the company was censured for failure to carry a headlight at the time of the accident, holding that while there was contributory negligence on the part of the deceased, the presence of the light would have lessened the censure due the company. The car was supplied with the lamp, but which had not been placed in position because at the time the car left the barn daylight was still bright. The failure in this case was on the part of the employe in charge, who should have placed the light before darkness set in. Companies have no desire to economize the few cents' worth of extra oil necessary to keep on the safe side and now as the days are rapidly shortening and darkness comes on more quickly than in summer months, special

care should be exercised to make sure that the headlights are at least placed in position for lighting early in the afternoon, ready for use when needed. The presence of a good, strong light is in many respects superior to the gong in announcing an approaching car: and as cold weather comes on, and people wrap their heads and ears, will be even more so than during November.

SIX months ago President Yerkes of the West and North Chicago Railroads offered a prize of ten days' furlough with full pay to the conductor and driver making the best record, and a second prize of five days to the next best. The plan has worked so well that the officers were unable to select four such best records, there being no less than fifty-five men who were rated as equal winners. The companies therefore have made the awards accordingly, and those having made perfect records are in receipt of notice to take the vacation at their own selection, or receive its equivalent in cash. Assistant General Manager Crawford says the plan has been surprisingly satisfactory and that the companies have never had as good service from the men or as few complaints from the public. Personal appearance, honesty, attention to passengers, politeness and general faithfulness are the test, and the board of officers making the award found, on comparing notes, they had in nearly every case made the same selection. The same offer is extended for the next six months, and every conductor and driver among the entire 2,000 men are doing their utmost to win a prize. The scheme is well deserving of careful consideration by every company, and even those who are smaller financially can find a way to make some kind of recognition for faithful service. No man living, but is the better every way for feeling that his endeavors are appreciated, even in an inexpensive way.

OUT in Cheyenne, some time ago, the city built a viaduct for the use of vehicles and pedestrians. Later the street railway was built and crosses this viaduct. A local paper, as many other local papers elsewhere have done, is suddenly taken with an attack and wants the company to pay a big bonus for using what is nothing more or less than an elevated street for public use, the same as any other street. The operating of its cars over this grade costs the company more than for several times the distance on level track, but the accommodation to the public is to have the cars use the viaduct.

The company could doubtless carry its passengers to one approach, allow them to walk over, and board a car in waiting at the farther end; all of which would be so much more in keeping with the eternal justice and fitness of things! The paper in question, which assumes to own a public improvement, which it is accusing others of using for the purpose for which it was built, had better post a night reporter to watch lest the company in an unguarded moment steal the viaduct and carry it away. There is more nonsense sprouting up all over the country among newspapers claiming to be respectable, regarding imagined abuses by street railways, than would suffice to fill Lake Michigan for a World's Fair site.

A MOTORMAN, in a leading western city, the other day put the following question to a newspaper reporter riding on his car—"Why is it the newspapers are continually 'roasting' the street car men about people being run down by the car: why don't you pay some attention to the other fellow?" There is no small amount of justice in the inquiry. Accidents will happen:—often the employe is to blame:—perhaps as often he is not. But it has become a sort of custom with many papers to jump at the conclusion that because a person receives an injury in or around a street railway, the company's men have certainly been on a still hunt for his life or limb. Some men comment on an accident as though the driver was only prevented from leaving the track and charging boldly on the sidewalk through lack of necessary steering apparatus. "Pay some attention to the other fellow" is good sound sense, and if done would in a surprisingly large number of cases entirely change the complexion of the account, which on general principles now seems to be laid at the door of the street car. Why not also mention the hundreds of instances daily where people would have been killed several times over, through pure stupidity, but for the careful watchfulness of this same, much-abused driver.

THE address of President F. B. Brownell, of the Brownell Car Company, before the convention of the Ohio State Tramway Association is full of practical hints to users and buyers of street cars. A car must receive in its way just as good care as a horse or motor if best and lasting results are expected. As the speaker stated, too many companies forget in a few weeks to maintain that inspection of rolling stock which is rigidly enforced when new cars are first received.

His mention of the loss in travel resulting from a use of inferior cars is most timely as is the terse remark that "decreased expenses make as good dividends as increased earnings" and "that it takes some companies a long time to learn that they make no money from the people who walk."

Next to a regular and rapid operation the quality of the car itself is of vital importance as an inducement to frequent riding. A business man, whose store was as ill-kept as some cars, could never expect a large number of customers. As in all other departments of railway business, a cheap article is the most expensive. First cost is not the most important question. The yearly repair account and the value of the car at the end of a term of years should decide the selection. The interest on two or three hundred dollars extra first cost goes very little way toward the repair bill at the end of a few months.

STREET RAILWAY POSTAL SERVICE.

THE contract between the Wheeling, W. Va., electric line and our Uncle Sam, for carrying mails from Wheeling to Bellaire and other points, has gone into effect. The railway is to get \$800 per annum for the service.

THE THANKLESS PUBLIC.

"FOR all this the railway company gave nothing in return, but an agreement to pave 16 feet in "the center of the street, which, by the way, is "necessary for the operation of an electric road."

With the above words, which are positively none but those of malicious untruth, a leading daily of the West comments on the construction of a line of street cars, which has been in operation now some two years. The wording may have been thoughtless, but a man killed by a gun "not loaded" is no better off than had the shot been made with malice aforethought.

The "all this" referred to was simply a franchise to operate street cars in a town where none existed; where the residents walked in good weather and stayed at home in wet seasons; where a population of 15,000 were wholly unprovided with means of intramural transit other than private carriages for the rich and such as nature provided the poor.

A wait several years long had been going up in vain for help, and none had come. Other and smaller towns were enjoying the benefits of a street car service while theirs was fast growing untrimmed whiskers on the face of modern improvement. At last outside capital heard their cry and put in an electric car service second to none in the state. The cars were the largest and best that money could buy, with large windows, cushioned seats, good heaters and incandescent lamps. They were run on frequent headway. The employes were nicely uniformed, polite and accommodating. People were able to visit friends and relatives weekly, who previously saw each other but once in two or three months. Passengers were carried 6 miles for 5 cents. The aged and infirm attended church again and property along and contiguous to the line advanced dollars a foot.

And yet, when the company in response to petitions from outlying districts asked for a franchise for that territory the papers and a parcel of dogs-in-the-manger people raise a howl and say to one another, that the company "gave the town nothing in return."

The real cause of this outcry is found to arise from the discovery that "the company is said to have declared a neat dividend last year." This then is the cause. The road was so well built and operated, it succeeded in a little more than paying expenses the second year. Had it gone on losing money the undeniable inference is that in so doing the road would have given the town something in return. These same old kickers who could not be induced all these years to subscribe one dollar of stock towards the enterprise as a public benefit, and who staid out and predicted failure and coma, now that the demonstration has been made of their poor foresightedness, are in rage because, forsooth, others with enterprise and grit have risked their money and by force of good management made it safe. And because now they are too late, and others are about to reap the reward they scorned, the necessity suddenly exists, to put on brakes and bleed the company.

THE ANNUAL MEETING OF THE WEST
END ROAD, BOSTON.

THE annual meeting of the West End Road, Boston, was held November 12th. The report for the year ending September 30th, was:

Gross earnings, - - - - -	\$5,968,981.47
Operating expenses, - - - - -	4,445,559.59
Net earnings, - - - - -	\$1,523,424.88
Fixed charges were, - - - - -	545,116.01
Dividends, - - - - -	888,317.50
Surplus, - - - - -	89,991.37

President Whitney in his address said: "We believe that it is now well nigh universally admitted that for the propulsion of street cars, the electric system is to be the established system for the future; and the directors feel that, in spending the money for a plant that is calculated to produce a very large amount of power in the most economical way, they have consulted the best interests of the company and of the community.

"There is also the advantage of the greater reliability of the system and the greater freedom from accidents, which are considerations of prime importance when the whole system is to be run by electricity.

"The further introduction of the long cars is one of the important events of the year. A year ago there were but few of the long cars running, most of the electric cars then in use being of the short pattern, supplemented by tow cars. The cost of running the long cars is about the same as that for the short cars, while the increased earning capacity, as well as the increased accommodation for the community, are considerably greater. The increase in earnings during the past year has been mainly in places where the electric system is in operation. The lines which have heretofore been electrically equipped, have mainly been the long and unprofitable horse car lines, while the lines now being equipped are the shorter and more profitable ones of the system,

"It is the purpose of the company to proceed with the establishment of the electric system over its lines as rapidly as possible. We expect to be able before the 1st of January to add 175 more long cars to the electric system; the cars have been ordered, and have been promised in season to accomplish this, and the car houses and the track will soon be ready. If this is done, the mileage of the electric system having been about one-fourth of the whole mileage during the past year, the mileage for the present year will be something more than one-half the whole mileage, or about 9,000,000 miles.

The company is now charging to its operating expenses, for depreciation in horses, the same amount as when the entire system was operated by horse power. Besides this, the increased cost of provender alone for the last year, even with the reduced number of horses, has been about \$119,000, over that of the previous year."

The reports were all highly satisfactory to both the management and stockholders, especially so as a period of transition from one motive power to another is always expensive.

EDISON'S LATEST.

NOTHING in street railway circles has caused as much comment, or given rise to more expectation than the article first published in the New York Herald, and announcing a radical departure in the method of conveying electric current from power house to car motor. The paper mentioned quotes Mr. Edison as saying that for street railway work he had "abolished the central rail. The current passes along one side rail to the motor and back to the stationary engine through the other. I can pick the current up out of two inches of mud. The pressure I use a horse wouldn't feel at all nor would a man. I think I have really solved the great street car problem."

Of the working details of the plan the public is not yet further informed than the above unsatisfactory statement. A letter from the Edison Company, received by the STREET RAILWAY REVIEW a few days ago, states they have no information to impart at present. As Mr. Edison has entered no denial of the interview as published it is to be inferred he has been correctly reported. On several previous occasions, however, the wizard has been credited with some wonderful invention which has gone the rounds and been forgotten, and unless he is really in earnest in this matter the publication of unaccomplished results is most unfortunate; and particularly so at this season of the year. Many a president has labored night and day for months to bring his stockholders to a point where they were ready to vote the increased expenditure to put in electric lines. Most of these annual meetings occur in December and early January, but like a dash of cold water the announcement has put out the fires of decision in many places. If he has indeed worked out the problem satisfactorily and practically, it is no less than a duty to capital, whose purchases have made him rich, to make public a tangible description of the new system. If not it should as emphatically be denied. Almost any other man could have made the statement with little harm, but coming from one whose name is so great an endorsement of any undertaking, however difficult of belief, it is a matter of no little moment.

The street railway interests of the country naturally look to the street railway press to protect them in a conservative endorsement or condemnation of all new departures; and we cannot but feel the street railway management throughout the country would have vastly greater confidence in the promised invention had its publication first appeared in the columns of those papers devoted exclusively to their interests.

A VERY wealthy corporation of Hebrews, known as the Jewish Colonization Association, has undertaken to plant Jewish colonies in North and South America. They will also build manufactories, railroads and street and suburban railways. The capital stock is \$10,000,000 and the principal office is at 17 Old Broadway, London, E. C., England. The corporation promises great help to the race.

HOW COMPANIES ARE SWINDLED.

THE world is growing better in some directions—notably the improvements which are being made by the street railways of the land; and fast retrograding in other directions—notably the contemptible effort of certain sharks to rob these same companies. As an instance of this, recent developments resulting from investigations covering a long term of months, on the part of the St. Paul City Railway, is a striking but not unusual example.

In the winter of 1887, soon after the opening of the cable road, the gripman while taking a train of two cars down the very steep hill on Selby avenue, lost control of his train and the rails being covered with ice at the time, the train dashed down the incline at frightful speed and striking the sharp curve at the bottom, left the track, wrecking the cars, causing several fatalities and a number of serious injuries. After paying out \$80,000 for damages, some of which were admittedly genuine, and the crop of claims constantly increasing, the company began a systematic investigation of the claimants, using a corps of the most skillful detectives obtainable. The results have been astonishing, and while space will allow of but one or two instances they clearly represent a hundred others.

In the first place the conductors' registers show there were but 118 passengers on the train while 239 people have entered claims for alleged personal injuries, said to have been received in that eventful ride.

One St. Paul woman some time after the accident filed a claim for \$18.25 for damage to her dress, and made affidavit in the presence of three witnesses that the tearing of her dress was all the injury she sustained. Afterward, however, she came across a prominent firm of lawyers who persuaded her to make out a new affidavit alleging that she had sustained serious internal and external injuries; that her teeth were loosened and several knocked out, so that, in her own words, "I have been an invalid ever since, and am personally injured, all of which damages I am willing to settle for \$100, if paid to me in cash to-day."

This was on Oct. 10th, and Mr. O. E. Pardee, special agent of the St. Paul City Railway company, paid her claim. The detectives, who were working upon the sweetheart of this young woman, found out the true facts. The sweetheart filed a claim for \$5,000, alleged personal injuries. He claimed that his leg was hurt and shortened. The detectives found positive proof that his leg was shortened when he was four years old, and learned for a certainty that the next night after the accident the young woman and her lover went to a dance together. After the woman was paid her damage money she was foolish enough to tell the neighbors that she had succeeded in swearing \$100 out of the street car company, and advised her lover to swear \$5,000 out of them. The woman has since offered to refund the money if the company would let her off. Her lover dropped on his claim of \$5,000 to \$500 and now wants to let the matter drop entirely.

Another man, who was not in the accident at all, and has recently admitted it, claimed through a firm of lawyers,

\$50,000 for the alleged injury to his eye. The lawyers notified the company they could recover \$50,000 before a jury, but would accept \$5,000 if paid at once. J. J. McCafferty, the company's attorney, asked time for consideration, and in the meantime found sufficient evidence to prove that on the night of the accident the claimant was not on the train but out of the city. The man was confronted with the evidence and admitted everything, and stated that he was advised to file a claim by a firm of lawyers whom he named. He admitted that his eye was injured when he was a small boy.

A lady from out of the city claimed damages for alleged injuries to her hip. The detectives discovered that the woman has been treated for the past six years for sciatica and that she had sustained no injury. Her lawyers had asked for \$1,500, but they threw up the sponge when confronted with the facts discovered by the detectives.

A young woman of a family in a prominent residence district claimed that fright from that collision had caused her to become afflicted with hysteria. The detectives found her visiting at Madison, Wis., in the best of health.

A firm of lawyers informed Judge McCafferty that their client, a woman from Marshalltown, Iowa, was injured for life and wanted \$15,000 damages. The detectives discovered for a certainty that her dress was damaged and the road settled matters with her by paying for her dress. She gave a receipt in full, and stated she had never authorized the lawyers to make the claim for her.

And thus the interesting story goes. Hardly a road of any size but has had more or less similar expensive experience. In small towns there is less of it because the employes are apt to personally know who a large number of their passengers are. But in the larger cities this is impossible, and there are those debased perjurers in abundance, and those still more contemptible and abandoned blackmailers, the shyster lawyers, who are a scourge and a blot on any community however low and false.

And yet when a railway company enters a court of law in defense of its rights, instead of purifying the moral atmosphere by a striking rebuke, nine juries out of ten will close their eyes to the facts and put a premium on this worse than highway robbery, by awarding the plaintiff with a big verdict. And even where this knavery is fully exposed the sneaking culprits are allowed to depart unscathed, while the public is content to say in a wholly unconcerned manner—"well, their little game didn't win!" Of all the refuse of society such people are at the bottom of its dregs, and the unfortunate occupants of prison walls would even be disgraced by their presence.

A LOCAL Michigan paper sagely informs its readers—"As soon as the new engine, recently purchased, is placed in requisition, five or six cars will be run." Just what sort of a place "requisition" is we don't know, but imagine it must be near the heated district.

A BURLINGTON, Iowa, electric car motor man has coined a new word. He asked a prospective employe if he "had ever street-carried any."

OHIO STATE TRAMWAY ASSOCIATION.

TENTH ANNUAL MEETING—INTERESTING SESSIONS—
ENJOYABLE BANQUET.

THE Ohio State Tramway Association is one of the institutions in that magnificent presidential empire, and its yearly gatherings are always looked forward to with feelings of the most pleasant expectancy. The value of the organization has been amply demonstrated, and the hopes of its founders more than realized.

The busy city of Akron was the selection for this year's gathering, many delegates arriving the evening previous. This number was increased on the arrival of the early morning trains, and the morning was mostly spent in social conversation and interchange of experiences and incidents of interest.

AT 11 O'CLOCK

the meeting was called to order by President Stewart, in the pretty parlors of the Hôtel Buchtel, and the following responded to roll call: John Harris, superintendent of the Cincinnati Street Railway Company; A. D. Rogers, president of the Columbus Consolidated Street Railway Company; Dr. A. Everett, president of the East Cleveland Street Railway Company; J. B. Hanna, secretary and treasurer Woodland Avenue & West Side Street Railway Company, Cleveland, Ohio; H. M. Littell, general manager Inclined Plane Railway, Cincinnati; J. N. Stewart, president Ashtabula Street Railway Company; H. E. Andrews, president Broadway & Newburg Street Railway Company, Cleveland; F. A. Sieberling, secretary and treasurer Akron Street Railway Company, Akron, and J. E. Maitland, general manager Akron Street Railway Company, Akron.

Besides the above named delegates, A. Bowman, Lancaster, O., and E. C. Carter, Fremont, O., were present. The convention then went into

EXECUTIVE SESSION,

and listened to the annual report of J. B. Hanna, secretary and treasurer. The report was in every way satisfactory and was adopted and ordered placed on file.

The convention appointed a nominating committee, consisting of Dr. Everett, of Cleveland; John Harris, of Cincinnati, and J. E. Maitland, of Akron, to nominate officers for the ensuing year, also to choose location for place of the next meeting.

The committee recommended the election of the present officers, which report was unanimously adopted. Officers for 1892 are: President, John N. Stewart, Cleveland; vice-president, John Harris, Cincinnati; secretary and treasurer, John B. Hanna, Cleveland; chairman executive committee, E. K. Stewart, Columbus.

Cincinnati was declared the place of next meeting and the day the second Tuesday in November.

After a general discussion of questions of policy and interest the executive session adjourned.

THE AFTERNOON SESSION.

was promptly called to order at 2 o'clock, in the main parlor, all in attendance at the convention being present.

Mr. Stewart then delivered the following interesting
PRESIDENT'S ANNUAL ADDRESS.

AKRON, O., NOV. 11, 1891.

Gentlemen of the Ohio State Tramway Association:

It is my duty, as it is my pleasure, to open the proceedings of this, the Tenth Annual meeting of this association.

At our meeting last year in Columbus it was decided that, as meetings had been held in all of the larger cities of the State, that some one of the many smaller cities which were making rapid strides in the advancement of its street railroad accommodations and population, one following the other in the order I have named, should be visited by us, and it was decided to come to this beautiful and thriving city of Akron, where the merry buzz of commercial activity is heard all around and about us: and here, as in larger cities, the population depends upon transportation by its street railroads. But Akron, and Akron people, need no eulogy at my hands. I am told that they some time since assented to unconditional surrender as the inevitable, when street railroad men show up, and on this occasion they have thrown the latch string out, and hold "hands up." I have, however, attempted to allay their anxiety by assuring them that the association was pledged simply and solely to the promulgation of the idea of the "greatest good to the greatest number," and not, as perhaps many suppose, by oath or obligation, to the annihilation of some of the oldest industries on the face of the earth by the substitution of electric generators for hay and grain consumers, and while we must acknowledge that most of our members during the past year appear to have had an unusual fellow feeling for electrical promotion, it is not to be taken as an implication of conspiracy against the "Farmer's Alliance."

During the last year we have added several new companies to our list of members, and now nearly all of the street railroads of the State are connected with the association. A kind providence has so favored us that we have to report no diminution in our ranks and "all are present or accounted for."

It has been the custom heretofore at our annual gatherings to have papers submitted only by our members. From this stereotyped method I have taken the liberty of departing, and you will be instructively entertained by several gentlemen who have kindly consented to submit their practical ideas on matters of great interest to us all.

At our last meeting I called your attention to matters of legislation, then, as now, impending. I much desire at this time to thoroughly impress upon you the importance of co-operation in the support of all legislation calculated to enhance the interest represented by us, as well as the united defense against all "piratical and tyrannical measures attempted in the name of the public by some selfish and mercenary malecontent, temporarily elevated to the dignity and importance of a statesman." Against all such methods, the smaller roads are equally interested with the larger, and should not expect to do less than co-operate when called on to do so. I allude in all seriousness to the growing evils menacing personal and

corporate rights and the attempts being made to make corporations bear more than a just proportion of their legitimate duties to the state, and to the people. Let justice and equity toward all be resolutely insisted upon.

BONDS.

When reviewing our stewardship and taking into consideration the many millions of dollars in street railroad industries in our state, we ought to feel that a "great and sacred trust" has been reposed in us, and that we must afford it all the safeguard and protection that can be made to surround such a trust. Our bonds and securities are owned by all classes of people, and held in trust for minors and indigents, and upon the earnings of such investments the "weal and woe" of many a household depends. The employment furnished our operatives is that of a much higher grade and better paid than was formerly the case, and proportionally as the march of progress goes on so do all elements of the street railroad service. Our managers and operatives are in closer touch with the public than are those of any other class of transportation, and contemplating the "hustle and bustle" of our crowded thoroughfares and the "pell mell" confusion consequent upon the loading and unloading of our cars, both stockholders, employees and the public are to be congratulated that so few accidents occur.

Several "Employers' Indemnity Companies" are of late, seeking your earnest consideration for their business methods, but how well and satisfactorily they may be able to protect your interests must depend upon your experience with them, as perhaps few conditions are equal and little reliable data exists upon which to base any calculations, though the impression appears to be general that in selecting companies in which to entrust your interests it may be well to remember that "real good things can't be bought the cheapest."

FRANCHISES.

Franchises—that much misunderstood and abused word—might as well be dropped from the vocabulary and plainer "contract" substituted. The change might disabuse the public mind which now appears to cherish the idea that when a contract is made and it appears christened in the name of "franchise" that every symptom of a large sized "wolf in sheep's clothing" is contained therein:—a clear case that the fragrance of a rose depends upon the name it bears. Contracts are as old as the ages, even the great book indicates when it says "One may be taken unto the other for better or for worse" that the inevitable solution of a contract is that one or the other contracting party gets the best of the trade. Street railroad contracts are made in accordance with the prescribed dictates and mandatory provisions of the laws of the state, made operative by and through the delegates, concurrent acts of a municipality, and predicated upon a term of 25 years. Rights to operate street railroads under these acts are unquestionably contracts, and sanctioned by legislative power, higher than that of a municipality, and not alone are the beneficiaries thereunder confined to the narrow domain of a city or town, but even the "stranger within the gates" temporarily enjoys the benefits thereof. Sometimes, not

always, the grantor proves to be a beneficiary thereunder, but where said grants or contracts are termed "franchises" it affects many as does the "flaunting of a red blanket in the face of an infuriated bull," and under such a christening "fabulous value" is attached thereto. Webster defines the word as meaning "immunities from" but experience demonstrates that street railroads never came under this category:—they are a class that never get out of anything. The joint interest between street railroads and the public cannot be gainsaid, yet the rampant wailing of a hungry horde of malcontents would disconnect any and all mutual affinity between the two, and condemn the former for ever having dared to earn an honest penny or enter the great race of the "survival of the fittest." The grantor, the grantee, or both, may try the patience and put the claims of Job to shame, nevertheless everybody joins in the refrain. The street railroads have come to stay, and no interest seems quite so allied to the people. The pittance contributed is doubly, yes trebly, returned in unequalled and unprecedented service.

CORPORATE MANAGEMENT THE BEST.

The value of the bonds of street railroads should not be less than that of the cities in which they are located, often they are the more desirable of the two, for the reason that private management develops greater business judgment, while the increasing debt and liability of state and municipal management, do not commend its business methods. An argument prejudicial to the theorist who rails away for "public ownership" at the expense of individual or corporation. "Take it," he says, by confiscation, and condemnation afterwards, at any cost of principle and equity, personal rights or financial loss; and with perhaps "a single exception," cooler and calmer judgment has prevented such incendiary acts, and such dogmas have been made to slumber in the brain of the inventors. I congratulate the members of this association that to-day witnesses a remarkable progress in methods and systems for propulsion of street cars, the initiative step towards which was taken within the borders of this state but a very few years ago, and the daily progress in this direction is indeed phenomenal and our people are unhesitatingly acquiescing in, and adopting all advanced theories and ideas, thus showing conclusively that capital stands forth, ever ready as a golden reward for brain, energy and devotion. In passing I cannot omit mentioning the valuable service rendered this association by its secretary and treasurer, Mr. J. B. Hanna, whose activity and devotion has during all these years added so much to its success. Gentlemen of the association, may you gather knowledge and wisdom from your associates and co-laborers here assembled; may the interchange of thought and inquiry prove a source of mutual advantage; and may you each as you depart to your various fields of labor carry with you the kind remembrance of these annual gatherings and the satisfaction that they have proven beneficial and instructive.

The report elicited hearty applause and was ordered placed on file.

President F. B. Brownell, of the Brownell Car Company, St. Louis, was then called on and spoke as follows on some points in constructing

STREET CARS.

In building street cars three important things must be considered:

- 1st. The Design.
- 2d. The Material.
- 3d. The Workmanship.

In regard to the first point, design, the importance of this is too often overlooked, and while many railway operators do not stop to consider all the points involved, their importance exists nevertheless. The form of street car in general use is an evolution from a coach or carriage up to the street car by the way of an omnibus, and not from a steam car down.

The main object is to get the greatest amount of strength with the least amount of weight. Most of the older car builders were formerly makers of coaches, wagons and omnibuses to be hauled by horses, consequently they studied the problem of how to get the greatest strength with least weight, more than those who have gone into the business later. Well do I remember one of the old-time successful circus managers saying, after urging the reduction in weight of some parts of his vehicles then in construction, "I would rather buy wagons than kill horses."

Of course this idea could be carried to extremes, and strength sacrificed to weight, but that was not after experience, and a few breakdowns soon established safe limits. After the questions of strength and durability come symmetry and form. Cars should be graceful in appearance as well as strong and capacious. We often realize this when we are away from home, and have a chance to see the other fellows' geese, while thinking of the beautiful swans we have left behind. It is well for railway managers to put themselves in the place of would-be passengers occasionally in order to appreciate the wants and feelings of the latter. Who has not arrived in a strange city, and, on emerging from a dark and smoky depot, been still further depressed by the appearance of a lot of antediluvian hacks, and broken-down horses that might have seen service when Adam was a boy; or beheld an old-time street car, unpainted, weather beaten, dusty and dirty, and not have wished for something better? And, finally, in his hurry to reach a hotel, concluded it would be safer and speedier to walk.

I remember a man telling me once of his conversation with a railroad president from whom my friend had just bought the line. He said after the transfer of stock was concluded the old president asked him how he was going to run the road. He replied by saying that he was going to put on new and better cars, which he described in detail, when the former broke in and said, "Well, if you do, you will make a mistake; you don't understand the people of this city. Why, they will ride in a dry goods box if you only put it on wheels." My friend replied, "All right; you have tried your way; I am going to try mine." He

did; with the result that his first year's receipts were nearly 60 per cent. greater than the year before, with the same number of cars running. This was eight years before the advent of cable and electric cars and rapid transit.

Cars should be light and attractive in appearance, cheerful and inviting to ladies and children and comfortable for all, so as to induce the greater number to patronize them. I some times think that it takes some companies a long time to learn that they make no money from the people who walk. In these days of mechanical motors, either cable or electrical, the idea seems to be growing that the question of weight was not so much of an object as heretofore. One party who wanted to buy cars expressed himself to me as not caring for weight, he was not going to run a horse road, in fact he wanted the cars as different in appearance from horse cars as he could get. I thought then and do now that he was mistaken and that it would take as much coal which would cost as much money to make steam to carry 10,000 pounds of street cars, as the same weight of passengers.

The design of cars also includes the manner of getting in and getting out, so as to make both safe, convenient and speedy; the amount of money it costs in wages and interest when cars are standing still aggregates more than is often considered. I presume it is not unreasonable to assume that in a round trip of 75 minutes, at least 20 are devoted to stops. What does this mean in wages to a car making 15 trips per day? A reasonable calculation gives us 300 minutes or 5 hours per day for conductors and drivers, to say nothing of interest and other expenses that are going on all the time, which at 20 cents per hour each, would make \$2.00 per day or \$730.00 per year. Now if this lost time could be reduced one-half the company would be the richer by \$365.00 per year per car, which is 6 per cent. on \$6,000 and is just as acceptable in way of dividends as if the result of increased earnings instead of decreased expenses. Besides this there is the question of safety and accidents, for whatever style of car the passengers can get in or out of the quickest will generally have the least number of accidents. Surely there is much in the matter of design of cars for consideration. After the design is settled then comes the question of material.

Many buyers think there is no difference in material that enters into the construction of cars. Well, such are mistaken. There is not only difference in the kinds of woods best adapted for certain purposes, but difference in qualities of the same wood. I have myself, weighed side pillars of the same size and pattern without particular selection and found a variation of 30 per cent. between the lightest and heaviest, and 13 per cent. between lightest and average. It is a fact that the strength and weight of ash increases in same proportion—and the heavier it is the stronger. As to the kind of timber best suited for certain purposes, builders do not always agree. It sometimes, if not often, happens that one kind of timber is better for certain things than

another, but if the former is not as well seasoned as the latter then the latter may give better results. The care and seasoning of green lumber until it is fit to use in work is great and requires long experience and much expense. It makes a difference in the cost of a car if it is made of lumber that has been carried from one to four years—is air dried and seasoned so as to retain all its strength and lasting qualities, as well as a difference in its life of usefulness, for if made from kiln dried or only partially dried the latter will soon rot and go to pieces. A railroad superintendent told me once in speaking of some new cars that when his men bored into the sills to put in some bolts the sap in the wood ran down the bit. It is only a question of time, and a very short time at that, when those sills will be rotted out and require replacing. Even though a car is new and nicely painted and there are no defects visible it does not follow that none exist.

A few weeks since in talking with a lumber salesman he asked how long we thought certain kinds of material should be kept before using. We replied "About four years; I think three at least." He laughed at the idea and said he could prove he had sold lumber of the same size, that in less than six months from the time it was loaded at the mill it went out of the shop in street cars. Now what does such saving in time mean to a manufacturer? Only a difference of 26 per cent. from interest charge alone. The foregoing only applies to lumber but there is not a thing we buy for cars from nails and glue up to paints, varnishes, carpets, bronze, trimmings, etc., in which there is not a difference of 10 to 33½ per cent., and while preparing this article I have been interrupted by a salesman who offered me supplies for cars 40 per cent. cheaper than we had been buying, and as he told it "equal to the best," and stated he had sold one firm 200, first order, and 100 in second lot, but in answer to my inquiry as to whether they were copper or brass, silver or nickel plated, he did not know as he had only been representing the company since Oct. 1st. We have built cars for railroad companies who in giving directions for color have taken their ideas from an elegantly gotten up sample book by one of the largest firms in the country. The sample looked well and so they selected it but the price was only 22 cents a pound, when if left to our own selection we would have used the color costing anywhere from \$2 to \$6 per pound. It would take an expert to note any difference when new, but a blind man could see a great change.

A year or two hence one would be bright as ever as long as any color was left. The other—well it was not long before it all did leave.

After material is chosen, workmanship comes nearest in importance, as the vital parts of the work are mostly concealed from view. The man who buys a car by its outward appearance only, is apt to be as badly deceived as those who have bought gilded nickels thinking them \$5.00 gold pieces.

At the present time the framing of the woodwork, that is the tenoning, mortising, etc., is all done by machinery,

and one might reasonably ask how is it possible to put the work together wrong. It will be difficult to explain how in all its details, besides it would tax your patience quite a little, if I were to undertake to do it. But if a man is fortunate and careful enough to set his machine right the work coming through it will probably be right. But if he is not, then the trouble commences, and instead of tenons driving into mortises so the shoulders make a tight, close joint, the latter will gap open like the mouth of a hungry fish, and make a lodging place for dirt and moisture and dampness to settle which will soon rot off the tenons and your car commences to wear and creak like an old-fashioned rope bedstead. But supposing the mill work is well done, and it goes to the body builder to be set up, here again are many opportunities for slighting the work, and he may fail to get lead in all the joints or in order to deceive his foreman he may get lots of it where it was easy to put it, and would be sure but not where needed but none where it was more difficult and would do the most good. Instead of draw-boring his stuff and putting in close fitting wood pins that would not rust or rot off he drives in a nail or screw that perhaps splits the timber and only partly fills the hole bored for it in the mortise. Or, in his haste, if he is a piece workman, he may drive home a tenon too big for a mortise, and split the latter open in an effort to make two wrongs right.

When he comes to put on his panels he may use white lead or glue. If the former, the probabilities are he will get much where it is not needed, and will do more harm than good, and if panels are glued on, it may be done with imperfectly heated glue, which is chilled before contact is made, and the result is no adhesion; but after it is all done, and panel strips are put on, who can see it? When I was an apprentice, an old man was showing me the necessity of being most particular about work in places where I knew it could not be seen, and when in a youthful and unsophisticated way I asked him why, he replied, "God sees it."

Further than this it would not take many months' use to develop bad results that any one could see. After a car is built and painted and finished, who can tell whether it is well made and will be durable? The only test that I know of is that applied by jewelers in purchasing gold or silver ware, viz., who is the maker? Is it one of those firms whose reputation and character is formed and whose trade mark is synonymous with honesty, integrity and fair dealing, or is it one of those—well, of course, there are none but the former kind engaged in the car business—so it is useless to carry out the figure. As to the care of cars, so as to prolong their attractive qualities and usefulness, more can be said than time will permit. It is too often the case that a company will go to great expense of time and money in getting cars that will be beautiful and all that the most exacting could wish for, and take great interest in them for a few brief weeks; but soon the novelty is gone and the cars are left to the tender services of the conductor and foreman. The manager forgets that it was a necessity for the cars to look well when first

put on the road and that the same necessity exists as long as it is expected to carry passengers. And so the car soon begins to look dull, the varnish is allowed to perish, as perish it will, even if the best is used, and when the varnish is gone the paint soon follows, and who wants to ride in such a looking tub? And the people walk; the company loses money; no dividends are paid; road is sold out and falls into hands who believe in keeping things up, and there is a change for the better.

In a few words I would say: A new car, if well painted, ought not to require repainting in ten years, but it should be varnished at the end of the first year, and every six months thereafter.

The inside of the car should be cleaned well at least once a week, using as little water as possible; the more water put on the floor of a car and around the bottom of the pillars and on sills the worse it is. It is apt to cause quick rot.

The seats and back and wheel houses should be taken out at the end of the first year, and once every six months thereafter, and the covers and inside work well painted with good oil paint. The roof should be painted every six months, one coat white lead with tint to suit.

The manufacturer and buyer should bear in mind that it is not the first cost of a car that should be considered of most importance, but the principal and interest cost of maintenance for ten or twelve years and the condition of car at that time.

A small interest charge is quickly overbalanced by a large expense for maintenance.

Following Mr. Brownell's remarks Daniel Coolidge, vice-president of the Johnson Company, Johnstown, spoke briefly, as did F. A. Rogers, general agent of the Short Electric Railway Company, Cleveland. A. D. Rogers, of Columbus, discussed the general subject of street railway interests, and was followed by Mr. Elliott, special agent of the Edison General Electric Company, Central District, Chicago. A. N. Lewis, of the Cincinnati office of the Thomson-Houston Company, made a few remarks.

C. A. Benton, general selling agent Detroit Electrical Works, spoke in the interests of the Rae motor, followed by S. S. Leonard, secretary of the Hill Clutch Works.

Garson Myers, president of the Calorific Heating Company, Chicago, warmed up on the subject of car heaters.

Of course the street railway press had something to say and was represented by P. G. Monroe, Gazette, Chicago; C. E. Stump, Journal, New York, and F. L. Kenfield, STREET RAILWAY REVIEW, Chicago.

The president then in a few happy words presented the vice-president of the association, John Harris, of Cincinnati, with a very valuable walking stick, a gift, as he termed it, "from the people of Ohio," which was followed by the presentation of another to Mr. Hanna, which came from the "young ladies of Akron," as Mr. Hanna is on the bachelors' list.

The meeting then adjourned, when the visitors visited the works of the Sieberling Machine Company.

THE BANQUET

was given at the Hotel Buchtel at 9 o'clock, and was a delightful affair throughout.

Among the supply men there were present D. B. Dean, sales agent for the Electrical Merchandise Company, Chicago, who made a display of a number of articles recently brought on to the market by this company for railway use.

M. Siersdofer, secretary, of Post & Co., Cincinnati, who made a display of the many goods manufactured by that company for street railway purposes.

Garson Myers, president of the Calorific Ventilating Heater Co., showed one of the latest styles of ventilating heaters which received much attention from street railway men, and he also presented everybody with one of their souvenir pocket rules.

Messrs. Mark & Sterling showed a model of their new rail chair, which is receiving much attention from street railway men. They have recently received orders for these chairs from the Woodland & West Side Street Railway Company, Cleveland, which will be placed upon their tracks at once.

S. Elliott, special agent, Chicago office, Edison General Electric Company, was on hand.

Vice-President Daniel Coolidge extended the compliments of the Johnson Company in a cordial manner, and was the life of the party. He has not missed a convention since the organization and is thinking of having his name changed to Convention Coolidge. He was assisted by W. E. Boughton of his company.

Wells Goodhue, president of the Electrical Supply Company, Chicago, was made welcome and contributed his share to the pleasure of the occasion.

S. S. Leonard, secretary of the Hill Clutch Works, Cleveland, found old friends in all present and ably represented his company.

The Munson Belting Company, Chicago, was represented by H. P. Morgan of the Chicago office, and N. H. Ryan, manager of the Pittsburgh office of that company.

The Westinghouse Electric Manufacturing Company, was represented by B. E. Stewart, of the Chicago office.

The J. G. Brill Company was represented by J. A. Hanna, who is well known among street railway supply men.

The Rochester Car Wheel Works, Rochester, N. Y., showed pieces of their chilled wheels, and Mr. Eldredge Packer told of their wearing qualities.

Will Christie, Sr., manager of the Cleveland Construction Company, contractors of Cleveland T. H. Company, was assisted by Mr. A. H. Lewis, special agent.

T. H. Strieby from the Cincinnati office, the representative of the Imperial Oil & Grease Company, was on hand with the many brands of oil and grease which that company are selling street railway people, to grease all who become dry.

President F. B. Brownell was busy telling of all the qualities, durability, and attractiveness of the cars his company has been turning out for so many years.

F. A. Rogers, special agent of the Short Manufacturing Company, represented that company.

The following newspaper men were on hand:

Mr. Buckley, of the Chicago office of the Electrical Review.

L. W. Collins, Electricity.

J. L. Barker, Western Electrician.

P. G. Monroe, of the Gazette.

C. E. Stump, of the Journal.

E. V. Cavell and T. R. Taltavall, of the Electrical Age.

F. L. Kenfield, STREET RAILWAY REVIEW.

THE NEW NORWOOD LINE IN CINCINNATI.

SUBURBAN lines in Cincinnati are still reaching out in every direction, the latest addition being the Norwood extension of the Mt. Adams & Eden Park Inclined Railway Company, of which John Kilgour is president and John C. Weaver superintendent.

The line leaves from Fountain square, by way of Mt. Adams Inclined Railway, ascending the inclined plane to Mt. Adams. The plane is 1,000 feet long and has a vertical elevation of nearly 300 feet. From Mt. Adams a

Walnut Hills cable; thence over Gilbert avenue by double-track road to the terminus of the cable line; this route being through the residence portion of Walnut Hills, thence over the Montgomery pike through the villages of Idlewild, Elsemere, Ivanhoe and South Norwood, terminating at Norwood proper. The distance from Fountain square to Norwood is seven miles; fare, five cents.

The Thompson-Houston double-trolley overhead system is in use, and the cars are equipped with 30-H. P. motors: twenty motor cars were built by the Pullman Company, and the balance of the equipment, fourteen cars, are from the Laclede Car Company. Open and closed trailers were built by John Stephenson.

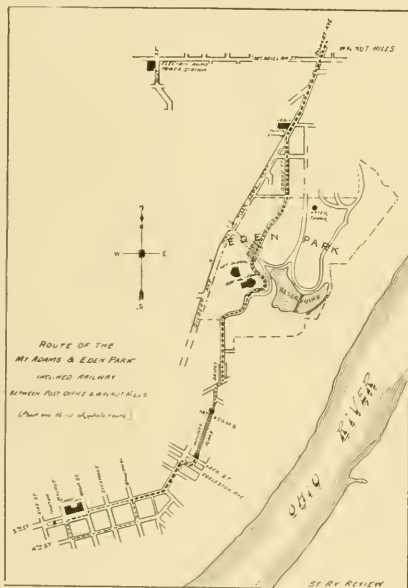
The inclined plane has been entirely rebuilt, both the trestle and track construction, and the machinery and winding drums and engines were furnished by the Lane & Bodley Company, of Cincinnati: the boilers were furnished by the Variety Iron Works, of Cleveland, Ohio, and the cables by Broderick & Bascom, of St. Louis, Mo. The safety wheels were built by Francis Fritch, of Cincinnati, and are constructed on cable plan, so as to obtain a number of wraps around the wheel. The engines, two in number, are of the Corliss type, size 20 x 30, with link motion. The winding drums are 13 feet in diameter, each one handling two cables. These cables are 1 1/4 inches in diameter, steel, while the safety cable is 1 1/2 inches in diameter, but ordinarily has no strain upon it other than that due to the weight of the cable itself, being more as a reserve, to be used in case of an emergency. The trucks are built of iron and steel, with the exception of the floor system. They are 12 feet wide and 50 feet long, and capable of handling two 16-foot motor cars at one time.

The entire system was built under the supervision of Bert L. Baldwin, mechanical engineer.

BRUSHBURG.

THE great electric light inventor and millionaire, Mr. C. F. Brush, contemplates building a town to be connected with Cleveland by an electric road. Mr. Brush has an estate of 2,000 acres in Richfield township, on the county line of Cuyahoga and Summit counties. This property is just a few hundred feet directly south of Brecksville, which is 17 miles south of the public square. Brecksville residents have organized a board of trade to push the interests of the town, and they have assured the electric light magnate of all the support they can afford him in carrying out his plans.

The road to connect with the city will be 11 miles long, and the trolley system will be used. It has been figured that the cost per mile will be between \$5,000 and \$6,000. The entire cost, including the rolling stock and power house, it is thought, will not be more than \$200,000. Mr. Brush thinks that the carrying of freight will be a source of revenue greater even than that received by passenger traffic, and each train will have one or two four-wheel gondola cars attached.



MAP SHOWING NEW NORWOOD LINE.

splendid view of the city may be had without leaving the car. The route is then through Eden park, a distance of about one mile, passing by the Art Museum and the Art School. The route through Eden park is one of the most picturesque in this part of the country, passing in full view of the reservoir and water tower; also affording a grand view of Dayton and Bellevue, Ky., across the Ohio river. The view looking up the river is decidedly grand. Upon leaving the park the line intersects with the cable road near the driving station of the

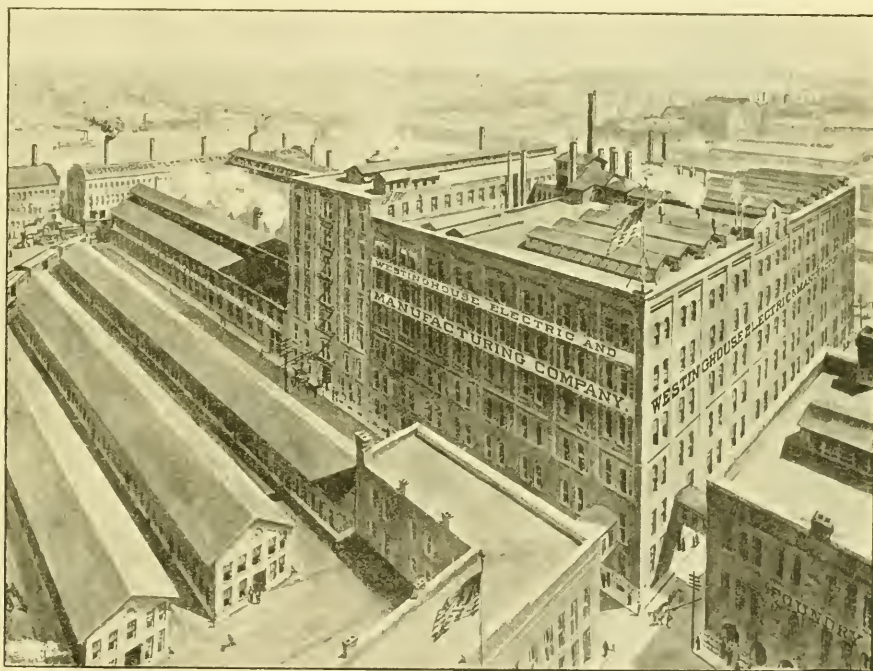
THE PITTSBURG PLANT OF THE WESTINGHOUSE COMPANY.

NEARLY every delegate in attendance upon the last convention, including the ladies, who were by no means the least interested persons, visited the mammoth Westinghouse electrical manufacturing plant. To these and to the non-attendants of the street railway fraternity a little history of this magnificent enterprise will be of pleasure and profit. The growth of this branch of the business in Pittsburg has been co-extensive with the rapid increase of the electric street railway interests during the past eighteen months. The name of George Westinghouse, Jr., as head of the company, is ample assurance of the quality of the manufactured product.

A little more than one year ago the first road equipped with Westinghouse motors was put into operation; to-day there are nearly 100 roads using their apparatus and the

a motor in which the use of high-speed gearing was avoided. In this single-reduction motor the three features of the older type mentioned above were retained, although in all other respects the two types were entirely distinct. The new motor, a view of which is given on page 502, was of the "iron-clad" construction, the field-magnet yoke being cylindrical in form and so completely surrounding the armature and field-cells that they were almost perfectly protected from injury. In this motor the armature made only about one-fourth the number of revolutions per minute as in the double-reduction for the same speed of the car, and as a consequence, the wear and noise were reduced in a much greater ratio.

Later in the present year a motor constructed on similar lines to their single-reduction, but designed to have



list is constantly increasing. Notwithstanding the fact that when they entered the field it had been occupied for several years, the increase in their railway business has been surprisingly large and gratifying.

By a special mechanical construction they succeeded in reducing noise and cost of maintenance in the use of motors.

The first motors manufactured by this company were of the double-reduction type, but they embodied certain features which are worthy of note, namely: Gear casings completely enclosing the gears, and so reducing the wear and noise; an ingenious arrangement of the field-magnets on hinges to give greater accessibility, and a frame surrounding the motor to give great rigidity to the bearings and to insure proper meshing of the gears.

A few months later this company placed on the market

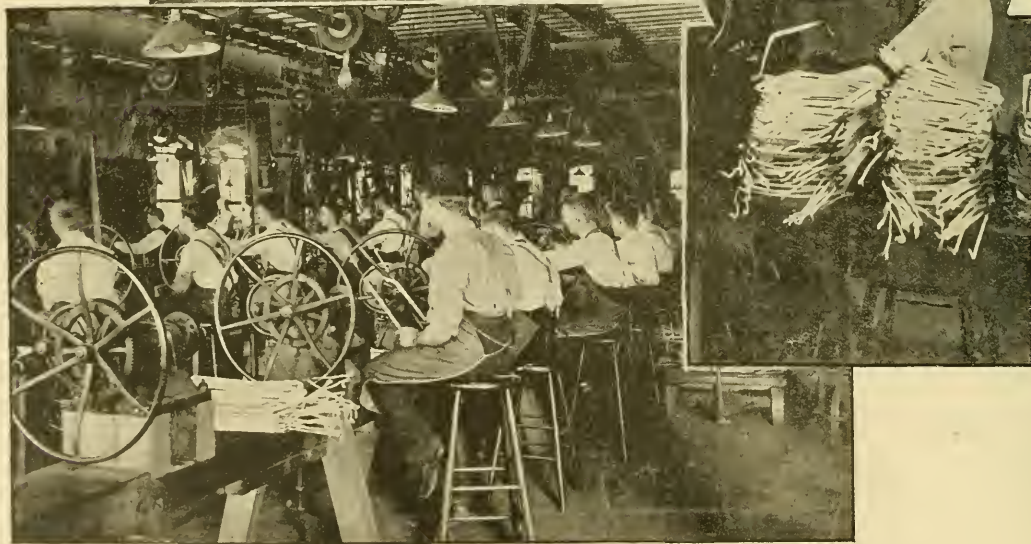
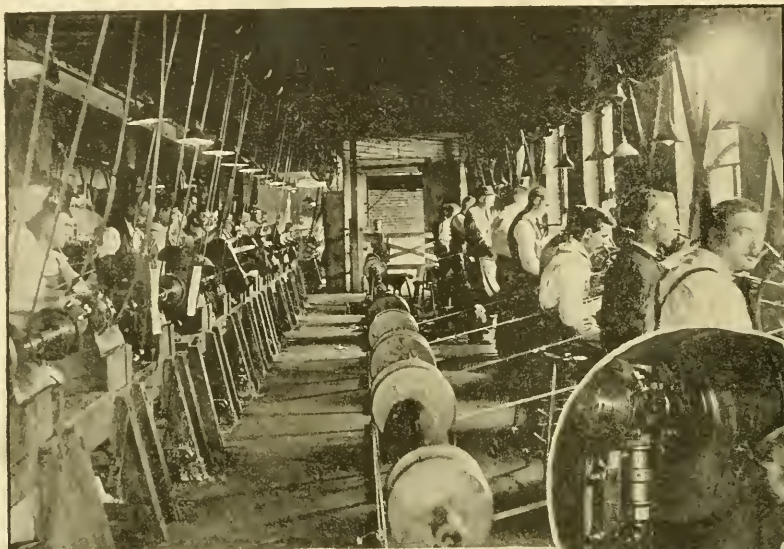
the armature directly in the car axle and thus dispense entirely with gears and other methods of connection, was brought out by the Westinghouse Company. This was called the "Iron-clad Gearless," and aptly so, since the entire exterior of the motor is iron. The feature of protection mentioned above was carried to a much greater degree in this motor and with such success that water on the track even to the height of the car axle would prove no obstacle to the operation of this motor. In the gearless motor the expense of operation and maintenance is reduced to the lowest possible point. Owing to the saving effected by directly connecting the armature to the car axle, the efficiency is very high and the repair expense has been reduced in the same proportion as the wearing parts, which are brought down to three in number.

The Westinghouse multipolar railway generators, which were fully described in these columns recently, are of a character to make the operation of the power-station as economical and reliable as possible, and the results attained with these machines have been most satisfactory.

The main factory of the company is located in Pittsburg and here the bulk of the railway business is done,

quantities of electrical apparatus could not be improved upon. The machine shop is particularly noticeable in this respect, being equipped with the latest and most improved machinery throughout.

The Westinghouse Electric & Manufacturing Company is but one of a large group of industries which center around the name of Mr. Westinghouse and which occupy



SCENES IN THE FACTORY.

the other factories located in New York City and Newark, N. J., being almost entirely confined to the production of lighting apparatus. The plant consists of two immense main buildings, around which are grouped the machine shops, foundries and blacksmith, cabinet and paint shops. The equipment and arrangement of this factory is perfect and the facilities for turning out large

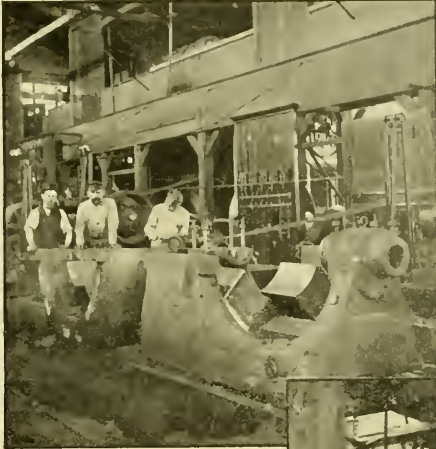
an important place in a city noted for the magnificence and number of its great industries. These associated interests are as follows: Westinghouse Air Brake Company, manufacturers of the Westinghouse automatic brake; the Philadelphia Company, suppliers of natural gas; the Union Switch & Signal Company, manufacturers of railway switching and signaling appliances; Westinghouse

Machine Company, manufacturers of high speed steam engines; the Standard Underground Cable Company, manufacturers of insulated wires and cables; the Standard Car Heating & Ventilating Company, manufacturers of heating and ventilating apparatus for railway cars; the Fuel Gas & Manufacturing Company, Limited, manufac-

tests to show the great starting torque of the Westinghouse gearless motor were also made and the ability of this machine to operate successfully and economically under the conditions of actual service was demonstrated beyond question. In addition to these shop tests, cars equipped with Westinghouse Gearless motors were in continuous operation under the ordinary conditions of practical service on two of the Pittsburg lines and even the most skeptical were convinced, after an inspection of their operation upon grades as well as under the conditions of a heavy city traffic where frequent stops and starts are necessary, that with a properly designed motor the use of gearing is not at all essential to the successful and efficient operation of a street railway motor.

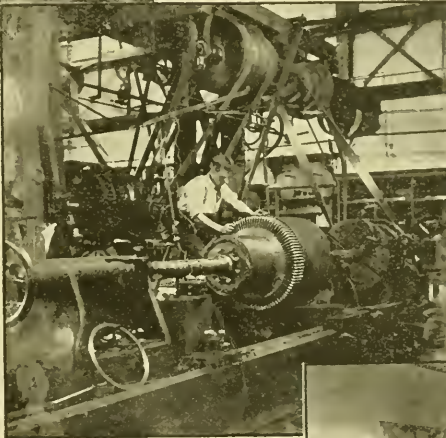
In another portion of the shop was shown in operation, a 300 horse-power generator of the new Westinghouse multipolar type which, apart from the beauty of its mechanical design, was remarkable for its excellent operation electrically. The heaviest available load, which was 33 1/2 per cent. above the rated capacity of the machine, failed

to produce any noticeable sparking at the commutator and the brushes, having been once set, required no adjustment for any load from zero up to the highest current output reached. This load was thrown off and on suddenly and an observer standing by the generator could not distinguish whether it was loaded or not except by the change in the noise made by the engine and belt. A number of machines of this type were



turers of fuel gas and regulating appliances for use with the same.

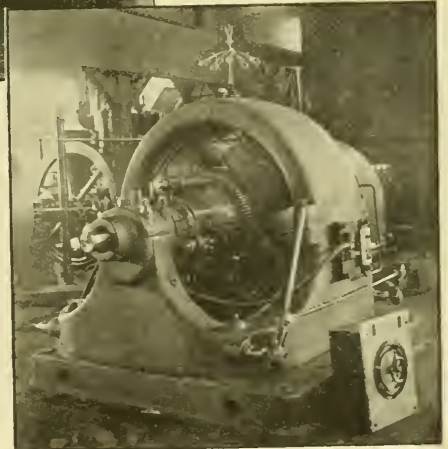
In addition to these, there are: The United States Electric Lighting Company, having its factories at Newark, N. J., and the Sawyer-Man Electric Company, with its factory located in New York City, both of which companies are leased and operated by the Westinghouse Electric & Manufacturing Company.



During the convention a special railway exhibit of generators and motors was provided on the first floor of the factory and included the several types of motors made. Here side by side were three street car trucks blocked up to allow free motion of the wheels. A friction brake applied to one wheel of each truck was fitted with a spring balance, which indicated the pull on the brake. The motors were started and the brakes adjusted until each motor took exactly the same current. The pulls on the spring balances were then noted and found to be as follows:

Double Reduction - - - -	78 lbs.
Single Reduction - - - -	88 "
Gearless - - - -	110 "

As all of the conditions of speed, voltage, etc., were the same in every case no more conclusive evidence of the superior efficiency of the gearless type could be given. These results were verified by a number of prominent electrical engineers and practical railway men, every one whom expressed his conviction of their reliability. Other



seen in process of construction, among them being one of 600 horse power. Large switch boards were arranged to show the operation of all the various devices for the equipment of a railway generating station.

The display as a whole was well calculated to give the visitor an excellent idea of the quality and quantity of the

work which the Westinghouse Company is turning out both for railway and lighting purposes and all visitors went away expressing themselves as well pleased with the attention shown them by the officers and representatives of the Westinghouse Electric & Manufacturing Company.

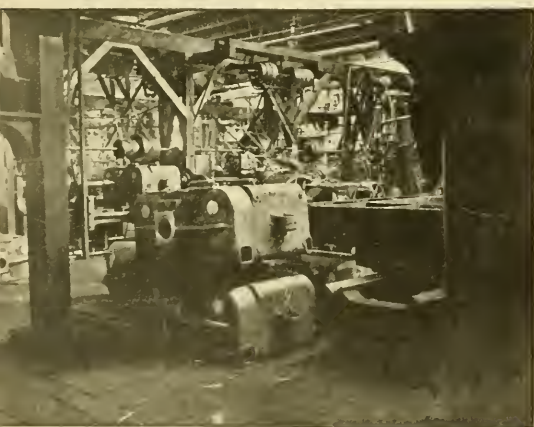
IN RETROSPECT.

The rapid growth of the company has been a surprise to the organizers of the branch and to the trade in gen-



ASSEMBLING CONTROLLING STANDS

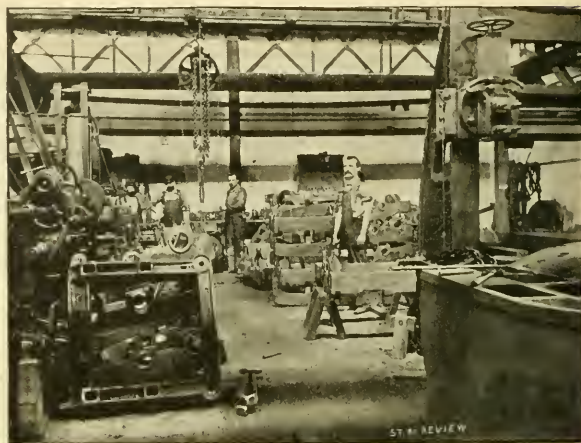
eral. In January, 1886, this company was chartered. The experimental work that has been carried on up to this time was done at the plant of the Union Switch & Signal Company and was thought by outsiders to be a branch of that concern. Only a small portion of the plant was occupied, and the work done was mostly in



GEARLESS MOTOR CASTINGS.

connection with the direct current lighting. Before things had progressed far Mr. Westinghouse secured rights under the patents of Gaulard & Gibbs to the alternating current system of lighting. This system was put upon the market. At once business began to grow. It grew by day and by night. More room was required,

and quarters were expanded until the Union Switch & Signal Company gave up the entire building to the Electric Company. Even this was sufficient for only a short time, and the building was added to and new buildings erected. Meanwhile, in 1888, this company secured



CORNER IN MACHINE SHOP.

control of the Sawyer-Man Electric Company by lease, and at this newly acquired plant on West Twenty-third Street, New York, the incandescent lamp construction of the company is almost wholly done now. A few months later, in February, 1889, similar control of the United States Electric Lighting Company was secured, and most



WINDING FIELD-COILS.

of the direct current dynamos, with the exception of the larger sizes of street railway generators, in the U. S. Co.'s shops at Newark, N. J. Dividing up the work in this manner leaves to the parent plant in Pittsburg the construction of street railway motors and generators, and alternating current incandescent lighting machinery. With such an expansion of business and enlargement of scope as the securing of these other properties gave, the charter of the Westinghouse Electric Company was

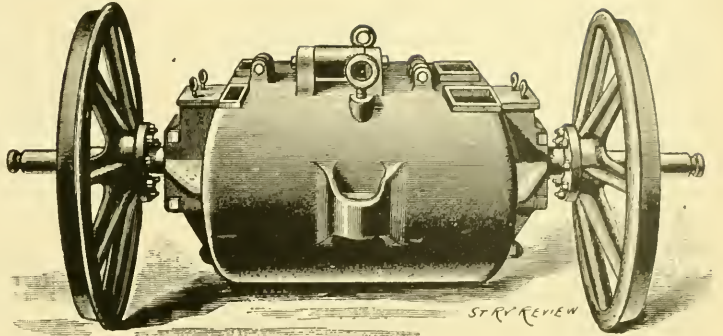
superseded in 1890 by one covering a broader field, and the name was changed to that of the Washington Electric & Manufacturing company.

In the face of difficulties that would have swamped many concerns, with a heavy competition and insufficient capital at the start, this company has fought its way to the front.

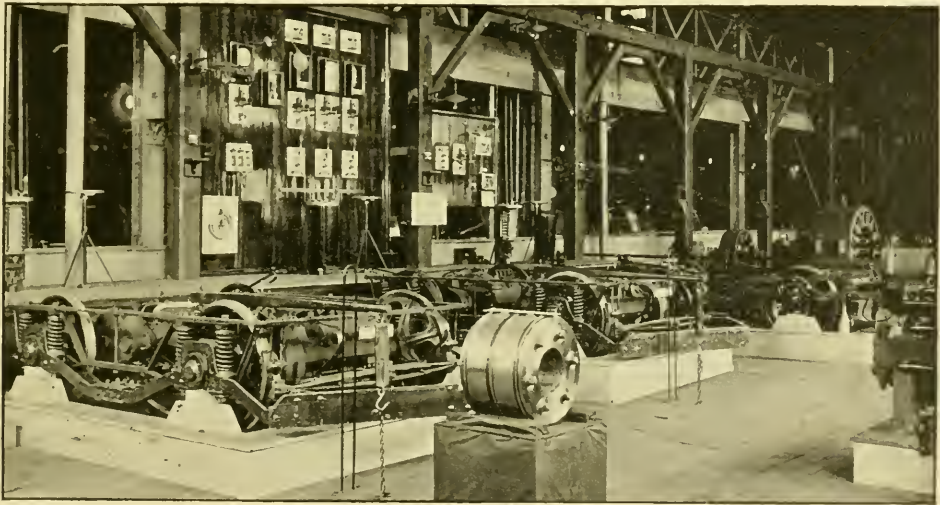
At the last meeting in Harrisburg Pa., to oppose street cars on Sunday, only four persons were present. No further efforts will be made.

ENGLISH railway papers declare the suburban transit accommodations in the 'effete east' are "a disgrace to civilization."

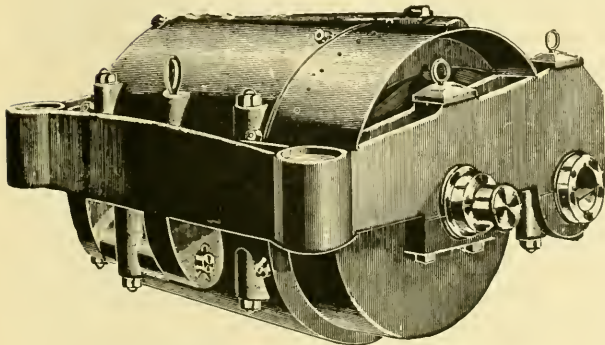
THE West End road, Boston, has lately tried the combination, introduced at St. Louis, of making one large car out of two old ones.



WESTINGHOUSE GEARLESS MOTOR.



WESTINGHOUSE CONVENTION EXHIBIT ON FIRST FLOOR OF FACTORY.



WESTINGHOUSE IRONCLAD SINGLE-REDUCTION.

An ambitious electrically inclined Chicago thief, has opened up a new field by stealing storage batteries. He now languishes.

THE company at LaCross, Wis., has had frequent occasion of late to furnish extra cars for funeral purposes.

HENRY VILLARD is said to have an eye on the New Orleans line with a view to purchase and consolidation.

ROBERT GILLAM, of cable construction fame, has returned from Paris with a flattering report of compressed air as a motive power for street cars and general purposes.

THE circuit court has come to a satisfactory conclusion, to the public at least, in allowing the Consolidated Company at Toledo, Ohio, to put up wires over its tracks in spite of the opposition of the other factions. The injunctions already granted were dissolved and new ones refused. The court held that, in allowing only the Robinson Company to use overhead wires, the city created a monopoly not consistent with equity. The decision opens up a large area to rapid transit.

THE BIG BOSTON POWER PLANT.

THE West End Road of Boston, in addition to being the biggest railway system in New England, has also the biggest stationary engines in the eastern states.

It was with no small pride that President W. C. Whitney turned on the steam that has 2,000-horse-power through the mechanism of one engine.

The boiler house is 160 feet long by 80 feet wide, and designed to contain twenty-four boilers which will supply steam for thirteen engines in the power house. These engines are of the triple-expansion type, and of sufficient capacity to develop at a maximum 2,000-horse-power each, making the total capacity at the station 26,000-horse-power. This, added to the capacity of the Cambridge station, will make, on the completion of the proposed extensions, a total of 34,000-horse-power, sufficient to run 1,700 long cars. This gigantic plant is, however, only about half completed at present, the amount of power furnished by the central station being 12,000 and that at Cambridge 5,000-horse-power. This is sufficient to operate 850 long cars.

It was the first of these big 2,000-horse-power engines which was formally set in motion for the first time as above stated. The great fly wheels are 28 feet in diameter, with a fan of 10 feet 7 inches, and each 80 tons. The two belts are 4 feet 6 inches in width, and run at the rate of 6,000 feet per minute.

The counter-shafting in the basement will be, when completed, the largest piece of work of this kind that has ever been built, and is designed to transmit the power of the engines to the generators on the floor above, four to each engine. Each section of the shaft is 40 feet in length.

The generators are placed on the floor immediately above the counter-shafting, and are connected with the driving pulley by a 30 inch belt. Each generator weighs 35 tons and is of 50-horse-power.

HUSTLERS CAN DO ANYTHING.

THE proposed location of one large plant, now under consideration for Sycamore, contemplates a line of electric street cars. This may seem a little visionary to a genuine moss-back, but for a real live hustler anything almost is within possibilities.—Republican.

MILWAUKEE'S MIXTURE.

WITH the sale of the West Side Street Railway Company's stock for \$850,000 to the Villard syndicate, the combination is complete enough to render the rapid transit facilities sufficient to please the most recalcitrant. This consolidation gives a ride to any part of the city for a five cent fare. The Villard syndicate has thus far shown a desire to give the people of Milwaukee the best that can be obtained in the way of electrical transit, and its East Side line is a model of solidity and smoothness. No expense has been spared by Vice-President Payne, and when the great system under his management is completed the city of Milwaukee will have one of the most perfect electric railways in the world.

J. B. HANNA.

ON the 26th day of August, 1854, on a farm in Columbiana county, Ohio, an important event to street railway interests occurred, although the importance of this event was not known until 1883, when the subject of the occasion mentioned, Mr. J. B. Hanna, was elected secretary and treasurer of the West Side Street Railroad Company, of Cleveland.

At the age of four years he removed to Lisbon, Ohio, where his youthful mind was trained in the public schools until the removal of his family to Cleveland, and again to Morrison, Illinois. At the age of fifteen Mr. Hanna entered the business world as salesman and bookkeeper for a buggy and paint firm. Afterwards he became a salesman for a gentlemen's furnishing store. In 1878 the house of Rhodes & Co., of Cleveland, obtained his services in their great coal and iron ore interests. After a year in Cleveland, Mr. Hanna went to Ashtabula, Ohio, in the same employ and remained until 1882, when Rhodes & Co., obtained control of the West Side Street Railroad Company and elected the hero of this sketch secretary, treasurer and purchasing agent on April 1, 1883. Until 1885 this office was graced by Mr. Hanna and until the consolidation of this road with the Woodland avenue line. The consolidation kept his services in the same capacity.

In 1885 Mr. Hanna was honored by the treasurership of the Ohio State Tramway Association, and in 1890, judging from his former record and capacity, the association gave him the responsibility of secretary also. He has thus been treasurer for six years and secretary for two, and on November 11th, of this year, was unanimously re-elected to both offices.

Mr. Hanna has been a constant attendant upon the meetings of the American Street Railway Association and a frequent speaker there upon current subjects of policy and management. He has had much to do with bringing about the recent decision of the stockholders of his company in the adoption of electricity. He is very popular among all his large acquaintance of street railway officers, and a young man of excellent judgment and progressive, determined efforts. His is a bright future in the railway field in which he has already been so successful and he fully deserves the good wishes and congratulations so freely bestowed.

HEALY'S HAPPINESS.

INVENTOR Healy is jubilant over the success of his motor, now performing successfully in and about Detroit, and the consequent orders resulting. One has been shipped to the Cleveland, Ohio, City Cable Railway Company, for night cars and switch work. The new Owasso & Corinna Street Railway Company has contracted for two motors, to be operated immediately, and other orders are being placed.

THE street railway at Dayton, Ohio, belongs to Eugene Winchett, who has become immensely popular through his order that working girls shall ride for half fare and washerwomen carrying baskets, free.



J. B. HANNA,

Secretary and Treasurer Woodland Avenue and West Side Street Railroad Company.
CLEVELAND.

LARGEST TUNNEL IN THE WORLD.

Greatest Undertaking Ever Attempted by a Street Railway—Eight-Story Buildings Destroyed to Make a Right of Way—The Dangers of Sliding Clay and Quicksand—A Mammoth Cave Beneath the Chicago River—Cost, \$1,500,000.

Although flat land of a good loam or sandy quality does not offer to the civil engineer a fair field for a pyrotechnic display of his ability, some of the most painstaking and carefully detailed works of constructive ability have not been through archaen rock, over abysmal depths, or under lofty mountains.

The peculiar situation of Chicago, on a flat prairie of sandy loam, and upon what seemed at times a bottomless marsh, made for the skill of the constructor a field for his utmost finesse. In witness of this the sky-scraping 20-story office and elevator buildings, standing as monuments of what can be done in the face of difficulties, and

its west entrance on Clinton, a distance of 1,514 feet, under buildings eight stories high, under the twenty-one tracks of three railroads where parts of the day trains run every minute and a quarter, and under streets where the heaviest wholesale traffic in the city rumbles ten hours a day. The half of the accompanying dangers can not be told short of a volume, but to the unscientific mind the difference that lies between the untouched clay, sand and mud and the completed tunnel, seems one of utter impossibility. But it will be done.

To Civil Engineer Samuel G. Artingstall belongs the honor of planning this work, and to Engineer C. V.



COMPLETE SECTION OF TUNNEL SHOWING METHOD OF CONSTRUCTION.

the various tunnels under the Chicago river, evidence the fact that human ingenuity laughs at the insidious dangers of creeping sand and shifting mud, as well as at the not more destructive menace of falling rocks and short curves.

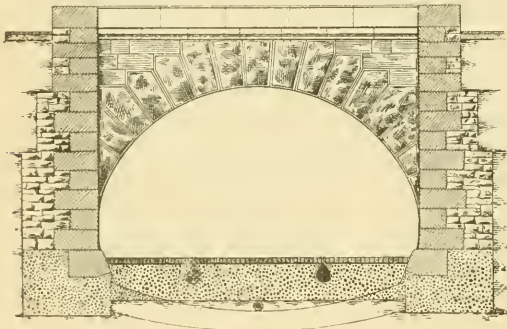
The tunnels under the Chicago river have been a necessity with the cable systems in vogue, running as they do miles into the suburbs from the center of the business part. The La Salle street tunnel on the North, and the Washington street tunnel on the West, are to be supplemented by a third now in process of construction, which has its east approach on Franklin street, and

Weston, that of superintendency. The latter gentleman, with his accustomed courtesy, gave a representative of the STREET RAILWAY REVIEW an excellent opportunity to see the interior of this, the largest tunnel in the world, and get the accompanying engravings of the various parts of interest.

Clad in some rather disreputable looking garments and rubber boots evidently accustomed to the trip, Mr. Weston led the way, lantern in hand, into the bowels of the earth. The entrance was effected west of the railroad tracks, and there an interminable mesh of trusses, thrusts

and beams of all sizes and seemingly in every conceivable position, emphasized the explanation given by Mr. Weston of this necessity: "You see, there is no rule to guide the tunnel engineer in this kind of soil. The seemingly irresponsible, spongy, tenacious, twisting, treacherous clay must be held back in almost every direction. You can see for yourself," pointing to several large timbers at least eighteen inches in diameter that were literally twisted off like match stems, "that the power of torsion is almost beyond calculation. Then, too, if you will notice, these thrusts that are driven into the abutting timber by the tremendous weight of slipping clay. This force can be calculated by instruments made for the purpose, and it has been found that a pressure of eighty tons is exerted upon each strut! Thus you see a little of the difficulty with which the tunnel engineer must contend, and need not wonder at the nest of beams every two and a half feet."

With some trepidation the STREET RAILWAY REVIEW man, accompanied by his flash-light photographic artist, played a little game of "follow-my-leader" with the active engineer. Fortunately the adipose tissue was not superabundant in either of Mr. Weston's followers, and the encumbrances of the camera tripod, the box and lanterns were fairly divided at the tunnel entrance. The beams and thrusts are not advantageously placed for rapid transit at present, and a front elevation of the trio would be a fit illustration for Dante's *Inferno*, as the dim light of the lantern threw shadows on the scene, which wove into fantastic shapes among the general network of beams and trusses. The struts in the most dangerous part of the tunnel are placed every three feet, and the network makes a mass which only the actual sight or the reproduction of photography can justify in describing.

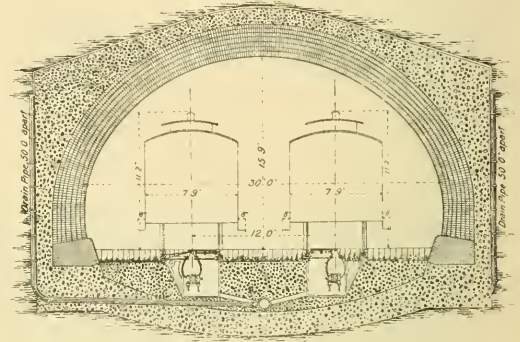


ELEVATION OF TUNNEL PORTAL.

After a tortuous trip of 150 feet back towards the river, the reverberations of the remarks attendant on placing the occipital bone in close and sudden contact with a beam proclaimed an open space, and the firefly light of the lantern showed the coming gloom at least not dangerous to an erect posture.

Here, directly under the tracks of the railway, was an open space cleared of the timbers and bricked up into an elliptical arch of 30 feet span, and here the photographer stationed his camera, looking toward the heavy beams of

the still incomplete part of the tunnel. The floor had not yet been drained in this part and the tripod was anchored on blocks of wood, while the interested parties of the experiment were perched on various other ligneous supports, like so many cranes. When the flash illuminated to the brilliancy of noonday this avenue, the effect was startling, and the instant darkness following the flash was intensified, as an astronomer might say, a hundred diameters. After taking several views of this portion of the work, the painful process was resumed of retracing the



ORDINARY SECTION.

narrow and anything but straight path which lay between the open tunnel and the sunlight.

The tunnel, in more scientific phrase, is an elliptical arch of 30-foot span, running, as above stated and here illustrated, from Franklin street on the east side to Clinton on the west.

The length of the tunnel and approaches, from the east line of Clinton street to the west line of Franklin street, is 1,514 feet, while the tunnel proper runs 920 feet. The east approach from Franklin street to the east portal is 278 feet, and the west approach, from the east line of Clinton street (see engraving), to the west portal, is 316 feet, with gradients ranging from 5.46 per cent. to 10 per cent., the maximum, (see illustration on next page).

The tunnel will contain two tracks for cable traction, lying about 15 feet apart from center to center, thus giving ample room for the exit of passengers on foot in case of accident, to which all transit is liable, with absolute safety and ease. The tracks will be at a sufficient distance from the tunnel walls to avoid the distressing accidents by crushing, of the careless persons who festoon the outside of the car rather than wait for the next train.

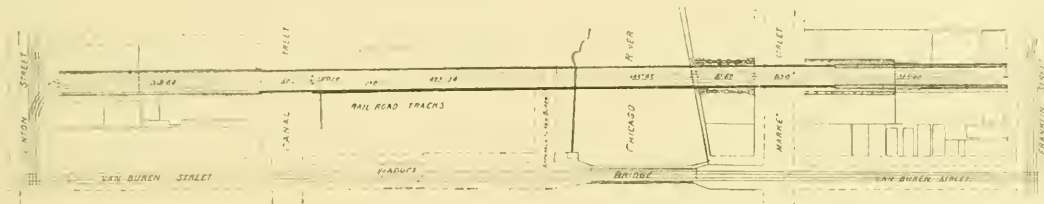
The cars will now enter and return, not into the direct street, but a few yards from the corner. The tunnel is all under private or corporate property, and thus a direct entrance on VanBuren street could not be effected.

The two eight-story buildings, whose foundations were undermined, are supported during the excavation on hundreds of jacks, many of them hydraulic machines capable of 30 tons lift each, supported by stone piers. The buildings are filled with manufacturing interests, workmen and machinery, yet not a wheel has stopped nor an elevator ceased running. One building, directly over the

Market street entrance has been purchased and demolished, as well as several other smaller brick structures. These will be subsequently re-erected, their foundation being laid upon the solid wall of the tunnel. As the excavations between these large buildings went down some 50 feet below their foundations, it was no small

The river section will be topped with concrete filling, covered with asphalt mortar, and in this flagstones 12 inches thick will be laid. The dock walls are to be of Portland cement concrete, faced with Bedford stone in 2-foot courses and coped 2 feet thick and 8 feet wide.

The masonry will be generally laid in Utica cement

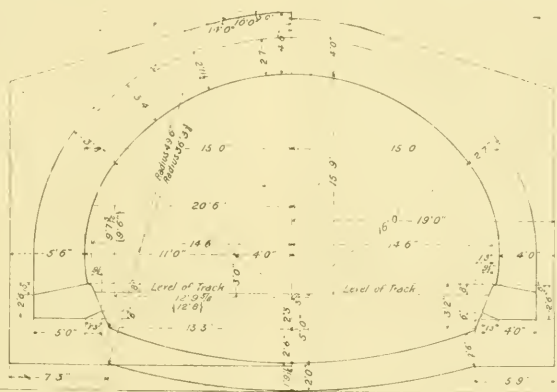


PLAN OF TUNNEL SHOWING LOCATION.

engineering feat to retain the buildings in a condition of safety, for the sliding clay constantly changes its position, and but for the utmost watchfulness, day and night, and the keeping of the walls plumb by the use of jacks, the structures would have tumbled months ago.

For the gratification of the curiosity of the figure fiend the following unscientific facts have been gleaned: The complete tunnel will require 3,000,000 bricks, 50,000 lineal feet of piling have been put in, 2,500,000 feet in bracing, sheathing and centers. There will be 6,000 barrels of natural hydraulic cement, and 15,000 barrels of Portland cement used in the different works. It will require 15,000 cubic yards of concrete backing and invert to make assurance doubly sure against the weight of clay, water and buildings. The amount of earth removed has been 50,000 cubic yards, with about 15,000 cubic yards of back filling over the arch. Nearly 300 tons of asphaltum

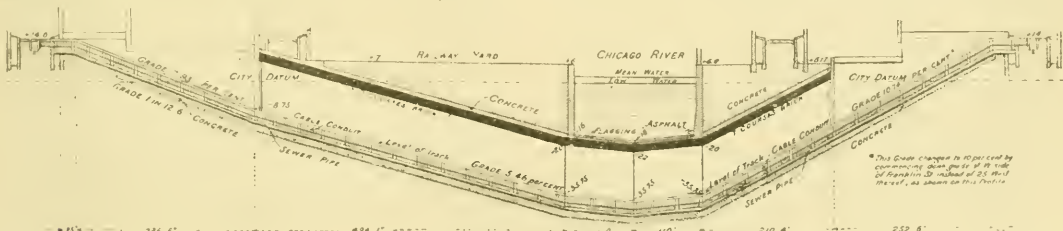
mortar, except the river section, which will be laid in and grouted with asphalt cement mortar. This mortar is made of Trinidad asphalt and gypsum. Portland cement concrete will form the mont, backing, and the filling over the haunches and crown of the tunnel.



SECTION SHOWING DIMENSIONS.

Under the center line of the tunnel (see engraving), there will be a 12-inch drain-pipe with man holes for cleaning, 200 feet apart. Tiles 4 inches in diameter will also be laid outside of the tunnel, about 50 feet apart, connecting with a 4-inch cast-iron pipe leading to the main drain, which discharges into a sump on the east, where a pump in a 6-foot well will draw to the surface.

The work on the construction was begun on the west half of the west section, and the tunnel is now complete to Canal street, 540 feet, and also a section between the east dock line and Market street, 140 feet, making a total of 680 feet now done to date. From Franklin street west,



LONGITUDINAL SECTION OF TUNNEL.

mortar gives protection against the seepage of water. For the storm water ample provision has been made as we have noted below.

The tunnel portal is to be constructed of Bedford stone, as illustrated, while the tunnel proper is of brick in seven rings, aggregating 32 inches thick, with extra strength under the tracks. The toothing joints are perfectly filled, by pressing the bricks into the mortar, not vice versa.

a distance of 140 feet of the open approach is finished. During the winter the east half of the river section will be finished, joining the west part, now complete. Besides the engineer-in-chief and the competent resident engineer, it only remains now to mention contractors Jos. Downey and Chas. Fitz Simons, who together with Superintendent Wm. Innes, have enabled the designers to carry on this great work to its present assured success.

STREET RAILWAY LAW.

EDITED BY MR. FRANK H. CLARK, ATTORNEY AT LAW, CHICAGO.

Collision of Cars Belonging to Different Companies.

In case of a collision at the crossing of two street car lines, where the evidence tends to show that the car on one line was going down grade at an unusual speed, and was unmanageable because of a defective brake, and that the driver of the other car drove across the track of the first car, when by stopping his horses he could have averted the accident, the case is properly submitted to the jury as to both defendants.

GILDERSLEEVE, J.—This action was brought to recover damages for a personal injury to the plaintiff caused by the alleged negligence of the defendants. The defendants are domestic corporations, having no interests in common, engaged in operating street railroads, as common carriers of passengers for hire, through certain avenues and streets in the city of New York. On the 7th day of November, 1888, at about 10 o'clock in the forenoon, the plaintiff was riding down town on the front platform of a Second avenue car, belonging to and operated by the defendant, the Second Avenue Railroad Company. He had gotten on the rear platform of the car, but, as he had some paint brushes and pails with him, being a painter by trade, he was ordered by the conductor to go to the front platform and ride there, which he did. The defendant, the Houston, West Street & Pavonia Ferry Railroad Company, has a single track railroad in East Thirty-sixth street, which crosses the Second Avenue Railroad Company's tracks, and is used by the former for eastward bound cars only. The crossing of Second avenue at Thirty-sixth street is approached from the west upon a down grade of 2 feet 4 1-5 inches in 100 feet. As the Second avenue car, upon which the plaintiff was riding, neared the crossing, one of the cars of the defendant, the Houston, West Street & Pavonia Ferry Railroad Company, was also approaching said crossing, going east on the down grade, and at about twice its usual speed, to wit, "about 12 miles an hour," as testified by Donohue, the driver of said car. Further evidence of the driver on this point is as follows; "I tried to put on the brake, and found there was something the matter. I knew there was something not in good order." It appears from other evidence that the failure of the brake to work was due to a broken brake rod, and that an examination of the broken rod disclosed a flaw in the iron, which was the cause of its breaking. Donohue's car being unmanageable, and the Second avenue car approaching the crossing at ordinary speed, Donohue shouted to the driver of the Second avenue car, who whipped up his horses, thinking to get over the crossing without a collision, but the Thirty-sixth street car struck the rear of the Second avenue car, and the plaintiff was thrown to the ground and injured. The action was tried before a jury, and a verdict rendered in favor of the plaintiff, and against both of the defendants, for the sum of \$15,000.

The evidence is conflicting on the question of the negligence of the driver of the Second avenue car, but we think the evidence was amply sufficient to warrant the

court in submitting the question to the jury. Three expert drivers, including Donohue the driver of the Thirty-sixth street car, testified that the driver of the Second avenue car might have averted the collision by stopping his horses. These experts all agree that either of the cars in question, at the points they were moving at the time under consideration, with the brakes in good order, could have stopped within the space of five or six feet. The plaintiff's evidence places the Second avenue car at least thirty to fifty feet from the Thirty-sixth street track, when the Second avenue driver saw, or should have seen, the Thirty-sixth street car approaching the crossing at unusual speed. It shows that, when the Second avenue car was this distance away from the crossing, Donohue shouted to the Second avenue driver, who had his face turned toward the east and was not looking ahead. This evidence clearly indicated a neglect of duty on the part of the Second avenue driver. He was nearing a crossing, where, if a car was to be met at all, it must come from the west, and yet he was looking toward the east, heedless of possible peril that might be encountered at the crossing directly in front of him, by the rapid advance on the down grade, of a Thirty-sixth street car.

Is there sufficient evidence to warrant the court in submitting to the jury the question of negligence on the part of the other defendant, the Houston, West Street & Pavonia Ferry Railroad Company? The evidence is uncontradicted that when the car of this defendant was moving eastward on Thirty-sixth street, on the down grade, at the time in question, and within about 70 feet of the Second avenue crossing, it became unmanageable, and rushed towards the crossing at a speed of about 12 miles per hour. No negligence can be imputed to the driver of this car. He showed courage in standing at his post in the face of imminent danger. He shouted to the driver of the Second avenue car, tried to put on the brake, and apparently did everything in his power to avoid the accident. Had the brake been in order he could have stopped the car and prevented the collision, but the unusual and unlawful rate of speed at which his car was moving just before reaching the crossing; the failure of the brake to perform its functions; the fact that it was a large car with two horses, and that there was no person in charge except the driver; the fact that there was a rear brake that might have been applied, if there had been a conductor on the car—are all circumstances which, together with the other evidences in the case, were for the consideration of the jury on the question of negligence of this defendant, and afforded good grounds for the refusal of the court to dismiss the complaint as to this defendant.

As to the contention raised by one of the defendants, that if negligence was proven against the other defendant, the first defendant should have had the complaint dismissed as to it, we see no force in this argument; for

the comparative degrees in the culpability of the two defendants will not affect the liability of either. If both were negligent, in a manner contributing to the result, they are liable jointly or severally (See *Barrett v. Railroad Company*, N. Y., 628). The fact that he was standing on the front platform was not negligence, especially as he was directed to do so by the conductor. We have carefully examined the questions raised by exceptions taken to the admission and exclusion of evidence in the progress of the trial, and find no error in any of the rulings that can be held to be prejudicial to the defendants or either of them. (N. Y. Superior Court, *Schneider v. Second Avenue Railway Company*, et al. 6 N. Y. L. Jour. 127).

Electric Street Railway—Additional Servitude—Rights of Abutting Lot Owners—Laying Track in Street Paved by Special Assessment—Authority to Construct and Operate Electric Railway—Pennsylvania Statute.

The use and occupation of the the streets of a city, under legislative and municipal authority, for the purpose of constructing and operating therein an electric street railway, with its appendages of poles and wires, does not impose such an additional burden or servitude upon such streets as renders it necessary to provide compensation therefor to the owners of abutting property. Accordingly an injunction will not lie to restrain the construction and operation of such railway, on the ground that no provision has been made for securing, in advance, compensation for damages accruing to such abutting property owners.

The fact that the street proposed to be occupied by the electric railway has been paved with asphalt, and the cost thereof assessed against the abutting owners, which pavements will be torn up and replaced with an inferior block pavement, does not affect the right of the municipal authorities to consent to the laying of tracks in such street.

A company incorporated under Pennsylvania Act of May 14, 1839, providing for the formation of corporations for the purpose of constructing street railways for public use in the conveyance of passengers by any other power than locomotives, may construct and operate a street railway, using electricity as a motive power. (*Sup. Ct. Pa. Lockhart v. Craig Street Railway Company*, 47 Am. & Eng. R. Cas. 57).

Injury to Person Attempting to Board Car—Standing Between Tracks—Contributory Negligence.

Plaintiff was on his way to work, and carried on his left shoulder pieces of wood measuring from five to eight feet, and in his hands a cane, a bucket and an axe. At the time of the accident he was attempting to board the cars—the West End train—owned by the defendant company. As a car approached on the other track, he turned with his planks perpendicular to the tracks, and thereby they were made to project over the two tracks, one end just opposite the platform of the West End train touching the tender, and the other immediately in front of the moving street car. The force from the street car and the resistance from the standing train pressed the planks against the plaintiff and caused the accident. The dis-

ance between the two cars, opposite each other, is about two feet, and the tracks are about four feet from each other. Plaintiff was familiar with the locality, had frequently traveled on these cars, and knew the distance between them.

Unquestionably plaintiff had the right to seek conveyance on the West End train; he had the right to carry tools and planks needed by him; to reasonable protection, and not to be exposed to accident. But when he carries wood or other material taking up more room than persons generally occupy, on the streets, he should be cautious, and more than ordinarily active in his movements. In this case the plaintiff is precluded by his own act from recovering damages. (*Sup. Ct. La. Byrd v. New Orleans City & L. R. Company*, 9 So. Rep. 565).

Boy Riding on Platform of Car—Injury by Being Pushed off by Passengers—Liability of Street Car Company.

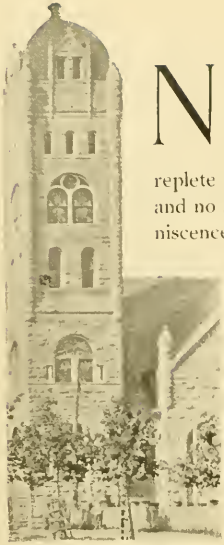
The plaintiff, over fourteen years of age, stood upon the platform of a street car, crowded within, having his foot upon the step and leaning upon the dash-board. As the car approached a transfer station, passengers in the car rushed out and pushed the plaintiff so that he fell and was thrown beneath the wheels and injured. The court instructing that the defendant company was not liable for the conduct of the passengers unless it was unusual and disorderly and could have been prevented by the persons in charge, and submitting that question and the question of contributory negligence to the jury, the judgment for the defendant was affirmed. (*Sup. Ct. Pa. Randall v. Frankford R. Company*, 139 Pa. St. Rep. 464.)

NOTE.—In the recent case of *Mullan v. Wisconsin C. R. Company*, 49 N. W. Rep. 249, the supreme court of Minnesota held that a railway carrier of passengers must, under an implied police power to prevent an abuse by passengers of their privileges, exercise the highest diligence reasonably practicable to protect passengers from violence, abuse or injury from fellow passengers. A railway company is not liable to a passenger for an assault made upon him by another passenger suddenly and unexpectedly, where the conductor separates the parties as quickly as practicable.—ED.

McKEESPORT'S PRIDE.

THE trial trip of the new line connecting McKeesport and Duquesne has been made with great success. Electrician Mosby, of the Edison Company, took the following notables, Dr. T. L. White, H. H. Swaney, J. W. Crawford, W. W. Anderson, superintendent of the road, Thomas Reynolds, of the McKeesport line, and thirty-one others, on a flying trip of one hour and twenty minutes from the Duquesne starting point to the McKeesport depot. A few stoppages on account of the roadbed were met with on the first trip, but the return was without jar. All along the line people ran out of their houses and gave cheers in honor of the occasion. The line is a good one and will no doubt prove a paying enterprise. It was built at a cost of over \$60,000 and is over two miles in length. The first work on it was commenced in July, 1890, but owing to many obstacles that presented themselves the road was not completed until the 15th of last September.

MISSION RIDGE, CHATTANOOGA.

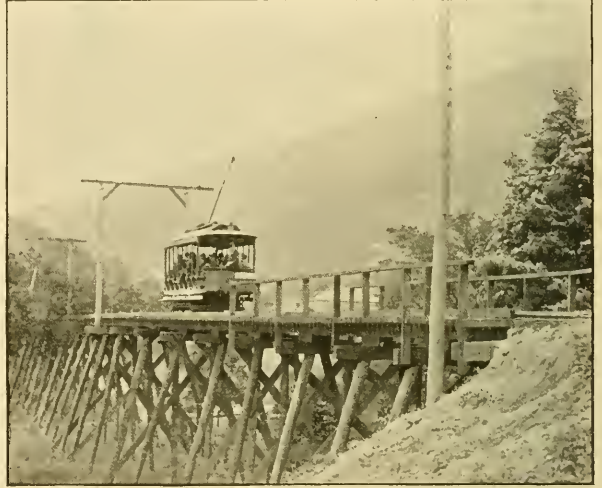


N the South, the tourist over the battlefields, prisons, cemeteries and camps of the late war, can find no district which is more replete with interest than Tennessee, and no spot gathers about it more reminiscences than Chattanooga and its environs. In the most beautiful scenic region of the South, in the salubrious atmosphere of the highlands, surrounded by places of historical interest, every acre witnessing the greatest struggle of modern times, it is no wonder that to this region are attracted yearly several

thousands of pilgrims from the North and from the South, to gaze upon the beauties of nature, so wonderfully arranged, and bring to mind the tender hopes and fears now happily buried forever under the cover of the sod.

All along the road of this, the most scene-honored railway of the south, are found the handiwork of the ages, supplemented by the dreadful memories of the dark days of war, and the tender recollections engendered in the mind of nearly every visitor, as he sees the spots sacred to the memory of some friend's spilt blood. Here gather every day in the year the blue and the gray, amid the signs of peace and prosperity,

field, the Garden of the Gods and to the Old Man of the Mountain; over the dark and bloody ground back to the beautiful city, grown from a muddy, straggling village of 3,000 to its present size and magnitude. The most conservative as well as the most liberal of the citizens give the honor due to electric traction in building up the fine city with its beautiful avenues, attractive dwellings and



TRESTLE ON ST. ELMO LINE.

handsome public buildings. The illustrations in this article give a fair idea of some of the salient points of interest.

The Mission Ridge incline, upon the scene of the battle, looks north over the Chattanooga Valley into the most



LOOKOUT MOUNTAIN INCLINE JUNCTION.

to review scenes now happily but remembrances. The route of the pleasure seekers generally is over the electric line as follows: From the city centers out over the incline, (see illustration) over the narrow gauge to Sunset Rock and Natural Bridge and across the historic battle-

beautiful portion of this beautiful State. The trestle over the St. Elmo line is a pretty piece of engineering work and well worth the prominence of the engraver's reproduction. The Lookout Mountain Junction, with its little waiting station and well constructed switches, is also

deserving of more than a casual glance. Through such surroundings the Chattanooga Electric Railway carries its patrons along 35 miles of track to all the points of scenic or historic interest. Nor is the road in itself unworthy of the locality. The best skill of modern mechanics has rendered it one of the noted roads of the South.

The gauge of the track is 4 feet 8½ inches, and laid with 56-pound T rails and 35-pound girder, on a well ballasted roadbed. The equipment of rolling stock is very complete, consisting of a sufficient number of 16 to 18 foot cars built by a well known company and finished in an artistic manner. Each car carries two motors of 15-horse-power each.

THE POWER STATION

is 45 x 140 feet in size and well constructed. For the

From the main line, with its varied interests, Ball Knob, Grant's headquarters, Bragg's headquarters during the Missionary Ridge fight, Grant University and the Catholic cemetery, there branches out the Ridgedale line, connecting at Ridge Junction, and is altogether two miles in length. The ascent from Ridge Junction is an average of 7 per cent., with a switchback at the halfway line.

The improvements contemplated are more motor cars, with a few double deckers for the Lookout Mountain line. The engineer of the company has just completed his survey of the George street line, which will run from East End avenue to Ridgedale. The poles are already up and the iron will soon go down.

The old mule cars are being remodeled into one-machine electric cars, but the management of the road say that it is only a temporary arrangement. "By next spring we will have put on at least twenty new cars," says Manager



ON THE INCLINE—GOING UP MISSION RIDGE—LOOKING NORTH UP CHATTANOOGA VALLEY.

necessary power to climb the frequent, difficult grades, besides doing the ordinary work required, three Beck engines, made by the Taylor Manufacturing Company, of 150 horse-power each, and one Armington & Sims of 250 horse-power are found sufficient. The boilers, of 600 horse-power, are also of the Taylor Manufacturing Company make and are very satisfactory.

THE ELECTRIC EQUIPMENT

is as thorough as any road in the South can boast. The five generators are from the Edison works and aggregate 550 H. P. Twenty double Sprague motors from the same company complete the list. The five long belts which drive the machinery are from the Munson Belting Company of Chicago, which has so many of its well-tested belts all over the country.

Divine. "We are just looking at a new car made by the Stephenson Company. The cars are about 25 feet long and entrance is effected at a door in the side. These new cars are provided with double trucks with a machine at each truck. The cars run rapidly with little more power than is used by the cars run now."

The complications arising in regard to the steam road, the Belt Line, will be best resolved by joining it with the city electric system, and the press and public urge the deal as a benefit for all concerned, and, no doubt, within the near future, the press and public can be accommodated as the needs demand.

Altogether, as a scenic line, the tourist through the South has not done justice to himself unless the Chattanooga Electric Railway has laid out to him this wonderful section of beautiful Tennessee.

BOOMING BROADWAY.

MERCHANTS on Broadway, New York, who imagined themselves in a slough of despond during the construction of the cable road, and who claimed to fear a destruction of their business, now find that like a trip to the dentist, they were more scared than hurt. At all events the tremendous undertaking of laying a conduit through the meshes of innumerable pipes, the accumulation of years, and which has never been equalled anywhere, is at an end, and the track work is completed. The event was celebrated October 28th, when for the first time in five months a complete round trip was made, in charge of contractor John D. Cummings.

Before work was commenced experts in abundance testified that from two to five years would be required to complete the street work, and at that time no one dreamed of the stupendous difficulties which daily arose as new obstructions were uncovered. The changing of the various pipes was really a much greater undertaking than the actual cable construction. And yet only five months have elapsed since the work began. Its completion marks one of the greatest and most indomitable engineering efforts attempted in many years. Previous to 1881 no record had been kept by the gas companies of the location of their mains on Broadway, and the opportunity thus offered to repair, inspect and relay the several gas, steam, water, pneumatic and other pipes was a most welcome one to those companies.

The new paving laid by the company is unequalled in quality and appearance anywhere. Old sewers have been rebuilt and in every way the occasion has been a modernizing of old Broadway.

When the car passed the old Morton House the landlord trotted out his brass cannon kept for great occasions and with a volley that echoed all along the street, called out the neighbors to witness the event. Fireworks and a general hurrah marked the progress of the car, which may well be termed a triumphal one. The Broadway of the good old days of Stewart, Wallack and Sharp is fast undoing the metamorphosis from which it will shortly emerge, and amid unprecedented prosperity born of new energies, make the butterfly.

MONTREAL AT PITTSBURG.

THE city of Montreal sent two delegates to the Pittsburg convention at its own expense and in the persons of Alderman Prefontaine and City Surveyor St. George. They returned enthusiastic over rapid transit as demonstrated by the Short, Edison, Westinghouse and other systems, and were doubly astonished at the length of the suburban lines and the amount of business carried. Mr. St. George has a plan for keeping the track open and cars running all winter, the present method being to abandon the rails and run sleighs with the first heavy snowfall. When General Manager Lusher was told of the return of the committee, of what they had seen and heard, and that "the mule must go," he remarked their charter was for a horse railway and that they had no intention of going yet.

HE FOUND OUT.

IT is sometimes amusing to note how some people will exert themselves to get behind the dealer and imagine they can save something by ignoring the seller. Especially is this true when the article in question is handled by the manufacturer's agent who controls exclusively a given territory. As an instance, the following letter of vigorous and healthy "nerve," addressed to a prominent western supply house is a good illustration, the names and addresses only being changed, "for want of space."

DUSENBERRY, NOV. 1.

CHRISTOPHER COLUMBUS CO., HOOPTOWN.

Gentlemen:—Will you please inform me where the Electric Tether which you handle, is manufactured, and oblige,
Yours truly, A. MANN.

To which the following reply was promptly sent:

HOOPTOWN, NOV. 3.

A. MANN, Dusenberry.

My Dear Sir:—Your esteemed favor of the 1st inst. is received and contents noted. We beg to inform you that the Electric Tether is manufactured in Egypt from equal parts of Elephant's hide, rubber and gum Arabic, the rubber coming from South America. We beg to assure you we shall be pleased to answer any further questions of like character and remain,

Sincerely yours,

C. COLUMBUS CO.

A SPOKANE SPECIALTY.

JOHN Fisken, electrician of the Spokane Electric Railway, has devised an electric car heater, to be placed under the car seats.

The apparatus consists of a long coil of iron wire, which will be packed in galvanized iron and clay and placed beneath the seats on each side of the car. This wire coil will be connected with the electric current and the heat generated in the iron wire will warm the car.

When the car leaves the stable in the morning about thirteen amperes will be taken from the current until the temperature of the car has become sufficiently warm, after which two amperes will be all that will be required during the day to keep the temperature up to the required warmth. An experimental test was made and the temperature of the car raised to eighty degrees within a few minutes.

NICKEL FOUNDRY CAPTURED.

THE secret service officers have unearthed a scheme in Chicago whereby an ex-conductor, named Frank Gillespie, and a conductor on the State street line, named Edward Allie, were "nickeling" upon an unusual method. The former worked in a bakery and with plaster paris molds baked bad nickels along with the pies. It is not yet determined whether the same material entered into the manufacture of both, but the probability is that it did. Allie was the lightning change artist and worked the product off on passengers. Molds for dimes and quarters were also captured at the time of the raid.

PROGRESS OF CABLE MOTIVE POWER.

(Concluded.)

Report to the American Street Railway Association at its meeting at Pittsburg, Pa., on Oct. 21, 1883, by James Clifton Robinson, London, England, "Committee" of the Association on Cable Traction.

PROGRESS IN THE UNITED STATES.

Following upon the success achieved in San Francisco, Chicago and New York, the year 1886 marks the period when the cable system began to make rapid progress in the United States, and about seventy roads are now being operated or are in course of construction. Kansas City, St. Paul, Omaha, Neb., Denver, Colo., Cincinnati, O., Los Angeles, Cal., and St. Louis, Mo., entered the field early. The lines in Kansas City, now six in number, extend to over 70 miles in all: Denver presents four lines 53 miles in extent, and in Cincinnati lines of 24 miles in length are in operation. The cable tramway constructed in Grand Rapids is 12 miles in length; St. Paul has a system of 15 miles; the four roads built in St. Louis now extend to 48 miles, and Omaha has a line of over 9 miles of track. The lines now named present a grand total of over 250 miles, mostly completed in the years 1886-9, and of which I shall presently give more detailed information.

I may be allowed to dwell upon the cable system in Los Angeles, Cal., partly on account of the active share I took in its construction in conjunction with my friend and colleague, Mr. Augustine W. Wright, and partly on account of the interesting features in its construction. The Pacific Railway Company now owns and operates a total mileage of 20½ miles, traversing the leading thoroughfares of the city; and Temple street 4¾ miles, has recently been double tracked. The leading features of the Los Angeles cable tramways are two. In the first place, I may point out that the project was conceived with great boldness in view of the population the roads were intended to serve. In 1880 Los Angeles had a population of 7,500 only, which in 1888 had risen to 65,000, and on the completion of the work in 1890, to 80,000. In view of the fact that the city was already gridironed with horse and mule car lines when the cable roads were begun, it will be seen that the undertaking was on a large scale for a place of the size. But the association of Mr. Holmes with any enterprise is a guarantee that there will be no half measures, and that whatsoever is done will be done thoroughly and well. This has been abundantly proved at Los Angeles, and it is only a plain fact to assert that the prestige of Mr. Holmes' association with the magnificent cable roads at Los Angeles, has both directly and indirectly brought about further important developments of cable motive power in San Francisco, Chicago, St. Louis, Cleveland, Washington, Baltimore, Brooklyn, New York and elsewhere. In the second place, the system constructed at Los Angeles, included works such as had never before been realized in tramway or street railroad construction, including the building of large and massive iron bridges, the diversion and grading of new streets, the driving of straight line through undeveloped territory, and the crossing and recrossing of roads, rivers and railways. In all this, capacity and power have been provided to meet all expected growth of population, and although we were considered to have run a little in

advance of the times, yet, looking to the phenomenal development of the city, I have little doubt it will grow to justify the boldness of Mr. Holmes and his associates, and their faith in their great undertaking.

The bridges and viaducts, three in number, built specially to carry the cable tramway, form outstanding features of the Los Angeles system. One viaduct, 578 feet long, carries the tramway over the track of the Santa Fe railroad and the river in one span. In all, the length of bridges and viaducts thus specially built amounts to 4,250 feet, and the greatest, on San Fernando avenue, carrying the cable road over the depot of the Southern Pacific Railway Company, measures 1,535 feet. This grand viaduct carries, like the others, a double track, but owing to difficulties as to the site for supports between the steam railway surface tracks below, it rests on single posts, being the only case in which double tracks are so carried. Of the total length of 1,535 feet, 50 feet at each end form the concrete approaches, and the remaining 1,435 feet are all in metal work. The dimensions generally are as follows: Height from ground to rail level, 25 feet 9 inches; width between hand rails, 25 feet; main posts 5 feet wide at ground line, tapering to 3 feet 14 feet above the ground, and 22 feet long. There are 19 main posts, each weighing 4½ tons; 10 smaller ones, 12 inches square and 26 feet long. The ruling span is 50 feet, but 2 spans are 55 feet, 3 of 40 feet, 1 of 30 feet, and 1 of 20 feet. The main trusses are of the "Warren" type, 4 feet deep, weighing 100 lbs. per running foot; the concrete approaches are 8 feet high at the highest point, and 19 feet wide. Two curves on the viaduct are 60 feet radius. There is no thoroughfare on the viaduct except for the cable trains,—indeed the grade of the approaches, 1 in 5, forbids the possibility of any other traffic using the viaduct, and, as a consequence, the cable is not here enclosed with a conduit. Probably not many places will be found where this plan can be adopted, except in such cases as the Brooklyn bridge, or where, as here, a viaduct is built exclusively for cable purposes, but the use of an open conduit cable where possible illustrates the general adaptability of the system.

The driving plant in Los Angeles is placed in three power houses, the weight of machinery being in Grand avenue, approximately, 549 tons; at Boyle Heights 448 tons, and in Downey avenue 446 tons. In principle, capacity and general arrangement the engines, etc., are the same, so that a notice of the Grand avenue power house plant will suffice to give the convention a knowledge of the whole system. The boilers by which power is generated are of the Hazleton tripod type, a boiler whose many advantages in occupying small superficial area, and in giving a maximum of heating effect, I shall not here dwell upon. With Rony mechanical stoker and smokeless furnace, the steam generating plant used is of the best and most progressive character. The engines are double expansion, of the "Pacific Coast" type, high pressure cylinder 26 inches, low pressure 42 inches and stroke 48 inches in length. The high pressure transmits power to a double disc, and the low pressure to a single

disc crank, and the engines develop a *minimum* of 700 H. P. at 75 revolutions a minute. The cylinders are parallel, with ten feet distance, centers. The main journals are 12 x 28 inches; outboard journal, 12 x 20 inches; low pressure crank pin, 7 inches diameter by 7 inches long, and high pressure, 12 inches diameter by 7 inches length of journal. The flywheel is 14 feet diameter with 14 inch face, weighing 36,000 lbs. The main driving shaft, which is 18 feet 2½ inches long, communicates power to the car machinery by the system of endless cotton rope transmission, and not by gearing. On the shaft are two wheels, 6 feet 2 inches diameter each, grooved for fourteen 2-inch cotton ropes, these ropes giving movement to the driving wheels, 25 inches diameter, similarly grooved, the shaft on which these latter turn being coupled to the driving winder shaft of the cable machinery by Oldham couplings. Leaving out smaller details of measurement, I may say that the rope drums receiving power from the large driving wheels are 15 inches diameter, and they are coupled by ropes working on the grooves on the rim to two idler rope wheels in rear, these idler wheels subserving a valuable purpose in the economy of the design. They are *one inch* less in diameter than the companion rope wheels, and the result of this is that the cable itself has no labor in driving the idlers, the slip required being otherwise provided. The cable drums are 13 feet diameter, grooved for five 1¼-inch ropes, run loose on the shaft alongside the hub of the driving wheels, and receive motion by the action of friction discs on the Weston principle. A speed of 75 revolutions per minute on the engines represents a traveling speed of 8 miles an hour on the road. The road is 3 feet 6 inches, double tracked throughout. The rails are of steel, girder pattern, 40 lbs. to the yard, the slot rails being of the same weight. Yokes of wrought iron, weighing 200 lbs. are laid at distances of 3 feet 6 inches, and the conduit, 28 inches deep, is of concrete and averages 12 inches in thickness. Covering plates are used and its surface paved to level with bituminous rock, a Southern Californian asphaltum product. The carrying pulleys, 16 inches diameter, are of cast iron, unlined, mounted in lignum vitæ, and placed 30 feet apart. The curve pulleys are also of cast iron, 18 inches and 22 inches diameter, with centers 4 feet apart. The entire length of straight surface track of cable lines is 99,328 feet; viaducts, 4,250 feet; bridges, 2,124 feet; curves, 2,010 feet; pits, 562 feet; making a total of 108,274 feet of track, or rather over 20½ miles. The cost of construction amounted to about \$52,500.00 per mile of single track complete. The varieties of level, including those caused by the approaches to the viaducts and bridges, necessitated the use of depression and crown pulleys, and several steam railway and cable road crossings had also to be provided for. The cables, 1½ inches, in use at Los Angeles are of crucible steel, weighing 2½ lbs. per foot. The average weight per mile is 6.58 tons (2,000 lbs.); the price averaged about 12½ cents per lb.

The Los Angeles road, having numerous sharp curves in parts, is pretty severe on the seven cables in use, their

life averaging about ten months only. The cost of coal fuel, \$10.50 per ton, and the number of power-houses made the initial operating charges rather high, but the substitution of crude oil for coal as fuel has materially reduced these expenses. The cars are run in trains of one, two or three trailers to a grip car, 2½ and 5 minutes headway, each train averaging 110 miles per day or eighteen hours. The speed of the cables average 8 miles per hour. The system presents many curves of every type and character. In the first section operated, 15,000 feet, there are 14 right angle, compound and reverse curves, and yet the facility and safety with which these roads have been operated are gratifying, as far as overcoming practical difficulties is concerned. An appreciation of the magnitude of the undertaking may be gathered from the following figures, which represent approximately the quantities and total cost of the system.

CONSTRUCTION.			
Iron work, track and slot rails	-	-	\$370,000
Viaducts and bridges	-	-	150,000
Sundry track material	-	-	148,000
Paving	-	-	85,000
Labor	-	-	318,500
EQUIPMENT.			
Power-houses	-	-	154,000
Plant and machinery	-	-	300,000
Cars, etc	-	-	135,000
Cables	-	-	55,000
			\$1,715,500

The whole of the work at Los Angeles was practically carried out through, and the lines put into complete operation within one year of our taking hold.

Kansas City, Mo., as mentioned in the report by Mr. Lawless, to the fifth annual meeting of the Association, held in Cincinnati in 1886, had at that time completed one cable road, three miles in length. As already shown in my report, Kansas City now takes a high place in the records of cable traction, having about 70 miles of road in operation. The Kansas City Cable Company now owning 20½ miles of cable track, was the first in the field. In point of mileage, the Metropolitan Street Railway Company exceeds that of the City Cable Company, its length of cable track being now 22½ miles. This company began to convert a portion of its system in 1886, and it is of interest to notice that the line first converted was originally of narrow gauge, but on the cable being introduced the 4 feet 8½ inches width was adopted. Next in point of extent is the Grand Avenue Railway Company, holding 17¼ miles. The conversion in this instance was also begun in 1886, the first section being completed in 1887, and the rest being gradually brought into construction or conversion and operation. The other lines are the Kansas City Consolidated Street Railway Company, 6 miles; the People's Cable Railway Company, 6 miles; and the Union Cable Railway Company, 5 miles, the last having been completed in 1888. In connection with these

roads the name of Mr. Robert Gillham stands high in the work of constructive engineering.

St. Louis, in the same State, has also taken a prominent share in the development of cable traction. Here the People's Railway, now consisting of 11 miles of track, was begun in 1887 and completed in 1889. The St. Louis and Suburban, 7 miles, followed. In 1889, the Missouri Railroad Company cabled 9 miles, or about one-half of their system, and in 1890 the Citizens' Cable Company, whose system now consists of 21 miles of cable track, completed, and began the operation of this splendid Broadway line.

Denver, Colorado, has since 1887 opened over 58 miles of cable tramway, owned by four companies. The Denver City Cable Company comes first, both in point of time and extent, with 22 miles of track, on the narrow or 3 feet 6 inches gauge, completed in 1887. The Denver and West Side Cable Railway Company followed in 1888 with 12 miles of the same gauge, and in 1889 the lines of the Denver Tramway Company, 18 miles cable, out of a total mileage of 30 $\frac{1}{4}$ miles, and the Denver Cable Railway Company, 6 miles, were put into operation.

Another important contribution to cable mileage has been furnished by Cincinnati, O., where three companies have their lines, or a part of them, operated by this method. The Cincinnati Street Railway Company whose track is on a 5 ft. 2 in. gauge, has 8 miles in cable, and a line of the same length and gauge is operated by the Mount Adam's & Eden Park Inclined Railroad Company. The third line belongs to the Mt. Auburn Cable Railway Company and is 8 $\frac{1}{2}$ miles in length, on the same gauge as the others.

Coming to the state of Pennsylvania, we find in the "City of Brotherly Love," a cable line of 23 miles in length, part of the system of the Philadelphia Traction Company, whilst in Pittsburg three lines have been built, that of the Pittsburg Traction Company, 9 miles, opened in November, 1888; the Central Traction Company, 5 miles, and the Citizens' Traction Company, 12 miles, on which the first car ran January 1, 1889. As may be seen, the system is being extended in this famous iron center, where the problem of rapid transit has been attacked with marvelous nerve and enterprise. Taking a wide and comprehensive view of the situation, it is not too much to say that in no other city in the world has there been so great and diversified an application of mechanical forces in the operation of street railways, as in the phenomenally progressive city of Pittsburg.

The city of Baltimore, Maryland, now claims to be congratulated upon the completion of the first section, 11 miles, of cable track, part of the system of the Baltimore Traction Company. The history of this enterprise, it is stated, has been that of many another in which the most stubborn opposition has been met and overcome, and, as elsewhere, the very people who worked the hardest to prevent its inauguration, now take upon themselves the credit for a success which "they always predicted." So easy is it to be wise after the event.

Cleveland, O., has also achieved distinction in the con-

struction of some 20 miles of cable track, completed and put into operation during the present year, and there is no room for doubt that the character and design of roads such as those of Cleveland, contain, mechanically and financially, all the elements of assured success. In connection with them the name of the late Col. W. H. Paine deserves honorable mention, he, like a true soldier, dying in harness last winter while perfecting his good work.

In the District of Columbia, Washington, the capital of the United States, although somewhat late in falling into line, promises to occupy a high position in cable records. The Washington and Georgetown Railroad Company brought into operation in 1890, their first six miles of cable road; ten additional miles are now in course of construction. The "City of Magnificent Distances," offers a grand field for the operation of the cable, and I shall be disappointed if the development of the system there does not make rapid and successful progress.

Seattle, in the state of Washington, has seven different lines enumerated, most of them completed and brought into operation in the present year. They are the Front Street Cable Railway Company, 5 $\frac{3}{4}$ miles; the South Seattle Cable Railway Company, 2 $\frac{3}{4}$ miles; the West Seattle Cable Railway Company, 2 miles. Those lines are on the standard 4 ft. 8 $\frac{1}{2}$ in. gauge. There are also the Madison Street Cable Railway Company's system, 7 miles, 4 ft. gauge, opened April 1, 1890, and the Seattle City Railway, (the pioneer cable road of the great Northwest) 5 miles, of 3 ft. 6 in. gauge, constructed and inaugurated by Mr. J. M. Thompson, October, 1888.

In Tacoma, a cable line of 1 $\frac{1}{2}$ miles was opened this summer, and at Spokane Falls, a cable road of 3 miles, the motive power of which is generated by the neighboring water falls, is under operation.

Oakland, Cal., was early in the field, a line of 5 1-5 miles having been brought into operation there 5 years ago. The Piedmont Consolidated Cable Company has laid in a system of 10 miles.

In Iowa, Sioux City possesses a line of 4 miles. St. Paul, Minn., has had 15 miles of cable track put into operation by the City Railway Company. In Missouri, besides Kansas City and St. Louis, St. Joseph has 6 miles of cable tramway in the Circle Cable Railway, owned by the Wyatt Park Railway Company. In Butte, Mont., the year 1889 saw 3 miles of cable track brought into operation by the Butte City Street Railway Company; now merged in the Butte Consolidated Railway Company, and Omaha and Lincoln, Neb., have 9 $\frac{1}{2}$ and 5 miles of cable railways in operation. In Hoboken, N. J., an elevated cable railway of 2 $\frac{1}{2}$ miles in extent—following the example of the earlier elevated roads in New York—has been constructed; a further proof of the capability of the system; and from the city of Chicago intelligence is received of another system of overhead or suspended cable traction. Texas has a cable road 5 $\frac{1}{2}$ miles brought into operation this year by the Dallas Cable Railway Company. In Portland, Ore., a cable line of 5 miles was brought into operation in 1889. Providence, R. I., received a cable tramway of 3 miles opened January 1st, 1890.

San Diego, Cal., has 6 miles of cable line, single track, 3 feet, 6-inch gauge, opened June 7th, 1890.

A short length of cable road on Brooklyn Heights, Brooklyn, N. Y., concludes the list. It is worthy of mention that this road has been constructed and put into operation notwithstanding the vigorous opposition of adjoining property-owners, actuated probably by the reverses which a few years before attended an endeavor to exploit a new departure in cable traction, and that, now that it has been completed, it has been received with the same unequivocal favor that has been universally awarded to cable roads.

Taking the extensions now in process of construction, we arrive at a total of close upon 700 miles of cable road in operation within the United States, besides the lines existing and under construction, on the continent of Europe and in the British Colonies. As my figures have shown, a very large proportion of that mileage has been brought into operation within the three years more specially embraced in my report.

PRACTICAL CONSIDERATIONS.

Having given the story of the progress, early and recent, of cable tramways, I propose now to indicate some practical points, which a knowledge and review of the methods, appliances and circumstances of the various roads suggest for discussion. Notwithstanding the fact that conventions of the association have on previous occasions been favored with reports of its respective committees, in which the more technical side of cable traction has been most ably treated, the mechanical details of the system present to us a deeply interesting study; but the subject is too well known to the members of this association to bear more than an epitomized repetition of its most salient features. Yet it may not perhaps be deemed out of place if I set aside this portion of my report to the considerations of the conditions most favorable to the equipment, operation, success and progress of cable motive power. Guided by the light of our experience, and having regard to the remarkable development recently manifested in other directions, it may now, I think, be admitted that the primary essential to the perfect success of the cable system in the future is that its operation should be confined to cities of large population, preferably, perhaps, to those districts presenting the more severe gradients, and with regard not only to the volume of travel to be catered for, but also to the character and extent of probable competition. There is, I believe, no royal road to the construction of a perfect cable line, for each road or locality presents its own problem, and as all roads must be more or less controlled by local conditions, so too will every detail of the mechanical parts have to bear a relation in form, position and detail to these requirements.

Remembering the axiom that "the errors of to-day are fastened upon to-morrow," our determination in regard to the location and construction of the line becomes of considerable importance. A double track may not necessarily be looked upon as a *sine qua non* in successful cable working, inasmuch as many roads consisting of a single

track with "turn-outs" for passing-places, have been, and may under certain favorable circumstances yet be, built, and may be operated with satisfactory results. But I think, wherever practicable, a double track should be secured. Present indications show that the larger cities only of the United States are now falling into line in their adoption of cable traction; hence it is that the capacity of the system in the way of expansion and efficiency in handling large bodies of passengers at quick and frequent intervals during, probably, twenty hours out of every twenty-four, renders the adoption of duplicate cables and consequent construction of double-track roads in such cases almost essential, and this especially so when we take into consideration the growing demands for cheap, safe and rapid transit.

The question of gauge has been discussed from nearly every conceivable standpoint, and tracks of every width, from 18 inches to 6 feet, have been more or less satisfactorily brought into use by conversion. Viewing the whole circumstances of the case, I may say that for all practical purposes, the standard gauge, 4 feet 8½ inches, appears to possess many tractive advantages.

TRACK CONSTRUCTION.

It may be unnecessary for me to recapitulate the details of construction most beneficial in the line of progress, and in this connection I shall only state briefly that I believe the principle of construction now being wrought out on such a grand scale at New York is that most likely to be accepted. I am captivated by the splendid systems of construction there being so rapidly evolved, for the more I contemplate these operations the more I become convinced of the comparative advantages of the methods now being so vigorously applied there. The operation of duplicate cable methods has revealed the possession of so many striking advantages that to describe them in detail would be only a work of supererogation on my part. The satisfactory results achieved by Mr. A. D. Whitton, in the use of iron conduits, doubtless suggested their adoption on the New York roads. Opinion has long been divided as to the relative advantages of concrete and iron as the material to be used in the construction of the road, not only with regard to the question of cost, but also with regard to the facilities offered by these materials respectively in overcoming the difficulties which present themselves in building up a really substantial and serviceable conduit under all the conditions which may occur, and there have been many examples in practice of rushing into the extreme in each direction. I have seen a road built at Oakland, Cal., where the use of iron yoke frames or trusses has been entirely discarded, and the construction of the conduit has been almost exclusively confined to cement concrete, the track and slot-rails being retained in position by a series of tie-rods, stays and anchor bolts embedded in the walls of the conduit. But, so far as I have been able to gather, the success of the experiment, in view of the contingencies of disintegration and the difficulty of maintenance and renewals, is, at least, a subject for doubt.

The forms of conduit in use now, or likely, so far as we know, to be brought into use in the future, are: first, concrete as a whole; second, concrete and iron in combination; third, timber and iron; fourth, sheet-iron supported by yoke frames on a bed or foundation of solid concrete, and in the last-named form, inasmuch as the yoke frame or truss is intended to preserve the track and slot-rails in position, and in performing this duty possesses the inherent weakness of forming an arch minus the key. I think it will be generally conceded that the suitable design of the yoke frames must always play an important part in the construction of a perfect cable road. Their strength and stiffness gives the necessary coherence to keep the road substantial and true to gauge, and also to prevent the slot-beams from coming together, while they sustain with efficiency every possible strain which may under any conditions be brought to bear upon them. Yokes of every variety, weight, size, material and character have been brought into use. On the coast, where the climate is all that the most exacting could desire, and where strength rather than great rigidity is essential, light wrought-iron or steel yokes ranging from 150 to 300 pounds serve the purpose admirably. In the more eastern cities, and especially in level places, where the conditions of traffic and of climate differ so much, the selection naturally inclines to the use of heavier yokes—from 300 to 500 pounds in weight. In Europe, as in the British colonies, where material and labor are comparatively cheap, and where the severe climatic conditions of Chicago, for example, do not obtain, the inclination rather leans in the direction of the California form of construction. Regarding the typical section of track generally, there seems to be a consensus of opinion in all recent practice in favor of the use of grooved steel girder track-rails and slot-beams, weighing from 40 to 70 pounds per yard. The paving employed is laid flush with the surface of the street and is chiefly composed of granite setts, though in some instances asphaltum and even wood blocks have been preferred.

DRAINAGE OF THE CONDUIT.

The provision of an efficient system of drainage is deserving of the greatest attention, as without adequate drainage of the conduits there can be no sustained and satisfactory operation of the cable road. Having a vivid recollection of our experience in this direction at Los Angeles, I cannot emphasize too strongly the importance of this point. There, in a practically newly founded city, hurriedly built up as Los Angeles was, and developed in a period, brief beyond precedent, the city possessed no commensurate system of storm drains or sewers, consequently the cable roads for many miles of their extent were constructed without any drainage facilities whatever. In the rain storms, which periodically visited us, we found our roads literally swamped with storm water, which had no means of escape other than through the cable conduits and thence into the terminal pits and power houses, which had been located with their foundations 30 feet below the level of the tracks. How, and to what extent,

those power houses were flooded, and with what danger, expense and difficulty the roads were maintained in continuous operation, are matters of Pacific coast history. The connection of the man-holes of the cable conduits by 8-inch pipes joining their lowest points, will in the future render such a state of things as those I have described impossible. It was a very severe object lesson, however, and very clearly and forcibly demonstrated the necessity of providing proper drainage in laying out or building cable roads. Hence I think it desirable to direct special attention to the necessity that exists that the drainage of cable conduits should be provided for by their being connected at suitable intervals with the storm drains or city sewers. In consequence, doubtless, of the floods above referred to, Los Angeles is now being furnished with a splendid system of drainage. The catch basins of the drainage pits, or in other words, the length of track between them, will vary in their connections from 40 to 300 feet, according to requirements. In some instances it has been found convenient to connect pulley pits together before communicating with the city sewer: whilst in others it has been found desirable or compulsory to connect each pit separately. Touching upon this question of drainage in connection with cable tramway conduits, it is of great value to consider the following extract from the Annual Hygienic Report by the medical officer for the city of San Francisco, furnishing, as it does, testimony to the sanitary value of these conduits to the community generally. The writer says: "The engineer under whose supervision the roads were constructed, found it necessary for the purpose of drainage, to connect the conduit through which the cable runs with the sewers in the street, by pipes 4 inches in diameter; these pipes are placed at intervals of 40 feet, and so thorough does the ventilation seem to be that no complaint has been made of any offensive odors from this sewer since the construction of the line. Speaking from a sanitary standpoint, I believe the cable road to be the most desirable thoroughfare to live on, the offensive and mephitic vapors, which under certain conditions of pressure penetrate the dwellings of other streets in the city, here escape into the open air in a form so diluted as to be both inodorous and innocuous."

LOCATION AND CHARACTER OF POWER HOUSES.

I now come to deal with a subject of much practical value, namely, the location, number, and capacity of the engine houses providing the motive power for a system of cable tramways. On the proper selection of site and character of the power houses much of the economic success of a road necessarily depends: indeed, in looking over the ground for the purpose of laying out a cable system, one of the first, if not actually the first, points to be decided upon, are the site, location, and extent of the power required to operate the road, and many mistakes have been made from failing to pay proper regard to this matter. The great desideratum is to centralize the power houses so as to command the heaviest strain upon them at about the center of the system, and they should not be placed under street level if that can be avoided. Upon

the number and character and extent of the roads to be operated will depend the power necessary to be laid in at any power house. If the roads are of ordinary grade, conformation, and extent, practically any number of cables may radiate from one power house, the length and extent of curvature in the road alone defining the limit within which the cables may be operated. Single cables have been operated to 35,000 and 36,000 feet, and it is known that on a straight level road at Oakland, Cal., a cable of 39,000 feet has been operated. But it is not considered safe practice to exceed 25,000 feet in any one cable, particularly where the road presents unusual difficulties in the shape of sharp depressions or sinuosities in the routes. It is found in practice that every right angle curve on a cable road puts a strain upon the cable plant equal to that entailed upon it by 1,000 feet of straight road. The question of power and the arrangement of plant and machinery generally, is one that has exercised the minds of those concerned in the practical administration of cable roads, and rarely indeed has the same method been observed in any two plans that have come under my consideration. That there is no recognized standard is not because engineers have failed to solve the problem, but, apart from all claims on personal or patent grounds, is chiefly attributable to the many perplexing conditions encountered in the territory sought to be dealt with. There should, however, be little difficulty in determining the engines most suitable in size, capacity, and power for the efficient operation of a cable road under ordinary circumstances. The engines, plant, and machinery in use at Los Angeles may be quoted as the ideal of what the power equipment of a modern cable system should be. This plant has been found to combine all the requisite conditions for giving uniformity of speed under every possible change and variation of strain imposed upon it. As is well known, the demand upon the engines of a cable power house vary with a suddenness and rapidity almost unknown under other conditions, changes ranging from 50 to 350 H. P. being indicated within the space of a few seconds. One point with regard to the selection of engine power can not be too strongly borne in mind, namely, the determination of the efficient size in point of economy. Engines or boilers too capacious for the purpose required, represent, it can be readily understood, a profitless drain upon the revenue, and therefore it is, as laid down by Mr. Hanscom, that in any proposed cable system of roads the alignment, curvature, and gradients, and the other physical features of the roads, should be thoroughly studied, and the engines, plant, and machinery should then be carefully adjusted to suit the conditions of the case. The amount of traffic to be accommodated will, of course, guide the engineer in this respect, leaving a suitable margin to meet sudden influxes of traffic, etc. The expense involved in the operating of a cable road is, so far as regards power, largely independent of the traffic, for to run the cable alone a certain expenditure is entailed, therefore the greater the number of cars propelled the less will be the cost per car mile. It may be assumed that from 40 to 60 per cent. of the power used in operat-

ing the cable road is consumed in running the dead cable.

This percentage to those not thoroughly conversant with the subject is not a little deceptive in character, and is thus liable to lead them to erroneous conclusions. But while, for instance, when no cars are running, the whole power of the engines (100 per cent.) is absorbed in the movement of the cable, as the number of cars increase the power so expended is proportionally reduced. Mr. H. M. Kebby, whose experience I may say entirely coincides with my own statements that on 10 miles of road with thirty trains, cable speed averaging 8 miles an hour, the power required to move the cables and machinery was 140-horse-power, and the average when operating the whole of the loaded trains was 287-horse-power, leaving in that case about 47 per cent. power for cable and machinery. This fact has an important bearing on the question, to what locality can the cable system be most profitably applied. It may occur to some of my hearers that there is an inconsistency between the statement now made as to the large proportion of the required engine power employed on cable roads necessarily expended in moving non-paying loads, and the comparison above made between the cost of locomotive traction and of cable traction in favor of the latter, but this apparent inconsistency may be explained by the following considerations. In the first place, locomotive traction is not altogether free from the disadvantage of being obliged to spend a part of the power employed in moving non-paying load, viz., the weight of the locomotive itself, (and it is to be observed that the ratio of this part of the load to the whole will generally be larger on a tramway than on a railway) and secondly, the economic efficiency of one large fixed engine of the best type will always be very much greater than that of a large number of locomotives.

OPERATION OF THE ROAD.

It is important to bear in mind that while in contrast with some other methods of tramway traction, the installation of a cable system imposes a larger first capital outlay in construction, this is far more than counterbalanced by the low percentage of cost in operating the road. Owing to the distance from my base, having been unavoidably detained in Europe while preparing this report, I found it exceedingly difficult to obtain reliable data concerning the operations connected with many of the cable roads in America, but it may be assumed, as observed by Mr. William D. Henry, that "the expenses of such roads are directly proportional to their several characteristics. This however, serves only as a general guide in the construction of new roads; as has been discovered in some notable instances where the engineering or mechanical appliances (which should have contributed to the successful operation of the system if properly designed), have caused an unnecessary and unwarrantable, because unprofitable, expenditure of capital. The more perfect and suitable the design, the less will be the expense of operation." Having personally inspected most of the cable roads in existence, and made myself familiar, with many important details bearing on the subject, I

shall endeavor to give the Convention the benefit of my experience. But it will, I trust, be taken that in my references, deductions and conclusions, my desire is to avoid repetition of arguments already used, my object being to indicate as succinctly, yet comprehensively as may be, the conditions under which the success of cable motive power has thus far been achieved, and is most likely to be preserved.

After location of the proposed route and power houses has been settled, the question of cable-grip and rolling stock come into consideration—indeed, in the initial stages of the proposition the grip may be claimed as the focus around which for the time being, all other considerations center. The form, character and construction of the road itself is so materially influenced by this element that it might be a fairly safe dictum to lay down, first, determine upon the type of grip most suitable, then design and build your road. The varieties of cable-grips are legion, and, mechanically speaking, differ largely in detail, but when examined they are found to range themselves into two classes—the “side” and “bottom” grip. Both classes have their adherents, but for facility of manipulation and general efficiency in the operation of a complicated system of cable roads, I infinitely prefer the “bottom” grip. It is true the “side” grip may be less liable to drop the cable when it is undesirable to do so, but, on the other hand, it should not be lost sight of that where quick and positive action is necessary in order to relinquish the cable and regain it at will, the “bottom” grip possesses the advantage. In passing power houses, gravitating over cable crossings or making terminal switches, all that is required is simply to throw open the “bottom” grip to its full extent, whereupon the cable releases itself, and when the car has traveled over the intervening space by momentum, the running cable is recovered automatically. In case of accident by blockade or other exigencies which may arise on any part of a system during operation, considerable advantages also accrue, in so far that the cable can be instantaneously released and regained without difficulty. At Los Angeles we used a “bottom” grip, one pound of pressure on the lever of which was capable of exerting three hundred pounds pressure on the cable, a reserve power equal to several times the estimated load. The life of the solid steel grip-dies being 50 days, 2,506 miles; cost per set of dies, 57 cents; cost per mile run, .01 cent; maximum life of cable, 628 days, 100,348 miles. A good practice is to design a grip embodying either of the two principles referred to, with certain modifications to meet local conditions, and this course is now generally followed. Very great progress indeed has been made in the manufacture, and consequently, in the durability and economic treatment of cables during the past few years, simultaneously with improvements in construction of the road-bed, and particularly in the treatment of curves, as well as better knowledge of the subject generally, all tending to render the working more economical and satisfactory. The size of cable most generally adopted is 1½-inch diameter; the material should be of the highest grade of crucible steel, and the wires must develop high

tensile as well as high torsional strength, and possess a good percentage of elongation.

If the cable has a high tensile strength with a low torsional strength, it will soon crystallize and become worthless; if of a high torsional strength with a low or medium tensile strength, it will stretch very rapidly, and is apt to strand or break when extra strain is applied. Such contingencies may arise in ordinary operations which need not be enumerated. The cable par excellence is thus, that which maintains a proper balance of the tensile and torsional strength in the wire, and along with that as high a percentage of elongation as possible should be secured. Manufacturers have now realized the importance of producing a cable having in each case due regard to the position the rope has to occupy, and the nature of the work it is called upon to perform.

The speed at which cables may be run depends wholly upon the conditions under which the road is operated. It may be accepted that a cable may be run with safety and advantage on city roads, through crowded thoroughfares, and around ordinary curves at a speed of 8 miles per hour; while suburban cables running in direct lines to outlying districts may be allowed to attain any speed up to 14 miles per hour. Roads that are short, straight or level, of course, admit of the longest life to a cable, and, in an economic sense, display the most satisfactory results. A few illustrations may be given. On the Temple street cable road at Los Angeles, coming under the category named, the record showed for a 12,380 feet cable a period of three years and two months in continuous wear, during which time 120,681 miles were run. Market street and Geary street roads in San Francisco show respectively, one year and eight months for 106,225 miles, and two years for 119,153 miles run. On the Grand avenue road, Kansas City, 18,000 feet of cable gave constant service for one year and ten months, 135,872 miles, the uniform speed being at the rate of 14 miles per hour; while the Metropolitan cable road secured a success with one year and seven months and 102,359 miles. In Denver, a cable 24,000 feet in length, running around several right-angle curves, made a record of one year and eight months with 144,000 miles to its credit; while a 22,000 foot cable operated by the same company attained a record of nineteen months with 137,280 miles on a road embracing a 7 per cent. grade and four right-angle curves. The life of the cables throughout the country displays signs of increase, and at present averages about fourteen months, giving from 70 to 80,000 miles of service. The introduction of the solid steel or “interlocked” rope with electric welded splice, has not been attended with any degree of success. After a short trial on Brooklyn Heights this class of cable was found unsuitable for the purpose and withdrawn from use, and the ordinary cable with hempen core was substituted.

Without going into the merits of any particular make of cable, it may be sufficient, as a practical reminder, to say that the life of a cable plays a most important part in the results sought to be achieved in the operation of a road, and that on the class of cable adopted, and on the

supervision and attention bestowed by those responsible for its splicing and care, will in no small measure depend the profitable exploitation and operation of cable tramways.

Regarding driving plant generally, so much has been said at previous conventions that I can offer little in the way of indicating progress made. The most important question to be considered in designing winding machinery for cable roads is to propel the rope without injuring it, and with the least loss of power in operating the machinery itself. This, it is considered, is best accomplished by driving both drums and employing as few wraps as possible. On various lines now in operation differential ring drums, designed to reduce the wear on the cable, are employed with satisfactory results. There are numerous devices for securing a proper tension, and the point the engineer has to consider before adopting any one of them is to see that it is capable of providing against vibration, and the accumulation of slack or "sag" between the carrying pulleys. If this be not attended to, unpleasant surging is the result, and provision should be made in the tension apparatus to obviate this possibility. The permanent stretch of a cable is variously estimated at from 1 to 2 per cent. If these points have received attention, a cable equipment will indeed prove a beautiful system, working in sunshine or storm, in flood or fury, noiseless and smoothly as a charm.

The cotton rope system of transmission of power from engine to cable drum is employed at Los Angeles; in Geary street and Howard street, San Francisco; San Diego; Kansas City; Providence R. I., and is included in the designs for the equipment of the power plant in the Broadway road, New York.

The cars employed in the operation of cable roads are chiefly of three classes—the dummy or grip car, the combination car and the eight wheel bogey truck car. The eight wheel combination car, with open front, finds most favor on the coast, though all our road in Los Angeles are operated with "dummy" cars, drawing trains of one, two or three trailers as occasion may demand. It is held by some that the best way to handle heavy traffic in large cities is by single cars and many of them, rather than by the use of trains, but from my experience with both systems I have found the nearest approach to the solution of the problem of passenger transportation in reducing the number of cars by increasing their carrying capacity, and have handled a congested traffic with efficiency by means of the employment of trains. Numerous and widely divergent opinions have been presented on this point, with reasons and conclusions almost as widely conflicting, but, in my opinion, nothing has been more clearly demonstrated than that when regularity and promptness are required, short, light trains of cars are the most likely to clear off a crowd, and at the same time to achieve the most economic results.

In respect to brake power, while in some cases "emergency drags" and "slot anchors" have been provided, ordinarily the track and wheel breaks now universally applied to cable cars have been found to "fill the bill."

During some experiments made by me at London, under the inspection of the Government Board of Trade, in May, 1884, I released a descending train of cars on a grade of 1 in 8 from the cable and proceeded by gravitation until the speed indicator attached to the grip car recorded a velocity of 25 miles an hour. I then received orders from Major-General Hutchinson R. E., the Inspector of Railways under the Board of Trade, to apply the brakes, which was immediately done, and the train was brought to rest within 35 feet. Nothing better than this is possible, and on steep grades nothing less should be provided. If, as claimed, a running cable bearing no greater load than its own weight has an existence limited by attrition to a period not exceeding three years, it becomes important in the mechanical equipment of the road-bed to adopt only those appliances which are best calculated to lessen the evils which have been found to militate against good results. Much success has been attained, apparently, by the introduction of a system approaching "retrogressive" improvement, which, while it does not exactly return to the adoption of first principles, has impressed us with the prudence begotten of experience, and has taught not to "experiment for experiment's sake" so that in the matter of drum, sheaves and pulleys, we have learned to avoid all unnecessary expensive complications. Large and light chilled cast-iron curve and carrying pulleys of diameter and weight consistent with the requirements, when properly hung and balanced in bearings of Babbitt metal, give the best satisfaction, and are finding most favor in modern practice.

In the practical operation of a road immediate communication at all times with the power-house is necessary to the proper maintenance of efficiency. Insulated telegraph wires through the cable conduits, for giving between the power-house communication from any part of the system, by means of a series of signal boxes built within the man-holes, and accessible to the employes along the route, seems most worthy of adoption as presenting a ready and reliable signal system.

Regarding franchises, in the consolidation of the roads at Los Angeles the City Council, in the exercise of a wise discretion rendered us a very important service. The ordinances under which the old horse and mule car companies were promoted had the limit of their municipal existence fixed at 21 years, and it was deemed expedient that these ordinances should be rescinded and a new one substituted, granting us 50 years over the whole system, which concession has been carried into effect.

A clause specifying 50 years as the period for which all cable powers should run, is one that in view of the exceptional character of the case should, in accordance with the spirit of a liberal and considerate policy, be accepted by all local authorities and embodied in all charters relating to the operations of cable tramways.

In the effect upon drivers and conductors changed from horse lines to cable roads, I think there is no question but that old car drivers make the best class of gripmen. Nearly every possible type of man has been utilized by me for the purpose, and I record with pleasure the fact

that I have always found our old drivers the most efficient and reliable. Already accustomed to work through crowded thoroughfares, they have thus become familiar with the requirements of their position in respect to passengers, and with the amenities of street traffic generally. Invariably men of quick perception and intelligence, their occupation as horse car drivers sharpens and intensifies these qualities, and I find they appreciate and value the improvement naturally accruing in their condition as men selected for their competency and dexterity to handle a cable train, with all its responsibilities and opportunities for advancement. Conductors also develop by the change to a better grade.

I now come to the subject of working cost, and so far as I have been able to ascertain it, the average cost per mile is 13 cents, and 60 per cent. of the gross receipts about represents the average expenditure; 90 per cent. of the cable roads in operation have been converted from animal power, and the mileage attained per day in excess of the previous motor averages 100 per cent., while the ratio of increase in business has been in like proportion. In unsettled portions of cities to which roads have been extended, marvellous development has been displayed, that on some of the roads in Pittsburg alone showing a rise from 3,000 to 15,000 passengers per day. There has in all such cases been a very marked increase in the value of property, the increase varying from 50 to 300 per cent. Cable traction is admitted to have fully and conclusively disposed of the difficulty in regard to snow, no interruption now being recorded from this contingency.

The accident returns show a remarkable change for the better as compared with horse service in proportion to the number of passengers carried. In no instance have I discovered a symptom of public disapproval, either on the part of the resident population or of the local authorities, while there has been on the other hand gratifying and unequivocal unanimity of satisfaction expressed.

If you ask me where and under what circumstances the cable should be adopted, the answer would greatly depend on the local details of conformation and probable progress of the city given. Population offers no really reliable guide as to the volume of traffic likely to accrue in the operation of a new road. But it is a pretty safe conclusion that any mile of an existing system now carrying 2,000 passengers per day, may, in view of natural developments, be profitably converted to cable traction.

The mileage on cable roads by each car or train averages 110 miles per day, the average speed being 9 miles per hour, and the number of hours in daily operation being generally 18. The dividends paid to the stockholders have reached as high as 72 per cent.; though the average on the whole of the roads is about 12 per cent. Cable stock continues to be a favorite investment, commanding a high position in the market, but it is generally held so tightly as an investment as to almost exclude it from quotations, but from quotations to hand West Chicago, North Chicago and the Chicago City roads are seen to be respectively at \$625, \$500, and \$308, the par value of the stock being in each case \$100.

CONCLUSION.

I have thus fully, but I trust at not too great length, brought before the convention a review of the cable question, past and present, and it now falls to me to sum up results. Before doing so, I may point out that I have purposely avoided crowding my report with tables or minute details. Cable traction for tramways is a great subject, impossible to be exhaustively treated within the scope of one report. There is hardly a paragraph in the foregoing remarks, whether in historical retrospect, current review or technical opinion, on which a report so full as to occupy all the time allotted, might not have been written. It has, therefore, been necessary to treat the subject in broad touches, rather than in minute detail, to follow the character of Bartholdi's statue of "Liberty," rather than the trifling elaboration of a filagree chain, and I confess my consciousness of the compliment conferred upon me at being called upon to chronicle and advocate this mighty engine for the improvement and expedition of city transport, which the ingenuity and perseverance of many inventors have presented for our use. I might produce many witnesses before you to support by their practical knowledge and appreciation of the system all that has been advanced. But I shall here also refrain from loading my pages, being of opinion that the mere recital of the facts I have narrated constitutes in itself a triumphant proof of success, and an ample vindication of potency and promise. But it may be allowed to me to call one witness to corroborate, by his experience, all I have ventured to bring forward, and I find my witness in one very well known to this convention, and, indeed, well known everywhere where tramway transit is understood or discussed; I refer to the Hon. C. B. Holmes, who, in his report to the convention of this association, held in New York City, in 1884, referred to the conversion of the horse lines of his company, at Chicago, to the cable system, with his usual brilliancy and perspicuity on all matters pertaining to street railway operations. He advanced points in favor of the case for cable motive power, and the conditions most desirable for its successful progress. His words were: "After the first four lines had been built, covering short distances and carrying few passengers, a road was constructed in Chicago in 1881. The latter claims not one iota of credit for the invention of the cable system, but it did undertake the somewhat serious task of demonstrating, first, that the system could be utilized in a region of hard winters, deep snow and frost, the antipodes of the balmy climate and perpetual summer of California; and second, that it could be extended into a suitable system for moving the vast population of our largest cities. The former could not be accomplished by any fragile construction, but required great strength and compactness to resist the strains inevitable in a large commercial city, and the powerful pressure of the frost in a northern winter. The latter could not be accomplished by any mile or mile-and-a-half timid trying, but by unshaken faith in its methods of construction, and the possibilities of the system. Twenty miles of track were constructed and the daily transportation of

100,000 people was attained with the ability to move five times as many." What Mr. Holmes believed and knew in 1884 he still adheres to, for I find that under his direction last year, his company had grown from 22½ miles of track to 152 miles, and from 60 bob-tail cars to 1,250 of the largest and best; its revenues had increased from \$600,000 a year to nearly \$3,500,000; its patronage from 30,000 passengers a day to 200,000; the speed of its cars from 5 miles an hour to an average of 10 miles an hour. The Chicago company has developed a cable system second to none in the world in extent, efficiency and public regard. During the last year the passengers carried numbered 68,734,969, an average of 30,917 more passengers being carried every day in 1890 than in the previous year. The cost of operating per mile per car was, by cable 9.650 cents, by horses 21.985 cents. These are grand achievements, and the growth of the cable roads in Chicago, as the result of conspicuous success, is worth a train-load of theory, and sweeps into the limbo many words we hear against the system, from people who either do not understand it, or who do not wish to understand it. At a recent discussion of the relative merits of this and other modes of mechanical traction, held in St. Louis, it was actually made a point against the cable that in 10 years' experience all defects of appliance or construction had been improved away! Nothing, it was said, takes the place of working a machine to know its defects. Precisely so! And we cannot oblige the critic who used this argument by putting back the clock and constructing all cable roads on the first and necessarily imperfect plan. In point of fact the idea thrown out in this criticism suggests my strongest claim on behalf of cable traction. It did lie rather fallow for a year or two, and in that time an intelligent study of the weak points was made, with beneficial results. A system does not root itself into our largest cities and take possession of our finest and most crowded thoroughfares until any "weak points" it may have, have been strengthened or removed, and this is what we claim has in the case of cable motive power been done. Each new success has been the parent of another, and the progress, if slow at first, having found its crux, has at length begun to move on an accelerated ratio. What are the great outstanding facts? In the United States, Europe and the British colonies, there are at present at least seventy-five cable roads in operation or under construction, representing a capital of about \$100,000,000 and embracing 700 miles of track, 3,500 trains of cars running on an average headway of less than 5 minutes, the speed attained being from 6 to 14 miles an hour, about 50,000 H. P. being in use to propel them.

Cable traction surmounts grades of 1 in 4, it has conquered combined and sinuous curves presenting physical and mechanical difficulties impossible under any other system; it has conveyed larger crowds within a shorter period at less expense, and with greater safety and financial success, than has been found practicable by any other method of propulsion. The passengers daily are counted in millions, and wheresoever the traffic is most dense, there will the cable road most surely assert its superiority.

There is one point I must emphasize, namely, the improved type of car which the cable has rendered it possible to bring into use, and this simply from the fact that weight or length of car is of little consideration, while the available carrying capacity for a given street space occupied, has been largely increased. Where the cable has been introduced by conversion of system, the old primitive tracks have disappeared, and there has been evolved in their stead a substantial, smooth and perfectly constructed roadbed no longer rendered obnoxious by the necessary concomitants of animal traction.

In conclusion it can be claimed that while cable motive power is cheaper, given a suitable population, financial results are better, because occasional or sudden bursts of traffic add little or nothing to the working cost, while the knowledge on the part of the community that the system can cope with any casual influx of traffic, makes such intermissions a matter of frequent rather than of fortuitous occurrence. Remembering that no system of tramway traction is capable of universal application, we claim that the cable is open to few of the objections that have been urged against other motors, while it possesses advantages which no other can pretend to offer. For proof, many facts and arguments cognizant to most of us, could be advanced, but "comparisons are odious," and, in order to avoid contention, I should rather prefer to base the claim of cable motive power for recognition, on its inherent attributes, than on any comparison of it with rival methods that may still have their place as fitting factors in the economy of transportation. At the risk of exhausting your patience, I may briefly recapitulate what these inherent good qualities are:

1. Financially, the cable road shows a low operating cost, less depreciation and a high earning capacity—in other words, most favorable as an investment.
2. Practically, it ranks foremost in trustworthiness and complete independence of climatic conditions, moving its loads steadily through heat, cold, snow, frost or flood, so that, indeed, no disturbance short of an earthquake has any effect on its power to maintain a service on which the public has learned to depend.
3. Socially, it can claim that through its agency no district is cut off from sharing in rapid transit or intercommunication with other systems, by reason of steep grades, and that desirable facilities are given for the interchange of traffic, so that, by payment of a uniform fare, passengers are readily transferred to intersecting routes throughout the entire line of travel.
4. Personally, the cable road appeals to public patronage in various ways, whether in the furtherance of business or in the pursuit of pleasurable enjoyment; on the side of amenity it presents nothing offensive, actual or resultant; on the side of comfort, that better and more commodious cars may be used; on the side of convenience, all demand for extra or special accommodation can be readily met; and on the side of safety, the record is almost unbroken by accident or injury to passengers; and in that it offers less disturbance to the quietest streets from noise.
5. Sanitarily, the system confers the negative gain of

contributing no nuisance, and the positive gain of help in the drainage of a city, as shown in the quotation given from the medical officer of San Francisco.

(6) Generally: it can be alleged of cable traction that no condition, demand, or requirement in city traffic can be made that it cannot fulfil, demonstrating it to be well in the lead of all modes of affording internal transit to our busy cities.

These, gentlemen of the convention, are one and all strong points, and the opportunity which the preparation of this report has given me to pass in review every detail connected with the system has only served to strengthen my faith in its general value and adaptability, and in this faith I now respectfully submit this report.

J. C. ROBINSON.

GOLD FOR THE GOLDEN.

THE Denver, Lakewood & Golden Railway Company has strengthened its resources to such an amount that independence is its boast. An eastern millionaire has become a large stockholder and immediate preparations are made to get the right of way through the heart of the city.

The Lakewood will present a new feature in western railroading in its proposed route to Salt Lake City in that the steam locomotive will not be used at all. The track that has already been laid has a 75-pound steel rail, the finest and best in the west. No other road has anything like it; and instead of the overhead wiring that has been expected on the Lakewood, the power will be an electric engine, the finest that can be manufactured in the world.

The route has also been another question. It is now fully established that it will be westward by Loveland pass and a tunnel, which has been surveyed for years and has been kept alive, will be bored through the range at that point, and will be 5,000 feet in length.

RECEIVED A SHOCK.

LAST week two masked robbers boarded a West Side electric car in Kansas City, Kansas, late in the evening, and invited Conductor Bassett to hold up his hands. He promptly did so and in one of them was a big six-shooter which simultaneously began to go off. So did the robbers, one of them leaving a trail of blood. There have been a large number of similar attempts in many cities of late, and the thoughtful action of the conductor may well be emulated, with it is to be hoped, even better success.

A MOTOR man in Indianapolis is an old telegrapher. When he is flying up street with his car his gong rings almost continuously, and its warning would be better appreciated if everybody understood telegraphy. The bell clangs with the same graceful regularity of a telegraph instrument's clicks when it says "Look out for me," "Clear that Crossing," "We are coming, Father Abraham." When the conductor rings the bell to go ahead, the motor man answers with his "O. K. complete."

NO FLIES ON THE OLD LADY.

THE electric cars on the Montgomery street line in Jersey City, says the New York Sun, were discontinued for a time during the summer and horse cars substituted. An old lady from back near the West Side driving park stepped on one of the cars and inquired:

"Is this an electric car?"

"It is madam," answered the conductor without a blush. The old lady sat down and looked at the horses and then at the driver, and finally back at the conductor.

"Be you sure this is an electric car?" she asked again.

"Of course I am, madam," said the conductor.

The old lady looked at the horses again and then back at the conductor and said, in a tone that indicated disgust:

"Them's horses; they ain't electricity."

"Madam," said the smart conductor, "the objects you see attached to this car are not horses, but good imitations of the animal. They are the motors. The electricity is in them. Now, you will notice when the man there pulls on the lines the car starts. Those lines he holds are attached to buttons, and every time they are pulled those buttons are pressed, then the electricity does the rest."

"Oh!" exclaimed the old lady admiringly. Never was a team more closely watched than was the team coming down the hill. The old lady got off at Barron street, remarking to the smart conductor as she did: "Young man, flies bother electric motors the same as horses, don't they? Do you think they's any on me?"

EMPLOYEES' READING ROOMS.

CAPTAIN GEORGE McCULLOCH, general manager of the Chicago syndicate and the Benton-Bellefontaine lines in St. Louis, has an eye to the future and to the good of his men. The universal fact that benefits given to the street railway employes redound to the good of the company has been illustrated time and again and Captain McCulloch believes that care of the workmen will beget care of the work. With this in view he has provided for his men large, pleasant, airy reading rooms at the various power houses of his lines. Here the men are allowed all games, including cards, except gambling devices. Smoking and conversation is allowed, and the men thoroughly enjoy the privileges. This plan keeps sober, alert and contented men on the lines which means much for the care of the corporate property, and the civil treatment of the traveling public.

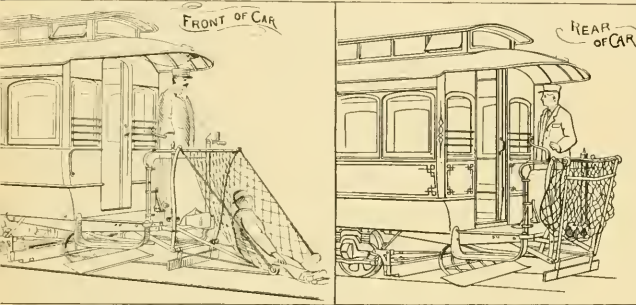
The men, as well as Capt. McCulloch, are proud of the rooms, and exhibit their pride by the manner in which they care for them.

THE STREET RAILWAY REVIEW is a welcome visitor and is in the hands of some of the men nearly every hour out of the twenty-four.

C. E. LOSS & Co., the enterprising railway contractors, at the First National Bank Building, this city, have been awarded the contract for the construction and equipment of the Waukegan, Ill., railway. The road will be 5 miles in length.

APPLEYARD SAFETY FENDER.

A NOVEL safety fender for cable and electric cars has been invented by A. E. Appleyard, and is being manufactured by the Chester Manufacturing Company of Boston. Its history arises from an incident in which a man standing on a track was thrown down by a rope stretched across the rails and held by two men who were running quite fast. Mr. Appleyard's idea is that a fender, to be a safety fender, should not only keep the individual from falling under the wheels, but should be so constructed that in striking him no serious injury shall result from the blow.



Tests made by the Newton Street Railway, at West Newton, Mass., recently, were highly satisfactory and witnessed by Chairman Crocker, of the State Railroad Commissioners, and other prominent men from various parts of the country. A straw dummy was set up on the track and run down repeatedly by an electric motor under full headway. The results were in every case successful. The man was then placed in a recumbent position across the track, but the fender was lowered and scooped him up as readily as an engine takes water from the track. The fender can be let down so as to slide on the rails if desired, but when not in use may be lifted against the dash and carried in that position. The West End Road of Boston, are to give it a trial soon.

CONVENTION ECHOES.

THE Pittsburgh Dispatch characterized it as "a convention of politicians." If that class of citizens to whom the term "politician" is generally applied could imitate some of the good sound sense, and straightforward business qualities of the railway managers, the word politician would have a higher motive than is generally ascribed.

The Press thus speaks of the sheep and goats: "Allegheny is nominally a city in the same class with Pittsburg, but the Christian conference there and the street car convention here, at the same moment, shows the difference between sentiment and spirits."

We don't know how it was in Allegheny, but everybody at the Pittsburg conference was in excellent spirits.

The convention imparted a stimulus to street railway interests, the influence of which will extend through the entire year, and of inestimable value.

GILL WATER TUBE STEAM BOILERS.

THE Gill water tube steam boiler, built by the Stearns Manufacturing Company at Erie, Pa., is after the usual type of water tubes set at an angle of 15 degrees from the horizontal, connecting, front and back, with a steam drum. The principal difference in tube water boilers is in the headers which receive the ends of the tubes. In the Gill boiler the headers are made to

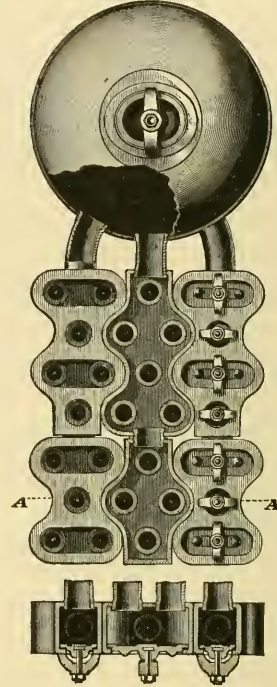


FIG. 1.

receive the four, five or six tubes, as shown in figures 1 and 2. The section at the bottom of Fig. 2 is through *A A* of the same figure. Into these headers the tubes are expanded and hand-holes, with plates and yokes of the ordinary construction, allow of easy access for cleaning and inspection.

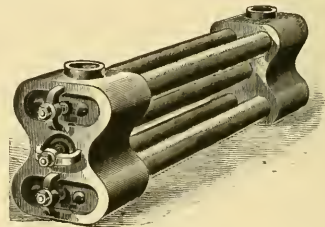


FIG. 2.

The plates are packed with their rubber gaskets which make the joints tight with the steam pressure on the inside, also thus preventing burns and scalds.

The arrangement of the tubes is such, that the flames and hot gases of the furnace must take a tortuous course to reach the flue. This arrangement allows the greatest amount of heat to be transmitted to the water.

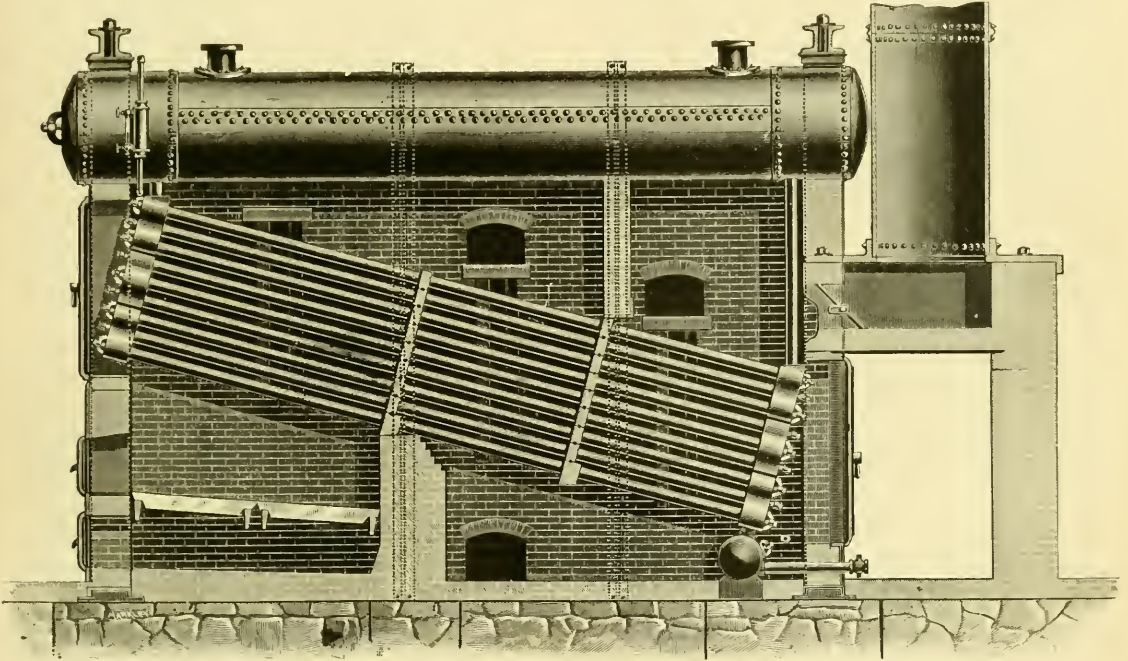
The circulation of this boiler is said to be so rapid that, when worked to its full capacity, the water will stand from four to seven inches higher at the front end of the drum than at the rear end, as shown by glass gauges placed at each end of the drum. Steam is taken from the rear end, assisting the circulation, and the water descending the circulating tubes to the rear headers deposits in the mud drum much of its suspended impurities.

The method of cleaning is satisfactory, and all together the boiler is one of the best of its class.

INTERURBAN CONNECTIONS.

THE careful reader of the signs of the times and the STREET RAILWAY REVIEW can not but note the extensive use of electricity in short lines between towns and villages within the range of from two to ten miles of each other. In fact the magnitude of these enterprises begins to astonish the steam railroad people.

The latest connection of this kind is between the towns of McConnellsville, New Haven and Leisenring, all in Pennsylvania. The road is finished from New Haven to



GILL WATER TUBE BOILER.

WILL STAY AT HOME NOW.

A CORRESPONDENT in the Atlanta, Ga., Herald writes: I boarded the electric car the other day, and what was my surprise to see beneath the cap of the motorman the face of a friend from south Georgia, a well-to-do professional man, but one I knew to have a streak of eccentricity in his making up.

"What are you doing here," I exclaimed, "at this sort of business?"

"Well to tell you the truth," he replied, as he turned on the current in answer to the double tap of the bell, "I came up here to get a job on the electric cars. I wanted a taste of real hard work so that I could better enjoy the comforts I have at home. I secured a job and I've been working at it a week. I think by the time one more week has passed I'll be ready to go home never to leave it again."

ONE of the species of irrepressible small boy, rejoicing in the name of Charley Lamp was injured while "hitching on" a Minneapolis car. His mama should trim that Lamp with a shingle, and not allow it to go out again.

Leisenring, a distance of $3\frac{1}{2}$ miles. Three trips are made per hour at a five-cent fare.

The rolling stock consists of four vestibuled passenger coaches and one freight car.

The power for running the machinery is furnished by two handsome Beck engines of 125 horse-power each, which are driven by steam from three boilers of 100 horse-power each. This department was put in under the direction of J. C. Bonnett. The electrical machinery was put in by the Edison General Electric Company, under the direction of G. L. Schemerhorn. The electricity is furnished by two generators of 75 horse-power each, which is enough to successfully operate fully twelve miles of road.

The grades of from 4 to 11 per cent. are easily climbed and the road bids fair to be a grand success.

The officers are: J. D. Frisbee, McConnellsville, president; J. K. Ewing, Uniontown, secretary; J. L. Gans, McConnellsville, superintendent. The capital is \$100,000.

It is somewhat remarkable that for electric interurban lines Ohio and Pennsylvania are at the head of the list, and the more they have the more they want.

IRON CLAD TRANSFER TICKET.

ON the last day of October the Rochester, N. Y., Railway put in service a new transfer ticket, the invention of a Mr. Stedman, and controlled and printed by the Rochester Printing Company. The center column of black figures indicate the hours, the left hand column the a. m. and the right hand p. m. The small figures on the cross lines indicate each 10 minutes of the hour. The cancellation for the day and month is made

		SOUTH & LAKE AVES. <small>Rochester Railway Co. Transfer.</small>									
		01	12	23	34	45	1	2	3	4	5
North Ave.	Patent	1	2	3	4	5	1	2	3	4	5
Hudson.	App'l.	01	12	23	34	45	01	12	23	34	45
St. Joseph.	Univ.	01	12	23	34	45	01	12	23	34	45
Clinton.	St. Paul.	01	12	23	34	45	01	12	23	34	45
North Ave.	Central.	01	12	23	34	45	01	12	23	34	45
South Ave.	East.	01	12	23	34	45	01	12	23	34	45
Central.	West.	01	12	23	34	45	01	12	23	34	45
Lake.	North	01	12	23	34	45	01	12	23	34	45
Lyell.	South	01	12	23	34	45	01	12	23	34	45
Allen.	West	01	12	23	34	45	01	12	23	34	45
Sophia.	Ave.	01	12	23	34	45	01	12	23	34	45

GOOD ONLY FOR CONTINUOUS RIDE WITHIN 10 MINUTES FROM THE TIME OF ISSUE.

at the office with a special device which marks a large number at one stroke. The conductor has therefore but one punch to make to mark the time and one indicating the line, to which it is given. Different colored tickets also are used to facilitate the reading of the ticket. To beat the company a passenger must hold an unexpired ticket, an unknown number of days and then be at the indicated transfer point within the 10-minute limit of the hour marked.

PORTLAND'S POWER.

AT Portland, Oregon, a city that for so long has been at the front of progress in the West, it is no matter of surprise to find one of the most complete electric power plants in the country.

The plant is located on the banks of the Willamette River in a frame building 85x155 in dimensions. Here are housed their 500-horse-power Buckeye engine a 1,000-horse-power Compound Corliss, five 250-horse-power Edison generators and ten 16 feet long and 60 inch diameter tubular steel boilers.

The Dodge system of rope transmission is used throughout both from the engines to the line shaft and from the line shaft to the dynamos. The fuel in vogue is sawdust and mill refuse conveyed from the mill to the powerhouse by a conveying system. All blocks and cuttings, first being chopped up fine by an immense cutter termed the "hog."

The Union Power Company has contracts with the Multnomoh street Electric Railway running 16 cars; the Suburban street Railway, soon to be electrified and to use 25 cars, and to a grist-mill, half-a-dozen printing offices and a large number of elevators, electric lights, fans and other smaller power users. In fact, many wheels of Portland would cease to go round if the Union Power Company should stop for an instant.

The officers of the company are: I. B. Hammond, president; H. C. Campbell, vice-president and D. F. Sherman, secretary, with offices in the Concord Block.

A CATSKILL CABLE.

THE next Rip Van Winkle who tries sleeping twenty years in the Catskill hills, will have to take an opiate. The thousands of tourists, who annually flock to this delightful region, will surely disturb the slumbers of any one who tries to go as fast asleep as Rip or a city with only horse cars. The Catskill Mountain Railway Company has decided to build a cable road between North and South Mountains. It will be only a mile and a quarter long, but in that distance it will make an ascent of 1,700 feet. It will begin at the present station of the Catskill Mountain Railway, at the foot of the mountain, and end within an eighth of a mile of the Catskill Mountain House, one mile from the Kaaterskill and two miles from the Laurel House. Trains will make the trip in ten minutes. At present it is an hour and a half's ride by stage coach. The road will be called the Otis Elevating Railway Company and will be built by Otis Brothers, the New York elevator-manufacturing firm. Otis Brothers will take a large part of the capital stock, which will be \$100,000, while the road will be bonded for another \$100,000.

THE MULE WENT.

IT only lies now with the STREET RAILWAY REVIEW to regretfully chronicle the sad, sudden and smoky demise of 75 swan-necked quadrupeds that have travelled their last mile upon the streets of Evansville, Indiana. Probably the most disastrous fire in the history of Evansville was the burning of the car barn and mule stables of the Evansville Street Railway Company. The fire started at 10:35 p. m. and within ten minutes the mules' boudoir was in flames. Five fire companies arrived shortly after upon the scene and did their utmost, in spite of the wind, to subdue flames. There were 103 mules in the stables but only about 30 were saved by the efforts of the firemen and citizens.

Twenty cars were lost, of which number fifteen cost \$900 apiece and were entirely new, also the harness and feed and railway implements.

The entire loss will amount to about \$85,000.

Superintendent Gist made commendable progress on the day following in keeping his few available cars running until other arrangements can be made.

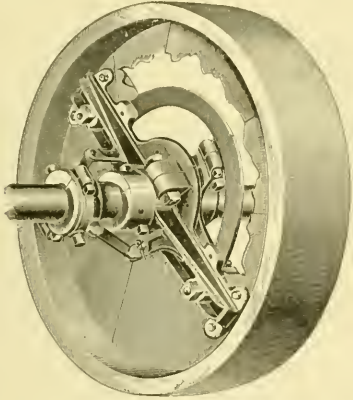
The present indications are that the Evansville Electric Street Railway will be in running order even sooner than provided for in the new ordinances passed by council. The electrician, who is to superintend the placing of the new plant, is in the city and with Superintendent Gist is making an inspection of the lines already built and the proposed extensions.

The loss of cars and stock sustained by the company will undoubtedly hasten the establishment of the plant, as the company will probably not buy new stock for so short a time.

The line belongs to Mr. Charles Hathaway of Cleveland, who will have the best wishes of the fraternity that the loss may be the smallest possible under the circumstances.

A NEW IDEA IN CLUTCHES.

A DEPARTURE from the previous method of building clutches has been embodied in the new device of the Taper Sleeve Pulley Works, of Erie, and is illustrated below. It is claimed to be the only one in existence where the arms and jaws stop running when



TAPER SLEEVE CLUTCH.

the clutch is disengaged. This is accomplished by making the ring part of the clutch fast to the shaft, and is the only part that revolves when the clutch is not working. The advantages, especially in high speeds, of holding the heavy arms and jaws stationary when not in use are many and obvious. The clutch will be placed on the market at once.

A SAFE INVESTMENT.

ON account of the monumental nerve of three gentlemen who traveled incognito and left no cards, the safe at the Ames avenue car barn, in Omaha, is a physical wreck and the company sighs for \$572.65.

As the last car came in and the last conductor's receipts had been placed in the receptacle above mentioned, three men very unceremoniously entered and requested a show of hands. The hands of the five occupants of the office were immediately exhibited to the unresponsive heavens and the bold bad men, while the revolver of one of the robbers effectually prevented that tired feeling which ensues from protracted postures. Ad interim, the artist with the drills, had introduced enough blasting powder into the interior economy of the safe to blow "future punishment" out of it, as one of the robbers poetically puts it.

The booty being secured, the telephone smashed and the men cautioned not to be too expeditious in their movements, the robbers departed.

The car barn was situated in a sparsely settled district, with little police protection, and the only wonder is that it has not been robbed before.

An Iowa paper trying to boom a street railway in a rural district closes its exordium with the tragic words, "Drop a pound of butter or a cabbage in the slot to get a ride."

EAST CLEVELAND RAILROAD SHOPS.

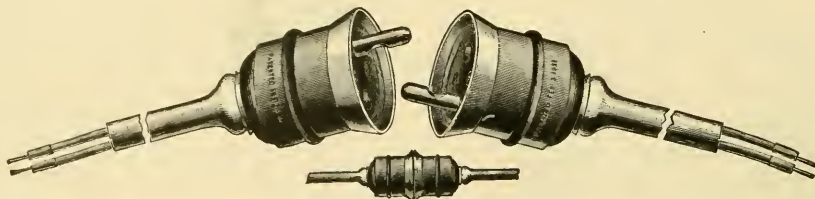
THE repair and construction departments of the East Cleveland Railroad Company's shops are among the best in the country, and are equipped with every necessary appliance and convenience. One of their electric lines makes a loop through one end of the building, and there the cars make a short laying time. The method of the starting is ingenious and interesting. At the stand is a large electric gong automatically operated from a distant part of the building by a device which is run by clock work, and consists of a disc with brass pins, which, as they revolve each in turn, makes an electric connection which sounds the gong on the stand. These pins can be set to make the contact as few or many minutes apart as desired, and naturally at the rush hours are found more thickly studded on the disc than in the middle of the day. Once set for the full twenty-four hours the machine will go any length of time with an occasional winding, and is absolutely automatic and positive. The cars while making the rest stand under a long platform suspended by iron rods and on a level with the car roof; so as each car passes, the trolley inspector can know exactly the condition of each. A trolley repair room also extends the length of the platform, and here all such repairs are made. The iron and wood working departments, which are on the first floor, are complete, as is also the room above for winding armatures, which are raised and lowered by convenient cranes. In one of the pits a hydraulic jack is placed, and when it is desired to remove a motor the car is run over it, the jack raised, the motor unfastened, the jack lowered, and the car run off, when the motor can be again raised to floor level and caught with a crane and placed where wanted. One man with the jack can do all this without other assistance. The store room on the second floor resembles a good sized hardware store, and everything needed is always ready. When a motor has been overhauled it is placed in gear with a pair of wheels under heavy brakes, the current connected and submitted to a heavier strain than would be exerted when moving the largest possible loaded car. An ampere meter also shows the amount of power thus developed. By this means when a motor goes out, it goes to stay until in need of new repairs. All the power for driving the shop machinery is derived from a motor occupying a space of 8x10 feet, and driven from the feed wires of the station 3 miles distant. Indeed, all the lines of this company, comprising some 75 miles, are driven from one central station. The shops are unusually light, from windows 12 feet in length.

MIKE CLEARY, the pugilist, had an encounter with a Grand street, New York, car, and was knocked out in the first round. The street car handled the subject without gloves.

GEO. H. BABCOCK says: "Set down all claims to the evaporation of over twelve pounds water per pound of combustible (unless it be oil, gas or hydrogen) under any conditions, as made ignorantly or with an intention to deceive."

ELECTRIC CAR LIGHTING.

ILLUMINATION of street cars by a new system is the idea of the B. G. Electrical Supply Company of 401 Fore street, Portland, Me. We are able this month to explain to some degree their method. As electric lines gather importance the necessity increases



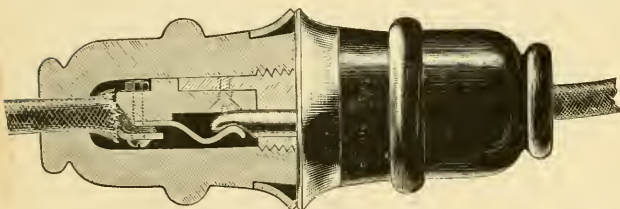
DOUBLE POLE COUPLER.

of operating cars in trains of two or more, and the desirability of electrically lighting each trail car is self evident. This is readily accomplished with but one trolley pole by the Jordan double-pole electric light coupler which is adapted to all electric systems. This current can be conducted through any number of cars and returned through

thus allowing for all curves. They are easily attached and prevent much wear on the cable.

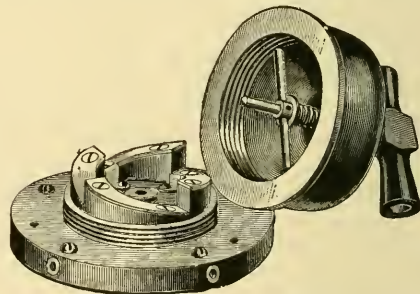
This company also manufactures a combination snap switch with removable key. This three way switch, (see the illustration), is made expressly for the Jordan lighting system and is perfectly insulated inside and out, and is proof against fire and wrong turning.

The Jordan system claims to be the only one for the lighting of trailers from the motor, and contains the following other points of vantage: Breakage of a lamp and consequent extinguishment of all lights in that car, does

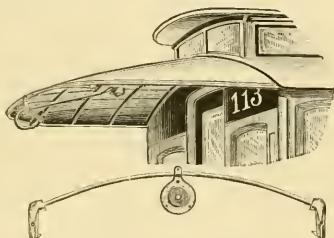


SINGLE POLE COUPLER.

the same coupler. It has a rubber gasket joint, on which the manufacturers have a special and strong patent, making it perfectly air, dust, and water tight; the connections are absolutely sure by friction bearings; the covering or shell is made of their perfect insulating material and can be handled with absolute safety.



COMBINATION SNAP SWITCH.



ELECTRIC CABLE GUIDE.

Their single pole electric coupler is a well-tested appliance, it has friction bearings making absolutely sure connections. Rubber gasket joints make it air, dust and water tight. The halves are exactly alike, and are interchangeable, and are fitted with proper wires and tips ready to attach to any switch or terminal. They are very light weight; insulation is perfect; no soldering, and there is not an "out" about them. They are par-

not affect the lights in any other car on that train. If the cars separate by any accident before the coupler is taken apart, no damage is done to the electric cable, as the coupler separates as though taken apart by hand. The switches cannot be interfered with by any one other than the person having charge thereof.

The system is well recommended by those using it and it will no doubt, become more generally used as it becomes more generally known.

STREET car strabismus takes an inconvenient form when the conductor isn't able to see that twelve men have had to pack themselves on one seat in order not to crowd the eight women on the other side, who would rather be torn to pieces by wild horses than budge an inch to make room for a newcomer.—*Philadelphia Times*.

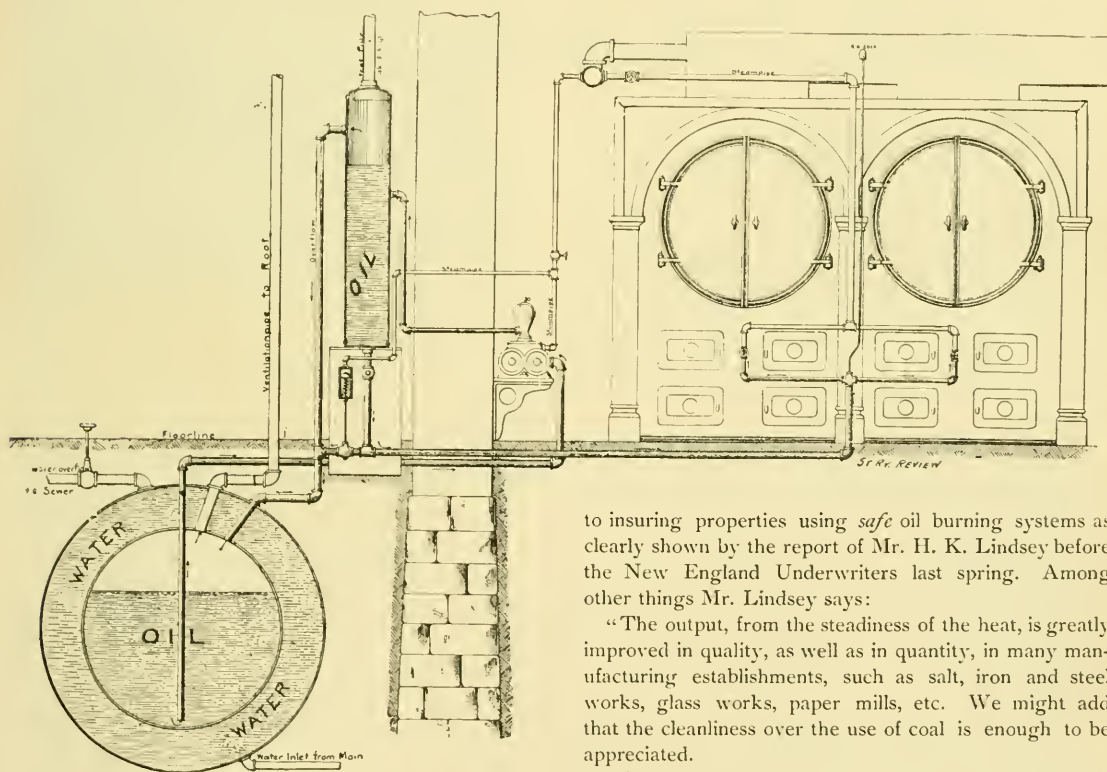
OIL AS FUEL.

ONE of the heaviest expenses of any power plant in constant use, such as street railway, electric and cable power houses, is that of fuel. In many of our western and middle states, coal is high priced on account of heavy freight rates, and the quality obtainable in such large quantities, moreover, is of the poorest. The intelligent manager is always on the outlook for means of lessening expenses, and consequently canvassing this question. The oil burners of late years have been attracting wide attention in localities where water power is unobtainable.

Where water power is convenient, oil burning methods furnish, now, the cheapest artificial heat for unremitting service. The chief objection has been that of the explosive character of the agent arising from gases generated by pressure or heat. Mr. C. F. Maural, a practical engineer,

well by the steam pressure, so that no engineer, however incompetent, malevolent or careless, can cause an explosion accidentally or with malice aforethought. The advantages of oil as a fuel are now becoming so generally known that it is almost nugatory to remark that 75 pound of evaporation can be obtained from one pound of Lima oil consumed, if the fuel-water be heated to 212° . Coal gives 7 pounds of evaporation to 1 of combustion, or a proportion in favor of oil of 7 to 17, which is more than 50 per cent. Again, 1 pound of coal equals 12,000 to 14,000 units of heat, while the same weight of Lima oil produces 21,000 units.

The absolute safety of many devices and the cheapness of the crude or reduced oil ought to be great inducements to the electric railway and electric light plants of the land, and prairie towns, to investigate the matter. Insurance companies are losing their objections



of the Chicago Fuel-Oil Construction Co., has invented a new device obviating these dangers, which has been in successful operation in several places besides Chicago, where a large number are in use. The great advantage of their method lies in the total submersion of the oil by running around it a stream of water from an adjacent main and connecting it on the other side with the sewer. This keeps the oil well cool during a conflagration in the neighborhood, and no explosive gases are generated by the heat. Besides the water-jacket, there is a new device for automatically returning the unused oil to the feed

to insuring properties using *safe* oil burning systems as clearly shown by the report of Mr. H. K. Lindsey before the New England Underwriters last spring. Among other things Mr. Lindsey says:

"The output, from the steadiness of the heat, is greatly improved in quality, as well as in quantity, in many manufacturing establishments, such as salt, iron and steel works, glass works, paper mills, etc. We might add that the cleanliness over the use of coal is enough to be appreciated.

"An economic advantage will accrue to those using oil at points remote from the coal fields, as the cost of transportation adds very materially to the cost of fuel.

"It is claimed that $2\frac{1}{4}$ barrels of oil of 42 gallons each, will equal the heating capacity of one ton of bituminous coal, and this amount of oil will weigh 630 pounds, which, if transported in tank cars, can be made to reach any point in this country at a very low figure, and of course all expense of handling is saved when compared with coal."

Although no definite action has been taken by many companies, oil burning is bound to come some day.

The accompanying table shows the relative cost of oil and coal in Pennsylvania. To this freight must be added which is much less on oil than on coal.

Oil per bbl.	Coal per ton.	Oil per bbl.	Coal per ton.
\$0.20.....	\$0.74	\$1.20.....	\$4.47
.30.....	0.12	.30.....	4.85
.40.....	1.49	1.40.....	5.22
.50.....	1.86	1.50.....	5.59
.60.....	2.24	1.60.....	5.97
.70.....	2.61	1.70.....	6.34
.80.....	2.98	1.80.....	6.71
.90.....	3.35	1.90.....	7.08
1.00.....	3.73	2.00.....	7.45
1.10.....	4.10		

Among the oil burning companies are the St. Paul City Cable, the West and North Chicago, and the Cleveland City Cable. One man where oil is used can do the work of six firemen, while the saving in heat by not opening the fire-box door is very considerable. In Cleveland the Standard Oil Company has laid an underground pipe line from their tank-car tracks to the power house of the cable road, and are pumping instead of hauling in tank wagons, at a considerable saving in expense and regularity.

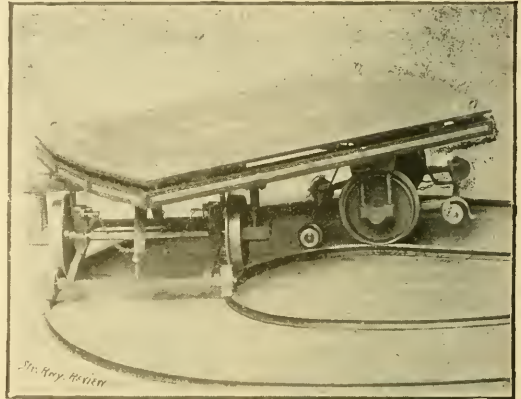
If burning petroleum will lift the smoky pall from some of our cities, let petroleum be burnt. Several large concerns in Chicago which have been making experiments with oil as fuel are satisfied with the results, not only in the matter of cleanliness, but economy, and have or are now preparing to change from coal to petroleum. The largest of these are the Chicago City Railway Company, the West Division Street Railway Company, as mentioned above, and the Chicago Sugar Refining Company. While New York has less to complain of in the matter of smoke than many other cities, there is still too much of the evil there, and it should be abated as far as possible.

The greatest oil field this country has ever known is now being developed near Pittsburg. Wells producing above 10,000 barrels a day have been opened up. Many thousand barrels of oil have gone to waste, and many thousand more are likely to. If this is a better fuel than coal, let it be utilized. The producers of petroleum will welcome a new market for their product. With apparently inexhaustible supply in the fields of Pennsylvania and Ohio, there need, perhaps, be no fear that there will not be plenty of this fuel for many years to come.

RECENT sales of Goubert Feed Water Heater, count in among a large number of others, the following electric roads: Douglas County Street Railway Company, West Superior, Wis., 500-H.-P.; Metropolitan Street Railway Company, Washington, D. C., 600-H.-P.; Buffalo Street Railway Company, Buffalo, N. Y., 800-H.-P.; Essex County Street Railway Company, Newark, N. J., 500-H.-P.; Peoples' Street Railway Company, Scranton, Pa., two 400-H.-P.; Valley City Street & Cable Railway Company, Grand Rapids, Mich., two 400-H.-P.; Winston Street Railway Company, Winston, N. C.; Brooklyn Street Railway Company, Cleveland, Ohio, five 400-H.-P.

WILLIAMS' RADIAL TRUCK.

AMONG the exhibits of new trucks at the last convention, was a neat model of a new radial, the invention and manufacture of H. B. Williams, of Rochester, New York. As illustrated, a pair of small guide wheels run in front of the car wheels, and give the direction to the large car wheels, very much as a wagon is turned by the tongue. There are two pair of guide wheels for each axle, one on either side, which are dropped to position by a lever operated by the driver, to suit the direction the car moves. It will be seen this device admits of passing the car around a curve of the smallest possible radius.



The necessity for guard rails is also removed, and another and entirely new and desirable advantage is that the car wheels ride squarely on the tread of the wheels and the flanges do not come in contact with the rail, producing a uniform gliding motion to the car, free from jerk or jar. Wheels are located only two feet from end of car box, irrespective of length of car, thus increasing the wheel base to an extent impossible under any other method.

LEEDS AND THE OVERHEAD.

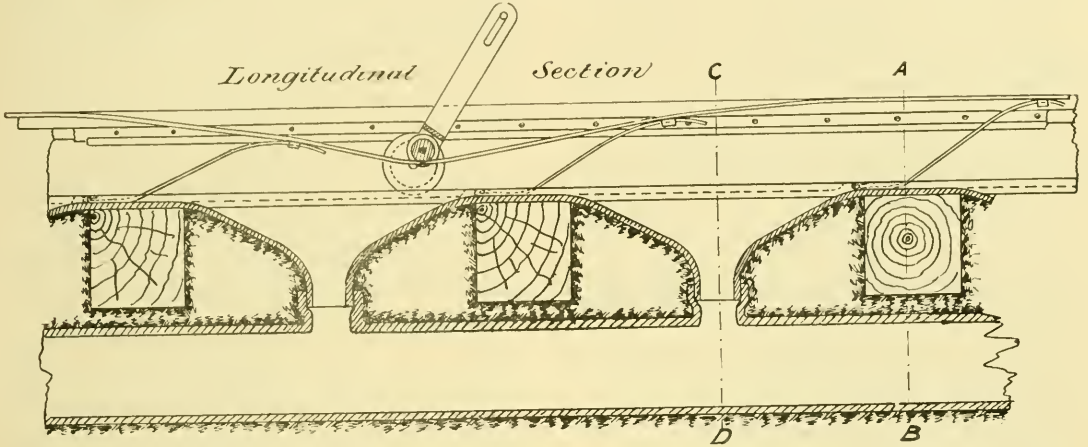
THE electrical fraternity in England has been considerably exercised of late over the innovation made by the Thomson-Houston Electric Company in the erection of overhead wires in the long stretch between Leeds and Roundhay Park, its prominent pleasure ground.

It is passing strange, as an English contemporary remarks, that American machinery and enterprise should equip this road. The said contemporary then sapiently says: "Most tramways are earning a fair dividend under existing conditions; they promise only a *probable* increase with a change of system but on the whole, who will provide us with an argument to combat the bird-in-the-hand-is-worth-two-in-the-bush argument?" Who indeed, but the roads which have increased their traffic from 50 to 500 per cent. by affording the workers and tradesmen in our cities the facilities to dwell in the comforts of suburban air and still prosecute their vocations in the business centers. Verily conservatism in electrical lines means nothing but retrogression and seventeenth century accommodations.

ELECTRICAL CONDUIT WITH CLOSED SLOT

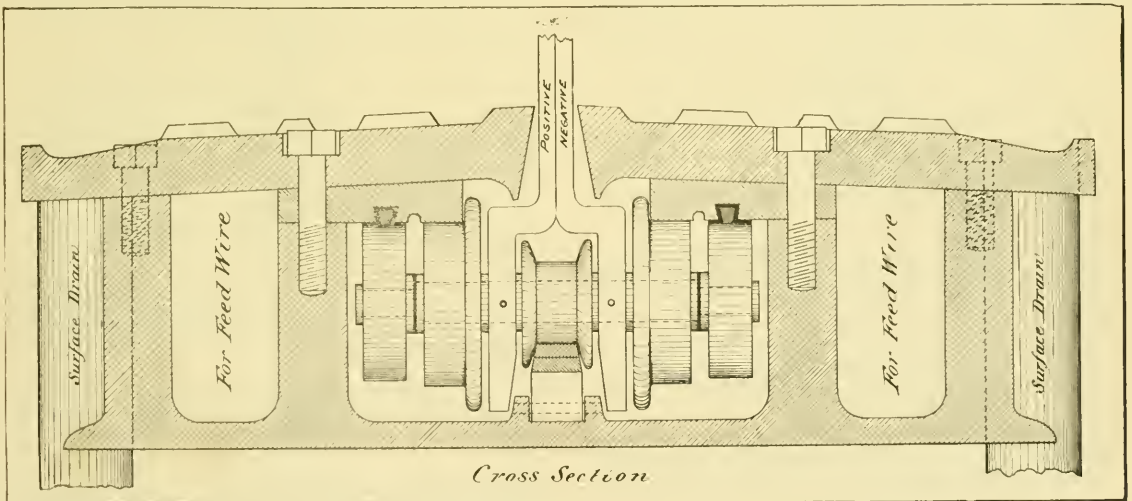
A NEW conduit construction has been devised by Mr. C. H. Bates, a dentist of Minneapolis, and is illustrated herewith. The cross-section needs little explanation as the cut readily explains itself. The conduit is very shallow and is intended to rest upon the ties and between the rails. The large centre chamber in which the trolley wires and contact wheels are carried is drained at intervals direct to the sewer. Other drains

A prominent feature is the slot closing device by which the inventor expects to keep his conduit clean and free from foreign matter otherwise entering through the slot, and which if allowed to enter would render so small a conduit impracticable. A steel strip, or continuous strap extends the entire length of slot and is held in place on the under side of slot rails by steel springs. Both strap and springs are depressed as contact wheels advance with the car. The contact wheels correspond to the grip



are also placed just inside the rail to carry surface water and prevent its backing up and into the slot. Two tunnels are provided for feed and return wires—one on either side. The trolley is fed from metal bars in short

of cable roads, and can only be removed or placed in the conduit at manholes provided for the purpose. The cross sections and top plates are of cast iron—the conduit walls of rolled plates.



insulated sections to prevent leakage and wear from contact. It will be noticed the positive wire is at one side and the current after passing through the motor returns through the trolley shank and is passed out at the opposite side and thence conducted through the small contact bar to the main return wire, which is of same size as the feed wire. The trolley device rides on a light insulated rail in center at bottom of conduit.

THE construction can readily be made in sections of 10, 20 or any desired number of feet, and joined when laid in the street, thus greatly facilitating construction, and avoiding obstruction of street, as the rails are not disturbed. the conduit being laid directly on the wooden ties. To make the conduit water-tight, the joints are seamed with lead. The Bates Electric Conduit Company is incorporated for \$1,000,000, with offices in Minneapolis,

CAUGHT ON THE RUSH TRIP.

American Street Railway Association.

JOHN G. HOLMES, PRESIDENT, Pittsburg, Pa.
 THOMAS H. McLEAN, FIRST VICE-PRESIDENT, New York, N. Y.
 JAMES B. SPEED, SECOND VICE-PRESIDENT, Louisville, Ky.
 ALBION E. LANG, THIRD VICE-PRESIDENT, Toledo, O.
 WM. J. RICHARDSON, SECRETARY AND TREASURER, Brooklyn, N. Y.
 EXECUTIVE COMMITTEE—THE PRESIDENT, VICE-PRESIDENTS, and HENRY M. WATSON, Buffalo, N. Y.; LEWIS FERRINE, JR., Trenton, N. J.; W. WORTH BEAN, St. Joseph, Mich.; MURRY A. VERNER, Pittsburg, Pa., and THOMAS C. PENNINGTON, Chicago, Ill.
 Next meeting will be held in Cleveland, O.

Massachusetts Street Railway Association.

President, CHAS. B. PRATT, Salem; Vice-Presidents, H. M. WHITNEY, Boston, AMOS F. BREED, Lynn, FRANK S. STEVENS; Secretary and Treasurer, J. H. EATON Lawrence.
 Meets first Wednesday of each month.

Ohio State Tramway Association.

JOHN N. STEWART, Ashtabula, President; JOHN HARRIS, Cincinnati, Vice President; J. B. HANNA, Cleveland, Secretary and Treasurer; E. K. STEWART, Columbus, Chairman Executive Committee.

The Street Railway Association of the State of New Jersey.

President, JOHN H. BONN, Hoboken; Vice President, THOS. C. BAER, Newark, Secretary and Treasurer, CHARLES Y. BAMFORD, Trenton; Executive Committee, OFFICERS and C. B. THURSTON, Jersey City; H. ROMAINE, Patterson; LEWIS FERRINE, JR., Trenton.

The Street Railway Association of the State of New York.

JOHN N. BECKLEY, PRESIDENT, Rochester, N. Y.
 THOS. H. McLEAN, VICE PRESIDENT, New York, N. Y.
 GEO. LAW, SECOND VICE PRESIDENT, New York, N. Y.
 WM. J. RICHARDSON, SECRETARY AND TREASURER, Brooklyn, N. Y.
 EXECUTIVE COMMITTEE—D. F. LEWIS, Brooklyn, N. Y.; C. DENSMORE WYMAN, New York, N. Y., CHAS. CLEMENSHAW, Troy, N. Y.
 The next meeting will be held at Saratoga, September 20, 1892.

Alabama.

BIRMINGHAM.—The Elyton Land Company talks of adopting storage batteries.

EVOLUTION.—A new town with a new electric road is attracting people to Evolution. T. C. West of Sioux City, Ia., is interested.

Arkansas.

DARDANELL.—Northern capital will build a road from here to Mt. Nebo.

California.

BENICIA.—An electric railway between Benicia and Vallejo is one of the probabilities of the future.

LOS ANGELES.—The ordinance denying the Cross franchise has been reconsidered. The obdurate mayor having vetoed the Los Angeles Consolidated Electric Railway Company's franchise, the city council, except one man, passed it over the veto.

LOS GATOS.—F. Chappellet, H. de Laguna and others have presented a petition to the Town Board for a franchise for an electric railway to connect with their Haywards & San Jose Line in San Jose. They propose a 15 cent fare to San Jose.

OAKLAND.—Materials have arrived for the Oakland Consolidated Railroad Company. The franchise has been asked. Mayor McElrath is at the head of the enterprise.

FRANCHISE on Tenth Street has been denied the Rapid Transit Company. Trackage is asked on the city wharf but will probably not be granted.

THE Southern Pacific has decided to turn the Telegraph Avenue Street Car Line into an electric road. The equipment has been ordered.

SACRAMENTO.—An electric road to Perkins is assuming tangible shape. J. H. Henry and L. L. Lewis represent the company. The cost for the four miles will be \$32,000.

SAN DIEGO.—The entire system of San Diego Street Car Lines, embracing several miles of track operated by horses, was purchased to-day by A. B. Spreckels, son of Claus Spreckels, the sugar king. He will at once convert the main portion of the system into an electric road, and if that proves satisfactory will apply electricity to all of the lines.

SAN BERNARDINO.—San Bernardino Street Railway Company has been incorporated, capital stock, \$10,000. Directors, H. M. Willis, S. R. Brunn, James Fleming, William A. Harris and W. S. Hooper.

SAN FRANCISCO.—Mortgage has been filed by the Metropolitan Electric Company for \$1,000,000, to the California Title Insurance and Trust Company. About two miles are now built and 5 miles will be in operation by March 1.

THE completion of the additions, aggregating 27,000 feet in length, to the Ferris and Cliff House Railway System has been made in ninety days.

Connecticut.

NEW HAVEN.—A company has been formed including W. W. Ward, Wilson Weddingham, Henry Sutton and others to get a charter to run in electric road from Savin Rock to Woodmont.

APPLICATION has been made to double track the State Street Line. Trains will be laid in the new portions and greater improvements in speed and equipment will follow.

IN spite of the protests of some citizens the conductors have been substituted by fare boxes on the Whitney Avenue Horse Car Line.

Colorado.

ASPEN.—T. J. Flynn, now operating the horse car line, proposes to augment travel by changing to electricity.

DENVER.—Valverde, a suburb, is talking street car connection with this city.

A MOVEMENT is on foot to construct an electric railway from the southern terminus of the South Broadway Electric road to Littleton. The distance is not over 7 miles.

THE Tramway Company has begun work on their new electric power house at the corner of Gillespie and Thirty-sixth streets. A large car house will be built in connection with it.

MANCHESTER.—An electric road to Denver is agitated.

Florida.

OCALA.—Northern capital will construct an electric railway from Silver Springs to this place, where a resort will be established. Ex-Gov J. L. Chamberlain, of Maine, is interested.

Georgia.

ATLANTA.—Mrs. M. H. Powell gained the \$8,000 damage suit against the Metropolitan Company.

THE Atlanta, West End & McPherson's Barracks and the Grant Park lines are now consolidated as the Atlanta Traction Company. The officers of the company are as follows: George E. Hoppe, president; J. H. Mountain, vice-president and general manager; Henry Lanier, treasurer; Harry Woodard, secretary.

MACON.—Deputy Sheriff Harrington has sold \$8,000 of the bonds of the Macon & Suburban Street Railroad. The bonds were signed by George F. Work and other officers of the company. The lot was knocked down to Mr. Henry Horae for \$100, his being the only bid made.

ROME.—The contract for the sale of the Rome Street Railroad has been closed. The new company will begin at once to erect the electric street car line, which is to supplant the present line.

SAVANNAH.—A mortgage has been given by the Atlanta Consolidated as security for the first mortgage bonds, amounting to \$2,500,000.

THE Southover Street Railway has been chartered. Capital, \$15,000; and incorporators, J. L. Whately, C. H. Olmstead, C. H. Dorsett et al. The road will carry freight and passengers to the city from Southover Junction.

Illinois.

AURORA.—A strong syndicate, headed by Senators Evans and Crawford, have bought land near the city and will establish factories and a park with an electric road connecting with the Joliet & Eastern.

BELLEVILLE.—Belleville Electric Railway Company, at Belleville has been incorporated. Capital stock, \$100,000; incorporators, James A. Atterbury, Joseph Fuess and others.

EAST ST. LOUIS.—East St. Louis and Belleville, Ill., will be connected by an electric line. J. H. Atterberry, of Litchfield, is the organizer.

ELGIN.—The Elgin City Railway Company to day voted to increase its stock from \$50,000, to \$250,000. William Grote, president; J. B. Lane, vice-president and general manager; A. B. Church, secretary and treasurer, are officers for the coming year.

JOLIET.—Joliet with its elegantly equipped road took occasion recently to honor J. A. Henry, president, with an ovation. The mayor made a complimentary speech and a large party of notables took a ride in the fine Pullman palace cars.

JOHN HALSIZER, cashier of the Electric Railway, has returned after an extended trip east.

KANKAKEE.—The council has granted the railway company the privilege of using T rails on the Eagle street extension.

MONMOUTH.—The Monmouth Motor Street Car Company certified to an increase from \$300,000 to \$600,000. The Monmouth Motor Company is bound to have street car lines between the depots, college and square in Monmouth by next July.

SPRINGFIELD.—The City Railway have received four new cars from the La Ciede Car Company St. Louis, which are greatly admired.

TAYLORVILLE.—The Christian County Electric Railway Company at Taylorville has been incorporated. Capital stock, \$100,000; incorporators, W. W. Anderson, J. N. C. Shumway, Charles Cheney and others.

WAUKEGAN.—Two applications for franchises are before the council. The Electric Light Company wishes to run from Washington street, Chicago. The other is asked by R. W. Coon, C. E. Loss, Chicago, and others. The latter do not restrict themselves to electricity.

Indiana.

BROWNSTOWN.—Steps have been taken to organize a Brownstown and Seymour street railroad. The distance is eleven miles, and it is thought the line can be made for \$65,000.

BLUFFTON.—The city council has passed an ordinance granting W. H. Atkinson of this city a franchise to build a street railway on four of the principal streets, cars to be in running order within six months.

INDIANAPOLIS.—Ex-President Shaffer of the Citizens' Street Railway Company denies the rumor that he is interested in a new Indianapolis line. He is consulting with the St. Louis Car Company about some new cars.

SOUTH BEND.—Superintendent Cornell of the South Bend & Mishawaka Railway Company has resigned to accept a place in the traffic management of the World's Fair. Zenas Campbell will take his place.

Iowa.

DAVENPORT.—The Davenport & Rock Island Railway have increased their capital stock from \$750,000 to \$1,500,000.

Kansas.

KANSAS CITY.—Two new electric roads, aggregating 11 miles, bid fair to be built before snow flies. The Thayer-Enright franchise has been extended as to time and the stock yard road been reported favorably.

Louisiana.

An ordinance is pending which requires all drivers to wear uniforms.

NEW ORLEANS.—The Stockton street railway ordinance has been reported favorably for the Canal street line. Mr. Hall's street railway ordinance was also reported favorably, with amendments.

Maine.

BIDDEFORD.—The following directors were elected by the B. & S. Railway Company: Charles B. Pratt and Harry S. Sealey, of Worcester, Mass., Esreff H. Banks, Joseph Gooch, John F. Nourse and C. H. Prescott, of Biddeford; Franklin Nourse and Stephen S. Mitchell, of Saco. Receipts for past year \$27,000, expenses \$24,000.

The construction of the Biddeford, Gold & Old Orchard Line has begun. Mr. Kitson, quondam of the Worcester, Mass., Road, has charge.

PORTLAND.—D. D. Warren & Co., of Cumberland Mills, are to have an electric freight line.

Maryland.

BALTIMORE.—The City Passenger Company has accepted the offer of A. Brown & Sons to take the \$2,000,000 issue of stock made for the purpose of paying for cabling the system.

GEO. C. MYERS, a railway employe for thirty six years, died in a street car recently. He was 52 years of age and had served as conductor for thirty-four years, and was street boss of the Union Line at the time of his death. He was a man of large physique, generous disposition and great honesty. He leaves a wife and child to mourn his loss.

The proposed Mill Line on Huntington Avenue has been finally beaten and the B. H. & L. R. Electric Road has the courts with it in the injunction suit.

Massachusetts.

BOSTON.—A franchise has been granted to the Norfolk & Suffolk Street Railway Company by Hyde Park for a line from the Hyde Park and Dedham line by Hyde Park through River street and Hyde Park avenue, to the Boston line.

The West End Road is rapidly extending its lines to Malden.

HAVERRILL.—To the regret of every one Mr. I. O. Sawyer declines a fourth term as president of the H. & G. Railway Company.

TAUNTON.—The Globe Street Railway Company carried 3,250,000 passengers during the year and the receipts were about the same as in previous years. Robert Goff was chosen treasurer and M. G. B. Swift clerk.

Michigan.

BENTON HARBOR.—President Bean says that the electric equipment will come soon. A 200-horse-power engine has been ordered.

DETROIT.—A corporation is being organized by Springwells citizens and property owners, who will soon ask for a franchise for an electric street car line over Toledo avenue to Woodmere and River Rouge.

At a special meeting of the Street Car Employes' Association recently the secretary, J. C. Manuel, was presented with a purse of \$100, contributed by the men as a testimonial on the occasion of his marriage, which occurred on the 14th of October. The money was then raised, but this was the first opportunity the men had to convey it to Mr. Manuel with expressions of their esteem and confidence.

ESCANABA.—Jas. Lillie, the wealthy resident of Escanaba, says that he will have 4 miles of track on his electric line next spring.

RED JACKET.—The Red Jacket common council has granted a franchise to E. Ryan and John D. Cuddihy for an electric railroad. It is hoped to extend the road through the streets of the mine location.

IONIA.—Ionia, by the energy of home capital, will soon have an electric railway about 3 miles long.

MUSKOGON.—G. P. Kingsbury has resigned his position as superintendent of the Muskegon Street Railway. His successor has not been appointed yet.

OWOSSO.—Paine Brothers, of New York, have filed bond and accepted franchise for the electric railway. Cars and iron have already been ordered.

Mexico.

CITY OF MEXICO.—This company has about 12 miles of street car lines in operation and in course of construction. It already extends nearly to the famous Sierra de la Silla (Saddle Mountain), and when completed to that point will furnish a most delightful ride to that picturesque locality.

Minnesota.

DULUTH.—The Park Point Street Railway Company petition for right of way over Lake avenue for an extension. The company proposes to build a cable road next spring. President B. Silherstein is authority for the statement. Other extensions will probably be added in electric lines to the suburbs.

ATTORNEY J. A. BOGGS, Winnipeg, is trying to procure franchise for an electric road. He claims that he uses American capital.

MANKATO.—Franchise has been granted the new electric road, provided that the operation begins within a year.

MOORHEAD.—A plan is on foot and a franchise drawn up for constructing an electric railway to Fargo, City Attorney Nye is the attorney.

ST. PAUL.—The railway company will remodel the big shops at the Thirty-first street junction into a power-house. It is proposed to expend about \$30,000 on the improvements. The company has decided to connect the Monroe street line with the Lyndale line.

The directors of the street railway have authorized the issuance of bonds needed to cover the 14 miles of road built since January.

SUBSCRIBERS of \$100,000 to the Selby avenue cable protest against substituting electricity and demand their money back.

Missouri.

ST. LOUIS.—The unknown members of the St. Louis Electric Railway Company have asked extensive franchises. Remuneration offered is \$1,000 first year; \$2,000 each year afterwards. Mr. Cullinane, alderman, introduced the bill.

The report for the third quarter, of the earnings of the various roads, shows a strong increase over the preceding three months. During July, August and September, the total number carried was 22,056,590, an increase of nearly 2,000,000 over April, May and June. There has been a strong suburban movement in residence districts during the past two years, due to cable and electric lines.

Montana.

HELENA.—The Union Railway Company, which runs the Lenox and University street car lines, has closed a contract with the Helena Electrical Power Company, for power to operate the Lenox line. Rolling stock has been ordered.

MANAGER H. W. Clark is using every effort to equip his road electrically before winter. Several extensions will be made.

Nebraska.

OMAHA.—The Omaha & Florence Street Railway Company has been incorporated. The Omaha men interested in it are H. G. Clark, F. C. Smith and F. L. McCoy.

Four masked men robbed the Ames avenue barn safe of \$800.

Nevada.

RENO.—It is rumored that John W. Mackay is at the head of a scheme to build an electric railway from Reno to Virginia City.

New Jersey.

ASBURY PARK.—Owner Shaffer, of the electric system, promises extensions to Long Island and Seabright.

JERSEY CITY.—J. H. Bourne, the president of the North Hudson County Railway Company, will transfer his controlling interest to the Hoboken Land & Improvement Company.

PRESIDENT C. B. THURSTON, of the Jersey City & Bergen Railroad, says: "Our electrical engineer has orders to finish the Montgomery Street Line, and we contemplate doing away with horses on the four other lines. This time next year Jersey City will have much improved rapid transit facilities."

New York.

BROOKLYN.—The Atlantic Avenue Line will run cars to Greenwood cemetery. \$1,000,000 more stock, \$3,000,000 in bonds have been allowed by the commissioners.

The Myrtle Avenue branch of the Brooklyn City Railroad is to be extended to Richmond Hill, the extension to be operated by steam motor for three years, after that by electricity.

A NUMBER of capitalists connected with the Laurel Grove Cemetery Company, prominent among whom are James A. Morrisse, a real estate agent, and John R. Beam, a lawyer, are forming a new electric railroad company. The plan is to build a road from the Erie Railroad's Market street station through Ellison and Spruce streets to the Passaic Falls, and thence past Laurel Grove cemetery to the village of Little Falls by way of a now disused road along the north bank of the Passaic river.

NEW YORK.—The Belt Line has quietly elected officers and directors without the expected faction opposition.

HOODLUMS have been smashing L car windows and injuring passengers of late. No arrests can be made as the attacks are after dark.

NORWOOD.—There is a talk of extending the street railway from Watertown to Carthage along the north bank of the river, and developing the water powers above Great Bend.

OSWEGO.—The Knickerbocker Trust Company, of New York City, has loaned the Oswego Street Railway, Company \$125,000 and taken a mortgage on the property.

TONAWANDA.—The Tonawanda Electric Railroad Company has succeeded in obtaining the consent of the owners of property along Two-Mile Creek road to construct and operate its road along that highway.

YONKERS.—A New York City syndicate, headed by C. H. Montague, of Yonkers. The overhead trolley will be used as soon as consent is obtained.

North Carolina.

WILMINGTON.—The electric railway people have put up their \$2,500 forfeit to have the electric plant up in six months. J. H. Barnard is the manager.

WINSTON.—Superintendent Cooper, of the Electric Railway, is making a fine record. A new line has just been opened up beyond Wachovia Brook. Recently 14,764 passengers were carried in two days.

North Dakota.

FARGO.—The report of the committee of the city council is made public. It recommends granting a 20-year franchise to the electric street railway.

Ohio.

CINCINNATI.—The Consolidated Company has permits to erect poles for the new Clifton avenue electric.

CLEVELAND.—A new scheme is to connect Cleveland and Akron by electric railway. The distance is 37 miles, with several towns on the way. J. J. Shaffer, Chicago, C. F. Dunbar, Beckville, Ohio, and others, are the promoters.

COLUMBUS.—A plan is on foot to join Nashville and Columbus by an electric line. This distance is 20 miles and the cost calculated at \$40,000.

The projectors of the Columbus & Clintonville Electric Railway company have filed articles of incorporation. J. M. Loren, E. W. Pegg, C. M. Williams, J. M. Wilcox, et al. are the men interested.

The Columbus & Westerville Electric road has been incorporated. M. H. Neil, Lewis Hoffman, et al. of Columbus, and E. A. Denune, A. Jarvis, Muffinsville, are among the incorporators.

MOTOR cars of the Consolidated will run to North Broadway. The owners of the addition built this road.

FREMONT.—Emory Carter, superintendent of Fremont's street railroad Company, will wed Miss Laura Stjernal, a young society lady.

SPRINGFIELD.—Ward Frey is pushing his electric line extension with great dispatch.

WASHINGTON C. H.—H. W. Thomas, of Zanesville, has selected a route for the electric road.

Oregon.

SALEM.—The lines, tracks, cars, horses, etc., of the Salem Street Railway Company, by virtue of a \$16,000 chattel mortgage have passed into the hands of H. W. Cottle, who will operate and manage the road until sold.

Pennsylvania.

CONSHOHOCKEN.—The Recorder is talking electric railways.

DUBOIS.—School tickets at certain limited hours will be sold at 3 cents.

ERIE.—The motor company will build a new power house. Five cars are now in. The Ball Engine Company is building the engine, one of the largest ever made for this concern.

LANCASTER.—A charter was granted recently by the state department at Harrisburg to the Lancaster & Strasburg Railway, with capital stock of \$125,000. The directors are: John A. Coyle, Robert D. Stewart and Walter M. Franklin.

LATROBE.—The Latrobe & Derry Electric Street Railway Company, of Westmoreland county, capital \$50,000, has been chartered. Directors: John W. Hughes, John B. Miller, James E. Heck, David J. Bush and C. O. Slater, Latrobe.

PITTSBURG.—The Pittsburg, Manchester & Alleghany Road sold its horse and mule power recently at from \$25 to \$75 per head.

THE White Electric Traction Company has decided to extend its line from Duquesne to Homestead. The Monongahela river will be bridged.

THE consolidation of the Pittsburg Traction Company and the Duquesne line is about to be consummated. The former road will not get out a new supply of 3 cent fare tickets.

THE Pittsburg, Alleghany & Manchester Company will build an addition to its power house. Twenty-six new cars will be run when all the branches are equipped electrically.

PHILADELPHIA.—The meeting of the stockholders of the Lombard & South Streets Railway Company has been held. The report of the president for the past year showed that 7,281,414 passengers had been carried during the year. The net earnings of the road for the year amounted to \$88,849.52. Of this amount \$87,500 was devoted to the payment of dividends and \$1,349.52 was carried to the surplus account.

THE West Philadelphia road has elected directors. The new board organized by the election of P. A. B. Widener president and D. W. Dickson secretary and treasurer.

FEED and medicine have been stolen in large quantities by the employes of the Eighth and Dauphin street line. The robbery has been wholesale and long continued.

MT. PLEASANT.—It is promised that the street railway between Mt. Pleasant and Tarr will be completed and in running order by April 1, 1892.

SCOTTDALE.—Charters have been granted to two electric railways at Scottdale.

WILKESBARRE.—If the Pittston brick stand the test on the square in Wilkesbarre, they will be used in paving between the rails on the electric road.

Rhode Island.

PAWTUCKET.—The officers of the Pawtucket road for next year are: Arnold B. Chase, re-elected president; Alfred H. Littlefield, vice-president; E. N. Littlefield, treasurer; Charles F. Luther, secretary and general manager, and Darius L. Goff, auditor.

South Carolina.

CHARLESTON.—George Layton is constructing the Five-Mile House extension of the Enterprise Street Railway.

South Dakota.

RAPID CITY.—Rapid City will build a motor line, four and a half miles long to her artificial lake.

Tennessee.

CHATTANOOGA.—S. M. Felton, of the E. T. V. & G. Railroad Company, has consulted with Edison on the advisability of turning the Belt into storage battery traction.

CLARKSVILLE.—The Greenwood Company has bought the line here, paying \$2 for each \$1 of stock. Officers were elected as follows: W. M. Daniel, president; F. P. Gracey, W. H. Woodward, C. W. Tyler, M. H. Clark, L. R. Clark. W. T. Dorchett was elected secretary and treasurer.

Texas.

SAN ANTONIO.—J. U. Groesbeck and G. S. McElroy have been granted right of way for a road to the Southwestern Insane Asylum. It is conjectured that this is an extension of the Alamo road.

THE Alamo Road has been placed in a receiver's hands, L. M. Gregory.

ALAMO.—The Alamo Electric Street Railway receiver has secured power for its cars, which are now running again.

BEAUMONT.—Rails are now going down for the railway here.

HOUSTON.—The street railway has won the \$20,000 damage suit brought against it by Osborn.

THE new Washington street extension has been opened.

Utah.

LOGAN.—The petition of the Street Railway Company that its franchise be extended for one year has been granted.

RENO.—T. K. Stewart is surveying for an electric road from Reno to Lake Tahoe.

SALT LAKE CITY.—The Salt Lake Street Railway Company will make considerable extensions soon.

Virginia.

ALEXANDRIA.—A. H. Truax, Hastings, Minn., and J. R. Howes, Duluth, will begin work on the street railway line very soon.

BERKLEY.—The North Norfolk Company will run an electric line to its land. The officers are Colonel D. J. Turner, president; Virginius Butt, vice-president; Charles R. Nash, secretary, and I. D. Smith, treasurer. The directory was not materially changed.

HAMPTON.—The electric railway track is now laid as far as the Government Stables on Old Point. The piles are all driven for the bridge over Mill Creek and it looks now as though the cars will soon run through to the wharf.

Wisconsin.

MILWAUKEE.—The Villard syndicate has purchased the Becker street system for \$875,000.

THE Villard syndicate has begun track laying on their new Elm street line. The extension will finally reach South Milwaukee. Fifty new motor cars have been ordered. Before the close of the year the Cream City and the Milwaukee City systems will be united in 75 miles of road.

800 day laborers struck recently against a 25-cent reduction in wages. No riot occurred.

THE Soldiers' Home electric cars are now running.

SUPERIOR.—The Douglas County Street Railway Company will build a new car house, 20x135 feet, on West Seventh Street, and otherwise enlarge their plant.

FOND DU LAC.—W. G. Curtis of Cumberland has been appointed receiver for the Fond du Lac Street Railway Company. Frank B. Hoskin of this city is the principal creditor. The assets and liabilities are not known.

Washington.

FAIR HAVEN.—A temporary organization of the Street Railway Company has been effected. H. W. Goode, of the N. W. Thomson-Houston Company, was present. E. Cosgrove, of the syndicate, is president.

West Virginia.

WHEELING.—M. Loftus, for many years superintendent of the company here has resigned and been succeeded by W. E. Harrington, an experienced electrician of Atlantic city. The change occurred November 1st.

STREET RAILWAY PATENTS.

Selected list of patents relating to Street Railway Inventions, granted during the past thirty days; reported especially for the STREET RAILWAY REVIEW, by Munn & Co., Patent Attorneys, 361 Broadway, N. Y.

ISSUE OF OCTOBER 13, 1891.

Trolley Catcher for Electric Cars, W. L. Browne, Boston, Mass.	460,942
Track Rail for Electric Street Railways, J. T. Hill & B. Meiring, Cleveland, O.	460,967
Automatic Switch for Railways, E. Shoup & G. F. Trudeau, Toledo, O.	461,056
Electric Railway, B. R. Shover & W. C. Dickson, Indianapolis, Ind.	461,057
Track for Street Railways, W. C. Wood, Brooklyn, N. Y.	461,050

ISSUE OF OCTOBER 20, 1891.

Street Car Locomotive, E. Dederick, Milwaukee, Wis.	461,466
Contact Plow for Electric Cars, E. B. Bentley, Brooklyn, N. Y.	461,548
Conduit and Conductor for Electric Cars, W. H. Knight, New York, N. Y.	461,549
Trolley Switch, C. E. Hudson, Leominster, Mass.	461,611
Motor Truck for Cars, G. M. Brill, Philadelphia, Pa.	461,662
Electric Railway, F. Mansfield, New York, N. Y.	461,685
Electric Railway, S. H. Short, Cleveland, O.	461,690
Railway Rail Fastening, L. Scofield, Sr., Chattanooga, Tenn.	461,717
Chair Plate for Compound Railway Rails, P. Bargion, Oakland, Cal.	461,729
Car Track Cleaner, J. E. Chambers, St. Louis, Mo.	461,735
Railway Rail Chair, F. Pelton, Des Moines, Ia.	461,773
Street Railway Switch, W. H. Snyder, Akron, O.	461,786
Trolley Wire Support, L. S. Pfouts, Canton, O.	461,785

ISSUE OF OCTOBER 27, 1891.

Trolley for Electric Cars, C. A. Lieb, New York, N. Y.	461,840
System of Distribution for Electric Railways, S. H. Short, Cleveland, O.	461,851
Means for Supplying Motive Power to Cars and other Vehicles, L. O. Dion, Natick, Mass.	9
Electric Railway, W. B. Vansize, Plainfield, N. J.	461,895
Electric Railway, G. W. McNear, Oakland, Cal.	461,96
Electric Railway Switch, H. C. Spaulding, Boston, Mass.	462,014
Fare Receiver and Register, L. Ehrlich, St. Louis, Mo.	462,022
Covering for Cable Conduits, H. Hughes, Abilene, Kan.	462,114
Underground System for Electric Railways, S. D. Nesmith, Cleveland, O.	462,135
Electric Railway, C. W. Thomas, New York, N. Y.	462,157
Electric Railway Trolley, R. M. Hunter, Philadelphia, Pa.	462,173

ISSUE OF NOVEMBER 3, 1891.

Electric Railway, E. M. Bentley, New York, N. Y.	462,231
Clamp for Trolley Wires, C. A. Lieb, New York, N. Y.	462,359
Cable Gripper, G. S. Duncan, Melbourne, Victoria, Australia.	462,378
Cable Pulley, G. S. Duncan, Melbourne, Victoria, Australia.	462,379
Trolley for Electric Cars, R. B. Nuttall, Alleghany, Pa.	462,578
Electric Railway, J. B. Sheldon & D. J. Murnane, St. Louis, Mo.	462,595
Street Car, F. B. Brownell, St. Louis, Mo.	462,620
Threading Rod for Underground Conduits, F. G. Bolles, Washington, D. C.	462,648
Conduit Electric Railway, A. J. Robertson, New York, N. Y.	462,672

WORKMEN excavating for the Broadway cable had a surprise when they chopped a hole in one of the pipes of the Steam Heating Company. They were not "frozen out" but left the trench nevertheless on a double-quick.

A GREAT COUNTRY.

Owing to the great amount of interest shown in the Northwestern states, and especially in Montana and Washington, the Northern Pacific Railroad has prepared two folders, entitled "Golden Montana" and "Fruitful Washington," which contain a great many interesting and valuable details in reference to climate, topography, agriculture, stock-raising, mining, lumbering, government and railroad lands, homesteads, and other subjects of interest to the capitalist, business man or settler. These folders can now be obtained on application to the General Passenger Agent of the road.

It should be borne in mind by travelers to the Northwest that, among other things, the Northern Pacific Railroad offers the following advantages: It is the direct line to principal points in Minnesota, North Dakota, Montana, Idaho, Oregon and Washington; it has two trains daily to Helena, and Butte, Mont., Spokane, Tacoma and Seattle, Wash., and Portland, Ore.; it has complete equipment of Pullman first class sleeping cars, dining cars, day coaches, Pullman tourist and free colonist sleepers, the cars being new, comfortable and neat; it has through sleeping car service every day from Chicago, Ill., to Montana and Pacific Coast points, of Pullman first class and tourist sleeping cars in connection with the Wisconsin Central Line, and vestibuled first-class sleepers via C. M. & St. P. Ry.; it passes through the grandest scenery of seven states and the great young cities of the Northwest. The service is complete in every respect, the "Yellowstone Park and Dining Car Route" being, in fact, a thoroughly first-class line to travel over.

District Passenger Agents of the company will supply publications referred to above, with maps, time tables, rates or other special information may be had by addressing Chas. S. Fee, G.P. & T.A., St. Paul, Minn.

A POPULAR ROUTE.

The rapidly diminishing discomforts attending long railroad journeys reach almost a vanishing point on the new Wabash trains running out of Chicago for the south and southwest.

During the last month the train service to Saint Louis and return have been altered to the following effect: train number 5 leaves Chicago at 9:05 A. M. and arrives in Saint Louis at 6:15, making a 9-hour trip through by daylight, and the return, number 4, leaves Saint Louis at 7:55 A. M. to arrive in the World's Fair City at 6 in the evening. Both of these elegantly equipped trains have the finest Wagner parlor car service in the world. On night trains the magnificent Wagner compartment sleepers will be continued. On these cars every section is a drawing room complete, with closets, hot and cold water and the best of service in addition.

Train number 3 for St. Louis and the southwest leaves Chicago daily at 9:20 P. M., arriving at St. Louis at 7:25 A. M. Trains 1 and 6 leave Chicago at 2:30 and arrive at 1 P. M. respectively, discontinued as a Sunday train between Chicago and Decatur, but will run as usual daily, between Decatur and Kansas City. Night trains also include elegant reclining chair cars, for which no extra charge is made.

Florida and the Sunny South via the Big Four Route.

To all persons contemplating a southern trip, the Big Four Route offers special attractions and advantages possessed by no other line. Solid vestibuled trains, heated with steam and equipped with palace sleeping cars, reclining chair cars and elegant parlor cafe dining cars run daily, making connection in Central Union Station, Cincinnati, with through express trains of the Queen and Crescent Route, Louisville & Nashville, Kentucky Central and Chesapeake & Ohio Railways, avoiding the tedious transfer necessary via other lines, and affording practically through train service to Old Point Comfort, Asheville, Chattanooga, New Orleans, Savannah, Jacksonville, St. Augustine, Tampa, Indian River and all winter resorts of the South. Tourist tickets via the popular Big Four Route at special low rates are on sale at all coupon ticket offices throughout the country. Ask the agent for tickets via the Big Four Route. D. E. MARTIN, General Passenger and Ticket Agent, Cincinnati, Ohio.

THE Louisville Street Car Company pays the arresting officer \$5 for every boy who is convicted of hanging on to the cars or of stealing a ride. They are trying to break up the evil.

A MAIL service is talked of on the electric cars between Davenport and Rock Island.

NEW YORK RAPID TRANSIT COMMISSION.

THE New York Rapid Transit Commission has made a lengthy report to the common council, of that city. The committee has received reports and plans from eminent engineers all over the country, and has made an inspection of the European systems.

The plan finally meeting approval as the most feasible and the most convenient, although not the cheapest in construction, is an underground, double-tracked, double-deck railway, to be operated by electricity. Suitable loops, switches and time schedules to be perfected, as the needs demand. The tunnel will be as near the surface as possible, so that the public can easily board the trains which will be run as express and locals.

The committee's report has been approved by Mayor Grant.

Engineer Worthen says that he can build such a system in eighteen months, embodying these features: An under-ground system of railways; tunnels on each side of Manhattan Island, from Yonkers line to the Battery; a cross-town tunnel under Union Square; express trains on special tracks to run forty miles an hour; electricity as the motive power and to light the tunnels; the block system to prevent accidents and good ventilation, doing away with smoke, steam and discomfort.

ROBBED.

THE alarmingly long list of street railway treasury robberies lately, is augmented by one from Kansas City, Kas. The robbers, to the number of seven, held up the power house employes of the Metropolitan Company and after shooting a switchman and abusing their victims departed with \$500 and several gold watches. It is high time that power house employes were allowed an armed watchman whose business would be to become suspicious of strangers who drop in during the evening with masks on. The fact that considerable money is usually in one place at that time of night is an incentive to the frequent robberies we have chronicled of late.

THE BALL ENGINE COMPANY, of Erie, Pa., has recently made the following sales: Palace Hotel electric light plant, San Francisco, 100-horse-power tandem, (being a duplicate order); Patent Brick Company, San Francisco, 150-horse-power tandem; H. Bloomfield, San Francisco, 150-horse-power compound condensing; Street Railway Construction Company, Norfolk, Neb, through agent E. G. Gilbert, Atchison Kas., 40-horse-power; World's Fair electric plant, 60-horse power. The Johnson Company, Johnstown, Pa., has recently ordered a 60-horse-power engine, being the twenty-second engine built by them for the Johnson Company, aggregating over 3000-horse-power.

M. S. ROBINSON, JR., late superintendent of the Cleveland cable road, has returned to that city after an absence of some eight months, during which time he has traveled through Mexico and to the Pacific coast in hopes of regaining his health. He does not expect to return to his duties before the coming spring.

PERSONALS.

J. W. MEAKER, president of the Meaker Register Company, Chicago, was called to Auburn, N. Y., a few days since to attend the funeral of his mother.

GORDON J. SCOTT, chief electrician of the Minneapolis Street Railway, has resigned to accept a position with the Edison General Electric, in New York City.

JOHN TAYLOR, inventor of the Taylor electric motor truck, has resigned his position as chief draughtsman of the Gilbert Car Company, and will devote his entire time to the manufacture of his truck.

B. J. JONES, formerly an installing engineer with the Westinghouse people, has been appointed general superintendent of the Riverside Park Railway Company, Sioux City, vice C. W. Reckard resigned.

CHARLES T. YERKES, president of the West and North Side roads, Chicago, has returned from an extended European trip. He denies that he intends to make other than Chicago his home. The entire office force were remembered with valuable presents purchased abroad.

CAPT. SAMUEL H. PEARCY, superintendent of the Nashville Electric Railroad & Power Company, has resigned to go to Bilboa, Spain, where he has a contract to build an electric road. Resident Americans are at the head of the enterprise, which will be in most competent hands while intrusted to Capt. Percy.

FRANK X. CICOTT and A. M. Wilcox, of Chicago, sailed on the 11th inst. for Europe, where they will inaugurate the Tramway World. The paper is to be published in London, monthly, and will be devoted to steam road and street railway interests. There is nothing of the kind in Europe now. We wish the new enterprise success.

E. H. CHAPIN, who has made a most enviable record during his connection with the Street Railway Journal, for the past two years, has resigned to engage in a manufacturing business at Rochester, N. Y., on his own account. It is also rumored he is soon to become the head of a firm in which the other partner is one of the most lovely of the charming young ladies for which Rochester is so celebrated.

M. K. BOWEN, whose thorough experience and ability were so well demonstrated during his connection with the Kansas City Cable Road, has accepted an offer and has become assistant superintendent of the Chicago City Railway Company. Mr. Pope whose health has been quite poor of late, has gone to California to spend the winter. Mr. Bowen will be a most welcome addition to the street railway fraternity of Chicago.

MR. ROSEWATER, editor of the Omaha Bee, will shortly deliver an address before the New York Electrical Club, on the result of his investigations in Europe, of the system of governmental control of the telegraph. The attendance will be large and distinguished.

PUGET SOUND NOTES.*(From our regular correspondent.)*

SEATTLE, WASH., NOV. 11, 1891.

The Union Trunk Line of this city expects to have its Lake Washington branch in operation by November 13th. The road will strike the Lake railway between the termini of the Madison street and the Yesler avenue cable roads. A pleasure resort like those at the ends of the cable roads will be built there.

Some 220 tons of rail for the Grant Street Electric Line are on the way from Chicago. The road will be finished by January 1st, and fine cars will then be put on. They will give a four minute service.

E. Shepard, secretary and manager of the Front Street Cable Railway, has resigned his position in order to give all his attention to a water works project at South Bend in this state. The office of manager of the company has been abolished; W. B. Goodrich does the work as secretary, and S. Gibson remains superintendent.

The Rainier Power and Electric company has paid the city \$1,000 for a franchise on Third street. This proposed line will be parallel to the main trunk of the Seattle Consolidated on Second street.

The Union Trunk Line has changed the system under which the men are paid. The old way was to give \$2.50 a day to conductors and \$2.75 a day to motor men. The men now receive 23 cents an hour; and since no man is allowed to work over nine hours nor less than seven, the earnings are between \$2.07 and \$2.53 a day.

S. L. Shuffleton, the new manager of the West Street and North End Electric Railway, has replaced six conductors by new men.

There is in this city a Street Car Men's Benevolent Association, which has over 100 members, and meets every Friday night in the Frye block. In former times collections were being constantly taken up for the aid of sick and needy members. Now the association carries out all its acts of benevolence upon a systematic basis and the burdens are distributed with more equity.

The jury in the damage suit of John B. Cogswell against the West Street and North End Electric Railway has brought in for the plaintiff a verdict for \$10,000. Cogswell's knee was injured for life by being struck by a plank projecting over the track while he was riding in a company car. The company pleaded that the plank was not there through negligence.

The jury in the case of J. W. Hunt against the Seattle Consolidated Street Railway Company brought in a verdict for the plaintiff, awarding him \$600. Hunt had sued the company for \$10,000 for damages sustained by being thrown from a car. The award was apparently a disappointment to both sides, for Hunt's motion for a new trial was at once assented to by the defendant's attorney.

The Union Trunk Line has been sued by Mike Christenson to recover \$250 damages. He was driving with a load of wood on a narrow street, and he claims that a car ran into him, knocking him down an embankment. As a result of the accident one of his horses was killed.

On October 30th a Madison Street cable car ran over and killed Ross Matthews, a ten-year-old boy. He recklessly tried to run across the track just in front of the cars.

The steam motor on the South Seattle Motor Line backed into a switch engine at the crossing a few days ago. The tender on the rear of the motor car was smashed entirely off. The trouble was a failure of the motor's brakes.

The Tacoma & Steilacoom Electric Railway has been transferred from Mr. Abbott to the Thomson-Houston Electric Company. The road, which is about thirteen miles long, cost \$300,000 to build and equip. The change in ownership was brought about because Mr. Abbott was unable to meet his obligations to the company. E. B. Kittle, of the Northwest Thomson-Houston Electric Company, is now president of the road. The cars on the line are now run to lower Eleventh Street in Tacoma, and transfers are issued with the Tacoma Railway & Motor Company. It is reported that the road will be extended in the spring to the Higgins ship yard at Safety Harbor on the Narrows. A small steamer to be run from the terminus to Fox Island, Wollochot Bay and Hole's Passage will enable the people at those places to reach Tacoma in one-half the time now taken to make the complete circuit by boat.

Two new 28-foot cars have arrived for the Point Defiance road at Tacoma. The Tacoma Railway and Motor Company will furnish the line with electric power.

On October 28th a landslide covered part of the tracks of the Tacoma Railway & Motor Company. A car filled with passengers narrowly escaped being crushed by the falling earth. When the car was within a few feet of where the earth fell, the motor-man, seeing the earth beginning to crumble down, stopped and reversed the car barely in time to prevent a catastrophe.

W. H. Lewis has been reinstated as assistant superintendent of the Tacoma Railway & Motor Company. During the past few weeks about forty employes of the company have been replaced. The men have formed an electrical society and will establish a reading room and library.

The Lowell, Everett & Mukelteo Electric Railroad has been organized. Norton Walling and R. J. Mooney are among the directors.

The Fairhaven Electric Street Railway was opened October 19th. The track is laid with fifty-six pound rails, and is very smooth and substantial.

M. J. Dooley who has started street railways in Port Townsend and Whatcom has undertaken the Whatcom, Lynden, Sumas & Blaine Motor Line.

THE Day Railway Construction Company noticed in the REVIEW for October, is endeavoring to secure a franchise from the city council to erect an elevated electric road from Rush street to Chicago avenue, and on Michigan avenue to Jackson street.

ECHOES FROM THE TRADE.

THE NORTHERN CAR COMPANY have just delivered two 30-foot suburban coaches to E. Haakinson, Sioux City. These cars are finished in quartered oak and mahogany, and upholstered in plush.

THE ILLUSTRATED WORLD'S FAIR, Chicago, for November, is a genuine art number and, with large illustrations, shows the progress in construction of the exhibit buildings.

THE GILBERT CAR COMPANY has received an order from the Albany, N. Y., Railway Company for ten new cars for the State street line. They will be longer and larger than the cars now in use there.

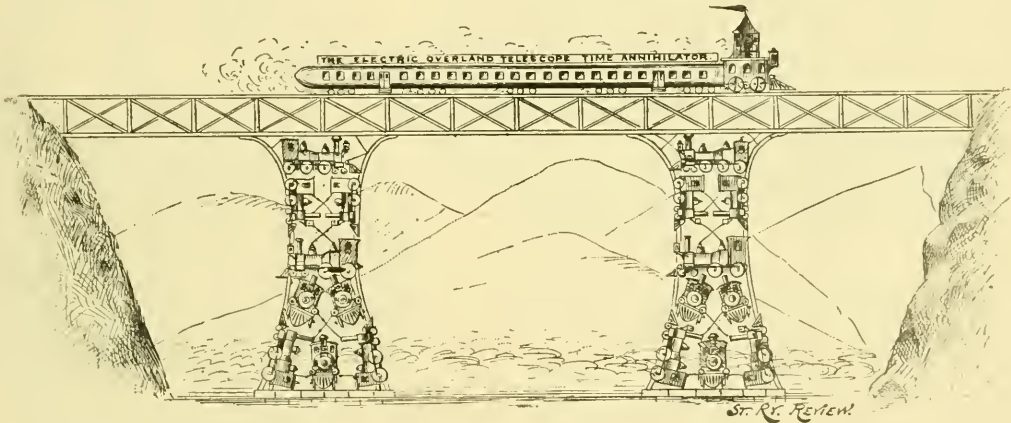
THE INTERIOR DECORATOR, Chicago, is a new and very attractive publication devoted, as its name indicates, to interior attractions. It is handsomely printed and published by two experienced newspaper men.

burg, besides the equipment for fifty cars now being sent to Milwaukee, while small orders keep their factory very busy.

THE FITCHBURG STEAM ENGINE COMPANY, of Fitchburg, Mass., has two large engines booked for the Woman's Temple of Chicago. A 600-horse-power cross compound condenser has just been delivered to the Powelton Light Company of Philadelphia.

THE regular 2 per cent. cash quarterly dividend has been declared on preferred stock of the Great Western Electric Supply Company, and if the business of that company continues to grow as it has the last quarter, the common stock also bids fair to pay a dividend very soon.

ANOTHER triumph has crowned the Babcock-Wilcox boiler. The Providence Steam Engine Company, Providence, has changed the drums of the Moore boilers, which



WILL IT EVER COME TO THIS?

MARK & STERLING, manufacturers of street railway equipment, Cleveland, Ohio, have recently placed upon the market a new rail chair which is receiving much attention from street railway men, being adopted by many lines.

THE JOHN STEPHENSON COMPANY, as usual, are full of orders. They are now completing a large shipment for Brazil, and have recently received large orders from Mexico, besides many home orders, which they have on their books.

THE ALLEN PAPER CAR WHEEL COMPANY, Chicago and New York, are receiving many orders for their patent steel-tired wheels, and in many cases receiving duplicate orders, which speaks well for the wearing qualities of this noiseless steel wheel.

THE MCGUIRE MANUFACTURING COMPANY have recently booked a very large number of satisfactory orders. They have an order for the entire equipment of 375 cars for the Third avenue line of New York. Four very large orders their vice-president, Mr. Cook, took while at Pitts-

were recently set up at the Narragansett Electric Light Company's station by the National Water Tube Boiler Company, of New Brunswick, N. J., to the Babcock & Wilcox system.

THE WESTINGHOUSE MACHINE COMPANY, and the Westinghouse Electrical Manufacturing Company, are receiving many inquiries for their new combined engine and generator for street railway work. They have just received large orders from a number of companies, including one from the Minneapolis Street Railway Company.

THE LEWIS & FOWLER MANUFACTURING COMPANY, Brooklyn, write us that their factory is full to its utmost capacity, besides numerous orders for cars. Their stove, which has been adopted by so many roads, is having a special boom this season, and they are equipping many roads in all parts of the country. Their snow-plow department is also very busy. They are making a specialty of their patent snow-plow, which has given such very good satisfaction the past winters.

ALBERT & J. M. ANDERSON, manufacturers of general electrical supplies and the well known Anderson trolley, at Boston, report their sales exceedingly good, especially with their trolley and its attachment,—they recently having equipped the whole West End Railway Company, of that city, with their taper steel trolley pole.

THE HOPPES MANUFACTURING COMPANY, of Springfield, Ohio, will furnish an 800-horse-power exhaust feed-water heater to the Cicero & Proviso Street Railway Company of Chicago. Their boiler is for this new power-plant. The Hoppes boiler is widely known all through this section of the country and never fails to give satisfaction.

THE Chicago Mail has just changed hands and become the property of Joseph R. Dunlop, who has been for two years past editor-in-chief of the Chicago Times and is a most prodigious worker. Mr. Eckert city editor of the Times, takes the same position with the Mail, of which three editions are now issued daily except Sunday, and which has a future of great promise.

THE INTERIOR CONDUIT AND INSULATION COMPANY located at 42 and 44 Broad street, New York City, has acquired the exclusive right to manufacture and sell the apparatus of the Universal Arc Lamp Company. Among the specialties the universal railway circuit lamp holds a prominent place. The new company will no doubt, gain its share of the rapidly increasing electric business.

THE CALORIFIC VENTILATING HEATER COMPANY report orders for their different styles of car heaters from all parts of the northern country. They have recently received orders for a full equipment from British Columbia, and have now completed full equipments for the North and West Chicago Street Railway Companies, which order alone amounted to over one thousand heaters.

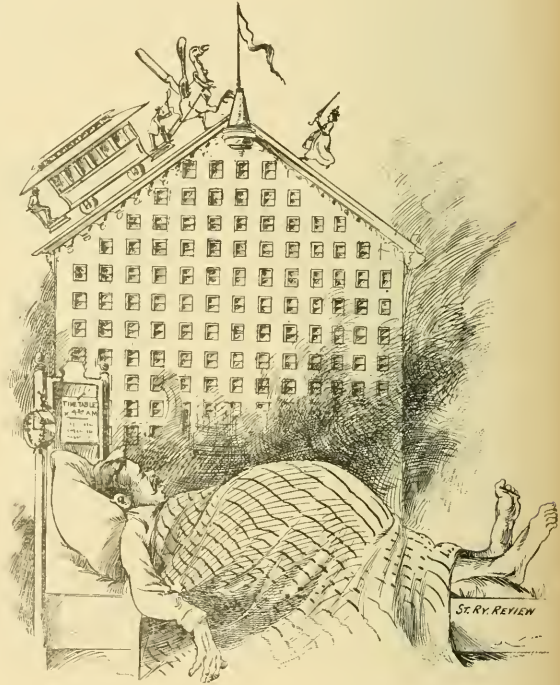
CHARLES A. SCHIEREN & COMPANY, New York and Chicago, report very large business from both offices, especially for their perforated electric leather belting, which is especially adapted to street railway work. Mr. Earnest Brill, manager of the Chicago branch, having just returned from an extended trip with a number of fine orders, reports the demand for their goods increasing very rapidly.

THE POND ENGINEERING COMPANY, St. Louis, are very busy and report a large demand for their Armington & Simms engines, for which they are general western selling agents, having recently placed orders for a lighting plant at the state asylum, San Antonio, Tex., soldiers' home, Santa Monica, Cal., for the asylum at Traverse City, Mich., the electric light plant at Waterloo, Ill., besides many others in different parts of the country.

THE STEARNS MANUFACTURING COMPANY, of Erie, Pa., are newcomers with high-speed engines for electric and street railway work. They have recently appointed Barclay & Sharp, general western selling agents, who

office in the Rookery building, this city. These engines have been in operation for some time and thoroughly tested and as their new representatives are very well known in the street railway and electric light field, we predict good success for them.

THE PRICE RAILWAY APPLIANCE COMPANY, of Philadelphia, has lately put in large orders of their well-known track construction. The People's line at Philadelphia, in particular, has replaced their old track with the Price construction. The roadbed of the People's line bears perhaps as heavy service as any in the country, hence the advantage of this style of rail. The rail, sleepers and plates break joints, making a continuous rail and the sleeper is protected by the rail and plates from weather changes and accidents.



WHAT THE DRIVER SAW AFTER THANKSGIVING.

THE ELECTRIC MERCHANDISE COMPANY, Chicago, received the following letter from Electrician Finch, of Escanaba, Mich., a day or two ago: "The Burton electric heaters you sent to the Escanaba Electric Street Railway Company have been put to a thorough test and have been found equal to the emergency. We have had some cold weather and quite a fall of snow but the cars have been as warm as toast. Your heaters are the simplest, cleanest and most efficient of any heating apparatus in the market. "You may use this in any manner you wish or refer to me at any time." Officers of the Pennsylvania railroad were in Chicago November 12th arranging for Burton heaters on the limited trains of that road. This will relieve their locomotives very considerably, as the heaters will be fed from storage batteries.

THE WIGHTMAN ELECTRIC MANUFACTURING COMPANY, of Scranton, Pa., report a brisk business, contracts for their single reduction motors having been awarded them by several roads recently. Last week their first equipment on the Second Avenue Passenger Railway, of Pittsburg, Pa., was put in operation. Orders for their "anti-come-off" trolley are coming in by the dozens. This trolley is the latest development in that line, and it is immensely taking with street railway men. Owing to its peculiar construction this trolley will keep the line under all conditions; the wheel always remains parallel to the trolley-wire.

We chanced to be in the office of the Munson Belting Company recently when the letter was received of which a fac simile is reproduced below. It is so strong an indorsement we give it herewith.

FREIGHT CARS OF EVERY DESCRIPTION
CAR WHEELS; CASTINGS & FORGINGS.



CAPACITY FORTY CARS PER DAY

MADISON CAR CO. CHICAGO, ILL.



L. M. RUMSEY, Pres.
C. D. MCLURE, Vice Pres.
PAUL A. FUSZ, Treas.
J. G. MILLER, Secy.
T. C. SALVETER, Genl. Mgr.

Madison, Ill. Oct. 27/91.

Chas. Munson Belting, Co.,
Chicago, Ill.,

Gentlemen:-

We have used several makes of belting in our Works and take pleasure in saying that we unhesitatingly pronounce yours to be the best of any that we have used.

Wishing you all possible success, we are,
Yours very truly,

T. C. Salveter
Gen. Mgr.

THE R. D. NUTTALL COMPANY is meeting with the most gratifying success in the manufacture and disposal of their cold blast charcoal iron gears, improved process rawhide pinions, which elicited such favorable comment at the convention, and tempered copper commutators for all systems. This last specialty is fast becoming a leader with the company and this department is being greatly enlarged. Nuttall's compression spring trolley with drawn steel trolley pole in one piece is finding great favor in the eyes of the trade. A new catalogue will soon be issued with latest price lists and make it way to all interested.

THE ELECTRIC APPLIANCE COMPANY is a young but vigorous institution bidding for public favor and located at 242 Madison street. The following is the list of offi-

cers: Willard W. Low, president, Harry B. Gilbert, vice-president, Thos. I. Stacey, secretary and treasurer. These gentlemen are not novices as any one acquainted in supply circles knows. Their street railway department is up to the times and several valuable patents will soon be handled through the company. It will be worth the while of electrical buyers to visit the commodious apartments of the company at an early date.

THE ENGINEERING EQUIPMENT COMPANY are receiving congratulations upon the excellent move made in transferring their New York offices to the handsome store premises on the ground floor, next the main entrance, in the same building. This company has now advantageous locations in both New York and Boston. Their Boston offices and salesrooms occupy the ground floor and base-

ment of 126 Pearl street, in the heart of the steam and electric equipment trade. No better location in New York than Liberty street could be found for the same trade. The following gentlemen are interested in the company, which was incorporated last February: F. L. Perine, general manager; A. L. Tinker, secretary and treasurer; C. J. Field, M. E., consulting engineer; Albert C. Hale, Ph. D., chemist of the company; F. A. Magee, M. E., manager of the Boston branch; W. F. D. Crane, M. E., in charge of the railway department at New York; C. S. Merrill, representing the Underwood belting, and others.

W. W. ALLEN's safety car brake is being tried on a large number of roads having heavy grades, and with success. He reports inquiries from all parts of the country.

FAITHFULNESS REWARDED.

THE offers of prizes made to the North & West Chicago Street Railway employes were distributed this month. As will be remembered the prizes were for attendance to duty, avoidance of accidents, and a disposition to accommodate the public. The first prize was \$100 but the records of nine men stood alike and that twelve merited either the second, \$75 or the third, \$50. To equalize the matter Mr. Yerkes gave \$75 each to the first nine and to the other twelve \$25, making \$975 in all instead of the \$225 intended.

On the North Side Road, those drawing the \$75 prizes were R. J. Clark, George Bach, J. Labin, Gus Johnson, of the Limit line, and T. Whalen, H. McGinnis, William De Saul, A. Mayo and C. J. Wills, of the Lincoln avenue line. Those receiving the \$25 prizes were Ed Johnson, H. Weaver, G. Sullivan, J. Lynch, S. R. Frost, F. Goss, J. O'Gren, F. Card, of Limits line; T. Buckley, Clybourn avenue line, and H. Gustafson, P. Kendall, and E. L. Hopkins of the Lincoln avenue line.

The West Chicago management, which is never behind in any matter of benefit to the public, offered as prizes ten days' furlough or ten days' extra pay for the neatest and most polite conductors and gripmen, and one-half the above for the second. Secretary Crawford says that the management has been eminently satisfactory and the patrons of the great West Side second the motion.

The following is the list of the best men: first conductors: John A. Myer, Thos. Coghlan, E. Eikenhoter, H. Towers, P. Holloway, F. P. Tilton, Jas. Williams, A. Lanbinger, T. Geraldine, H. F. Fossum, A. Robertson, S. Rassmussen. Second conductors: C. Trevett, D. W. Murphy, M. Hoffman, M. J. Kerrigan, E. Kirchoff.

First drivers: J. Tyndall, P. Horn, H. Krygsman, C. Westongard, Wm. Hays, J. Horan, R. Zimmerman, Ed. Hussey. W. McCormick, G. Ross, C. Otto, S. Goldbeck. Second drivers: P. H. McGrath, D. J. Burdell, L. Saxon, John Kearney, W. Crosskuph.

ROOMY AND ELEGANT.

THE Milwaukee Evening Wisconsin of recent date has the following:

"Six of the fifty new electric cars which the Villard syndicate has had built by the Brownell Company, at St. Louis, arrived last night, and have been unloaded at the Farwell avenue barns. They will be put on the Farwell Avenue Line. It is expected that the balance of the cars will arrive at the rate of six or eight a month until they are all here. The new cars are very roomy and elegant in finish."

THE manufacturers of the Wightman motor, of Scranton, Pa., are naturally feeling quite proud of their motors at Auburn, N. Y. One car equipped with two 20 H. P. motors drew six heavily loaded trail cars over a poor track, and carried 280 passengers, the weight of the load and cars being over 60,000 pounds. No difficulty was experienced in attaining a speed of 8 miles an hour.

THE ST. LOUIS CAR COMPANY have their big shops crowded with new cars in all stages of construction, and already have entered several orders for next season's delivery of open cars.

SHAW & FERGUSON, of Boston, are meeting with the most gratifying success in the introduction of their self-lubricating trolley wheel, which is well made and serviceable in addition to the convenience suggested in the name. Silver & Company are their agents.

THE J. M. JONES WORKS at West Troy, N. Y., report their shops full, causing them to run night and day. They are fast turning out cars for the West End Line in Boston, which is a part of a very large order recently received from them.

THE WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY have recently issued two very interesting pamphlets entitled, "How to Protect Your Generators," and the "Iron Clad Gearless." These were distributed freely at the Pittsburg Convention, and will be mailed to any party interested in motors.

JOHN CROWTHER, Cincinnati, well known among cable men as the patentee and manufacturer of the Crowther interchangeable carrying wheel, reports trade rapidly increasing for all sizes, besides keeping their shop very busy making their new horizontal engine, which has made a great "hit" where all small power is needed.

AN interesting test was made recently with a motor operated under the new principle invented by H. Ward Leonard. The motor used was a 10-horse-power shunt wound Sprague with a speed of 1,500 revolutions per minute. The motor was belted to a counter shaft upon which was a brake, and in addition a heavy fly wheel. The motor was operated in either direction at any rate of speed, and instant reversal occasioned no sparking or disagreeable features of any kind.

In order to get the most marked effect in overcoming the momentum of the fly-wheel, the brake was taken off, and when the fly-wheel was running at its full speed of 300 revolutions a minute, the motor was instantly reversed. In thirteen seconds the motor had brought the fly-wheel to rest, and in thirteen seconds more had it running at full speed in the opposite direction, the entire operation being effected with the greatest smoothness and without any spark whatever. The performance of the motor was extremely satisfactory to all concerned, and showed its perfect adaptability to any class of work to be met with in practice.

GEO. W. KELEY, Wm. McKenzie, A. McDougal and Z. Saukey, of Toronto, Canada, recently spent two days inspecting the railway systems of Cleveland, the guests of H. A. Everett.

P. A. B. WIDENER returned, October 28th, from four months in Europe. He was quite ill in London for the three weeks preceding the return voyage.

RAPID TRANSIT RARITIES.

TO the born schemer nothing is more enticing than a chance to work up an intramural transportation plan and overcome the opposition that springs up as surely as any improvement is broached. The finesse and statescraft necessary stamps every successful promoter of a street railway as a man of trans stact.

Just now Chicago and its suburban resident towns are enjoying a procession of schemes for transportation, and besides the great expectations derived from the World's Fair, many of the residence portions of Cook County still sigh for rapid transit which, unless all signs fail, will soon be given them.

The list of the suitors for the favor expressed by franchises has been steadily growing during the past month and the surplus at Springfield continues to gorge its voracious maw with the "six dollars" requisite for state incorporation.

The Day Elevated Railway Construction Company noted extensively in the last issue of the STREET RAILWAY REVIEW proposes a route to the World's Fair exhibition and with considerable show of success. It is rumored that a prominent steam railroad is more than interested in the venture.

Diametrically opposite in construction of the latter mentioned road, the Wabash Subway Construction Company proposes at considerable expense to tunnel beneath the sidewalks of Wabash and give a cool, swift underground ride to sightseers and business men along its route to the World's Columbian Exposition. The capital of this company is fixed at \$10,000,000 and G. W. Cole & Co. of the Chamber of Commerce building are principal promoters. If the cold, clammy lake can keep its fingers off the Subway and no opposition is encountered in the diggings and sufficient stock can be sold, the road may be a success.

The new Harvey road is an assured success, and under the name of the Harvey Transit Company has the necessary franchise and already has two and a half miles of track ready for the motors. The length of the line will be about five miles. For present traffic the three motors and three trail cars are sufficient. The Short Electric Railway Company supplied the motors. The officers of the company are: President, J. M. Wanzer; treasurer A. C. Badger; secretary, C. D. Stanwood and superintendent, W. S. Reed. The power house will also supply electricity for lighting purposes to this growing and prosperous town.

The Jefferson & Urban road projected by F. A. Soule et al. is a West Side venture. The route proposed is this: commencing at the intersection of Canal and Monroe streets, thence west on Monroe to Morgan, north on Morgan to Fulton, to Western avenue, north on Western avenue to Grand avenue, northwest on Grand avenue to Armitage avenue.

The Douglas Park, Western Springs Electric Railway proposes to run from the terminus of Ogden avenue along the C. B. & Q. tracks to Western Springs. The power-house to be at Riverside.

The dead past has given us Jules Verne's schemes and Rider Haggard's imaginations, but the United States Rapid Transit Company will provide us with locomotion on a cable high enough to clear any building in the city. John Irvine, Isaac Dyer and Frank Anderson are the incorporators of a \$5,000,000 company for the above purpose.

The South Chicago City Railroad Company is authorized by the council to lay track on Commercial avenue from 92d to 79th, thence on 79th to Coles avenue; on Cheltenham place from 79th to Coles avenue; on Buffalo avenue from 92d to 87th, thence west on 87th to Superior avenue, thence north to 83d, thence west to Ontario avenue, thence north to 79th, thence west to Coles avenue, thence northwesterly to 71st, thence west to Yates avenue, thence north to a point 234 feet north of 68th street; also on 106th street from Ewing avenue to Indiana boulevard.

Cars may be operated by any known or unknown method. This company has already been operating several years, and there is good reason to expect a very considerable portion of the new franchises will be accepted and the line built.

The franchise has been granted the West & South Towns Railway Company to build a line on Lawndale avenue from Thirty-fifth street to Twenty-second and on Twenty-second street from Lawndale avenue to connect with the line of the Chicago City road, just west of the branch of the South Branch of the Chicago river. This proposed route also connects with the Cicero & Proviso line on Crawford avenue. Among those interested in the new line are George W. Cass, S. J. Glover, W. A. Fuller, J. G. Shedd, C. L. Bonney, T. P. Phillips, Senator Noonan, and J. J. Lombard.

BROTHERHOOD OF SURFACE RAILWAY EMPLOYEES.

THE last two days of October witnessed the organization of the above named confederation of employees of surface roads. The meeting was in New York City, and the new organization grows out of the now defunct district assembly 226, of Knights of Labor there. Ten hours was adopted as a day's work and copies of the resolution are to be sent all presidents of street railways. The benevolent department provides for a benefit of \$7 per week in sickness and \$150 in case of death.

The brotherhood has representatives in every large city of the Union. Its officers for the ensuing year are: President, Mortimer O'Connell, New York; vice-president, J. H. Skinner, Lynn, Mass.; secretary and treasurer, F. C. Lewis, Lynn, Mass.; sergeant-at-arms, A. J. Seeley, Detroit; executive board, W. H. Rogers, New York; John Edsall, Syracuse; Hugh Collins, Denver; Andrew Hasting, St. Louis, and Henry Carter, Milwaukee.

THERE is every indication of a genuine winter this time. Snow plows and heaters not already overhauled should be put in working order immediately. An ounce of prevention will knock out a ton of snow.

OBITUARIES.

LEWIS LYON.

Lewis Lyon, the father of the cable system of New York City, died there recently at the age of 62 years.

Mr. Lyon was born in Birmingham, England, in 1830, and came to this country when a young man. He was in trade until 1876 when he became treasurer of the Third avenue road, afterwards president and principal owner.

In spite of active opposition, he built the first cable road in New York City, on Tenth avenue and afterwards on One Hundred and Twenty-fifth street. The net earnings of the road increased in two years over \$76,000. It took five years of determined work and litigation before he succeeded in obtaining for the company the right to place the cable on Third avenue. Every detail of the construction was personally superintended by him.

Prominent in all charitable and public enterprises Mr. Lyon will be long remembered by the city he has benefited.

JOHN BAIRD.

John Baird, formerly general manager of the Metropolitan Elevated Road in New York, died recently in that city.

JOHN BUCH.

The sad and tragic suicide of John Buch, recently has removed one of the hardest working street railway men in the country. He was for many years superintendent of the Second & Third Avenue Street Passenger Railway of Philadelphia. Overwork and lack of recreation was the cause of his unbalanced mental condition resulting so tragically.

HENRY P. DODD.

Henry P. Dodd, for 18 years past in the employ of the Chicago City Railway as master car-painter, died recently. He was much respected by all who knew him and was an artist of more than ordinary ability.

ZERO HOODS



ON A COLD DAY



ON A WARM DAY

Hundreds in Use by Street Railway Men.

Address ZERO HOOD CO.

530 Caxton Building,

SAMPLES BY MAIL 50 CENTS.

CHICAGO.

WANTED.

Capital to manufacture three of the best Electric Motor Trucks. 100 of them now in use. Address J. T. care Street Railway Review.

TO INVESTORS.

I want a man to help build an Electric Railway in a growing western city, in which I have a 50 year franchise, which is practically exclusive. Have clear real-estate Subsidies in escrow, to a greater value than cost of the contemplated line. Can give a large interest to any one furnishing funds and repay the investment with interest. Address "Electric Railway," care Street Railway Review. 10.2

FOR SALE.

125 Tons 38 lb. Second Hand Steel Tram Rails in excellent condition.

100 Tons 25 lb. Second Hand Steel T Rails, but little used.

D. E. GARRISON & CO.,

219 N. 4th St., St. Louis, Mo

J. R. PARROTT, President,

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The Parrott Varnish Co.

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MANUFACTURERS OF

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Electric Railways.

C. E. LOSS & CO.,

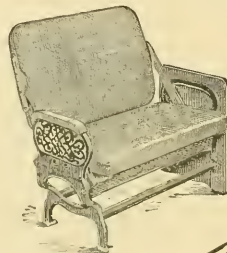
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CHICAGO.

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Correspondence Solicited.

References Furnished.



A Regular Reversible Seat adapted for STREET CARS.

THE LATEST!!
FOR
ELECTRIC and CABLE
CARS.

THE HALE & KILBURN MANUFACTURING CO.
CHICAGO.
NEW YORK.
PHILADELPHIA.

Street
Car Seats

Of Every Description, With or Without
Springs. Covered in

CARPET, PLUSH AND RATTAN.

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Catalogues, Estimates and Samples on Application.



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Caxton Building, 334 Dearborn Street, Chicago.

H. H. WINDSOR, Editor. F. L. KENFIELD, Business Manager.

CORRESPONDENCE.

We cordially invite correspondence on all subjects of interest to those engaged in any branch of Street Railway work, and will gratefully appreciate any marked copies of papers or news items our street railway friends may send us, pertaining either to companies or officers. Address:

THE STREET RAILWAY REVIEW,
334 Dearborn Street, Chicago

Entered at the Post Office at Chicago as Second Class Matter.

VOL. 1. DECEMBER 15. NO. 12

NOW is the time to order open cars. You will have more people to carry next summer than ever before.

THE only perfect system of rapid transit is where every individual has wings of his own. Some people evidently are waiting for that day to come instead of making the most of the very excellent means already at hand.

THE prosperity of any city is best judged by the business of its street car lines, and the reports of the year's results in passengers carried is very satisfactory, not only to the companies but as reflecting the financial interests of the country at large.

THIS issue completes the first volume of the STREET RAILWAY REVIEW, and the table of contents of the year will clearly suggest the broad scope and variety of subjects treated, and which tell their own story. Its high standard will be maintained during 1892 and many improvements, already planned, put into operation.

DEALERS and manufacturers of street railway supplies have had an intensely busy year. Not only have they been obliged to constantly devise new means to fill new wants, but competition has been strong. The review of the business situation in this issue of this branch of trade shows to what immense proportions it has grown, and we congratulate our friends on the satisfactory showing of the year.

DECEMBER is a busy month in the office of the street railway, and while other and more fortunate individuals are at home enjoying the festive holidays, the railway manager is hard at work by day to furnish the extra facilities to meet the greatly increased travel inci-

dent to the season, and at night is working on his annual report which must be forthcoming on a certain day whether he has time to prepare it or not.

THE little flurry of winter which swept over the country the first of the present month was quickly followed by warmer weather and rain which has carried off the snow and where unpaved tracks were not in good condition for winter they are in many places very soft and in bad order. New lines which had deferred the purchase of snow plows and sweepers, and a few old ones which had allowed repairs to wait until plows were ordered out were caught, and lines were not opened until the middle of the first day of storm. But such were few, and taken altogether the present winter has thus far been a very fortunate one for railway operation. However we are not out of the woods yet as it has been known to snow in February and March, but let us be thankful for past favors to date.

THE past year has uniformly been a good one with street railways. The pleasure riding opened much earlier—fully a month in most cities—than last year and the weather throughout the year was generally favorable to afternoon and evening travel. Those companies which last year laid out pleasure resorts at terminus of line received good returns this year. Many electric lines completed late last fall enjoyed their first summer business. The difficulties incident to breaking in new machinery and old men to new work has all been accomplished, and as we look over the country the comparison of the accommodations furnished the American people to-day shows a most astonishing and satisfactory improvement as against this time one year ago.

PEOPLE jump at hasty conclusions and in none more than condemning the inability to furnish a seat for every passenger on every possible occasion. While every company should use its utmost endeavors to furnish every reasonable accommodation at all hours, there are times when such a thing is impossible. There is not a hotel in the country which could run a month did it attempt to carry through the year sufficient rooms, help and furniture to give usual accommodations to every applicant during extra times of unusual gatherings. No bank in the land would be able to keep out of a receiver's hands did it have during every hour in the year a sufficient amount of gold coin locked in its vaults to meet at any instant all its obligations. Cots are cheap and can be bought at an hour's notice; extra provender is always available; waiters and cooks are obtainable on telegraph to neighboring cities; one bank can cross the street and cash securities to meet unexpected demands, but street cars require weeks to construct and competent conductors and drivers have to be educated to order on the spot, and no institution whatever its management and resources can keep on hand cars, and men under full day's pay, to furnish every passenger in our large cities a seat during the entire rush trip and carry passengers at even twice the usual 5-cent fare, to say nothing of trying to do so for a nickel.

WE have had frequent occasion to refer to the sociological effect on cities of the street railways operating therein, and the results have uniformly been of an elevating and progressive character. The recent report of the chief of police, of the city of Pittsburg is an interesting document, and while that official properly gives the high standard to which his department has been brought the chief credit for decreased crime and increased order and discipline, he does not fail to attribute to the excellent railway systems of Pittsburg a share of the honor in promoting the congratulatory results.

Superintendent Weir says: "Rapid transit has had a great deal to do with making Sundays quieter. Those inclined to be turbulent can ride out to the suburbs, where they will find more safety and less chance of disturbing people. Schenley Park, by providing a place for those who have nothing to do to go to, effects a great deal of good and keeps people away from portions of the city where otherwise temptations would lead them into trouble. It is like a fire. Scatter it and it is easily subdued."

Across the river in Allegheny, that Siamese twin of Pittsburg, Detective Steele states: "I have lived in Allegheny for many years, but I have never seen it so quiet and orderly, particularly on Sundays, as it is at the present time. Yes, I believe rapid transit has more or less to do with it. A great many people take their families to the suburbs on Sundays, and, while it is not the disorderly element that travels away from the city, those who do go lessen the likelihood of disturbance."

ONE of the leading papers in this city strongly advocates an ordinance which shall make it a misdemeanor for a driver or conductor to permit a passenger to stand on the platform of a street car or enter a car after the seats are filled, and brings to the support of its position the inquiry: "Cannot what is done in other cities be done in Chicago?" The other cities referred to are all European cities, and it is unnecessary to argue the question, for Americans will not for a moment permit of any such nonsense. People in this country and this age are busy men and women and not one in a hundred but prefers and absolutely insists on taking a car and accepting a standing ride in preference to waiting for the next one even when they know it is not filled.

Another even more foolish argument is offered that accidents will be greatly reduced by the above regime. Occasionally a man falls over the dash and is killed or injured, but not often; there have been cases where the wagon-tongue of a vehicle following the car has punctured the back of somebody standing on the platform—but not often. Such accidents do not occur to one passenger out of ten million, and then are almost invariably due to gross carelessness on the part of the passenger.

The American public religiously insist on standing on a car platform when they are so disposed, and very few days in the year are so inclement but that a large number will do so. It is even no unfrequent sight to see men standing outside when there are few or no passengers

within. Not to stop for passengers when a car had no more vacant seats would increase the accident record beyond all conception as nearly every man and even many women would make a grab at the hand rails with results unnecessary to depict. Passengers should not be allowed to crowd the platform to such an extent as will block the way, but to exclude them from using it under ordinary circumstances would be an unpopular measure, and as for locking the door when the seats were once filled—why that would cause a positive insurrection. French customs may prevail in Paris, but American ideas will rule here.

A "PUBLIC BE VANDERBILTED" POLICY.

A NARROW minded policy may sometimes succeed temporarily but can never hope to be long lived. A broad-gauge policy sometimes fails, but more often wins where a more conservative course would have caused a wreck. In no other business more than the street railway is this true; and where the existing population is small and the receipts necessarily limited, is the very place of all others where care should be taken to popularize the road. This does not mean that the luxuries of street car travel are expected or should be given where business does not warrant, but it does mean the operation of the road should be painstaking and accommodating.

The recent passage of the Fond du Lac, Wisconsin, road into a receiver's hands calls out the following from the Commonwealth of that city, which forcibly illustrates the case:—

"The sentiment of the public in regard to the Fond du Lac street railway seems to be largely one of resentment on account of the bad faith and disregard of public welfare shown by the organizers and managers. Pledges were made that the best modern equipments would be used. Rejected, dirty cars, with wheels worn flat in places, pounded and rattled along with a noise and shock almost unendurable. Such treatment of the rights of the public to the safe use of the streets and such consideration of the comfort of patrons does not stimulate public pride in an enterprise. Public interest and public concern do not grow or even sprout out of such soil. Hence public sympathy has been lacking and public patronage grudgingly given, and the first failure of the enterprise to pay its way has followed legitimately."

Good business judgment should of course prevail and new departures and radical changes involving large outlays of money must be intelligently studied; but there are hundreds of men in every city, we all meet them daily, to whom the hundred dollars immediately in front of their nose completely hides the five hundred a little farther off but within arm's reach, and they refuse to spend the hundred and gain the latter. There are exceptions to all rules we are taught, but we believe with fewer exceptions than any other is that one that a short-sighted policy never pays. Whether dealing with the public, employes, repairs or first purchases of materials—always pursue a broad-gauge policy.

THE THREE-CENT FARE QUESTION.

WHEN the Pittsburg Traction Company some five months ago voluntarily reduced its rate of fare to three cents, the announcement was heralded from one end of the land to the other, and simultaneously the local papers began to hammer their own home companies for a like reduction. In long columns day after day they proceeded to show the gratifying results to the company which had made the move and how their cars were crowded and the prospects of an extra dividend was looming up for the end of the year like one of the steep hills which the Traction's cable-cars mount during twenty hours out of every twenty-four. To all this the home companies could only reply that the business could not be done at that money and were ridiculed and branded as modern Ananiases for saying so. "If it can be done in Pittsburg, it can be done here," they cried.

Now in order to claim any particle of fairness, the same papers should give equal prominence to the annual report of the traction company, made a few days since in which it was shown the only profit earned by the company was during the first seven months of the year, and that the succeeding five,—those during which the 3-cent fare prevailed—did not net the company a cent but instead caused a heavy loss which cut down the profits of the year very greatly.

As was known by all well posted in street railway matters, the rate was cut for the sole purpose of effecting certain transfer facilities with a competing company and was not induced because the road could, or probably expected, long to carry for that figure; but simply as a matter of policy, believing that the good results to follow justified the certain loss which they fully understood and invited as a temporary arrangement. The desired ends having now been achieved the announcement is made that rates are to be restored, and indeed have already gone into effect.

We have not been able to learn that the added income of two cents twice a day to the patrons of the road has resulted in any marked activity at the saving's banks, or that the merchants have been able to detect any increased trade from their customers, as the results of the decreased street car fare. On the other hand while the four cents daily to the individual is so small as to practically cut no figure whatever, a small fraction of a cent is of the most vital importance to the railway, representing as it does a possible interest on the capital invested or even a question of making a loss as small as possible.

It is also a fact that by far the great majority of the American public are perfectly willing to pay a five-cent fare. It is the daily press who somehow seem to think they are making themselves everlastingly "solid" with the dear people by thus championing the defense of wrongs that do not in the least distress the people. There is scarcely a more favored subject in all the range of abuses heaped upon street railways than this. What the people almost to a man would vote would be—give us

rapid transit and good accommodation at five cents, in preference to less acceptable service at any less figure. Such accommodations as the public demand and are perfectly willing to pay for, cannot in many instances be furnished for less than five cents; and even the poorest would find his time worth more than half a five-cent fare were he obliged to spend one hour instead of thirty minutes in going to or from his home.

No better illustration of this can be cited than the highly successful failure in this city several years ago, of a new evening paper to reach the sympathy of the public by becoming an advocate of a three-cent fare. It devoted pages of abuse to the street car companies, and several columns for a week advertising a great mass meeting to protest and petition. Handbills by the thousand were scattered broadcast throughout the city; posters as large as a barn door adorned bill boards and vacant walls. Notices were posted in all the large mercantile and manufacturing establishments in the city; a band-wagon filled with musicians paraded the streets all day, carrying a big banner announcing the meeting, which was to be held a little after 6 o'clock in the evening to accommodate the working public. One of the and largest best known, halls in the heart of the city was hired and in short, nothing was left undone to give the movement all the impetus which curiosity, individual advantage or even personal resentment could incite.

The writer was on hand half an hour before the appointed time.

Did he struggle through a pushing, surging mass of humanity, falling over one another in their endeavors to get in? Did he have to wait at the rear of the hall and stand on tip-toe in the vain endeavor to get a glimpse of the speakers, and catch one or two of the fiery bursts of eloquent protestation?

No.

He was the first one of an audience which at twenty minutes to seven numbered exactly thirty-one persons, some of whom were men. The rest were boys. Not one of the "500 seats reserved for ladies" was occupied. Of those present there was the city editor and two reporters of the paper which was to be the leader in this great reformation, and fully twenty of its compositors and pressmen, most of whom had not even taken the precaution to remove the printer's ink from their faces and hands. They came in a body and evidently considered the entire proceeding a good joke.

The whole enterprise fell as flat as a Dakota prairie and was the laughing stock of the town until forgotten. This, too, all occurred at a time when more than half the city was as yet unprovided with cables and where the down-trodden people had nothing better than horse cars.

As already stated, the actual feeling of the general public is one of readiness to pay a five-cent fare, while expecting modern accommodations; and with the long haul made in most cities for that money a larger equivalent is given by the railway companies than by any other institution.

These papers which are so anxious to reduce something, might reduce the price of their publications for a while and learn thereby how few thanks they would get for a service for which there is no necessity.

STREET FREIGHT CARS IN CALIFORNIA.

AN ordinance has been pending for some time before the city council of San Jose, Cal.; the bone of contention to all appearances being the right asked by the petitioners to carry freight on their electric cars at night. The line in question has secured rights to construct and operate along the country roads for a considerable distance from the city, passing through a thickly settled fruit raising district. The plan is to carry passengers during the day and haul in the product of a day's fruit gathering during the night, for distribution and shipment to San Francisco and the East—this now being the custom of hauling at night the fruit gathered during the day. In fact a very considerable portion of all farm products are hauled at night in that country, in wagon trains frequently composed of as many as three 16-foot wagons, drawn by from 6 to 8 horses, and the entire outfit occupying 75 feet or more of street. The freight car would do away with the street blockades which constantly occur when a large number of these wagon trains enter town at the same time. One of the daily papers is greatly exercised and thoughtfully refers to those in favor of the scheme as "a gang composed chiefly of frauds and fools," bent on "ruining their property." The writer of the remark quoted undoubtedly has good intentions and feels the great burden which comes to those who carry upon their individual shoulders the problems domestic and political of a whole city. To his mind's one-eyed vision a great public calamity threatens. But he need not thus distress himself. Other larger and possibly better cities have investigated the question of freight street cars and have found therein the possibilities of great commercial value to a lively town. He possibly imagines a train of thirty or forty freight cars blocking the street and preventing his subscribers getting across to his side with raisins and dried prunes or other subscription exchangeable commodities. Electric freight service, however, does not operate in any such way. In St. Louis it has been found a most satisfactory enterprise; Seattle would not be without it; Ann Arbor, Michigan, finds it a great boon, especially during bad weather when the country roads are impassible, and so on through a long and daily increasingly large list. It is of the greatest possible assistance to business men as it brings their stores within 30 minutes' ride of farms 8 or 10 miles away and enables their patrons to come in and trade and ship purchases back by car just as often as desired, instead of making a day's trip in and out by wagon in good weather only. To the unprejudiced eye there is much less unsightliness in a neatly painted little electric freight car, which rolls quietly along the street, than attaches to a farm wagon kicking up a dust as it rumbles slowly along at 4 or 5 miles an hour. In either case the merchandise or farm

product is carried in a box on wheels, and the fact that the car has a roof but no horses should not involve any such direful effects as seem to have struck in like pins on a cushion on the excited imagination of the San Jose Herald man. What are the streets for if not for use; and what better use of them can there be than the transportation in cars of passengers and other home-raised products? We indignantly reject the idea that when the distribution was made of ground floor stock, the Herald man was overlooked and hence his situation on the wrong side. No, perish the thought; and give the little electric freight a chance; it will neither kick, bite or lose a shoe, but will increase in a surprising degree the commercial activity of the city. In the East no less than twenty cities are each raising a bonus to secure just such a service.

FREIGHT CARS GOOD FOR THE CITY.

THAT is the title under which the Spokane, Washington, Spokesman commends the operation of freight cars on the lines of the electric railway in that place, and says:—"In the city of Seattle the street railway companies have franchises for the handling of passenger and freight traffic, and the Ballard road there runs special freight cars at all hours of the day and night, and handles freight between the city of Seattle and Ballard. In Seattle, this privilege has been of considerable benefit to the commercial interests of the city, and appears to be thoroughly appreciated.

There was some talk about the effect on the draymen, but the opinion is frequently expressed that they will not be particularly affected. "Look at the advantages it would give the small manufacturer," said one gentleman. "A factory, no matter how small it is, located upon one of the street railway company's lines, would be able to get cars as cheaply as its big rival, and it means that a little factory could buy a piece of ground on the suburbs of the city and engage in business with just the same facilities as the more expensive factory located on the lines of the transcontinental roads. This seems to me to be an argument in favor of the project."

Another gentleman held that it would decrease the price of flour, and his argument was based on the cost of drayage.

Said he: "The cost of drayage to the mills of this city to-day equals the sum of 6 cents per barrel of flour made. This change is greater than the charge for power and engineering services to the mills of Tacoma and Portland so that to-day the mills here, although using water power, are not able to produce flour as cheaply as those in Seattle, Tacoma or Portland and solely because the cost of drayage from the track to the mill is so expensive."

The company are to carry freight between the hours of 11 p. m. and 7 a. m. As has been earnestly maintained by THE STREET RAILWAY REVIEW from the first, the commercial advantages to any city, and the revenue gain to the company, make the street freight car problem an interesting and inviting one and one that commends itself to every thoughtful manager.

GRAND VIEW BEACH RAILWAY.

A LONG the shore of Lake Ontario from the village of Ontario Beach, a suburb of Rochester, there extends one of the most peculiarly scenic electric railway routes in the world. The road is 8 miles long, running to Manitou Beach through a land replete with the legends of the Iroquois and glistening in the beauty bestowed by the bountiful hand of Mother Nature.

For several miles out of Ontario Beach the road runs along a bluff close to and overlooking the placid expanse of Ontario and about 15 feet above the level of the water. From Rigney's westward to Manitou the track threads a sandy beach between the great lake and various little bays and ponds which seem small children of the great parent, and here is room and here are facilities for the thousands to spend a day in sport and pleasure, and all easily accessible on account of the electric line.



TERMINUS GRAND VIEW BEACH RAILWAY.

For a long distance the beach is lined by pretty summer cottages and cool, wide-porticoed summer hotels. At Manitou are the finest pic-nic grounds in western New York and near it the pretty little village of North Panna.

As to the road itself, it is of modern construction and equipment. The track is 45-pound steel T rail. The rolling stock consists of 7 motor cars, five open and two closed, and 7 open trail-cars, which will seat comfortably 60 to 70 persons. The Rae motors of 40-horse-power are used and the old reliable McGuire truck.

THE POWER PLANT

is located two miles from the eastern terminus of the road. It is equipped with two Thompson-Houston 8,000-watt generators, two engines of McIntosh-Seymour make and three 100-horse-power boilers from the Pierce & Thomas shops. This magnificent equipment, says the management, is of more than sufficient power to operate the road in a highly satisfactory manner. The car-barn, located near the power house has storage capacity for 20 cars.

As should be expected from the above account of the equipment and the route, the results of the first year's operation have been eminently satisfactory to all concerned.

The cars began running in June, but the road was in an unfinished condition until about August 1st. To October 1st the total earnings were \$17,976.08, operating expenses \$8,500.06, interest and taxes \$4,010.34, surplus \$4,465.14. The total number of passengers carried was 150,000.

The officers of the company are: H. H. Craig, president, M. Doyle, vice-president, J. Miller Kelly, secretary and treasurer, E. A. Roworth, superintendent, and to these men the thousands of travelers are indebted for the fine accommodations of the Grand View Electric Railroad equipment.

CHICAGO.

A SCHEME is talked of for an electric L on the North Division.

THE long delayed and much talked of alley L has been again discussed. The "man who knows" says that all the gaps will be finished between Van Buren and 39th streets, within three months.

THE Lake Street L promises that the construction shall be finished, and that the road will make valuable connections with surface railways, and all that is needed is capital, and that, says the friend of the road, will be forthcoming.

GEO. APPEL, a North Side mechanic, has a blooming, Utopian plan for an elevated system, with special rooms for horses, cattle, dogs, baby carriages, street cars and common people. Go it inventors, go it, the more gigantic your scheme the bigger noise it will make when it drops.

THE Calumet Electric Company, now operating a short line between Burnside and South Chicago. This is now, with the permission of the council, to be the nucleus of extensive lines through this section lying between Grand Crossing and South Chicago, and south and west as far as Kensington and Gano. It is a costly enterprise, but it is said to be backed by abundant capital, directors of the Calumet Canal and Dock Company, N. K. Fairbank, and other leading capitalists being behind it.

THE past month has brought forth the annual crop of kickers, who waste so much shoe leather and good print paper in howling about the over-crowded cars. Did these prodigies of ignorance ever think that three cars every half minute could not at once take care of the half million people who go to the city and from it every morning and evening? Every body wants the first car and the biggest car on earth won't hold them all. If the anti-stand-on-the-platform ordinance should be passed the howl would be greater yet. Just think that Carlyle said that England had a "population of 35,000,000, mostly fools," and then kick, brethren, kick!

PERSONALS.

SUPERINTENDENT WAHL of the Rochester, N. Y., Railway has resigned.

THE New York management will substitute 90-pound rail for the 70-pound now laid.

A. L. SORTILL, who owns the street railway of Marshalltown, Iowa, was a recent caller.

F. J. FRY, auditor of the Grand Avenue Railway, Kansas City, was in the city recently, investigating the Chicago system of tramwaying.

E. S. GOODRICH, president of the Hartford, Conn., road was knocked down and run over by a carriage, recently, while alighting from one of his cars.

ENGINEER W. F. CARR of the Street Railway System, Minneapolis has started on a long tour of observation in the South. During his term of service with the company, 125 miles of electric railway have been placed in successful operation, involving an expenditure of \$6,500,000. Mr. Carr takes with him a very flattering testimonial from General Manager Goodrich. He will probably engage in similar work in one of the Eastern cities at the close of his tour.

A NUMBER of changes have been ordered by General Manager Scott to the handling of the St. Paul lines of the city railway. H. M. Sloan has been made superintendent of the entire St. Paul system, including both cable lines. E. P. Morgan, formerly superintendent of the cable lines, has been made roadmaster, F. L. Butler, assistant super-



TRESTLE ON THE GRAND VIEW BEACH RAILWAY.

L. M. DELAMATER, Mr. Tackaberry and D. W. Pugh, of the John Stephenson Company, New York, spent several days in Chicago recently, meeting old acquaintances and making many new ones.

J. C. REILLEY was elected secretary of the Second Avenue line, Pittsburg, to succeed E. G. Milner who has been with the road since its start, and who now on account of ill health resigns.

A VERY silly and wholly unfounded rumor was started by a Boston paper, that General Manager Monks, of the West End was to retire. President Whitney denies the rumor and states that neither the company or Mr. Monks have any desire to part.

WILLIAM HOEN, of Cleveland, Ohio, has been appointed superintendent of the Muskegon Electric Street Railway, and is already in charge. Mr. Hoen was for twelve years foreman of the machine department of the Brush Electric Works, Cheveland, and for the last two or three years electrical superintendent of the Cleveland & Brooklyn Electric Street Railway line.

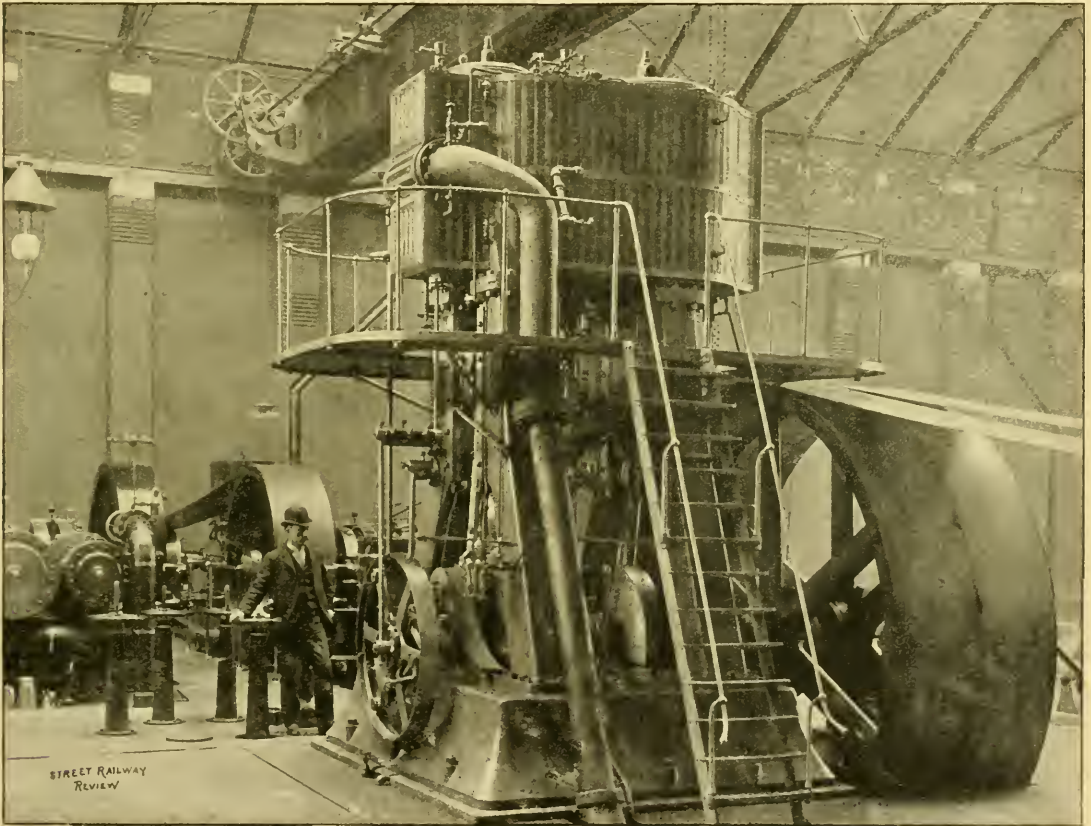
intendent, F. F. Tabor, foreman of the Selby avenue line, and C. C. Raymond, day foreman of the East Seventh street line.

J. L. BARCLAY, western manager of the railway department of the Westinghouse Company, and whose office is on the first floor of the Pullman Building, had a very lively, though not altogether enjoyable experience a few days ago. A crazy Frenchman, who could not speak a word of English called to enlist Mr. Barclay's interest in his air ship. As the inventor proceeded with his description, wholly unintelligible to any but himself, he became highly excited and tore about the office like a Texas steer from the stock yards. As it was late in the evening Mr. Barclay was alone in the office, but a doctor whose office adjoins heard the disturbance and came to his assistance. It required the combined efforts of the two gentlemen to subdue the maniac, who was then taken to the Detention Hospital, where it was necessary to handcuff the prisoner. Mr. Barclay has a less favorable opinion than ever of air ships and their inventors, and was extremely fortunate in escaping as he did.

FIVE HUNDRED HORSE-POWER ENGINE OF THE BUFFALO CITY RAILWAY.

EVEN the most careless observer be he wholly unacquainted with the simplest principles of mechanics on which an engine is constructed and operated, cannot fail to be fascinated by the sight of an engine, whether stationary or locomotive at work. The construction of cable and electric lines have afforded opportunities all over the country for the building of some of the most attractive specimens of these wonderful agents in the conversion of force, among the latest of which, and somewhat out of the usual type employed, is the new 500-horse-power, which for the past ten days has been

diameter with 50 inch face. If a grooved wheel for rope transmission were used instead of the belt, the floor space would be reduced to 12 feet by 13 feet 2 inches. The total height above capstone is 15 feet. The condensing apparatus is under the floor and independent. The number of square feet on floor required to contain the engine and wheels is 180 or only .36 of a square foot per horse-power. The engine is driving two No. 60 Edison railway generators by two 25-inch leather faced belts. The principal dimensions are as follows:—diameter of high pressure cylinder, 17 inches; of low pressure, 33½



BUFFALO CITY RAILWAY—500-HORSE-POWER ENGINE OF THE LAKE ERIE ENGINEERING WORKS.

driving the generators of the electric lines of the Buffalo City Railway. President Watson and General Manager Littell naturally take just pride in their new and handsome acquisition.

It is of the inverted cylinder type, compound, with two sets of cranks set at right angles; the crank shaft having five bearings, one of which is out-bored and provided with two belt wheels between the outer bearing and engine proper. It occupies a space 12 feet by 15 feet over all, including wheels and outer bearing. The base plate is 8 feet by 9 feet 9 inches, and the wheels 12 feet

inches; stroke, 28 inches; revolutions per minute, 130; diameter of crank shaft, 7¾, 9½ and 12 inches; weight of wheels, 36,000 pounds. At full speed, the wheels develop about 2,500,000 force units, or 5,400 units per horse-power upon a rating of 500 horse-power. The governor is at one end of the crank shaft, and is of the one-armed type and acts directly on the high pressure steam valves, affecting the cut off only. It is set for about 1 per cent. variation. The exhaust valves are entirely independent. All centrifugal and weight forces are carefully balanced, thus avoiding the necessity for

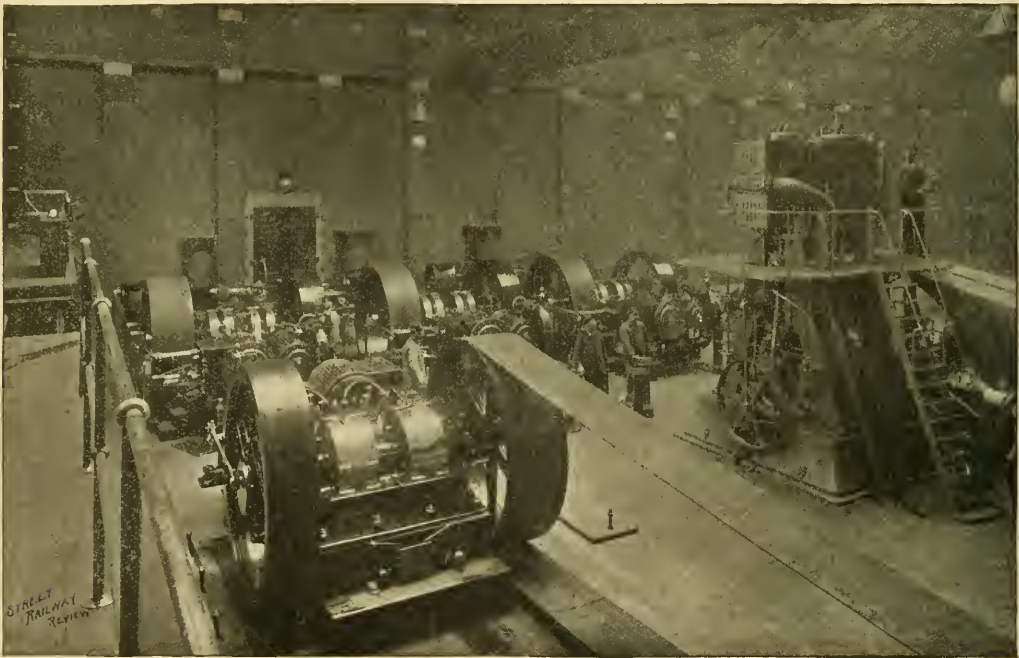
dash pot or frictional surfaces, the controlling weight being free to move quickly in response to sudden changes in load.

There are four valves to each steam cylinder, the steam and exhaust being independently driven by separate eccentrics. The lap and lead are also independently adjustable, which permits of adapting the engine to any service, either condensing, or non-condensing, and admitting of small cylinder clearances. This engine with not more than $3\frac{1}{2}$ per cent. clearance in low pressure cylinder runs without excessive compression non-condensing; in fact could be readily adjusted for no compression, if so desired, and without interfering with the cut-off on the steam side. The low pressure steam valves are provided with a "pause gear" giving a wide opening of port with an early cut-off.

yet considerable pains have been taken to distribute the metal symmetrically. The base plate is heavy and deep with a view to firmness. The engine is for belt, rope drive, or direct connected service, and was built and installed by the Lake Erie Engineering Works, of Buffalo, N. Y., and reflects great credit both in workmanship and design.

THE BARRE SLIDING RAILWAY.

SINCE the demise of the the elevated-electric-200-miles-an-hour scheme between Milwaukee and Chicago the Barre Sliding Railway, of which Philip Hornath is promotor, wishes to fill up the gap. The Barre method has been in vogue in Europe experimentally for a few years.



BUFFALO CITY RAILWAY POWER PLANT—VIEW FROM VISITORS' GALLERY.

The valves are four ported, flat faced and partly balanced, there being just enough pressure upon the seats to make tight joints. This is done by the steam itself, and the valves follow their own wear always keeping tight.

The pistons are of an English marine type, the connecting rod forged and of a forked pattern with bearings in cross-head—the latter being forged in one piece with their counter balances. Main bearings are provided with removable shells, grease lubrication and water jackets, and there is a water jacket behind the guides on the running side also. The main bearings, crank pins and cross-head pins, are lubricated through pipes leading from a large cast iron grease pot on the platform of the engine. All joints in the valve gear are provided with independent grease cups. In appearance, the engine is massive

The cars run on slides instead of on wheels, and water is used as the motive power. The slides under the car are hollow and bottomless, fitting over the rail. Water is to be forced into these slides by hydraulic pressure with sufficient power to force out a thin film of water constantly, to do which the cars must raise from the track as high as the film or sheet of water is thick. The cars are to be connected with a water pipe beneath the track. The water pressure is upon this pipe, which is supplied with propellers to send the train along. These propellers are to be placed at about ten yards less distance apart than the train is to be long, so that there is a constant force upon the water, compressing it against the air in the air chambers of the slides, forcing out the thin sheet of water upon which the train runs.

CONDITION OF THE HORSE MARKET.

THERE is a quotation from Shakespeare that has done duty as a moral-pointer and tale-adornment until it is absolutely threadbare, but nevertheless, in the interests of rapid transit we whisper, "Othello's occupation's gone."

In fact, by all the signs known as prophesying the decay of an industry, acute observers are able to assert that, in a few years, the street car horse industry will take its place in a niche of antiquity, along with the handloom, candle light and the sickle.

It is nugatory to repeat the chorus of the fashionable song, "The Mule Must Go," or to again bring out the statistics that evidence the marvelous growth of electric and cable traction, or to tell even in round numbers the tale of the electric companies that have grown from absolutely nothing to a large business within the past two years and a half. It will be unnecessary to enter into the advantages, therefore, from a mechanical traction point of view. From the horse side, however, THE STREET RAILWAY REVIEW has gleaned the following facts and opinions from the men now most interested in our faithful friend, the horse.

In an interview with J. F. Berry, of Berry & Co., one of the largest horse shippers in the United States, Mr. Berry said: "No, the present low price of horses and the immediate large supply is not affected at all by the discharging of second hand car horses upon the market. You know that the great horse raising districts are Missouri, Nebraska, Minnesota, Iowa and Illinois. Of course the speed horses are not raised there, but the animal of good size for light and heavy draft purposes comes from those regions. I have not noticed any diminution of our trade from any cause. The Philadelphia and Baltimore shippers buy the most horses, I think, for street railway use, but New York City is not very far behind. Speaking of horse markets, when years ago I moved down here to the stock yards I foresaw that Chicago was destined to become one of the largest horse markets in the world and the results have exceeded even my most sanguine expectations. Chicago, in a few years will be not only one of the greatest, but undoubtedly the greatest mart in the world for this useful animal. I think the low market price is the natural consequence of the supply exceeding the demand. The farmers were short of feed during the summer and the horses were thin and would not bring what they were worth in better condition. Since harvest, the horses have been better fed, brought into condition and put on the market in large quantities. Hence the present price."

We believe, however, the prices would have been affected to some degree had all disused horses gone back into the market.

S. J. Cooper, another prominent shipper, was found at his auction, which occurs on Wednesdays. Although very busy he took his first opportunity to express himself thus on the question in hand: "I do not think that the present gorge in the horse market is attributable to any

than the well known law of supply and demand. The farmers have held their stock to get it in better condition and the result is that too many horses are now on the market.

As to street car horses I must say that the "streeter" is a thing of the past as a class. Why, within the past year or year and a half our "streeter" trade which was very large, has fallen off perhaps, 25 per cent. A "streeter" that once brought from \$110 to \$140 now goes at \$90 to \$110, and there are not any second hand horses in the market either. What becomes of the horses that are dispensed with? Well, they are not good for the market although sound enough. They are shoulder-galled, knee-swelled and tough-looking, so they are auctioned off locally or put on to the feeder lines that are the concomitants of mechanical traction. Yes, sir, the railway companies are engaged in wearing out these old horses on the feeder lines, and before many years I think the horse and mule will cease to be an object of value for street railway traction. Philadelphia, New York and Baltimore men buy most extensively here, for street purposes."

After this voice from the stock yards, the down town firm of Kohl Bros., formerly Kohl & Joseph, was induced to give of their experience for the enlightenment of the street railway public.

The Kohl brethren both united in the assertion that the "streeter" trade had fallen off. The elder estimated the decrease to be about two-thirds, and claimed that the value of first class streeters had fallen off from \$10 to \$15 per head; thus concurring in the statements made by the stock yards traders. This firm has furnished thousands of animals for the use of the Chicago City Railways, and has even this year delivered 700 head to the West Chicago Railroad Company. Mr. Kohl said that the greater portion of their stock came from Iowa and Illinois and by far the greater proportion of country sales were made in Michigan towns. Mr. Kohl strenuously opposed the idea that the present low prices in the horse market were due to any other cause than over production, and said that a draft horse or all purpose horse was just as good property as ever, but that "streeters" were down in price and would be liable to remain.

While this article was in preparation the writer chanced to meet in a sleeping car a gentleman of long experience in raising horses of all kinds, and who is at the head of one of the largest firms in Wisconsin. He imports each year large numbers of Percherons and, the horse subject being incidentally mentioned, and not knowing any of his hearers, he voluntarily spoke at considerable length. In referring to the prevailing low prices of "streeters" he stated it was due to two causes. Primarily and chiefly he blamed the rapid transit systems of cable and electric roads, "which have knocked out thousands of horses of that grade, and," he added with a sigh, "it wasn't apt to get any better very soon, as more roads are built every day." The other reason was the increasing use of Texan and Mexican broncos, which can be purchased on their native heath, saddle broken, for \$5 a

THE LIFE AFTER DEATH.

BY R. W. SNOWDEN.

head, the buyer selecting his choice out of a drove of 300 or 400 horses. These are being broken and used in many places for light work, and while not a heavy horse, he is very tough and hard to kill.

For a long time the bronco was considered unfit for city work, but the class being forwarded now are much better broken.

From the above consensus of opinion the public may judge, making due allowance for the personal equation, which is always present even in mathematics, that the cervical vertebrae of the street car horse trade is irremediably fractured, and "all the king's horses and all the king's men," can not stop the car of progress when driven by mechanical traction.

THE STREET CAR HORSE OF TO-DAY.

THE street railways have for years been an enormous consumer of horses, and though the demand is fast decreasing there are still thousands of these faithful animals successfully filling their mission in the daily duty, in which the public are so strongly dependent upon the street railway; and although he is being daily released from the steady routine of so many trips per day, and returned to other avenues of service, his entire emancipation from this work will, in all probability, be a matter of still many years.

In the large cities or in smaller towns where the volume of business will warrant, mechanical methods must eventually crowd him out; but in small towns, where the business is small and fuel high; where only two or three cars are run, he will yet remain for some time to come. As the harness necessary to attach steam and electricity to a car becomes less expensive and more simple, the transition will be more widespread and complete, and the day when the last car horse has had his number checked on the salesbook will indeed be a happy one for animal and the public.

Street railways formerly did not treat their stock with anything like the scientific consideration which has characterized the management of the past ten years, and to be pointed out as a car horse, conveyed at once an impression of protruding ribs and sunken back. Now the best feed is none too good; his stable is well ventilated; his hours and amount of work are regular; he is well groomed and when sick has the best hospital treatment the science of modern veterinary can afford. Horses, too, are no longer kept until their usefulness is a record of the past, but are sold before breaking down, and when placed in lighter service or returned to farm work, as a rule soon regain a considerable portion of their strength and last for many years. Especially is this true where troubles of the feet are the chief cause, for in such cases the soft dirt country roads or farm work speedily rectify the disease. But in the great majority of cases the car horse is sold to draw peddlers' and cheap delivery wagons, where their career is usually a brief and painful one, so that the mortality in every city resulting from street car service is very great. What then becomes of the old car horse?

HE must indeed be a hard-hearted man who sees the carcass of even the poorest, meanest looking old horse carted away on the dead wagon without some feeling of pity for the dumb beast, whose life has been one of helpless, yet uncomplaining service to the will of man; or who would not entertain the wish that in the horse heaven perennial pastures of red clover may blossom, bounded on one side by barrels of choicest salt and on the other by streams of sweetest water. When a poor unfortunate drops in his traces in the street he has not yet escaped the unrelenting grasp of man, but is destined to undergo a metamorphosis which shall even cause his very bones to grace scenes of beauty and his flesh to lubricate the busy wheels of commerce. He is destined to appear in a short time in many and varied forms as articles of great commercial value. It may not be without interest to briefly trace his "journey to the tomb."

The carcass is taken to a fertilizer establishment, where the skin is stripped off, the average weight of which, when green, is about 60 pounds. It is then salted and laid on a pile of other horse hides until enough have accumulated to make a shipment. Horse leather is used mostly for heavy boots and shoes. Next the long tendons between the knee joint and hoof are removed. These tendons are kept soft in a pickle of lime water until ready for use, when they are made into a cheap quality of glue.

The legs from the knee down are cut off and thrown aside while the rest of the body is being disposed of. If there are shoes on the feet they are knocked off and sold for old iron. The shin bones, with hoofs on, are put in a large tub; water is turned on them, and they are cooked slightly with open steam, just enough to separate the hoofs from the bones.

The shin bones are then transferred to another open tank and are boiled slowly until all the grease is tried out. The grease is then skimmed from the water and run into the cooling room. When cool it is pressed in muslin cloths and the oil running through is neat's foot; the sediment remaining in the rag affords a poor quality of stearine, which is sometimes used in the manufacture of candles, but is more often mixed with other brown greases. The shin bones when dry are very hard and white, and from them our best bone buttons are made. The hoofs are ground when dry, the meal usually being mixed with some brand of fertilizer.

The body is cut up, and with the exception of the entrails is put in a tight tank. Water is let into the tank and steam turned on at a pressure of about 15 pounds, which is maintained for 10 to 12 hours. Then the grease is drawn into open tanks and when partially cooled is run into tierces. There is only a small percentage of grease in a horse, the product of from five to seven animals being necessary to make a tierce of about 375 pounds, net weight.

Horse oil is of a dark brown color and when cold is of the consistency of jelly. It is used for oiling leather and harness which some other horse must wear. The refuse matter in the tank (bones and muscle tissue), after the grease and water are drawn off is called tankage. This tankage is sometimes dried by evaporation, but more often by a mechanical operation called extracting, which is accomplished by means of benzine vapor. When dried by this process tankage contains only about 2 per cent. of moisture, having lost about 60 per cent. of water and grease. Dry tankage is either ground separately as a certain brand of fertilizer or is mixed with other ingredients to give the required analysis of fertilizing properties.

The refuse matter in the extractor (water, benzine and grease) is distilled to separate the benzine and grease when the benzine is used over again and the grease is redistilled. The best product is clean, light-colored grease. This, when pressed, yields red-oil and stearine. The best quality of mottled German soap is made from the red-oil and the stearine is made into candles. The process of redistilling yields large quantities of animal tar (used for roofing), and when the process of redistilling is carried further there is a yield of glycerine.

The grease obtained from the entrails is usually made into very cheap grades of washing soaps. Bone black or bone charcoal by which sugar is refined, is made from raw dry bones. Frequently these raw bones are ground into a coarse meal, which is used as chicken feed.

There is no part of the horse's carcass that is not utilized for some purpose, and to sum up we find that man's best and most faithful friend has, notwithstanding his hard and often cruel treatment by us, given his best services during life and at its close has left us a rich legacy.

A DOUBLE REDUCTION SYSTEM.

THE general manager of the United States Electric & Construction Company, of New York, one C. H. Laurence, was arrested at Lockport, where he was promoting an electric railway, charged with grand larceny. When arrested he feigned illness, but the scheme didn't work. His complainant was his time-keeper who put up a guarantee of \$500 but who had received no salary and became anxious. It is stated, that some months ago, this same Laurence worked a similar game in this city through a fire service in which for a few dollars a month he contracted to send a swift conveyance to a man's house whenever fire occurred in his office or factory during other than business hours. To accomplish this, he kept quite a number of rigs in various parts of the city close to the fire department headquarters, and required his employes to make a large deposit as guarantee. Several of them lost heavily when the business suddenly collapsed and the proprietor departed in great haste, leaving them unpaid as to wages and wiser but sadder as to deposits.

A LARGE number of consolidations have taken place during the past year. All this is mainly due to the fact that greater territories can be reached by mechanical traction and the increase of travel.

LIVERPOOL AND WELLSVILLE ELECTRIC.

AFTER much competition the contract for electrical equipment to be used on the East Liverpool & Wellsville Railway, has been awarded to the Short Electric Railway Company. The road will be about 8 miles in length, connecting Ohio City, Wellsville and East Liverpool, with the power-station in the last named place. Eighty-two pound Johnson girder rail will be used throughout the entire roadbed, grading for which has been pushed vigorously. A force of 500 men was at work for some time past on the roadbed, which has been cut and filled according to the best practice for steam railways, and will, when completed, be practically level. Thirteen acres of ground have been purchased in East Liverpool, on part of which a handsome red brick power-station is in process of erection. Power will be furnished by two 150-horse-power Reynolds-Corliss engines, with accompaniment of two 300-horse-power boilers, and a Worthington duplex pump. Two Short Multipolar slow-speed dynamos of 150-horse-power each, and a handsome marbleized slate switchboard of the latest Short type, fitted with all necessary appliances for the modern electric power-station, will complete the equipment of the power-station.

Seven 26-foot cars will be equipped with fourteen Short "Gearless" motors, having a capacity of 20-horse-power each. Line construction will be the Short system.

The road, as was expected, was put in operation on Thanksgiving Day, when the citizens of the two enterprising towns arranged to decorate their streets and cars, and to give a banquet in honor of the occasion. For some time past the usually quiet streets of both East Liverpool and Wellsville have been filled with foreign workmen, several hundred men being employed at different points along the line. The greatest enthusiasm has been shown from the start by the people of the two towns, the cause of their co-operation being the desire for immediate relief from the steam cars, which have been their only method of communication thus far.

MORE ELECTRICS FOR ST. LOUIS.

THE lines of the Cass Avenue, Northern, Central and Union companies will undoubtedly be equipped with electricity in the early spring, at an expenditure of an even million dollars. These lines have always been operated by animal power, and the change will have an important effect on property values in the northwestern portion of the city. Among the conditions of the franchise are the following:

Every six months, from now to 1900, the company undertakes to pay to the city $1\frac{1}{2}$ per cent. on the earnings of the three consolidated lines; from 1900 to 1910, 2 per cent. will be paid; from 1910 to 1920, $2\frac{1}{2}$ per cent., and from 1920 to 1930, when the franchise expires, 3 per cent. is the figure.

The Seventh street road will also be equipped with electricity and operated south to the junction with the Broadway cable line, independent of other syndicate lines.

MISSION RIDGE, CHATTANOOGA.

PART II.

TO properly describe the railway facilities of Chattanooga and to set forth with fitting description the surpassing beauty of this part of Tennessee requires more space than the limits of one article will allow. Therefore our readers will thank us for this double-tracked extension necessary to show that the

CHATTANOOGA & NORTH SIDE STREET RAILWAY COMPANY

is doing business commensurate with its importance as a common carrier. The city itself, though insufficiently described in our last issue, would require a good sized volume to tell of all its advantages and we forbear to enter more into details than to remark that as a commercial center it is growing in importance, and with the connections by river with St. Louis, for which purpose a transportation company has

THE LINE

is equipped with as handsome cars as Stephenson ever turned out. They are 22 feet in length and mounted on his celebrated trucks, which is sufficient guarantee of comfort. They are each supplied with two Thomson-Houston 15-horse-power single reduction motors; the gears are encased and run in oil. This obviates noise and their smooth running is the admiration of every one. This is the first line in the South to use the single reduction motors. For this reason the road is of interest to southern railway men and the success of the single reduction type is fully established in this section. All cars are equipped with the Lewis & Fowler car heaters which, the management says, are giving the best of satisfaction and add greatly to the comfort of passengers.



LOOKING EAST FROM THE CHATTANOOGA & NORTH SIDE RAILWAY BRIDGE.

been organized, Chattanooga will be joined to the great western markets, in addition to rail facilities. The Chattanooga & North Side Railroad was opened to public use about the middle of June 1891.

Starting from the center of the city it extends across the river into the beautiful and growing suburb, Hill City; then on towards Walden's Ridge. It has not been completed as yet to the summit of Sturges' Ridge, a distance of $3\frac{1}{2}$ miles, but the view obtained from the bridge, which, by the way, is another structure of which the city may well be proud, and from along the line as the car ascends the hill, is surpassingly beautiful. Strangers especially are loud in their praises of this picturesque route of the beautiful southland. The accompanying cuts show the car climbing hill, also a scene at the end of line.

THE STATION

is equipped with two 150-horse-power tubular boilers, built by Walsh & Weidener, of Chattanooga; two 100-horse-power Armington & Sims engines, belted direct to two 80-horse-power Thomson-Houston generators. The switch-board is also a model of neatness and beauty, being equipped with all of the latest improvements of the Thomson-Houston Company in the line of circuit breakers, switches, ampere-meters and other conveniences and necessities of a well ordered power-station.

THE TRACK

in the city is laid with 40-pound girder and after crossing the bridge with 56-pound T-rail, the heavy rail adding very materially to the ease and pleasure of riding. The

plant has been running an average of 16 hours per day since it began operations and the current during this time has only been shut off for a period of 1 hour. This, considering the many difficulties incident to the opening of a new road, is a remarkable record and the company has great reason to feel gratified with the success that has crowned their efforts.

The officers of the road are: S. R. Read, president; W. E. Baskette, vice-president; W. H. Hart, secretary and treasurer, and David R. Rankin, superintendent.

The success in equipping of this new line has been very largely due to the efforts of President Read, and the citizens of Chattanooga appreciate his endeavors. Mr. Read has been largely interested in the great improvements of Chattanooga, and his last effort to secure this magnificent equipment for his road has been of the utmost importance to a large territory.

houses and yards, will no doubt attract widespread attention, and General Torrence says he is happy in the consciousness that in disposing of the bonds he will experience no difficulty, having already arranged for that.

The cost of the entire terminal will be little less than \$60,000,000. At present the cost of maintenance of guarding the crossings and operation, costs not less than \$500,000 per annum not counting damage suits.

Gen. Torrence says that the tracks will be carried on an iron or steel structure through the more thickly populated part of the route, and upon brick or stone arches at points where that construction can be used. One hundred pound steel rails will be used, so that the heaviest engines can enter the city at from 40 to 50 miles an hour. The enclosed freight yards to be built in connection with the road would be an improvement on the present methods of handling freight. The roads will be



THROUGH A HILL ON THE CHATTANOOGA & NORTH SIDE RAILWAY.

THE TORRENCE TERMINAL.

MAYOR WASHBURNE of Chicago, has signed the Torrence Elevated Terminal ordinance now pending for some time. Considering that the railroads have generally opposed it and that the privileges granted are among the most valuable ever extended to any one corporation, it is a matter of surprise that this has been done.

This plan is, in brief, an arrangement to provide elevated terminals for the roads entering the city from the south. Negotiations are now under way to acquire 300 acres owned by the Atchinson, Topeka & Santa Fe Railroad, and extending to Twelfth street, the site of the proposed depot. With a depot that may cost \$2,000,000 and trackage facilities sufficient to accommodate ten trunk lines, the extensive system of elevated terminals, freight-

on the street grade, while hydraulic lifts as used in England will lower the cars to the yards. In England the system has developed to a saving of 50 per cent. in the receipt, handling and delivery of freight. At least half an hour will be gained in suburban traffic.

This plan, in which Calvin Brice and his coterie are interested will be probably constructed in time for the World's Fair.

The terminal will have considerable effect on suburban traffic and make the progress and egress of suburban residents easier and more satisfactory, although, of course, some will be inconvenienced by the change. The gain however in the train time will more than offset the inconvenience of walking a few blocks. Thus with half an hour gain in suburban time, more trains and no accidents at crossings, will make life both more tenable and longer by one hour per day.

STREET RAILWAY LAW.

EDITED BY MR. FRANK H. CLARK, ATTORNEY AT LAW, CHICAGO.

Street car driver killed at railroad crossing.

The driver of a street car approaching a railroad crossing should exercise the care of an ordinarily prudent man, whether or not a flagman is in sight.

The question as to how far he may rely upon the absence of the flagman from his post, and the want of any signal of danger, is properly submitted to the jury.

MORSE, J., in delivering the prevailing opinion, said: Sherwood, with his car drawn by one horse, came down West Fulton street, approaching the defendant's track. West Fulton street runs nearly east and west, and the railroad track crosses it nearly at right angles. Sherwood was going east. About 185 feet west of the defendant's track is another railroad crossing; Sherwood was observed to cross this latter track on a walk. Beyond that to the east it is down grade, and he then started his horse on a trot, and continued until within twenty-five or thirty feet of defendant's crossing, when he slowed down to a walk. At this crossing is a shanty used for a flagman, who was stationed there to give warning of the approach of trains. To the north the view of the track was comparatively unobstructed, but upon the south side of the street, and to the west of the railroad track, was situated a lumber yard, office, sheds, and piles of lumber and posts, more or less obstructing the view of cars coming from the south. On the day in question there was at least one car loaded with lumber upon a side track in the lumber yard, which added to the obstructions. Just as Sherwood got to the track a train of nine cars, detached from the engine, came down the track from the south. Sherwood then stopped, put his hand on the brake, tried to "brake up," but could not. The horse was on the track, his forward feet across it. The horse gave a jerk and pulled Sherwood over the dash board and under the car. Sherwood died of the injuries there received. These cars were running at the rate of from 8 to 12 miles an hour. There was no warning of their approach, except the noise they made in running. There was no lookout on the forward car. There was a man standing on the third car from the front of the train, but he was looking northeast, and giving no attention to the crossing. The flagman was not at his usual post of duty, and no signal or warning was given by him until the horse was on the track; he then ran out of the shanty, but too late to warn Sherwood of his danger.

It is not the law of this state that, under all circumstances, it is absolutely necessary for a person approaching a railroad crossing to look both ways, and to listen for approaching trains. It is generally required, but it is not a rule of universal application. Every case must depend upon its own circumstances, and it would be unreasonable to apply such rule, under all circumstances, without regard to the condition of things at the time. *Cooper v. Railway Co.*, 66 Mich. 266. Nor is a traveler compelled, under all circumstances, to stop before a crossing, if his view is obstructed from one way. He

is only required to take such precaution as an ordinarily prudent man would under like circumstances, and whether or not he did use such care is generally a question for the jury.

The court instructed the jury that a railroad crossing is a place of danger, and is itself a warning to any one about to go upon it to be careful and vigilant to the extent of his opportunities. "It was the duty of Sherwood to use his sense of sight and hearing to ascertain whether a train was approaching, and if the jury find he did not, then the plaintiff is not entitled to recover." That it was the duty of Sherwood to exercise due care whether or not the flagman was in sight, and, if the flagman was found not to have been present to give warning, such fact could be considered as bearing upon the negligence of both Sherwood and the defendant. The court left it to the jury to determine whether, under the circumstances, Sherwood had a right to rely, and how far, upon the absence of the flagman from his post of duty, and the want of any signal of danger from such watchman as an assurance of safety; and they were instructed that, if an ordinarily prudent man would have done the same as Sherwood did under the same circumstances, the plaintiff could recover. I find no errors in the charge on the subject of negligence. (*Sup. Ct. Mich. Richmond v. Chicago & W. M. Ry. Co. 10 Ry. & Corp. L. Jour. 334.*)

Municipal Ordinance—Care Required in Operation of Street Cars—Penalty—Liability to Person Injured.

An ordinance requiring the conductor and driver of a street car to keep a vigilant watch for all vehicles and persons on foot, especially children, and stop the car in the shortest time and space possible on the first appearance of danger to them, is valid under a charter which gives power to make ordinances not inconsistent with the general law, and to license and regulate the construction and operation of street railroads.

Failure to observe the degree of care in running a street car which is required by a valid ordinance imposing a penalty therefor, renders a street car company, which has undertaken to obey ordinances in consideration of the right to use the public streets for its tracks, liable to a person who is injured in consequence, although such degree of care may be higher than that which would otherwise be required by law. (*Sup. Ct. Mo. Fath v. Tower Grove & Lafayette Ry. 13 L. R. A. 74.*)

Bridge Maintained by Street Railway Company—Defective Approach—Injury to Foot Passenger.

In constructing the bridge and its footways over the Harlem river, the defendant, at the point where the plaintiff received her injury, interfered with a part of the public highway without authority or warrant of law therefor. The platform approach to the stairway leading to the footway of the bridge must be regarded as an appendage to and practically a part of the bridge. The defend-

ant undertook to construct and maintain a bridge over the river "open for the free use of all persons desiring to pass over the same on foot," and to keep "the bridge and its footways and approaches and stairways and roofs in complete order."

One of the planks in said platform approach in some manner became loose and the accident was caused by the plaintiff catching her toe against the end of this plank. The defendant was liable for the injury sustained by the plaintiff, unless her own negligence contributed thereto. (N. Y. Superior Ct. *Murphy v. Suburban Rapid Transit Co.* 6 N. Y. L. Jour. 171.)

Electric Railways—Ground Circuit—Interference with Telephone—Injunction.

A grant by the legislative and municipal authorities to a street railway company to use electricity as a motive power, though it does not designate the particular system by which the power is to be supplied, does not give the company a right to use a system by the use of which the electricity will pass from the street and interfere with the current of a telephone company, which has previously lawfully erected its poles and wires, where there are other systems which might be used by the railway company at a greater expense, but less additional expense than would be required for the telephone company to change its system.

When a street railway company is about to use electricity as a motive power, to be supplied by a system which will allow the current to escape to the wires of a telephone company, and to continuously interfere with and injure the business of the telephone company, an injunction will lie, there being no adequate remedy at law. (N. Y. Supreme Ct. *Hudson River Telephone Co. v. Waterville Turnpike & Ry. Co.* 10 Ry. & Corp. L. Jour. 364.)

NOTE.—This decision is contrary to that of the Supreme Court of Ohio in the case of *Cincinnati Inclined Plane Railway Company v. City & Suburban Telegraph Association*. STREET RAILWAY REVIEW p. 371. The circumstances of the two cases are essentially parallel.

In the New York case the court reasoned that the maxim "so use your own as not to injure another" was applicable; that under the rule that statutes which may result in imposing burdens on private property must be strictly construed, it would not be presumed that the legislative grant to the defendant, under which the use of electricity was permissible, contemplated the use of motive power which would not only pervade the whole of the street, but would drive out of use on private property industries lawfully and properly established there, without the consent of the owner; that, in view of the fact that the grant relates only to the power to be used, and specifies no particular mode of its application, and as all injury to plaintiff can be obviated by the adoption of the double trolley system or the storage battery system, it follows that enjoining the use of the single trolley system would leave the defendant in the beneficial enjoyment of the grant.

In the Ohio case the court says that, as compared with the double trolley method, the single trolley system is deemed more simple, less liable to derangement, much cheaper, and less liable to accident (and this is not questioned in the New York case); that the telephone company, notwithstanding the lawful erection of its poles and wires and its priority in point of time, did not have an exclusive right to the use of the ground circuit; that the dominant purpose for which streets are established is to facilitate public travel and transportation, and a franchise of a telephone company for operating its lines in the streets is subordinate thereto; if the operation of a street railway by electricity disturbs the working of the telephone system, the remedy of the telephone company is to readjust its methods, and the relative expense of a change of system by plaintiff or defendant is immaterial.—ED.

Specified Points for Stopping Cars—Injury to Passenger—Contributory Negligence.

A passenger on a street railway must be held to know a rule of stopping cars only at certain specified points in the streets as prescribed by a city ordinance.

Where a city ordinance prohibits street cars from stopping except at certain specified points on the streets, if the conductor of a car was not in his place when the train stopped at another point on the street in apparent response to the pulling of the bell cord by a passenger, who believed that the stop was made to allow her to get off, and was injured in the attempt to do so, the question of her contributory negligence is one of fact for the jury. (Sup. Ct. Ala. *North Birmingham Street Railway Company v. Calderwood* 7 So. Rep. 360.)

Municipal Ordinances—Paving Streets—Passenger Railway Company.

The kind of pavement to be laid upon a particular street in the City of Philadelphia must necessarily be left to the city council, unless some legislative restriction has been imposed upon them; and the property owner, if liable at all, must pay the expense thereof, although it is greater than that of the kind of pavement in use when the city was incorporated and authorized to pave at the cost of the abutting owner.

When the central portion of the street, which has hitherto been used for a garden or market house, is opened for general travel, the city may pave it with a more expensive kind of material than that already in use at the sides and charge the full cost to the adjoining owners.

A passenger railway company which is subjected by its charter to all city ordinances in force or afterward to be enacted, is not liable for the original paving of a street simply because such a burden was imposed by an ordinance existing at the time of its incorporation. If the ordinance is afterward repealed, the company receives the benefit of such action, and is thereby relieved of its liability.

The fact that certain street paving is done in winter, whereby its cost is increased, does not entitle the property owner to a deduction to the amount of the excess.

(Sup. Ct. Pa. *City of Philadelphia v. Evans* 24 Chicago Legal News 34.)

STREET RAILWAY BONDS.

THE fact that street railway bonds are good investments goes without saying and the fact, as the mechanical traction extends, the dividends become larger is growing upon the corporate mind. For example:

The subscription books of the Baltimore City Passenger Railway Company were opened one fine morning at the banking house of Alexander Brown & Sons and by eleven, a. m., the stock was over subscribed and at two, p. m., the subscriptions amounted to \$3,000,000.

The bonds are understood to have been offered to subscribers at \$105½ and accrued interest. They bear date of November 2, 1891, and are in denominations of \$1,000 each. The interest is payable half yearly and the principal in twenty years from date of issue.

SAVANNAH, GEORGIA.

WHEN the first settler looked on the beautiful spot now teeming with the life and hurry of our twentieth century progress, there was not the shadow of a suspicion that the land upon which his eyes feasted would in less than two hundred years be a modern city with all the accompaniments of metropolitan life. In the year of grace 1733 Governor Oglethorpe, the philanthropist, warrior and loyal subject of good King George II., planned the province of Georgia, the last established by Britain, and then platted the city of Savannah at the mouth of the Savannah river, where it empties into the great Atlantic.

The city of Savannah is the most prominent port of entry on the southeastern coast and the greatest cotton shipping point in the Union. As the county seat of Chatham county it gathers judicial and governmental importance, and from the location its historic records are complete and interesting. At the harbor, Forts Jackson and Pulaski of Palmetto flag interest, guard the city from foreign invasion except the mercantile fleets which annually carry the bales of cotton to English and European mills. Here in 1776 a British squadron was repulsed, but two years later the enemy occupied the entrenchments until ousted by treaty.

During the late war, the exciting interests of blockade running, confederate garrisons, and finally federal occupation under Sherman, kept the city in a constant fever of excitement and centered the interest of the entire country around the spot during the closing of the great conflict.

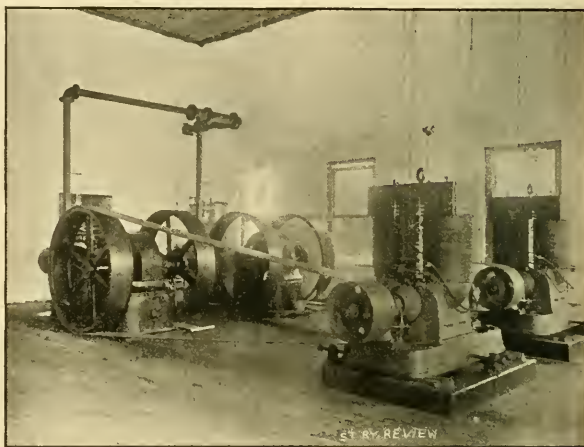


EXTERIOR OF POWER HOUSE.

Since these times the city of Savannah has steadily grown in importance and power. To-day it is one of the most beautiful cities of the South, with wide streets, fine shade-trees, beautiful buildings and handsome private residences. The systems of lighting, water-works and like public improvements are of the most modern type, while their systems of intramural transportation are the

pride of the public spirited citizens, the dismay of the mossbacks and kickers, the convenience of the populace and the source of revenue to the enterprising men who made the venture.

This city is the second largest cotton port in the world, annually exporting 1,125,000 bales. It has the largest naval-stores port in the world, is the second or third in rice exportation and does an immense lumber business.



INTERIOR OF POWER HOUSE.

The necessities of river traffic have started a crusade for deeper water and there will soon be river accommodation for the immense freight business carried on.

Magnificent churches, a new jail, an elegant court-house, lovely public squares and parks make Savannah one of the most beautiful cities of the beautiful state of Georgia and "one that must be lived in to be appreciated," as a loyal Savannahian writes.

About 10 miles of stone, asphalt, Belgian block and shell pavement has been laid and the paving boom is still on.

The principal thoroughfare, which is Bull street, will be completed in sheet asphalt, which will make it, so Savannah claims, the handsomest street in the world with two exceptions. The avenue is 100 feet wide and leads through the city from north to south, beginning at the City Hall which stands at the head of the street, and running through five beautiful squares (four with monuments, and one with pool and fountain) through the park, through the parade ground, in the center of which there is a magnificent monument, erected to the memory of the Confederate soldiers.

With such a city it is no matter of surprise that the three systems of street railway should be up to the standard in every particular.

The road possessing the largest stretch of track is the City & Suburban Railroad. This line has 12½ miles of steam line, using three engines and 12 cars, 6 miles of horse line 5-foot gauge, using 130 horses and 40 cars.

The road is manned by: President, J. H. Johnston; secretary, E. G. Thomas; treasurer, E. Smith and superintendent, G. W. Alley.

The only exclusive horse line is the Coast Line & Barnard Street Railway with 7 miles of horse line and five miles of suburban steam road. The line is controlled by the City and Suburban people.

As a matter of course so progressive a city would not be without electric traction, and the rapid transit problem is solved by two well equipped electric lines.

The Savannah Street Railroad, prior to October 6, 1891, called the Savannah Street & Rural Resort Railroad Company is a belt road of $6\frac{1}{2}$ miles, of which 2 miles are double tracked, with prospects for more. The belt encircles the entire city and passes to the depots and through the down town districts. Two miles of new road pass through the residence portion of the town. The old rail is 42-pound center-bearing, but all new track is laid with 40-pound T.

The equipment consists of 16 cars; 2 cars of double motor, single reduction, Thomson-Houston type; 6 single motors of the same kind; 2 double motors 30-horse-power Thomson-Houston, and 6 single of the same type and make. The closed cars are 16-foot, of the celebrated John Stephenson make, and 4 of Pullman's strong and artistic pattern. Two Phoenix Iron Works 150-horse-power engines and boilers furnish the power which is converted by 2 Edison generators of 80,000 watts.

The officers of this company are: President, W. G. Cooper; general manager and treasurer; Clement Saussy and S. C. Cunningham secretary.

The Electric Railway of Savannah, owned by the Savannah Real Estate Loan & Building Company, of which organization J. S. Collins is president and W. K. Wilkinson secretary and treasurer.

The road is still young but has all the necessary marks of long life and great extension in that pluck and energy are large constituents in the characters of the managers. Although 4 miles are already in operation, the president is instructed to begin procedure towards the building of 4 miles of extension. The route takes the cars the full length of South Broad street, which, as mentioned, is one of the most beautiful streets in the city. The new track will pass all depots, hotels, wharves, and the city market, besides the greater number of churches and places of amusement.

This company has just closed a contract whereby it gains connections with the Savannah & Isle of Hope Railway, a suburban, which runs to Thunderbolt and is projected to the Isle of Hope which is perhaps the loveliest spot on this part of the coast.

We are able to illustrate in this issue the exterior of the power house where are housed, in the engine and dynamo room, which is 40x40 feet in dimension with a 25-foot ceiling, 2 Armington & Sims high speed engines of 100-horse-power each, and 2 Edison generators of 50,000 watts capacity. The boiler room, in the rear of the engine room, is 40x60 feet, with a 25-foot ceiling, and here are 2 Phoenix boilers of 125-horse-power each.

The water for the boilers is supplied from a 6-inch artesian well which spouted $14\frac{1}{2}$ feet above the surface. Arrangements are being made to install a Corliss of 250-horse-power and a large battery of boilers for emergency, to duplicate those now in use. The belts are of the perforated-leather pattern.

The gauge of the track is 4 feet $8\frac{1}{2}$ inches, and the rail is 40-pound street T. The maximum grade is only $3\frac{1}{2}$ per cent. giving greatest ease for safe and rapid transit.

The cars are 16-foot body, 24 feet over all, and seat 30 to 35 passengers. The motors are of Edison make, 15-horse-power.

With this modern equipment it is no wonder that the road does a good business. Its route is popular and the animated scene engraved for this article shows its popularity among all classes.

OVER THE BAY.

THE two loving cities of Menominee, Wis., and Marinette, Michigan, have a great fixed gulf between them in addition to the river which nature kindly interposed. A recent exchange of compliments was as follows:

Marinette paper: "The Menominee electric street car service is not nearly as satisfactory as that of this city, owing to the slower speed."

The same day Menominee daily remarks: "The Menominee electric street cars are working nicely, the service is good and gives very general satisfaction."

An umpire will be needed yet.

NEW YORK THIRD AVENUE ROAD.

THE Third Avenue Company in its recent meeting for the election of the successor of the late President Lewis Lyon decided upon Alfred Elias, and the following coadjutors: Henry Hart, vice-president; Alfred Lazarus, secretary; John Broles, assistant secretary; John Beaver, treasurer, and John H. Robertson, superintendent.

The meeting was a most harmonious one, and out of 24,000 shares, 17,600 were represented. Mr. Samuel Townsend presided and the following board was elected: Henry Hart, William Remsen, Silvanus S. Riker, Robert George Bensen, Robert W. Taller, John E. Parsons, Edward Lauterbach, Solomon Mehrbach, Albert S. Rosenbaum, Albert J. Elias, Alexandre Nones, Simon M. Ehrlich, Abraham Ayres.

A suitable memorial was presented in honor of the late president and a report that the cable on Third avenue would be running by July 1892, was accepted.

The Third Avenue Street Railroad has carried during the past year nearly 35,000,000 passengers. Dividends aggregating 12 per cent. have been paid, and the net earnings show an increase over the previous year. The gross receipts last year were \$1,858,643. The gross earnings of the One Hundred and Twenty-fifth street cable road are very satisfactory.

THE COLUMBIAN MOVABLE SIDEWALK.

Men may come and men may go,
But it goes on forever.—*Tennyson.*

AT the northwest entrance of the World's Fair grounds, partly within and partly without the high board fence which separates the world from the Fair, is an elevated shed 900 feet long, 25 feet above the ground and elliptical in shape. It is the movable sidewalk, the joint invention of Max E. Schmidt and J. L. Silsbee of Chicago, and is the first practical demonstration of a plan which the promoters have good reason to believe will solve the problem of safely and expeditiously moving large masses in the congested business streets of the largest cities. The system requires either a sub-way, or, preferably an elevated structure. It could not be operated on the surface, nor do we believe it adapted to any lines of great length or where the volume

form, which rides upon and by friction of its own weight travels with the top of the wheel. In this the size of the wheel cuts no figure whatever. The relative speeds must be the same in a wheel 1 foot or 10 feet in diameter.

As every one knows it is the stopping for passengers to board or leave a car that makes a long time card of even a rapid speed. The plan in question contemplates a slower car speed but absolutely no stops. Every one can walk as fast as 3 miles an hour so that, stepping from the stationary walk to the platform moving 3 miles an hour, no inconvenience is felt or experience required. So in passing from the platform going 3 miles to the one moving at 6 miles the conditions are repeated. The 6-mile platform has seats in which one rides with absolutely no stops. When the passenger wishes to get off he walks across the slow to the stationery platform, thereby stopping himself instead of the car. The ladies have no difficulty in stepping on to the platform after the first



MOVABLE SIDEWALK—PLATFORMS AND SEATS.

of business is not uniformly heavy throughout the day. As a means of transporting visitors about the fair grounds it seems to us an excellent one. The following is a brief and untechnical description of the system. First an endless platform with cross seats, moving at 6 miles an hour. This is carried on two rails each of which rests upon the periphery of a wheel running on an ordinary T rail track. By its side and barely overhung by the first is a second platform supported by beams which are an integral part of the truck of the wheels mentioned. A third or outside platform, slightly overhung by the second is stationary.

The principle of the 6-mile platform carried on the periphery of the wheel going forward at a speed of 3 miles an hour is nothing more nor less than the very old and simple law that the top of a moving wheel advances at exactly twice the speed at which the axle or hub goes forward. Hence the second or intermediate platform, the one directly carried by the axles, when moving at any given speed will advance just half as fast as the first plat-

attempt, and as in all new appliances the public will have to learn by experience, although the new experience will not be so costly as in the cases where damaging accidents can occur. The proverbial obstinacy of falling under the wheels is rendered impossible of display by this method, and no doubt the timidity of the feminine world will be overcome with great rapidity.

It is calculated with a 6-mile speed that by this endless belt method 40,000 people can pass a given point in an hour and as the speed is increased the number of passengers can be augmented indefinitely. In fact, its carrying capacity is more than any other device known.

The company now organized with Arnold P. Gilmore as president, O. Chanute as vice-president and Max E. Schmidt as secretary is merely a promotive one, and having bought the patents, grants rights to construct, the present test being their only effort. Messrs. Schmidt and J. L. Silsbee hold the patents, jointly.

As a method of solving the long-haul rapid transit problem this method seems to us inadequate, as the running of many miles into the residence districts would be very impracticable. The inventors, however, concede this difficulty and had in view the probabilities when devising the scheme.

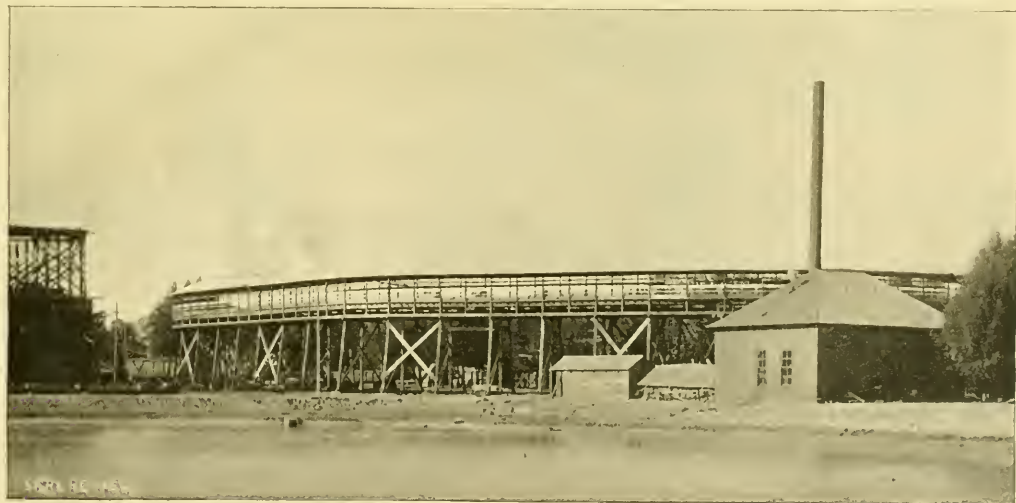
ing placed at the left or outside. The rails *a* are ordinary T pattern spiked to cross ties, and weigh 30 pounds per yard, and are set to 3-foot gauge. On these rails travel the wheels *b* which are 18 inches diameter, with 3-inch tread. These wheels carry a frame of 2¼-inch by 6¾-inch pine sills, of which *m* is one of the cross beams,



MOVABLE SIDEWALK—LOOKING NORTHWEST FROM WORLD'S FAIR GROUNDS.

It is amenable to the same criticism as a cable in that it is not practicable to run it backwards, but has the benefit of economy in power. When one seat moves all must move, when one stops, all must stop; while the cable system can economize by running fewer or more frequent trains, as the traffic demands. For short distances and great crowds it may be a grand success.

and which it will be noticed extends beyond the wheel for a distance of 28 inches, and supports a platform marked *s*. This walk or platform is 32 inches wide and being a part of the truck frame travels with it at whatever speed the wheels are driven. The post *j*, is 40 inches high, is made of gas pipe and is placed at intervals of every 12 feet for the use of any requiring such assistance in step-



MOVABLE SIDEWALK—POWER HOUSE AND STRUCTURE WITHIN WORLD'S FAIR GROUNDS.

The Columbian Movable Sidewalk, as the structure is termed, is an elliptical track, 900 feet long and elevated to a length of 25 feet to clear all surface roads and permit passage of teams and foot passengers to the World's Fair grounds. The cross section on this page is of the two movable walks or platforms only; the stationary one be-

ping from the stationary to the slow or intermediate platform to which the post is fastened. The sections *k* rest on the journals, carry the truck frame *m*, and also allow the necessary lateral motion in passing around curves.

To the casual observer this may not seem practicable, but the fact remains and the theory is good.

ENDLESS FLEXIBLE RAIL.

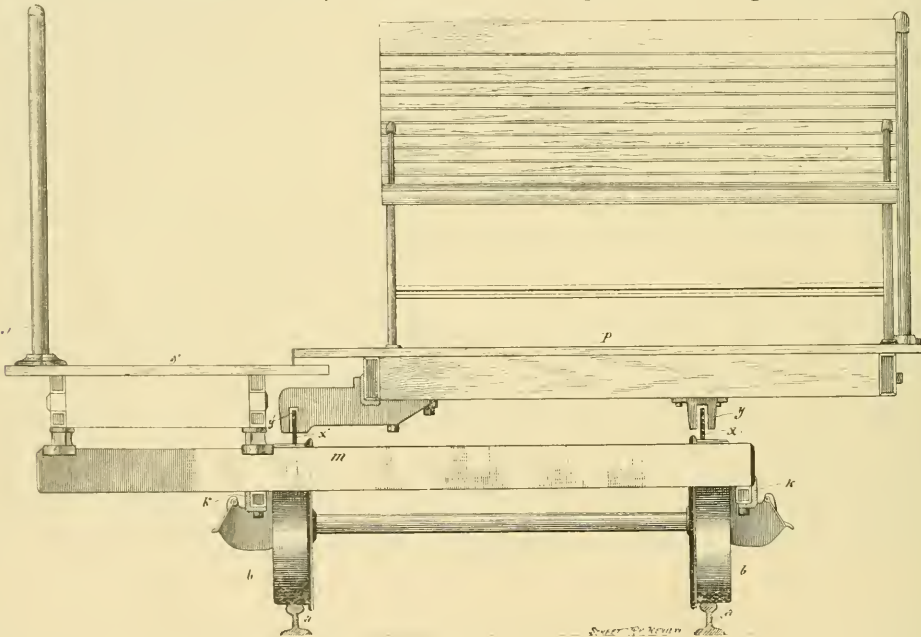
The principal feature of the invention is the application of the two flexible steel rails, *x*, which rest and ride upon the periphery of the wheels. These rails are 4 inches deep, $\frac{1}{2}$ -inch in thickness, and are made in lengths of 30 feet, which are joined to make one continuous, endless rail the entire length of the road, however long that may be. These rails are of rolled steel, and it may very properly be compared to a cable in this respect.

Other systems of movable sidewalks date back many years, but the credit of this application of the endless flexible rail belongs to the promoters of this system. The flexible rail weighs 20 pounds to the yard and is held loosely in a shoe or socket let into each cross beam. The weight of the platform whether loaded or empty presses upon this rail sufficiently to give the necessary friction to propel the load, and it is obvious that the greater the load

axles, of ordinary length and strength. The wheels are from the well known works of the Griffin Wheel and Foundry Company.

SEATS.

On the first platform *p*, are stationary cross seats 54 inches long, 36 inches high, and four of them are placed on each section of platform. They are open at the entrance side, and closed at the farther end by a guard rail of gas pipe as high as the seats. This guard rail which is fastened to the platform and consequently moves with it, has a strong wire netting from rail to floor. Where the sections are coupled, gates of strong canvas are substituted for the guard rail and wire, to allow lateral motion at curves,—the arrangement being quite similar to the bellows connection of vestibule steam cars. The canvas gates are 2 feet $5\frac{1}{2}$ inches long. The seats stand on iron legs, and the arrangement of seats and guards



CROSS SECTION OF TRUCK SHOWING FAST AND SLOW PLATFORM.

to carry forward, the necessary friction must always increase in the same ratio—pound for pound. The shoe, *y*, is $3\frac{3}{8}$ inches high, $1\frac{5}{8}$ inches wide and has a slot opening of $\frac{5}{8}$ inches to hold the rail, thus giving $\frac{1}{8}$ inch play to the rail to allow for lateral motion in rounding curves. The shoes are made of case hardened steel.

As above stated there was a feeling of apprehension that the flexible rail would not fulfill its function but the trial shows that the theory is good and the continuous band, of steel, goes gracefully, noiselessly and easily around a 75-foot radius curve, carrying with it its superimposed platform.

WHEELS.

The wheels *b*, are ordinary solid iron chilled wheels of 18 inch diameter, 3 inch tread with flange $\frac{3}{4}$ inch wide, and $\frac{5}{8}$ inch deep. The bore is 1 $\frac{5}{16}$ inches with steel

will be perfectly understood by reference to the cut on the first page of this article. Seats will comfortably contain from three to four persons, this seating capacity being dependent on the good nature as well as upon the diameter of the sitters.

TRUCKS AND PLATFORMS.

We come now to a side view of the trucks and platforms. Each separate platform is 12 feet long and connected with its predecessor and trailer by an ordinary pin coupling. The inside series or faster one is 6 feet wide over all, the middle or slower, 3 feet, and the stationary 5 feet $2\frac{1}{2}$ inches, and in one section, that of the length of the road. The wheel base is 5 feet 9 inches for trail sections and 6 feet 3 inches for motor sections.

The motive agency of the test road is electricity furnished by a Thomson-Houston generator of 107-horse-

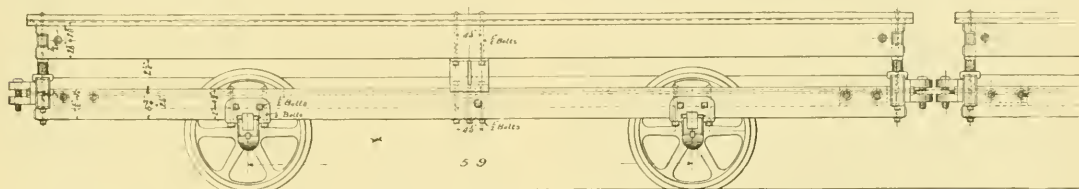
power at 500 volts. The generator is of the multipolar railway pattern and but 50 to 75-horse-power is sufficient to run the platforms at a speed of 5 or 6 miles per hour for the fastest and half that speed for the slower platform. An Ideal engine of a 125-horse-power capacity is the power used.

There are three trucks provided with two 15-horse-power double reduction Thomson-Houston motors used to transmit the power, and each handles consequently 25 platforms. The current is conveyed by a trolley wheel and pole from the feed-wire beneath the platform and a return current is secured by binding the steel rails together in the usual method. On the controlling station

to carry a half-dozen or even a single passenger. The small amount of power required, however, is a great point for the sidewalk.

For down-town business districts of many large cities it would seem to have a real field of usefulness, but beyond that its mission remains to be determined.

The principles involved in the moving platforms of the Schmidt-Silsbee patent are not exploited for the first time. Some twenty-five years ago a (now expired) patent was granted one Fitzgerald, an American, for a series of platforms carried on a moving rail, which rail was joined by chains at certain intervals, and on account of inflexibility was only capable of very long radius curves. No work-



SIDE ELEVATION OF SECTION OF TRAIL PLATFORM.

are found the necessary main switch, reversing switch and rheostats in easy reach, and by means of a circuit breaker in the station box shown to the left of the third figure, at a signal from push buttons at convenient intervals on the stationary platform, the sidewalk can be stopped instantly.

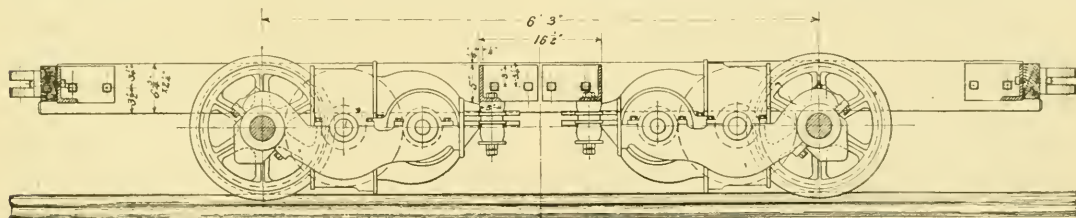
The maximum speed at which the test structure has been subjected to, is 18 miles per hour.

The weight of the track and platforms is 233 pounds per lineal foot when empty and about 350 when loaded. The horse-power estimate per mile run is 180 for transporting 40,000 passengers per hour.

Of course more platforms may be added by a simple process of gearing a larger wheel to the main axle from which power is furnished.

ing model, to our knowledge, was ever constructed. Two Germans have now in operation movable sidewalks of three platforms' width, running on separate tracks by cable power. The objections to this system is, however, the difficulty of adjusting the speed of the cables and the uneven surface of the platforms.

Several other schemes of like nature have been devised, the most important of which being the Munden patent. These patents granted to Munden, an Englishman, are dated February 11, 1890, number 421,186, and purporting to be a new method of traction. An examination of Munden's patent in no wise conflicts with the Schmidt-Silsbee device, although Mr. Munden has circularized the country pretty well to the contrary. The



SIDE ELEVATION OF SECTION OF MOTOR TRUCK PLATFORM.

Altogether the device is one to excite amazement in the crowd and to call the attention of thoughtful men.

As to cost of construction it is evidently vastly less than the present elevated railroad, as there is no heavy locomotive, nor end thrust from applying brakes. The construction complete, exclusive of power house and right of way, should in our judgement not cost much in excess of \$150,000 per single mile. As there are no stops, the system can safely operate with at least one-half the power which would be necessary in case of stops. Its operation is practically noiseless, there is no smoke nor dust; but labors under the misfortune of being obliged to move the entire system with capacity for thousands,

claims of the sliding railway are few, and it seems able to substantiate these claims while the principles involved are not new, but simply and practically applied.

THE Minneapolis Journal has the following: "The Chicago railways give gold medals to gripmen who make the best records for freedom from accident. They can't eat the medals, and as articles of dress they are not much protection against the cold."

All wrong and quite uncalled for. The prizes were not medals, but a one and two weeks' furlough with full pay; and while the boys "can't eat" the furlough or the pay, they find very acceptable uses for both.

ECHOES FROM PUGET SOUND.

(From our own correspondent.)

SEATTLE, Wash., Dec. 10th.

Electricity is to be put in as the motive power in the Commercial street motor line of this city, which has been in operation for over a year with steam. The road is 2½ miles long, running south of the city, but it will be extended for two blocks at this end to make a better connection with the other street railways. The contract for three closed electric cars and for the other equipment has been let to the Northwest Thompson-Houston Electric Company. Men are now busy making the change, and it is hoped that the new system can be put into operation by the first of January.

The Lake Washington branch of the Union Trunk Line has been completed, and is 2½ miles long. The system now has its ¾ of a mile cable track up the hill from the water front, and from the top of the hill three branches, one north, one south, and one east to Lake Washington. The greater part of the last branch was constructed over and which had to be cleared of heavy timber, and there are a number of deep cuts and big fills. The steepest grade is 9 per cent., and the rails weigh 56 pounds to the yard. The company will lay out a pretty park at the Lake Washington end extending 440 feet along the shore and 660 feet back. Fifteen pagodas will be built along the shore for family pic-nic parties, and a pretty little two story hotel with wide verandas. A boat house will be erected, and four electric launches, the first to be used on the Pacific coast, will be placed on the lake in May. Accordingly the Union Trunk Line will be a strong competitor for the traffic which now goes to the pleasure grounds at the Lake Washington end of the Yesler avenue cable and Madison avenue cable roads. The opening of the branch was the occasion of an excursion given to the city council, public officials and other leading citizens. There were several speeches, one by Fred E. Sander, one of the largest stockholders in the Trunk line. Seven new cars are being built, chiefly intended for summer service on the new branch. The total equipment of the company will then be fifteen cars. A contract has been closed with the Northwest Thompson-Houston Electric Company for \$60,000 of new equipment.

The cars for the Grant street electric railway are all finished and the motors have arrived. The tracklaying is also well on toward completion. Fred E. Sander, the president of the company, is just now in San Francisco.

Guy C. Phinney who owns the Woodland Park Electric Line, a feeder for the Seattle Consolidated system, has contracted with the Northwest Thompson-Houston Electric Company for two cars, one to be ready March 1st, and the other a few weeks later. In order to climb the steep grade of the road they will have 50-horse-power motors. The sides will be arranged so that they can be taken out and the car made an open one in summer. To insure perfect safety, hand-brake and foot-brakes will be provided.

A few days ago the street car employes of the city held a ball which was attended by 500 people.

Frederick Ledyard has secured a verdict against the West Street Electric Railroad for \$2500 damages. The defendants will endeavor to secure a new trial.

Mrs. Anna Sears has brought suit for \$25,000 damages against the Seattle Consolidated Street Railway Company. She claims that on September 16th she was riding on the Fremont branch, when the car ran into a wagon and she was thrown out. She claims that she was injured in her head and spine and is still confined to her bed.

B. T. Gillespie is suing the Front Street Cable Railway Company for \$1,775. He claims that the wheel of his wagon caught in a hole between the rails of the car track. As a result the horses ran away, the wagon was demolished, and he was severely injured.

Electric cars have replaced the steam motor on the Point Defiance road at Tacoma. Power is furnished by the Tacoma Railway & Motor Company. A 15-minute service is given. The Point Defiance Company has executed to Henry Wood, as trustee, a mortgage for \$50,000 on its franchise and rolling stock.

The Tacoma Railway & Motor Company has been petitioned to extend its lines to Wright avenue. Some truckmen oppose the proposition to allow the company to haul freight and material over its line at night. Hereafter the older employes will be allowed to select the hours of service performed by them. In November George A. Jennings, one of the conductors of the company, had his hip dislocated and his spine injured by being caught between the shed door and the side of a car that was coming out. Colin Morrison and C. W. Briggs, two motormen, were injured by falling into an opening near the power-house.

On November 13th the cars of the Olympia Street Railway Company were seized on an execution issued against the North Olympia Land Company, a corporation composed of Henry Drum and J. W. Thompson of Tacoma, and others, who own the street car line also. The cars were released on a replevin bond.

The Edison and the Thomson-Houston Electric Companies each have headquarters in Seattle, and are competing sharply for the trade in this region. W. G. Grambs, the local agent of the Edison Company, has issued the following challenge:

The Edison General Electric Company hereby challenges the Thomson-Houston Company to a competitive test of the efficiency and relative merits of their respective systems of single reduction motors, under similar conditions of load, speed and grade, etc., on the James Street Railway, each party to deposit \$500 with the Post-Intelligencer Company, the loser in this competition to authorize the Post-Intelligencer Company to deliver the amount of his deposit to the Woman's Aid Society or some other charitable institution of this city.

In accordance with above proposition Mr. Grambs has deposited a certified check for \$500 with the Post-Intelligencer.

FOREIGN FACTS.

A NEW electric tramway scheme in Switzerland is to connect St. Gallen, Speicher and Trogen.

THE Australian road, called the Don Caster & Box Hill Electric Tramway, will soon be re-opened under new management.

THE Rhouda & Swansea Bay Railway proposes to light with electricity a two-mile tunnel and also all passenger trains.

A NEW railway has been commenced to run from Nino Perdido to Coyoacan and the Pedrerar Quarries, Mexico. Electricity will probably be employed.

THE Revue de l'Electricite is the latest magazine of the kind in France, and makes the ninth of the kind although perhaps equal, technically, artistically the French papers are superior to the English.

MR. F. BROWN, of the Walsall Electric Company, has been appointed by the town council to advise as to the terms and conditions upon which the South Staffordshire Tramways Company shall be allowed to erect overhead wires and work their tramway through the borough.

THE Electrical Review of London in a recent number gave a description of the Thomson-Houston system used on the Roundhay Electric Tramway. The motorneers and all the machinery come from America and the magazine in question says that the road has a successful future before it.

THERE are at present only 29 lines of electric railway in the United Kingdom. There are four different systems. Five lines having a total length of $15\frac{1}{2}$ miles are worked on the third-rail system; storage batteries on $4\frac{1}{4}$ miles; three lines with overhead trolley with a mileage of $7\frac{1}{4}$ and the two-mile line at Blackpool is an open conduit system.

THE South-Eastern Metropolitan Tramway Company of London has recently let the contract of supplying horse service for the company's cars, to the large firm of Thomas Tilling, at a fixed rate of $6\frac{1}{4}$ d. per mile, with a minimum daily run of 60 miles per car. The company can terminate the contract and use mechanical power after seven years.

EVEN the most conservative Englishmen are becoming quickened on the subject of electric traction. The Wigan tramways, heretofore worked by steam power, are not a success. Mr. J. Waugh of Bradford advises electric traction to remedy the evil. A party of the owners of the Wigan road inspected the new Leeds tramways, reported favorably thereon and there is likely to be another electric line in Great Britain.

AN elevated tramway of electric motive power is to be constructed by Messrs. Siemens & Halske in Berlin. An underground system is impossible, a surface line imprac-

ticable, so that the elevated line is the last resort. The traffic will require a 1-minute service to transport 10,500,000 persons per annum. The estimated cost inclusive of stations is 1,500,000 marks per kilometer. This projected line will be supplemented with further lines.

THE Blackpool Tramway Company pays a dividend of $7\frac{1}{2}$ per cent. on its paid-up capital of £20,000. The figures put down for conduit, and for motor and gear repairs seem very reasonable, viz., £144 and £192. There are now 12 cars running, so that the latter figure comes out at only £16 per car, which is about 5 per cent. of their cost, and about $13\frac{1}{2}$ per cent. of the original cost of the complete electrical fittings.

A NEW subway electric line is proposed between Waterloo and London. The South-Western Company's engineer, Mr. Jacomb, estimates that the line will cost \$1,000,000 for construction, \$7,500,000 for property rights. The traffic will be mainly business men to and from their city employment, and the ride will occupy about 4 minutes with no intermediate stops. The road will have its terminus a few yards from the South London line and will connect with it by a short viaduct.

GERMAN ELECTRICAL COMPANIES AND THE FAIR.

HERR CARL VOGELE, of the firm of Siemens & Halske, of Charlottenberg, near Berlin, Germany is in conference with the Columbian Exhibition manager. Herr Vogele promised to spend \$225,000 in an exhibit, but asked for a special building 60x160 feet, wherein to display his goods. The committee could not grant this, but the department of electricity has offered the Germans 20,000 square feet in the display and 17,000 in the power house.

No American firm has thus far offered to make an equally splendid display.

A fine point of law is yet to be decided upon before further steps will be taken.

The American patent laws, it appears, protect the man who secures a patent in the use as well as the manufacturer and sale of the device which he has invented. Herr Vogele wants to know whether he can use as part of his exhibit the device on which he has secured a patent in Germany and which may be also patented in America.

The principles of electric traction as practiced in Germany will no doubt be well represented by this great firm, and American inventors and manufacturers should bestir themselves that no opportunity for comparison or criticism be lost.

OVER in Brussels they have a five-wheel car which possesses the ability to turn out of the tracks at will and pass around any obstruction on the track. When a man comes home late from the club and reaches for a car only to see it suddenly but gracefully circle around him, the impression must undoubtedly be that he has 'em bad.

COL. THOMAS LOWRY.

THE birthplace of Col. Lowry was Logan County, Ill., and the time of the event was February, 27th, 1843. Since that time a succession of successes, honors and emoluments have made the nearly half century of one man's life worthy to chronicle, and form a history of which Col. Lowry has the just right to be proud.

The earlier years of his life were spent near Rushville, in his native state, and where his education was mainly received, and his ability in legal affairs recognized to such an extent that the Supreme court deemed him worthy of admission to the Illinois bar on the 17th of May, 1867. Although the Illinois courts had scant opportunity to judge of his merits the Minneapolis legal fraternity found him a worthy brother in July of the same year. Here Col. Lowry practiced until called into a new field by his election as vice-president of the Minneapolis Street Railway Company in 1875. At that time this since flourishing road had but a problematical call for existence, but the admirable executive ability of the management seeing its capabilities as a property developer, started immediately to reach the goal of excellence which it attained some years ago and has steadily held since.

In 1878 Col. Lowry, then controlling stockholder, was elected president, which position he has held ever since. Col. Lowry has also been honored with the eighth presidency of the American Street Railway Association, which duty was discharged with his accustomed zeal.

To him more than any other one person, is the city of Minneapolis indebted, and few if any public measures within the past ten years but owes much of its success to his counsel and assistance. Foremost in everything that will advance the interest of the city, he has never hesitated to contribute liberally whenever opportunity offered. Indeed his hospitality and generosity are too well known to require even a passing mention.

He possesses in a remarkable degree that intuitive keenness which penetrates the development of the future and is instantly carried into results with an executive ability that is at once quick and positive. While possessing a keen sense of the humorous, he is warm hearted, and though insisting upon a firm discipline is held in high regard by every railway employe of the twin cities. He is also largely interested in steam roads, and president of the "Soo" line.

He was among the first to realize the future of Minneapolis when it was yet a city of 60,000, and his extensive purchases of farm properties and their conversion into city lots was at that time ridiculed. When in three years the profits of this venture netted something like a \$1,000,000, it was the Colonel who donned the genial smile which has characterized his countenance ever since.

As president of the street railway interests of Minneapolis and St. Paul, and the two connecting lines, he presides over one of the largest systems in the world. He was among the first to introduce electricity on an extensive scale, and at Buffalo in 1890, gave utterance to now historic words that "I believe this is the last convention

that will ever seriously consider horses for the operation of street railways." The prediction was fulfilled in the case of the twin cities several months ago, and to-day, a car drawn by animal power is an unknown quantity there.

Col. Lowry, now approaching the fiftieth milestone of life, possesses a splendid physique, and is acknowledged as one of the most handsome men among the street railway fraternity; and is a royal host as all know who have ever visited his magnificent residence,—one of the finest in the country. He also has a small farm of 1,700 acres in the great wheat belt where he amuses himself along agricultural lines.

The colonel loves a good story, and if the joke is on himself all the better. When he had been president of the road two or three years, one night all bundled up in a great coat, he boarded a bob-tail car, late on his last trip one stormy winter night. As he fumbled through one pocket after another, he was amused to find he was out of tickets, and had actually spent his last cent for that day. The driver kept rapping on the glass door and pointing into the fare box. Still the president of the road appeared unmindful.

Soon the car stopped,—driver entered and requested a contribution from the distinguished passenger,—who began:

"Well, I find myself without any small change, and,—
"And its getting off this car ye'll be doing."

"But" explained the passenger, "I'll pay you to-morrow, and,"—

"My orders is strict; if yez was the president of the road yez can't ride on this car without pay."

"But my good man, I am Tom Lowry, the president of this company."

"Divil a bit do I know about that," said the master of ceremonies,—"them's my orders,—pay or get off. If yez was St. Peter himself, it won't go on this car." It was no use, and finally the largest owner, and chief executive of the road got out and trudged along, breaking his own path in the blinding snow.

The colonel was a trifle late in getting down in the morning, and his first order was to call in the driver of the night before. When the poor fellow entered the room and recognized his fellow passenger, he thought his time had come, and so it had, for the Colonel put a ten dollar gold piece in Pat's hand and without a single word, crooked his thumb in the direction of the door; and the cash records from that car for the next six months went quite a way toward the extra dividend which was soon declared.

THE Braddock, Pa., electric railway, for the purpose of educating the public up to a constant use of the cars, have placed on sale annual tickets, at \$25 each, which entitle the owner to ride as many times a day as desired.

THE Augusta Chronicle publishes a very neat pamphlet setting forth the beauties and advantages of the electric city not neglecting in the first category the face of the genial manager of the Augusta Electric Railway, Col. Daniel Burns Dyer.



THOMAS LOWRY,

President Minneapolis & St. Paul Street Railway Companies

A MOTOR OPERATING AUTOMATICALLY AT ANY DESIRED SPEED OR TORQUE AND WITH MAXIMUM EFFICIENCY UNDER ALL CONDITIONS.

BY H. WARD LEONARD.

IN the operation of electric motors there are three principal factors to be considered, the speed, the torque and the efficiency. Under any variations in power the efficiency should remain as nearly constant as possible. For one class of work it is desirable to keep the speed constant when the torque varies. For a second class of work it is desirable to keep the torque constant at one particular amount when the speed varies. For a third class it is desirable to operate at many different speeds, and yet automatically at any particular speed desired regardless of the torque. For a fourth class it is desirable to operate at many different torques and yet automatically at any desired torque regardless of the speed; and for a fifth kind it is desirable to keep the amount of power supplied constant, regardless of change in torque, that is, so that if the torque changes by the requirements of practice, the speed would automatically change so that the power consumed would remain constant.

The shunt-wound motor, operating on a constant potential circuit, is well adapted to the first class of work mentioned, where but one fixed speed is desired, practically regardless of the torque and with a practically constant efficiency.

The second class of work mentioned, having one particular constant torque and a speed variable at will, cannot be performed by existing electric motors without great sacrifice of efficiency. In this class of work we find hoists lifting a constant weight, certain printing presses, swing bridges, stamp mills, pumps, etc; that is, such work as requires that we should start up from this dead rest with full torque and run at any desired speed with the same torque and with perfect efficiency,

The third and fourth classes of work are more common than would at first appear evident, but since neither the steam engine nor the water-wheel can be operated under conditions where both speed and torque will vary, and where the speed or torque can be held automatically fixed at any point desired, regardless of variation of the other, we do not find work of this kind existing in such shape as to be operated by an electric motor instead of some other power. Nor has the electric motor been available for such duty heretofore. A familiar instance of the third kind of work is met with in the printing of fabrics, where the presses have a large number of rolls upon which the torque depends, and the speed of the presses must be varied as desired, and yet at any given speed must hold that speed constantly, regardless of the number of rolls set down, that is, regardless of the torque. Similarly, lathes, drill presses, wood-working machinery, etc., belong to this class. Certain variations in the speed are possible by existing methods by the use of cone pulleys and equivalent devices, but no motor of any kind has heretofore existed which, directly applied, would conform to the requirements of this kind of work.

The fourth kind of work has, as a familiar example, the passenger elevator, where the weight, and consequently, the torque is variable, and where at any torque the speed should be controllable at will, with constant efficiency. Another example is the pumping of water against a variable pressure with the speed controllable at will, and independent of the pressure. This result is not obtained directly by any motor to-day.

The fifth class of work, where the speed is automatically varied to keep the power consumed constant, no matter how the torque varies, is not met with in practice as far as I know, yet oftentimes we may have a constant source of power from which we wish to get a torque variable to the requirements of a variable load and do not care particularly about the speed. An electric street railway operated by water power is a familiar example of this class of work.

It will be seen from the above that of the five principal classes of work there is only one, namely, constant speed and variable torque, which we can take care of with reasonable efficiency and from our existing supply circuits.

It is well known that when a street car is first started and is scarcely in motion the actual power represented by such motion is almost nothing, for, although the pounds pull is large, the feet per minute is extremely small; consequently the power required must be exceedingly small. What do we find in practice? We find that in order to develop a power of but a fraction of a horse-power we must, on account of the slow speed demanded, develop about 30 horse-power, and then waste about 98 per cent. of this horse-power in order to utilize the remaining 2 per cent. in the way it is desired. The efficiency of the modern electric street car is not probably more than 2 per cent when just starting from dead rest and moving at the rate of one-half foot per second.

When we come to investigate this, we find that the explanation is that in order to get the necessary large torque with freedom from excessive sparking, we must have a very large current in a nearly constant field; and since our E. M. F. is constant we must use an amount of power which will vary almost directly with the torque, and will be regardless of the speed. Or, in other words, the efficiency of the motor will vary directly as the speed with an efficiency of perhaps 80 per cent. at full speed.

As a result of my investigation of this subject I have concluded that the operation of electric motors should conform to what apparently is a new law, and which may be stated as follows:

Vary the voltage as the speed desired.

Vary the amperes as the torque required.

In other words, make the speed dependent upon the voltage only and independent of the current, and make the torque dependent upon the current only, and independent of the voltage. Since the product of the speed and torque represents the work being done, and the prod-

uct of the volts and amperes represents the power supplied, it is evident that if we can operate in conformity to this law, we shall have a constant efficiency under all conditions, disregarding, of course, the small fixed losses in the field and armature.

One way in which this law can be followed is to supply the field of the motor from one source of electric energy and supply the armature from another source, the E. M. F. of which can be varied. It will be noticed that when the speed is fixed a fixed voltage will be necessary in order to conform to the law, and the shunt motor is found to conform perfectly to the law; but is the only motor I know of which does conform to the law which seems to be generally applicable.

A simple case will be the operation of a printing press for printing fabrics. Suppose the press has 10 rolls, that is, the torque will vary from 1 to 10 in amount. Suppose also that it must be run at any speed from that represented by 1 to that represented by 20, and at any speed it must hold its speed constantly, whether 1 or 10, or any intermediate number of rolls be brought into use. Also that the efficiency must be independent of the speed of torque. In order to conform to the law in a simple way, we will install a generator and motor of the same size, and connect their armatures by two conductors. We will supply their fields from a small separate exciter in the shape of a shunt-wound dynamo. In the circuit leading to the field of the generator we will place a rheostat. If now we drive our generator at a constant speed, the E. M. F. it will produce will depend upon its field, which in turn will depend upon the amount of resistance in the rheostat in its field circuits. The strength of the motor field is constant, being supplied by the constant E. M. F. exciter. Now, evidently the speed of the motor will depend solely upon the E. M. F. supplied to its brushes, and this can be varied from 0 to the maximum limit by varying the rheostat, which will preferably be placed beside the motor itself. The current will automatically vary in proportion to the torque, the speed will vary directly as the voltage and the efficiency will be constant and independent of the speed or torque.

If we wish to operate an elevator from central station conductors of constant E. M. F., we supply a shunt-wound motor mechanically connected directly with a generator whose armature is connected to the armature of the elevator motor. The field of the generator is supplied from the central station conductors, but a loop goes up to the elevator car, where a rheostat and reversing switch is placed, so that E. M. F. of the generator can be varied and reversed at will. The field of the elevator motor is excited from the line constantly.

It will be evident that we can control the elevator perfectly from the car and run in either direction, at any desired speed, and with perfect efficiency. It is worthy of notice that the non-sparking point is entirely independent of the speed, and that for any particular weight the non-sparking point is absolutely fixed and independent of the power used. Also that, since the maximum weight alone determines the maximum amperes, it will be impos-

sible to send more than the normal full load in amperes through the armature; consequently the liability of burning out of armatures is reduced to a minimum. The elevator in coming down generates current to assist the central station, and since the efficiency is practically constant under all conditions, and since as many foot-pounds of work are done by the elevator in descending as it requires in ascending, the consumer will in reality pay only for the energy wasted in charging the fields, in heating the armatures, and that represented by the friction of the gearing, which will be the least possible. The starting up of the elevator requires a minimum of power, and hence does not subject the central station to large, sudden fluctuations of load.

Suppose we want to operate a swing bridge by an electric motor. We connect as in the case of a printing press, but instead of a hand-field rheostat we use an automatic field rheostat, such as is used by the Edison company. We place an amperemeter in the armature circuit of our motor, and when the amperemeter needle indicates full load it touches a contact leading to the relay magnets of the automatic rheostat, which causes it to throw in resistance in the field circuit of the generator and reduces its E. M. F. Similarly, just below full load, the amperemeter needle makes contact, closing a circuit in the automatic rheostat so as to throw out resistance and raise the E. M. F. of the generator.

To start up the bridge we insert all of our resistance in the field of the generator and have, let us say, no volts. Now we close the main-line switch to the motor; we will have no current; hence the amperemeter needle will be on the lower contact, which will gradually throw out resistance and cause the generator to generate an E. M. F. The current will increase and will finally cause the needle to leave the lower contact. The full torque is now being developed and the bridge, if the motor be of proper size, will start to move. As it does so, the counter E. M. F. of the motor will tend to reduce the current, but this will cause the needle to again make the lower contact and raise the E. M. F. and speed and hold the current and torque constant.

Thus, the bridge will start from rest with a minimum of power but full torque, and will gradually accelerate in speed until the full E. M. F. and speed of the motor is reached. To vary the speed by hand we merely move the amperemeter needle to make either contact desired. In case the bridge should meet an obstruction which would slow it down, the amperes would not increase, but would remain constant, as the volts would be immediately and automatically reduced to just that amount necessary to keep the amperes constant. With this arrangement it will be practically impossible to overload the motor armature.

Another good application of this method of keeping the torque constant will be in any case where a tool is cutting certain material which may vary in hardness or when the feed may vary. If the torque be kept constant it will be impossible to break the cutting tool or injure the apparatus. An electric coal-cutter is a case in point.

The cutter may be advancing through slate, fire clay or coal and occasionally it will meet a layer of hard iron pyrites, known in the mines as "sulphur." This may stop the cutter-bar entirely, and with an ordinary or series or shunt motor the result would probably be a burnt-out armature. With the system I have described the current would be constant in any event and the cutter would automatically go faster in soft material and slower in hard material.

In pumping by an electric motor operated on this system the head alone determines the torque, and hence the current. Consequently, for any lift the non-sparking point will be fixed and the number of strokes per minute can be controlled at will from 0 up to the maximum by varying the volts.

For operating an electric railway we will place a shunt-wound motor on the car, and directly driven by this motor will be a special generator, which will be connected to the electric motor below the car. It is evident that the generator and working motor armatures may be wound for any voltage desired, say 20 volts, which will make the problem of insulating the street car motor an extremely simple one. If desirable, we can supply several cars of a common train from one special generator on the forward car. With this outfit we will be able to take any car up any practicable grade or around any curve with no more power than is required to move the car on a level, and always consume the same power, regardless of weight, grades or curves. That is, the automatic increase of current, to take care of any increased torque, will be compensated for by a corresponding decrease in the volts and speed. We may start a car up on any grade or curve with but a small fraction of the power required for normal speed on a level.

I wish to call attention to a very important development leading out from this, namely, that we will be able to use alternating currents for operating our street cars, for it is well known that the ordinary alternating current generators will operate perfectly as motors, if the speed and torque be kept constant. Since by this system we can, from a constant torque and speed, get any other torque and, automatically, a corresponding speed, we shall be able to run street cars perfectly by alternating currents. This again will enable us to dispense with trolleys, conduits, storage batteries, etc. We will place between our tracks, in manholes, converters whose primary pressure can be anything required for proper economy and whose secondary will be, say, 15 volts. This secondary circuit will connect directly with the rails. The road will be divided in sections, each a few hundred feet long, and each section will be supplied by its own converter.

This system also lends itself very readily to the transmission of power. We may transmit by alternating currents, and the alternating current motor running at a constant speed and at a nearly constant torque will drive special generators to operate hoists, pumps, locomotives, etc., at the varying torques and speeds demanded by practice, and yet without subjecting the alternating-current motor to a sudden or wide fluctuation in its torque and

without any necessity of varying its speed. With this system of operating electric motors there seems to be no work met with in practice which cannot be perfectly performed.

On first consideration, the additional apparatus necessary would seem to make the system prohibitory in practice; but the capacity of the present single motor is greater than the combined capacity of the apparatus this system would require, and the capacity of the prime motor is very much reduced.

In order to reduce the first cost to a minimum and yet secure the advantages of different automatic speeds and high efficiency, I have devised two modifications of the arrangement described above. The first is adapted to power in which a smooth, efficient acceleration of a load from rest is required, as in the case of passenger locomotives and elevators. The second case is where various automatic speeds are desired, but no special importance attaches to the starting of the load from rest, as is the case in machinery in general.

For the first case we have the trolley system of electric street cars as the most important. Let us suppose we have two motors of 15 horse-power each for the car. We find that for full speed upon a level we require about 15 amperes at 500 volts. Upon heavy grades we find that about 50 amperes are required, and, as before, we have 500 volts. With this consumption of energy we find that we get a speed upon the heavy grade which is about one-quarter of the speed upon a level. In order to operate upon my system, let us place upon the car a motor generator, the motor part of which is wound for 500 volts and $12\frac{1}{2}$ amperes and the generator part of which is wound for 125 volts and 50 amperes. The fields of the motor and generator part are distinct and are wound for 500 volts, as are the fields of the two propelling motors, under the car. All these fields are supplied from the 500 volt trolley circuit. In the field of the auxiliary generator is placed a rheostat.

Now, suppose the car at rest upon a grade. The motor generator is running, but the generator has a very weak field. Its armature is connected by a controlling switch to the propelling motors. We now gradually cut out resistance from the generator field circuit and finally get about 20 volts at the brushes of the generator. With this E. M. F. we get sufficient current to produce 50 amperes through the armatures of the propelling motors in a saturated field. This gives us the full torque and the car starts at a speed of perhaps half a foot a second. This speed can be maintained constantly and indefinitely and the consumption of energy will be less than 2 horse-power. This is less than 3 amperes from the trolley line. In practice, however, the speed will be rapidly but gradually accelerated until we have 125 volts upon the terminals of the propelling motors. We will now be running at one-quarter speed and will be consuming 125 volts and 50 amperes, that is $6\frac{1}{4}$ K. W. instead of 25 K. W. to get the same result with existing motors. To put it another way, we will not be using as much energy as is represented by the 500 volts and 15 amperes necessary for full speed on a level.

The next step on the controlling switch will disconnect the armature of the propelling motors from the auxiliary generator and put the two armatures in series across the trolley line direct. We will now go at a speed represented by 250 volts; that is, one-half full speed. The next step of our switch will place the two armatures in multiple across the 500 volts, and the next and last step will place the 120 volt auxiliary generator in series with the main central station generators and give us 625 volts on our armatures and a correspondingly increased speed. We will be able to go up a grade of 6 to 8 per cent. at full speed, with 50 amperes and 500 volts, which, with the present motors, gives us only about one-quarter of that speed.

Under this arrangement it will be noticed that the only apparatus which could be called additional is the small motor of 500 volts for the generator part of our motor generator, which is useful not only for starting, but for full speed also. In stopping the car we have an electric brake action delivering back energy to the line at full efficiency and not through a rheostat, as at present.

If we have a train of, say, three cars, so that we have six motors, we can start from rest with sufficient smoothness by placing all six armatures in series, which will give us something less than one-sixth speed as the first step. Then we can place three in series with two multiples, which gives us one-third speed. Next, two in series with three multiples, which gives us one-half speed; and finally all in multiple, which gives us full speed. Under such conditions, we can dispense with the small converting plant altogether.

For an elevator requiring, say, 15-horse-power we will put in a motor generator of 3-horse-power with which we will control the starting and stopping and the operation up to one-fifth of full speed. Then for full speed we will connect direct to the line and operate without any conversion of energy.

For power in which smoothness of motion in starting and stopping is not essential I have devised a new system of distribution as follows: Three dynamos, all having the same current capacity and having voltages of 62½, 125 and 250 respectively, are placed in series and from conductors led off in multiple one from each terminal of the machines. These conductors will have potentials which can be represented by 0, 62½, 187½ and 437½. Let us now take a shunt-wound motor, and disconnecting the field from the armature circuit, excite the field from the outside two of the four conductors, that is, by an E. M. F. of 437½ volts. By connecting the armature terminals to the four conductors in various ways we shall be able to operate in either direction at six different automatic speeds represented by the following voltages: 62½, 125, 187½, 250, 275, 437½. By varying the field strength of the motor we can, if required, get any intermediate speed.

In many cases two dynamos will answer, one of, say, 110 volts already in use for incandescent lighting, and a second of, say, 30 volts. With this arrangement we could run in either direction and with automatic speeds represented by 30, 110 and 140.

With the four-wire, six-voltage system of distribution in a shop we can take out all countershafting, belting, pulleys and gears, if desired, and place a motor upon every tool, which we can operate in either direction at any automatic speed desired. Lathes, planers and all tools can be perfectly operated, and by getting rid of all countershafts and belts we can introduce the greatest of modern tools, the traveling crane, which we will also operate from our general system. We can also readily operate ventilating fans, hoists, elevators and factory tramways from the system.

The addition of one dynamo and one new conductor to any existing three-wire system will probably give all the flexibility required to meet practical conditions of varying speeds. For the alternating system a synchronous motor driving our three continuous-current generators will give us the four-wire system in any distant factory or town. For 500-volt street railway circuits a small motor generator plant for the slow speeds and a direct connection for full speeds will give us perfect results. For storage battery work we have the most perfect condition, as we can get any E. M. F. desired, with a corresponding speed while keeping the field separately excited.

Now, that we have the rotary field at command, I think I may safely assert that the time is not far distant when we shall have transformers which will, without motion, convert an alternating current in the primary into a continuous in the secondary; and this seems to me to be the ideal system of the future, that is, one in which energy will be transmitted by alternating currents of constant E. M. F. transformed without motion into continuous currents for use at the translating devices and used where motors are concerned, in conformity with the law of efficiency for motors:

Vary the voltage as the speed desired; vary the amperes as the torque required.

SIoux CITY SAYINGS.

SIoux CITY can now boast the only cable road in the dominion of Governor Boies. The hilly contour of this portion of the Missouri valley makes cable traction peculiarly applicable and to the energy and foresight of the following prominent men belongs the honor mentioned: John Peirce, D. T. Hedges, W. V. Hedges, P. Moller, Chrys Moller, Maris Peirce. Chrys Moller, superintendent.

The officers of the company are: President, John Peirce; secretary, D. T. Hedges; treasurer, W. V. Hedges.

The length of the cable, including the extension now in process of construction is nine miles. The rail is of the well-known Johnson make and fifty-pound girder by variety.

The management has very flattering hopes of success and the "busiest city in Iowa" will have cable lines in keeping with its progress in other things.

May the Sioux City Cable be the precursor of other lines along the bluffs of the Missouri valley.

INCLINED PLANE RAILWAY IN DULUTH.

Longest in the World—A Splendid Achievement of Engineering Skill—Ascent of 512 Feet—
Various Safety Devices.

AWAY to the north, at the head of Lake Superior, that greatest of the "unsalted seas," whose giant waves dash ceaselessly upon a shore of hardest granite, snugly sheltered beneath the great bluffs lies the pretty city of Duluth, whose commercial interests during the past few years have developed with a progress that has commanded the astonishment of the whole country, and whose fame even is known far across the oceans. In its superb harbor fleets of great steamers rivaling in size many an ocean craft, are constantly loading with the products of a boundless farming country reaching far beyond the Rockies, or discharging cargoes

from the brow of the bluffs is a rich and gently rolling plain, but which thus far has been practically inaccessible for residence purposes. The available land had either been occupied or become so valuable that the poor man could no longer afford a home.

These then are the conditions which has led to the construction of the Duluth Inclined Plane Railway on which the finishing touches have just been placed, and the road opened for daily business on December 1st. This line is perhaps the longest, strongest and most complete incline railway in the world, and was built at an expenditure,—including right of way,—of nearly \$250,000.



DULUTH INCLINED PLANE—POWER HOUSE.

of coal and merchandise. The ore mined in the state is alone sufficient to insure a large shipping interest, and requires a big fleet of steamers and sailers during the entire period of navigation. The invention and manufacture of "whaleback" tows has also given much prominence to Duluth, and the ten railroad lines entering the city all do a heavy freight business. The city is built from the water's edge upon a long and gently rising narrow strip from one-fourth to one-half mile in width, which extends along the shore for several miles, backing up against an abruptly rising granite cliff, which, at a distance of only twelve blocks from the water's edge, rises to a height of over 500 feet, and which affords but few accessible points of ascent. As long as the level along the water was unoccupied, business blocks and residences filled in rapidly and solidly. Stretching back for miles

The movement was backed by some of the leading business men, who associated themselves together, purchased large tracts of land back of the bluff and by providing guarantees, etc., induced the Duluth Street Railway Company to build the Seventh Avenue Incline. Of course, the hope of private gain was not lacking in the inauguration of this enterprise, but a public-spirited desire to aid in upbuilding the city was the primary object of the move.

Actual construction on the Incline began about eighteen months ago and on Tuesday, December 1st, the cars began making regular trips for the accommodation of passengers, the machinery having been subjected to severe tests daily during the past three weeks.

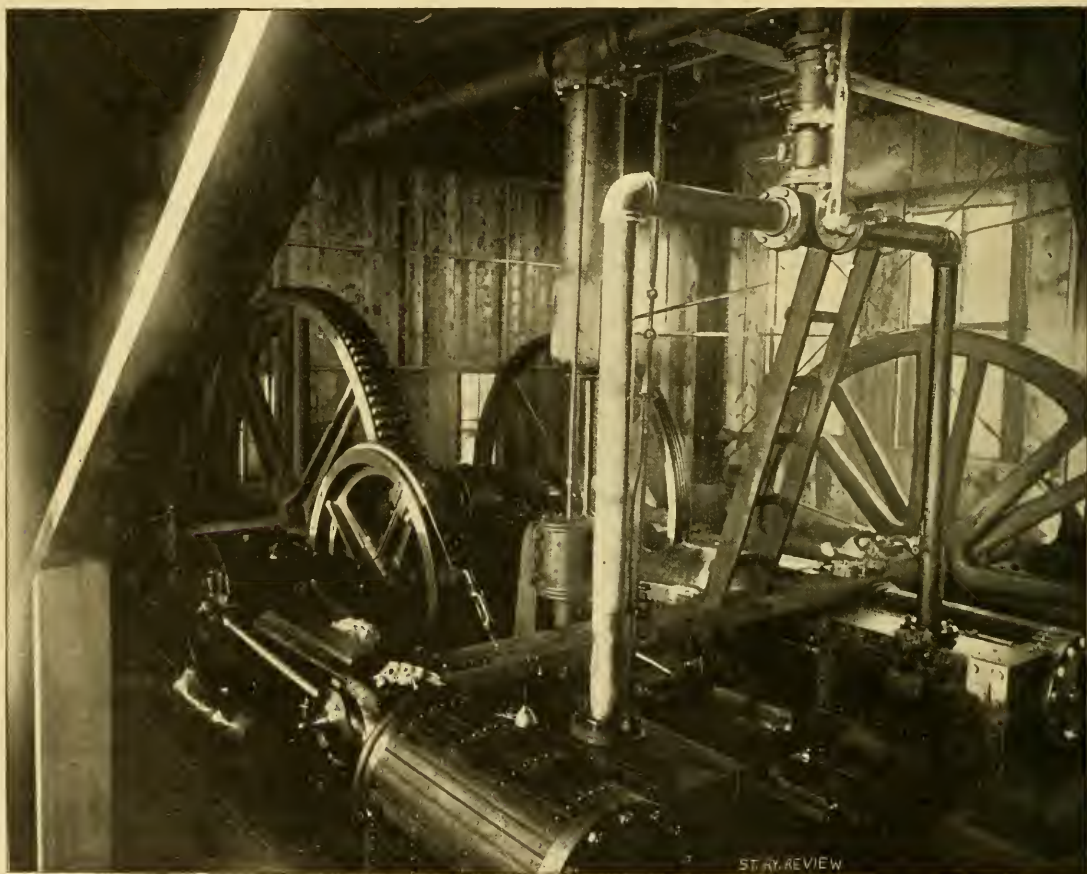
The structure has a total length of 2,975 feet and the total rise is 512 feet, with a percentage of grade as fol-

lows: Heaviest, 23.47; next, 17; lightest 15. The next largest street incline road in the world is the Knoxville, at Allegheny, which is 2,640 feet long and has a rise of 375 feet. The Duluth incline is a very heavily built road and in that respect is not surpassed by any other in the country. Foundations for supporting pillars are composed of solid granite, while the beds for much the greater portion of these foundations were blasted out of solid granite, the whole stone work costing \$32,000. Supporting posts are about 2 feet square at the base, taper toward the top and are constructed of angle iron of $\frac{5}{8}$ thickness. The main girders, of which there are three—one on either

and the other being so arranged that three teams with loads can be taken up at one time. The cars travel at the rate of 8 miles per hour and it is the intention to consume five minutes in each trip, though trips have already been made in three minutes and twenty seconds. Cost of equipment, \$8,100.

All machinery is on the latest improved plans and of most substantial character. The engines were manufactured by a home concern—the Iron Bay Manufacturing Company, of West Duluth. There are two, with 250 horse power capacity, and cylinders 18 x 24.

As in the operation of a road of this character, the



INTERIOR VIEW—POWER HOUSE DULUTH INCLINED PLANE RAILWAY.

side and one between the tracks—are 4 feet in width and $\frac{5}{8}$ inch thick. All braces are of $\frac{3}{8}$ inch steel. The sills are 10 inches square, constructed of $\frac{5}{8}$ inch iron. Oak ties and standard railroad steel rails, weighing 60 pounds to the yard, are used. The gauge of the track is 10 feet. Iron work on the incline proper cost \$112,000 and was constructed under the supervision of Engineer-in-Chief Samuel Diescher, of Pittsburg.

There are two cars, each 40 feet long and weighing 25 tons. They are constructed of angle iron and will safely carry 30 tons, one side being petitioned off for passengers

steam supply is of more than ordinary vital importance, selection of the boilers was made with unusual care, and resulted in the purchase of Babcock & Wilcox boilers, with a capacity of 280 horse power. The road operates nicely with 75 pounds of steam.

Water for the boilers is supplied through a Baragwanath water heater, manufactured by the Pacific Boiler Works, of Chicago.

The main shaft is twelve inches in diameter and on this is set the main gear wheel, which is fourteen feet in diameter. The driving shaft is ten inches in diameter

and the pinion wheel thirty-two inches in diameter. John Robeling's Sons Co., of Trenton, N. J., manufactured the cables, of which there are two, each of 1½ inch steel, tested at 200 tons. The main cable is operated by two driving drums, each twelve feet in diameter, and from these the cable passes around two sheaves, one of which is connected with a hydraulic tension cylinder six feet long and eight inches in diameter, manufactured by the Buffalo Pump Company, of Buffalo. When the cars are within about three feet of either end of the line the engines are stopped, then the hydraulic cylinder is brought into play, which tightens up the cables and the cars reach the abutments. The force of the concussion of cars and abutments being broken by two air cushions, with which each car is equipped, and the cars stop easily and smoothly, without the slightest jar. The second cable acts entirely independent of the engines, travels over four sheaves located in a safety frame, and is simply used as one of five excellent appliances, which insure the safety of passengers. The engines are equipped first, with a safety valve and, second, with what is known as a butterfly valve. Next there is a Westinghouse air brake, which clamps a brake band on a six-foot wheel, set on the driving shaft, as shown in the illustration. The setting of this brake will stop the engines when the throttle is wide open. Should all these contrivances fail to stop the machinery the engineer can set by hand an equally powerful brake on the safety cable sheave, so that there is really no possibility of a runaway unless both cables should break at once, and this is a possibility too remote to be considered for a moment. Engines, machinery and boilers cost \$36,000.

The power-house is a substantial two-story structure, located at the top of the line, is 28x100 feet in size, the first story being constructed of stone and the second of frame, with corrugated iron covering and surmounted by an observatory platform, the whole costing \$17,000. Right-of-way for the line and incidental expenses amounted to \$35,000.

The duty of making all contracts and arranging the practical details of the building of this structure fell upon F. S. Wardwell, general manager of the Duluth Street Railway Company, who was recently elevated to this position after serving the company for several years as superintendent, and to his constant watchfulness and untiring zeal is due in a large degree the speedy construction of the road and its successful inauguration.

WILLIAMSPORT IMPROVEMENT.

THE Williamsport Passenger Railway Company, of Williamsport, Penn., commenced last May to change its motive power from animal to electric power. The road had 5½ miles of center bearing rail, with nine one-horse cars in operation. Four miles have been replaced and two miles of new double track laid with 60 pound girder rail. The equipment consists of ten, 16-foot cars with McGuire trucks and Westinghouse Single Reduction Motors, the power being furnished by the same

company's make of generators. The overhead construction was carefully done, regardless of cost, to remove any municipal objection that might be made. Four cars were put in operation on the 6th of August and four additional cars on the 15th of November. The road will be extended 1½ miles further to a suburb this winter and some three or four miles additional track laid early in the spring.

The officers are: H. R. Rhoads, president; John Lawshe, treasurer; J. F. Starr, secretary; H. C. Young, superintendent, and directors: H. C. Parsons, C. L. Munson, Jno. R. T. Ryan, Wm. Emery, H. W. White.

Thus another road comes into line and the occupation of the faithful mule, like that of Othello, has departed.

The management avers that stationary gross receipts and the caustic remarks of the walking public, "compelled the change, and that all bob-tail cars are now for sale."

The electric equipment is most complete and will bear description.



WILLIAMSPORT POWER HOUSE.

In the construction of the overhead line, due consideration was paid to liability of leakage, by introducing additional insulation in the span wires, between poles and bells, and a method of staying was adopted which prevents, in case of a break in the trolley-wire, ill results from the accident extending beyond curves or further than five hundred feet on straight lines.

To economize current and to reduce to a minimum, interference with telephone circuits, the return circuit to the ground was thoroughly made by an improvement on the Sabold system, driving galvanized iron pipe, seven feet long, every fifteen feet and connecting them to the centre of one and the bond-wire of the other rail.

Electric heaters, smooth tracks and noiseless motors make the cars pleasant traveling these cold days.

Sheds capable of holding fifteen cars, have been erected but extensions will be necessary by next year.

Altogether, the management, the public and the mule welcome the electric car.

PORTLAND POINTERS.

(From our special correspondent)

PORTLAND, ORE., December 9, 1891.

THE City & Suburban Railway Company has a force of 175 men working on their track, bonding and putting in extra ties. The Morrison street line will be double tracked and extending out Eighteenth street to G and down to Twenty-first street. The wire is all on hand and work of putting up the trolley wire will be commenced shortly. Third and Morrison streets will be a transfer point from all their cars, and the company expects to have its offices in that vicinity.

The Multnomah Street Railway Company has seven new cars on the way for their line this winter. It is proposed to build from Willamette Heights down the river, a distance of three miles, the coming summer.

The Metropolitan Railway Company is having some cars built by the Columbia Car Works here, and a couple are also being built for the Sound. The cars are eight wheelers, with combination bodies, and 36-inch wheel. One of them is doing service for the Mt. Tabor Street Railway Company.

A rumor is current that the Portland Street Railway line has been sold for \$45,000 and will be converted into a cable, seeking an entrance into City Park from the southern terminus. This road is a single track and operated by horse cars, and the electric competition has completely paralyzed it.

The Mt. Tabor Street Railway Company has already begun building a new power house on the East Side. Saw dust will be used as fuel, as it is built in connection with a large saw mill.

The Union Power Company has been putting in some new dynamos. They were unfortunate a short time ago to burn out an armature, and not having a second machine ready, were compelled to tie up the Multnomah line a few minutes before 6 o'clock for the remainder of the evening.

The St. Johns and Mt. Tabor divisions of the City & Suburban have been putting their steam motors through a course of overhauling in their shops.

The Portland and Vancouver Railway Company will soon discontinue the use of their steam motors and use the Patton Motor. D. P. Thompson, a heavy stockholder, has just returned from Chicago and is very enthusiastic about it. A number of street railway men of this city who have seen one of the Patton Motors on the tracks at Pullman in Chicago, are watching it with a great deal of interest.

The house-movers and electric companies are having a hard fight in the council for their rights. As it stands now, an old shack of a house, not worth more than \$100, can be moved for blocks along an electric line, the wires cut, and the street railway companies have the expense of replacing wire as well as, in some cases, of stopping travel. The street railways hope to have a share in the say of who shall dictate to their roads in these cases.

The Mt. Tabor and Eastern, an extension of the City & Suburban line from Mt. Tabor, has fallen through with and the hope of it being built is small. This company is now operating four suburban lines, from three and one half miles in length, to nine miles, and seems to have come to the conclusion that the future is too long distant to do any more suburban business without some travel in return. Street railways have done more to build up and develop the East Side than anything else, but running an electric line for two or three miles through the woods, seems to have lost its charms with street railway managers here for the present.

JERSEY CITY'S RAPID TRANSIT.

THE Jersey City & Bergen Railroad Company has submitted to the authorities plans for the extension of the electric line from Varick street to the Ferry. President Thurston promises to use street poles twenty-two feet above and six below the surface. The span wire will be No. 5 galvanized and the trolley will be 3/8-inch hard drawn copper. To protect the public and ease the conscience of the very tender city fathers, the company promises never to use more than 500 volts, "which," says the local press, "has never been known to injure a human being, though the full voltage be taken."

The ordinary convenience of a cut off is contemplated and the utmost pains have been taken to instruct the public in matters electrical and relieve the silly prejudice against overhead wires.

The company will erect its plant on Grand street and its missionary endeavor to calm the public apprehension has the sympathy of the fraternity.

Chancellor McGill has granted the company a permanent injunction restraining the city from interfering with the work of furnishing rapid transit by the trolley electric system.

NEW WATER POWER.

AT Austin, Texas, the Colorado river is to be utilized to secure power for electric lighting purposes, and the surplus will generate the necessary lighting for electric railways and power plants. The dam at the river will be 1,150 feet long, 60 feet high and 18 feet wide. There is said to be 13,000-horse-power available here, and the entire cost will be \$1,265,000. Charlotte, N. C., expects to derive the same benefits in the same way from the Catawba river.

RAPID transit by the tunnel method has, of course, produced a feeling of uneasiness. New Yorkers fear that their foundations will be undermined, that the streets will be broken through, and that property will be encroached upon. These fears have been set so securely at rest the consents thus far received amount in the aggregate to over \$41,000,000, out of a required \$95,000,000.

NEW PLANT OF THE WALKER MANUFACTURING COMPANY.

One of the Largest in the Country—Where Heavy Cable Driving Machinery and Differential Drums Are Made—Wheels that Make the World Go 'Round.

THE name of John Walker has become so well known to all the street railway men of the country that a description of the great plant from whence emanate the cable driving machinery, clutches, and other necessities of mechanical traction will not be out of place.

In a previous number of the REVIEW a sketch of the busy and successful life of the principal of the firm has been given and it now remains to complete the matter by showing what he has wrought.

urer, Z. W. Hubbell and W. H. Bone, manager. The walls are fire-proof, the interior finished in antique oak and the orange-colored cathedral glass gives the richest effect to the beautiful suites of offices.

Further to the rear are found the fire-proof vaults, wherein are stored the valuable records. These vaults run the width of the offices, 57 feet, with a passage way 12 feet wide. On each side of this are the heavy brick vaults with massive iron doors, sixteen in number, which



VIEW IN FOUNDRY—WALKER MANUFACTURING COMPANY.

The capacious and magnificently constructed buildings of the Walker Manufacturing plant are situated on the west side of the city of Cleveland, O., and at the foot of Waverly avenue. Here commanding a fine view of the blue expanse of Lake Erie are found the edifices in question.

THE GENERAL OFFICES

are contiguous to the machine shops and are 75x57 feet in dimensions. Here are found the business abiding places of the president, J. B. Perkins; the vice-president and general manager; John Walker; the secretary and treas-

urer, Z. W. Hubbell and W. H. Bone, manager. The walls are fire-proof, the interior finished in antique oak and the orange-colored cathedral glass gives the richest effect to the beautiful suites of offices.

THE DRAWING ROOM

is on the second floor and the same size as the lower office. Here in this well-lighted apartment, twelve draughtsmen are busy formulating the drawings which, later are built into the monuments of iron-founders' skill and distributed all over the world. There is room here for twice the number of draughtsmen and if prophecy is correct this number will soon be required.

THE OFFICE LIBRARY

and dining-room are in the next story where a finely selected library on mechanical subjects awaits the pleasure of research.

In addition to these conveniences, there is on the same floor

THE BLUE PRINT ROOM,

which is well lighted and has all the facilities for reproducing tracings, and is the capstone to the complete set of offices for the head-work of the concern.

It is hardly worth while to mention the fact that the heating, lighting, wash-rooms and the entire furniture is the best that money can buy. It goes without saying when John Walker does the planning.

The grand point, however, around which gathers the interest of the mechanical world, is the

NEW MACHINE SHOP,

which has its front on Waverly avenue and is 170 feet wide. The building is in three sections or bays, as they are called. Each bay is 57 feet wide, two are 288 feet long and the third is 430 feet long and the extension all together is 500 feet. From the floor to the highest roof point is 54 feet. Massive iron pillars support the glass roof as can be seen by reference to the engraving accompanying. The cost of the glass in the roof of this shop and the foundry was nearly \$14,000. Each bay has a traveling crane capable of lifting 30 tons and moving it from one end of the building to the other. The cranes have many improvements and are built at the works. A cage on the crane is situated conveniently for operation of the big machine. In this cage the operator is stationed, and by the movement of levers he controls all the movements of the ponderous machine. The motive power is a small engine, which is situated in one corner of the shop, and is transmitted by a rope.

The cotton ropes which are used in operating the cranes were made in England and imported especially for this purpose. The length of rope required for the nine new traveling cranes is $2\frac{1}{4}$ miles, and when in motion will travel at the rate of 3,000 feet per minute. A specially constructed device for maintaining the proper tension of the rope is fixed at one end of the room, and consists of four grooved wheels placed one above the other. Around the top one the three ropes pass, and once around the other three, and when in operation these so adjust themselves so as to keep each of the ropes at the proper tension required.

For the convenience of vise-hands a gigantic bench is provided. Its entire length is 402 feet and its breadth 4 feet. Here are all the most modern tools and appliances, some of them made specially for the Walker Company, and many the devices of Mr. Walker. The shop is heated by steam and at night light is furnished by gas and arc electric.

In the erecting bay there is an erecting pit 49 feet long, 22 feet wide and 8 feet deep, in which to erect "cable plants," and other heavy and large machinery.

In the long bay there is a pit lathe 40 feet long, 12 feet wide and 16 feet deep, in which can be turned a drum or gear 32 feet in diameter and 8 feet wide.

The motive power for these tremendous machines comes from a 24x48-inch cylinder Corliss, with a 16-foot fly-wheel. The steam is generated in two boilers of 200-horse-power each and equipped with Brighton stokers. Feed water comes from a 20-foot cistern, into which the roof drainage and condensed steam is returned.

THE COAL STORAGE

is all under cover and ten car-loads can be kept at one time. The railroad tracks bring the cars to the vaults direct. The tracks are also run into the machine shops so that the finished work is loaded without drayage.

THE FOUNDRY.

Here the visitor finds one of the most interesting sights in the mechanical world. It is a large building fronting on Waverly avenue and 300 feet wide by 118 feet wide, built in three bays of which the center one is 57 feet wide by 41 to the tie-beams or 62 feet to the highest point. This bay is, of course, for the largest castings.

The works are supplied with a 4-inch service water pipe and a 4-inch fire line pipe, each running the entire length of the works, with laterals into all departments. The foundries are supplied with twenty upright pipes, each with a stop valve, a drinking tap and a $\frac{3}{4}$ -inch hose bib, so that when hose pipe for sprinkling the moulding sand, etc., may be connected, the drinking tap will be available; and should either or both of these be disabled the stop valve can be used to shut the water off without stopping the water from any of the other uprights. At each upright a sheet iron tank six feet long, two feet wide and two feet deep is supplied, and has waste pipe connected with drain, all of which water is turned into the large cistern, before mentioned, in the yard.

The fourteen sand pits for various kinds of sand are arched at their back end, and with 3-foot arches on top with 15-inch I beams, are a grand success, the sand always being in good condition. This is accomplished by having a 6-inch drain with laterals placed immediately under the floor, thus draining the entire series. There are five permanent casting pits, 12, 16, 20 and 24 feet in diameter and 4 feet deep, for large pulleys, gears, etc., and one 12 feet in diameter and 25 feet deep for casting hydraulic cylinders and rams on end and similar work of great length. The traveling cranes are placed at such an altitude as to lift a 25-foot casting out of the pit and lay it down on the foundry floor. The core ovens have each double tracks arranged with two trucks on each track so that there are four trucks for each oven. The trucks are arranged so that two, three, or all four in each oven can be joined together and operated simultaneously; each truck is provided with a crank and gearing, so that one man can wind a loaded truck in or out of the oven, dispensing with the time-honored pinchbar and half a dozen men for that purpose. The ovens are fired from the back end and have covered fireplace inside to shield the

cores nearest the fire. Flues are provided under the oven floor with openings on top, the openings being larger as they approach the door so as to equalize the heat at both ends of the oven; the usual smoke and damp chimneys are used with an additional damper at the top of oven to let out smoke and heat before opening the doors, thus cooling off more rapidly and preventing the smoke and heat from coming into the foundry when the door is opened. The cupolas for small foundry work have 60-inch shells, and for the large foundry have 72-

successful operation several years with extraordinary results, as may be seen by reference to the following table, in which the fuel for bed is included and no credit given for coke in drop.

The theory in working out this tuyere was:—

First—To get the greatest amount of air delivered into the cupola at a minimum pressure.

Second—To keep the melting zone as low as possible.

Third—That the air supplied shall as near as possible spread to the full section of cupola.



SCENE IN MACHINE SHOP—WALKER MANUFACTURING COMPANY.

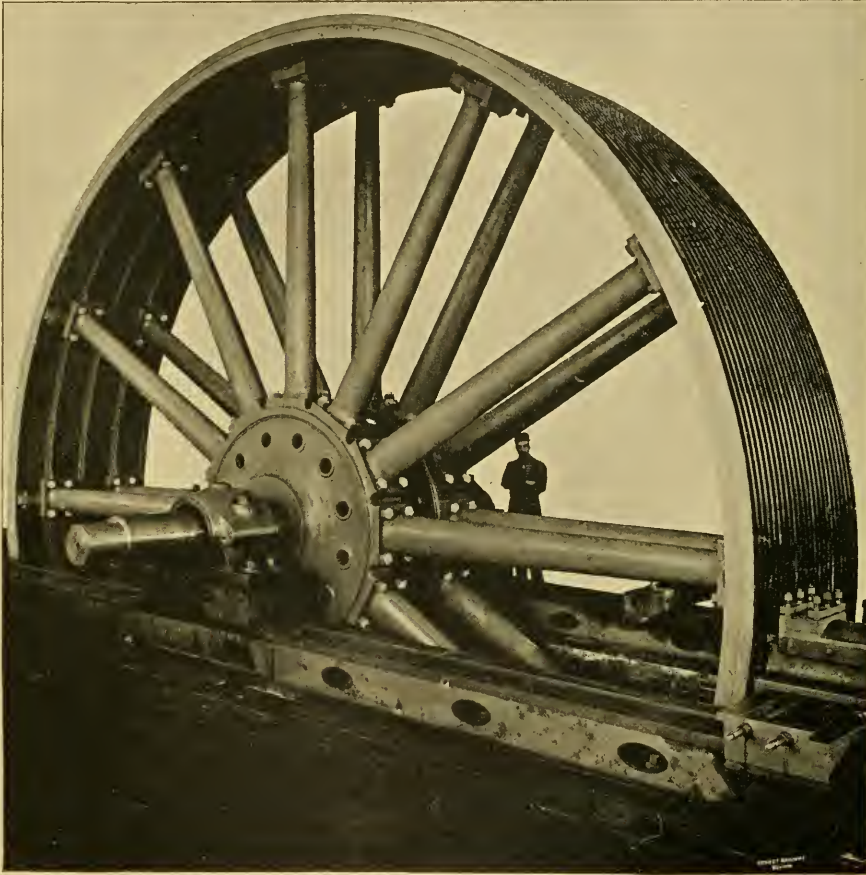
inch and 84-inch shells, each lined to 52, 60 and 72 inches inside diameters respectively. They are supplied with Walker's patent doors, balanced with automatic clutch to hold them in vertical position when dropped, so as not to warp and burn the edges of door in the drop. They are also supplied with a continuous blast breeching and continuous tuyere in the form of vertical slots, 1 inch by 4 inches, 1¼ inches by 5 inches, and 1½ inches by 6 inches, for the respective sized cupolas. This form of tuyere is the result of many experiments and much thought by Mr. Walker, and has been adopted and in

How near these points are complied with can only be appreciated by the pleasure afforded in running such cupolas, and seeing the results. A 3-cylinder vertical blowing engine supplies the blast for the cupolas. The air cylinders are 48-inch bore by 30-inch stroke. The air valves have a positive motion, worked with eccentrics and rocker arms. The steam cylinder is 14-inch diameter by 30-inch stroke. Its piston is coupled with rod of center air cylinder, the valve of steam cylinder is worked by a lever and link from the upper end of one of the outer air cylinder piston rods. This engine is the acme of

simplicity; its working and results are in keeping. It was built by the company and since its introduction they have decided to build four sizes for foundry, steel works and smelting purposes.

The hydraulic system used for elevating all the material for the four cupolas, etc., is very simple and complete and is entirely automatic. A 14-inch accumulator, 14-foot stroke, with loaded casing to secure a pressure of 1,000 pounds per square inch is used, and differential pumps operated automatically according to requirements. These pumps can work at a speed of 150 revolutions without

the yard to the elevator and with turn tables reaches all the various points where material and work are to be delivered. In the light work foundry which is 200 feet long by 50 feet wide, there is one of the most complete sets of pulley moulding machines and appurtenances that was ever designed; the interchangeability is something wonderful. The floor system of molding pulleys is equally complete and shows the result of years of experience in this line of work. The gear molding machinery located in the large foundry is complete in every detail, including both fixed and portable machines; also striking machines



ROPE DRIVE WHEEL—32 FEET IN DIAMETER, 6 FEET FACE, WEIGHT, 100 TONS—WALKER MANUFACTURING COMPANY.

the slightest water hammer. The elevator framing, girders and cage are entirely of iron, the cage is of unusual size and can take a load of 12,000 pounds, or a small wagon of coke or coal. All the coke for the cupolas and coal for the boiler are elevated to the third floor and dropped to the second, thus avoiding second handling of all this material. The entire hydraulic machinery and all its appurtenances was built by the company, being designed and erected under the supervision of Mr. E. W. Naylor, whose system of hydraulic machinery the company has adopted. A narrow gauge railway runs through

of the most improved form. All the pulley and gear machinery is of special character, invented and patented by Mr. John Walker. The production of machine molded pulleys and gears by the Walker Manufacturing Company has been very gratifying both in quantity and quality. They are used from Maine to Mexico and recently a 30-ton gearing was sent to Africa.

The No. 1 Foundry is fitted with two 30-ton rope drive, traveling cranes, in the center bay and four 12-ton traveling cranes in the side bay. No. 2 Foundry is fitted with five 6-ton traveling cranes, so that every foot of

space on the foundry floors is available for work and can be reached with a crane. The crane ladles used are the most substantial imaginable, ranging in capacity from three to twenty-five tons each; they can pour from either side and used for right and left positions as the pouring may require.

The immense amount of work that can be turned out of these gigantic factories is evidenced by nearly every machine-using city in the United States and Mexico. Their great specialty, that of cable railway machinery, has made a name for the company that will only dim by the extinction of rapid transit.

Among the work now in hand in this plant may be mentioned: four 32-foot diameter rope wheels, 6-foot-1-inch face, with 32 grooves for $2\frac{1}{4}$ -inch ropes; four 32-foot rope wheels, 8-foot-4-inch face with 34 grooves for 2-inch rope, finished weight about 100 tons; two 32-foot diameter rope wheels, 3-foot-3-inch face, with 13 grooves for 2-inch diameter rope, finished weight of each being about 40 tons; four 26-foot diameter rope wheels, 4-foot-11-inch face, with 20 grooves for 2-inch diameter rope, finished weight of each being about 60 tons; four 22-foot diameter rope wheels, 6-foot-1-inch face, with 22 grooves for $2\frac{1}{4}$ -inch diameter rope, finished weight of each being about 50 tons; four 9-foot diameter rope wheels, 6-foot-1-inch face, with 22 grooves for $2\frac{1}{4}$ -inch diameter rope, finished weight of each being about 22 tons; eighteen 1000-horse-power friction clutches, to operate and transmit this power at 55 revolutions per minute; four 500-horse-power friction clutches, to operate and transmit this power at 55 revolutions per minute; fourteen large spur gears, 14-foot diameter, 104 teeth, 16-inch face, 5-inch pitch; seven large spur pinions, 9-foot diameter, 62 teeth, 16-inch face, 5-inch pitch; one 20-foot diameter band wheel, 50-inch face, built up in segments, the finished weight will be about 27 tons; one 20-foot diameter band wheel, 44-inch face, made in halves, the finished weight of which will be about 30 tons. This band wheel is designed to run at a speed of 125 revolutions per minute, which is equivalent to 7,854 feet periphery speed per minute, or nearly a mile-and-a-half per minute.

They have also just received orders for two more of their differential cable drums from the Portland Cable Railway Company, Portland, Oregon; also for six more differential cable drums for the Washington road in Washington, D. C. These make a total of 116 of the differential drums which have been supplied or in hand.

With this very incomplete list of some of this great company's works, the readers of the STREET RAILWAY REVIEW can not get an adequate idea of their immensity, but reference to the accompanying engravings may assist in forming their ideas.

THE celebrated English Lang lay cable which was imported for use on one of the cable roads in this city, was taken out recently having proved a failure and making a record of only as many weeks' service as the American made ropes run months. The experiment will not likely be tried again soon.

SMOKING CAR SEASON.

THE cold winds are beginning to make their presence uncomfortably familiar with those of every company's patrons who enjoy the morning cigar on the way to business. This class is by no means small and constitutes a no small per cent. of that regular daily traffic upon which every road must place its dependence for steady and satisfactory earnings. The first smoking cars on street car lines were put on only two or three years ago, but have proved immensely popular. In cable or electric service where two or more cars are run in a train, one smoking car in every two or three trains will generally suffice, and should be so designated by suitable sign, so ladies and others wishing to ride in other cars can do so.

Where the street car comes in competition with parallel roads,—which all run smoking cars,—the plan is found to be specially desirable, and instances are not few where the increased volume of business from this source was not only directly traceable, but very satisfactory to gentlemen who smoke and have got to ride somewhere; then why not allow them to ride together and enjoy the protection of a comfortable car instead of standing like wooden Indians on the front platform.

Smoking cars are needed only a portion of the day, say morning and evening, or may be confined to two or three hours in the morning rush, and run in regular service the balance of the day, with the removal of the sign. It is found an easy matter to ventilate the car at the end of the trip, and their presence on a line will go a long way toward making the manager and his road popular.

STAGES NOT PROFITABLE.

FOR the ostensible object of "keeping street cars off of Fifth avenue," New York, the Fifth Avenue Transportation Company are operating a line of stages thereon, with a success and popularity best indicated by the recent statement that the net deficit for the past year is over \$32,000. The first year the losses were \$40,000 and at no time since its inception has the scheme been a profitable one. At present the company owes \$71,271 while the inventoried value of all its properties amounts to only \$76,841. The management has been very economical the past year but nevertheless were unable to come out even.

AT Seattle the other day a school boy ran in front of a motor, fell and was drawn out from under the middle of the car without a scratch. He started off on a run lest he "get a black mark for being late to school."

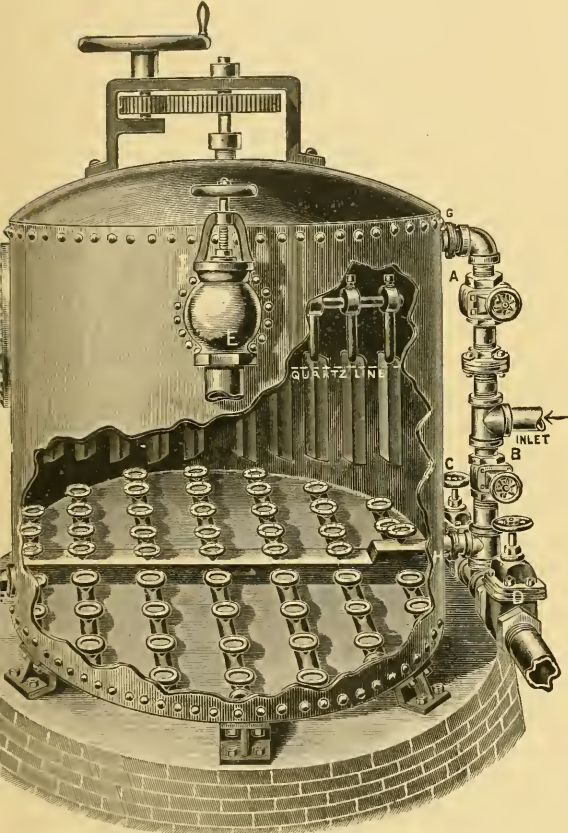
THE surface roads of New York City carry more passengers annually than are carried by the combined steam railroads of New York state in the same interval.

LAST Thanksgiving President Beckley, of Rochester, N. Y., presented all his employees with a big turkey.

THE JEWELL FILTERS.

A MANUFACTURER may choose his location, a steam road may make a wide detour to gain its ends, but a street railway is in the hands of the providence that places towns beside alkali deserts, muddy ponds and filthy rivers. In other words pure water is accessible to almost every power user except that of the street railway.

Now it stands to reason that the next best thing after finding water naturally pure, which is often impossible, is to make the water used pure by artificial means.



THE JEWELL FILTER.

There are many devices for this purpose but the latest of promise is the Jewell Filter, manufactured by the Jewell Filter Company, of 73-75 West Jackson street, Chicago.

The Jewell Improved Filters claim to remove substance held in suspension or solution; the former by simple natural filtration, and the latter by use of, in conjunction with the filter proper, a reagent as coagulant or precipitant suited to the specific work to be performed. These filters will develop results on a large scale identical with those of the laboratory, and effectually render waters pure—not only from a point of brilliancy but also in effectually removing the objectionable elements held in solution.

A large number of these filters are now in use for city water works to remove sediment and organic contamination, that microbes and other organisms may be withheld.

The filter medium is white crushed quartz which is 98 per cent. silica and obtained from selected sea pebbles. In filtering, water is forced downward through this quartz, and in washing is reversed in an upward direction. The quartz does not require to be changed, it being impervious, the impurities obtained by filtering must therefore in the process of washing, leave the filter bed in as clean and pure a state as it originally was.

The Jewell Pressure Filters, as illustrated in the accompanying section of cut, are made in sizes from 2 to 6 feet in diameter, with capacities from 50,000 to 125,000 gallons per 24 hours. They are often placed between the feed pump and boiler or heater, if such be used, so that the feed water is pumped first through the filter—thus carrying the boiler pressure.

The Jewell Gravity system of filtration which is more particularly used for paper mills, city water works, and places where large volumes of water are required, are made in sizes from 6 to 12 feet in diameter by 14 feet high, having capacities from 125,000 to 500,000 gallons per 24 hours.

A large number of the pressure style are in use to purify water for office buildings, they being connected on the intake pipe from the street. A battery of six of the largest pressure filters are now being erected at the water works of Lake Forrest, Ill., and among other users of the Jewell Improve Filters may be stated the cities of Rock Island, Ill., Terre Haute, Ind., Columbia, S. C., Burlington, Kas., Creston and Waterloo, Ia., and many others.

The great saving on boilers from filtration of feed-water deserves the attention of every thoughtful manager and the very good systems now in vogue present every facility for this saving.

It was on a Riverment street car, says the Lynchburg Virginian, and a young woman occupied one end of a seat and a well-dressed young man the other. The young woman was perfectly sober; the young man had indulged in three glasses of beer. The conductor came along to collect the fares, and as the young woman was far away she handed her nickel to the young man. He received it, looked at her for a moment through his tears, and then said as he passed it on:

"I accept the responsibility and thank you for the confidence reposed in my integrity. Never beat a woman on a street car out of a nickel in my life. Booze a little now and then, but I stand pat on my record for honesty."

She started to look confused and embarrassed, but he fell asleep in about half a minute and she changed her mind.

This story is not meant to convey any moral in particular, but just to show that the much-jumped-on street car 'boozer' may have his uses, and inebriety has no relation to dishonesty.

FIRES OF THE MONTH.

PITTSBURG.

The car house of the Second Avenue Electric line, Second avenue, Glenwood, was almost completely destroyed by fire, together with cars to the number of twenty-six, and five horses.

The fire was one of the most destructive that has occurred in this city in recent years. It was very destructive in its character, for at no previous time has such an enterprise been as completely crippled as the Second Avenue road in consequence of the conflagration. The loss foots up considerable more than was at first thought, aggregating probably \$140,000. The road had twenty-six cars in the shed and all were destroyed. The insurance is nearly sufficient to cover their loss.

ST. PAUL.

The old car barns of the Street Railway Company, situated at Seventh and Tuscarora streets, burned down, entailing a loss of some \$10,000, fully covered by insurance. The fire broke out about 10 o'clock, P. M., the dry pine lumber of which the building was constructed offering ready food for the flames, and rendering the work of the firemen extremely difficult.

It was apparent from the start that it would be impossible to save the barn, and the department turned its attention to saving the adjoining building, which was filled with hay and straw. It is singular coincidence that company's insurance carried on all its property, amounting to \$750,000, expired at noon the next day.

ST. JOSEPH, MO.

The Union line car stables and thirty-five cars have gone up in smoke and flames at a grade of 90 per cent.

The whole place was totally destroyed. Only two cars were saved. These were pushed out by the employes after the fire was discovered.

The loss is \$50,000, and is fully covered by insurance.

SPRINGFIELD, MASS.

Springfield had a \$10,000 blaze recently. The car-house was destroyed, but the flames arrested before further damage was done.

The fires of the month have been rather trying to the various capitalists, but in every case improvements are expected to follow with the reconstruction.

THE Liverpool Overhead Railway Company (described some time since in the REVIEW) has under way a scheme for an electric road to terminate in Ullet-road between Linnel-lane and Lodge-lane. Let the good work go on!

THE municipality of Buda-Pest has authorized the establishment of an electric tramway in the suburb Uj-Pest

THE Siemens-Haske electric railway proposition has been accepted by the Berlin authorities.

NEW ENGLAND NOTES.

BOSTON, Dec. 10, 1891.

The Pullman double-deck car which has been in daily service on the West End Line was slightly disabled recently by a careless teamster. The car has been giving great satisfaction. The Rapid Transit Commission recently were treated to a ride in the car.

The West End Line has a large force of experts upon its construction work. They are making rapid progress

The Washington Square and Post Office Square line was started December 1st. The line through Charlestown is to be extended two miles, single track, while the construction of one mile of boulevard through East Summer-ville to Winter Hill is being rapidly pushed.

The new line to Chestnut Hill will be one of the most picturesque in New England within a few years.

The tracks are in the center of the avenue and flanked on each side by a grass plat on the outer edge of which the company has planted a row of trees.

Next to this grass plat are equestrian drives where the devotees of the saddle and centaurs may worship without fear.

Next come the carriage drives, which complete the conveniences for all imaginable transit.

The new railway supply department of the Thomson-Houston Company is fast becoming settled under the able management of Mr. Elmer P. Morris and competent force. This will be the head office of the department and when the stock is all in will be complete to the last detail.

Mr. H. H. Harrison, of the Lieb Machine Works, has resigned that position to accept a place under Mr. Morris.

On calling upon the Ellis Car Company at Amesburg, your representative found the every wheel moving and the works at their full capacity turning out sweepers and snow ploughs besides a large line of handsome cars. They are soon to issue a street railway catalogue and will send one to every applicant.

The Tripp Manufacturing Company has recently placed a loose wheel electric car truck No. 11, on the West End Road and up to date its performance has been of the most gratifying character.

STANDISH.

A HIGHLY interesting runaway occurred in Windsor, Canada, quite out of the usual run. The company has a repair car for making repairs on the trolley wires, and while the man in charge was at the top of the high platform, the wind which was blowing about 40 miles an hour started the machine and it went flying down the street at a highly dangerous rate of speed. As it passed one cross street after another the frightened and sole occupant could only hang to his lofty perch and yell. The line is a single track and an approaching car filled with passengers barely had time to make the turnout. The "lightning" express took the switch all right, however, and soon reached the curve to a cross street where the wind lost its effect. For a "rush trip" it was a success, but will not be attempted again as brakes have been put on the car.

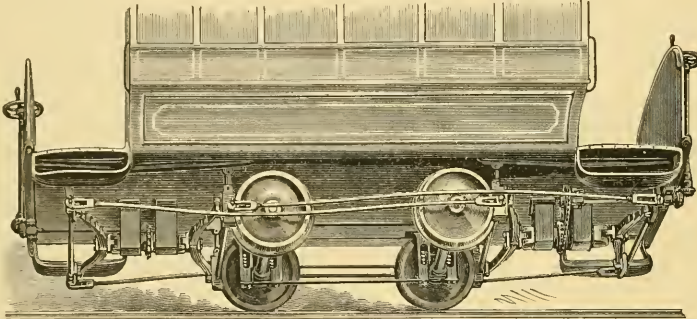
SCREW SAFETY CAR BRAKE.

A CORRECTION.

THE illustration below, as will be noted, is of a car one side of which is raised from the ground to better afford a view of a new brake mechanism, the invention of A. B. Pool and J. J. Beals, of Boston. Their improvement is the substitution of a live spring pressure for the old method of dead leverage. A right and left screw with traveling nuts thereon is hung to the car as shown, to which is attached two half-elliptic springs at either end of the nuts, the springs having friction rolls at their ends and being pivoted to the nuts so as to conform to any position of the brake beams. Opposite the springs are placed sub-beams, to which draught rods are attached connecting with the brake beams. Sprocket wheels are placed at the center of the screws and are connected with corresponding wheels hung to the car by chain belts, the wheels having a shaft connection geared to the operating

A STREET car horse is now on the STREET RAILWAY REVIEW. Our scribe in a moment of excitement said in the October number that Gould & Watson had sold "10,850 mica insulators within the past six weeks." Now the fact was that the Boston house of this big firm, has sold that number *within ten days*. We take pains to correct the statement and add that the sales within the past month have been fully up to these figures.

The Gould & Watson people have also put on the market a device in the way of a pull-over, with double insulation. The advantages of it are these: It gives double insulation and the brace comes from a longer leverage and consequently the strain is more distributed. The advantage of this is so evident that no further verbal comment is necessary.



POOL & BEAL'S SCREW SAFETY CAR BRAKE.

rod, by the working of which the springs are spread and a perfect equality of pressure is obtained upon all the wheels. Either end is worked independent of the other, or both together if need be, the proper application of the brake not only doing away with flat wheels, but overcoming the momentum of the car in the shortest possible time. This device is designed to be simple, durable and inexpensive, and when once adjusted will remain in position until the shoes are worn out, requiring no pawl or ratchet to hold it. It can be set at a certain pressure on a down grade, and will so remain without any attention of the motorman, and the power can be applied to or taken off the car by the same hand, and at the same time that the brake is operated, but little power being required to do the work.

It is expected that a test of this brake will soon be made on the tracks of the West End Road.

SHOOTING at the cars; Father Kerwin, a Catholic priest at East Orange, N. J., became incensed at the pole-planting in front of his church and opened fire on the workmen. No very fatal results attended his reverences' aim and the poles have gone up.

You can't stop the car of progress even with the weapons of carnal warfare.

A recent application also is the globe strain insulator, in two sizes. One is for dead ends and heavy guys where a second insulation is desired and the lighter for light guys and anchor insulation. The guard span insulator carries the guard line wires.

The Gould & Watson insulation has made a great record and each sale is the predecessor of larger ones.

SUCH IS LIFE.

THE editor of the St. Augustine, Florida, Press, moralizes in this most approved fashion: "Work on the street railway has not been resumed yet. The picks and shovels are idle, the bond has not been filed, and the men eagerly awaiteth their ducafs which show no signs of coming. When the road was started most people were as proud as a bob-tailed pullet on a rickety hen roost, but alas! such is life."

This is how it strikes the contemporaries:

The cable system in Chicago suggests a game of dominos. A long train starts, and one by one the cars disappear down branch lines; and, returning, the original car has a long trail behind it, added one by one, ere the center of the city is reached.—Boston Times.

STORAGE BATTERY CARS AT THE HAGUE.

AS has been noticed previously in the STREET RAILWAY REVIEW, there is an important storage battery line in Holland, running from the seaport Scheveningen to the Hague, about three miles inland. There are six cars now running at a speed of 12 miles per hour.



CROSS SECTION—CAR, BRACKETS AND TURN TABLE.

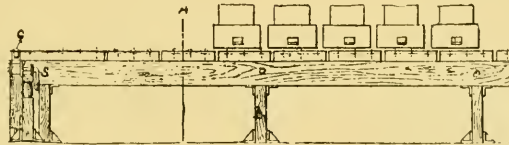
The loaded car weighs 16 tons; it is 32 ft. long, carries 60 passengers, and the battery of accumulators weighs 4 tons. The cars, constructed at Harlem, have two trucks of two axles each. The axles are connected to the motor by solid gearing, and the whole weight is carried by the axles. The motor is supplied by carbon brushes, from a battery of 192 Julien accumulators, weighing 40lb. each. This battery, when charged, provides current for a run of 45 miles, after which the cars

From a description in the London Electrician we are able to elaborate a little upon the method used.

The principal point of interest in the foreign article referred to, is the device for changing the cells from the car to the charging station and vice versa. The present arrangements were made by Herr P. Van Vloten, manager incumbent, and are much superior to the old methods.

Considerable ground space is occupied by the charging station, but, as it is built at the edge of town, this difficulty is not so great.

In the charging shed are two lines of tracks with examining pits. On each side of the lines are benches or tables, 26 meters long (about 86½ feet) on which the batteries are charged in series. A car containing batteries, which require charging, is run to the farther end of the shed and doors at the side of the car opened. This gives

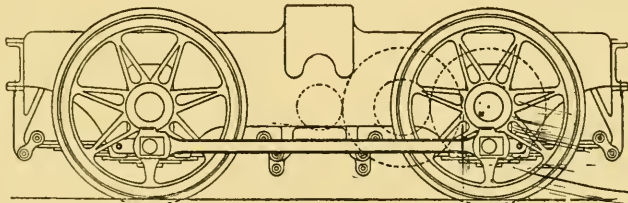


ELEVATION OF CHARGING TABLE.

return for change of cells. The accumulators are arranged in eight boxes, or drawers, weighing half a ton each, placed under the seats. The car is provided with switches and resistances to allow the speed to be varied. The spare sets of cells are always being charged as the others are being used. The change of cells requires 5 minutes. The connections are made with spring contacts arranged so that no mistake can occur. The charg-

access to the batteries which are arranged under the seats in sets of eight, each set weighing 500 kilograms (about 1000 pounds avoirdupois). Each set is in a case which is provided with contact strips automatically making connections when run into place in the car.

When a set of batteries is to be withdrawn, the car is so placed that the hinged bracket, marked O, is presented for their reception. The batteries are run out on this bracket



SIDE VIEW OF MOTOR TRUCK.

ing is accomplished by means of Silvertown shunt dynamos, with hand regulators, giving 60 amperes at 100 volts. The machine-room contains two condensing steam engines of 210 horse power each. The condensing water is supplied by a system from the canal three quarters of a mile away. It is intended to settle the question of maintenance by the erection of a small manufactory of battery plates on the spot, with a laboratory.

which has rollers, marked G. When the battery is pulled onto the bracket, an eccentric, P, below the shelf is turned by the lever, S, and thus the bracket is raised on its hinges and the battery runs on to the turn-table, B. A rubber buffer, R, is arranged underneath, to prevent any jar. A quarter-turn being given, the set of batteries is run forward on the charging bench, rollers being provided the entire length. The eight sets of batteries can be run

out simultaneously on the eight brackets and turn-tables, those already on the bench are automatically carried forward, to make room for more, the charging going on all the time as each set is in contact. This removal, as noted, takes about two minutes. The empty car is then run back toward the door of the charging shed at which end of the charging bench is a similar arrangement of turn-tables, and brackets. By the time a set of batteries has traveled the whole length of the bench it is fully charged.

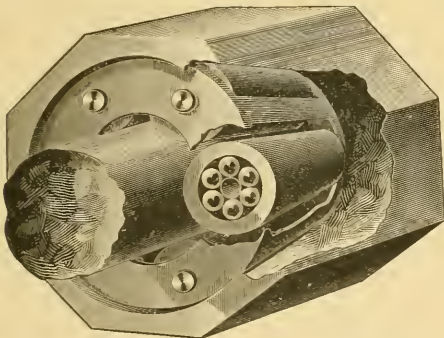
In operating the car the change of speed and starting is accomplished by a resistance switch, combined with the commutator. The commutator enables the accumulators to be placed, all in series for high speed or in two sets in parallel for slow speed.

We present also a side elevation of the truck of this storage-battery car, which is slightly different from American makes. They were built by Beynes of Haarlem.

The cars are only in service during the season at the watering place Scheveningen and figures are being prepared to show the cost of this method of traction.

THE MOFFETT JOURNAL BEARING.

ALL managers of surface railways, and for that matter the entire mechanical world, have been looking for the man who shall discover the secret of dispensing with the use of oil or graphite as a lubricant, without injury to the parts of a bearing. To this end devices almost innumerable have been employed, resulting in causing many disappointments.



The nearest approach to perfection was in the roller bearing, and subsequently in the ball bearing, but they are not in use on street railways, and that they do not meet the demands of a street car, is proven by the fact that the old fashioned bearing with its various modifications and attachments, is still universally used.

For this reason our readers will be interested in the following description of the Moffett Journal Bearing, the inventor of which states he has proven by the most severe and exacting tests, that it will operate without the use of any lubricants whatever, and that, too with a saving of over 30 per cent. in the power necessary to operate.

The principle of this bearing, a cut of which is here given, is a combination of balls and rollers. The rollers are held around the axle in a rigid cage, separate and independent of each other, by a spindle through the

rollers and cage, but in no instance do the rollers come in contact with the cage or the spindle. The balls, which are practically perfect spheres, as hard as steel can be made, and ground to the smoothness of glass, surround the spindle in a counter bore at both ends of the rollers. Their contact on the cage, rollers and spindle, is only a point. Their purpose is to guide the rollers in the cage and serve as an anti-friction bearing for the rollers when the weight is suspended, and herein lies the key to the invention.

The end thrust of the street car bearing is caught upon the taper rollers and axle. The rollers are the shape of truncated cones. The axle, box and rollers, at contact points are all on the radius of the same circle, hence the place of contact is an unbroken line. The result is that the rollers revolve around the axle, and on the interior surface of the box, as would be the case with parallel rollers. The speed at which the cage with its series of rollers revolves is proportionate to the speed and size of the axle.

The friction of the Moffett bearing is purely a rolling friction. The rollers are separate and independent, as above described, and always travel in the same direction. It must be admitted that there is an infinitely slight friction on the balls in the counter bore at the end of the rollers, which would be serious enough to require lubrication, were it not for the fact that at no time do the balls or the spindle support any weight except the actual weight of the cage, the weight of the car being transmitted directly through the roller to the axle.

Among the claims of this device to popularity over all others are the following: that it is mechanically perfect; economy of expenditure, as it requires no lubrication and little attention; a great economizer of power, which in the case of electric motor cars amounts to 50 per cent. of the power in starting and 30 per cent. when the car is in motion; that it not only will outwear any other bearing, but what little wear does occur is easily taken up by a simple turning of a screw, the bearing being adjustable. It can be easily applied to any of the present types of street cars.

By the first of the year the Moffett Journal Bearing Company will be prepared to equip street cars, and give practical demonstrations of its value in street car service. The office of the company is No. 516 Phoenix Building, Chicago, where the bearing is open to the inspection of all who may desire to see it.

The company have no hesitation in promising an exhibit test, to be made under the most difficult conditions and the judges to be men of the highest ability and wholly disinterested, and the occasion will be watched by railway men with the utmost interest.

THE new smoking cars just put in service on the cable line in Baltimore are immensely popular. They are somewhat smaller than the other cars on the line, are open at the side, with cross seats, and curtains that pull down for inclement weather. The cars were built by the Brownell Car Company, St. Louis, and are beautiful cars.

BELT POWER HYDRAULIC WHEEL PRESS.

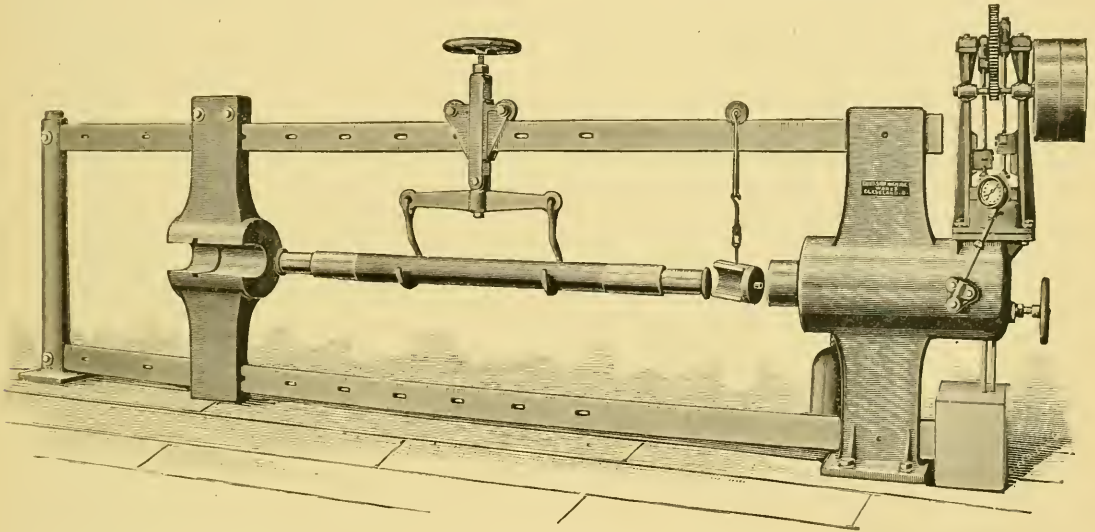
VERY few companies can afford to be without a hydraulic wheel press, and now that so large and constantly increasing number of roads are putting in their own repair shops, this becomes one of the prime necessities. Alfred G. Hathaway, of Cleveland, whose transfer tables and car house equipment are so well known, has just placed on the market a wheel press specially designed and built to meet the wants of street railways. A noticeable feature is that the pump will be built into the machine so as to suit the condition of the shop shafting, enabling the user to locate his press at any desired place in the room. This is done by setting the pump longitudinally (as shown) or transversely with the ram.

The pump, which is bolted to the stationary beam, is of the duplex pattern, geared 5 to 1, with single-acting plungers. The plungers are packed with a compressive

HINTS ON CAR PAINTING.

AT a recent meeting of the Northwest Railway Club, a paper was read by J. O. Pattee, master mechanic of the Great Northern Railroad, from which we extract the following valuable hints, the result of long observation and experience:—

“The foundation of the work of painting passenger equipment is the priming, which should be of the best material, principally of good lead and raw linseed oil. Linseed oil has marked drying qualities; it is capable of drying quickly, and at the same time forms that required thin, tough, elastic and adhesive film which is so valuable in all painting when put on in thin coats, as the object is to fill the pores and make a surface for the color; it must also be adhesive and have a proper elasticity, as much difficulty may arise from not giving the lead or priming coat time to dry before covering with another coat. All



HATHAWAY'S BELT POWER HYDRAULIC WHEEL PRESS.

fibrous packing with bolted gland, which is tight and works with no undue friction. The pump barrel is made in one piece from hammered steel. The suction and delivery valves are large, perpendicular and easy of access by separate bonnets, situated on top of pump barrel. The moving beam runs on rollers upon the top bar, which is planed. The movable beam is recessed so that blocks may be placed in it of sufficient thickness to act as a template in forcing on car wheels, etc. A swinging chuck placed against the ram acts as a template for the other end of the axle, the block can also be used when forcing shafts into wheels, etc. Return weight, water tank, pressure gauge and safety valve are furnished.

The press will take wheels of 36 inch diameter, and has a distance between bars of 41 inches. Diameter of ram 7 inches; movement of ram 18 inches, and exerts a pressure of 50 tons. Tight and loose pulleys are 15 inches diameter, with $3\frac{1}{2}$ inch face taking a 3 inch belt, and turn at 150 revolutions per minute. The presses cannot easily get out of order.

paint commences to dry at the surface, and if laid on in thick coats, and too much dryer is used or it is covered too quickly, it will dry unequally and peel off or blister.

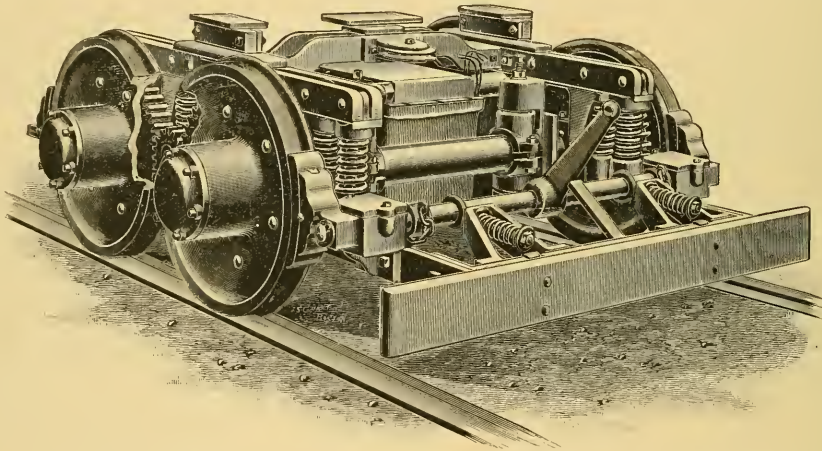
“In no case should the wood receive a coat of any wash or sizing to fill the pores previous to the coat of lead and oil, as by thus filling the wood and making a smooth surface the oil which is contained in the first coat of priming is prevented from entering the pores and thereby fastening itself firmly, and if the priming is not fastened it will be sure to peel off.

“After priming, putty must be carefully applied and given time to dry perfectly. The putty must be properly mixed so it will adhere and dry hard without swelling.

“Dark cars, in which the chief material is burned umber and raw sienna, will not admit of a liberal use of oil in the mixing and they will not stand the weather as well as lighter cars, in which more oil can be used. The advantage, however, in those shades is that they have a greater covering capacity, and do not require as heavy coats or as many coats to get the shade perfect.

"Light shades are preferable in many instances, as they are more durable on account of the foundation or body being made up largely of lead. Yellow shades will bear more oil in the mixture without cracking, and for that reason are desirable, and all light shades are less affected by the heat. Colors should be selected which are less affected by the heat, and a shade over which the varnish shows least when perished. The objection to light colors is that with the present fuel in the northwest (soft bituminous coal) they become tarnished and require washing often, which of course injures the varnish.

"Having applied the color, which should be laid on evenly and quickly and well brushed out, we advise putting the lettering and ornamental work on the color in preference to putting it on after receiving one coat of varnish, as the leaf is protected by the entire body of varnish. One coat of good rubbing varnish and two coats of good coach varnish will give good results if proper time is given to dry. We do not recommend mixing any two grades of varnish."



TRIPP'S TRUCK.

THE accompanying engraving of Tripp's Loose Wheel Electric Truck No. 2, represents an entirely new and improved form of truck patented and produced by the Tripp Manufacturing Company, of Boston, Mass. This truck is noteworthy in its construction for many novel features. The wheels, 26 inches in diameter, are loose upon the axle, and are fitted inside the hub with the well known Tripp Roller Bearing carried on a $4\frac{1}{2}$ -inch journal. Upon the inside plate of each wheel is bolted a 20-inch gear, which fits into a pinion 8 inches in diameter keyed on to each end of the armature shaft, thus applying power at four different points, and giving traction upon all the wheels. The entire weight of the motor is supported by two rigid axles, overcoming the necessary friction caused by the motor bearing upon a revolving axle.

The truck is interchangeable; it will swivel under either an opened or a closed car, and will take any radius curve without interfering with the car sills or running board.

The above mentioned advantages, in connection with the fact that this truck requires only a portion of the power needed to drive the ordinary truck, make it most complete, and its manufacturers confidently predict its success.

A BOSTON SCHEME FOR RAPID TRANSIT.

THE Rapid Transit Commission has another scheme laid before it for contemplation. This comes in the form of a report from the Boston Merchants' Association and was presented by its president, J. A. Lane.

The committee asks the Rapid Transit Commission to investigate the claims of the Spaulding system, which proposes a tunnel near the surface, to begin on Tremont street near Shawmut avenue, at the foot of the hill, and to be continued under Tremont street's length and under Scollay square to a point near Sudbury street and Haymarket square. This is nothing else than the tunneling

of Beacon Hill. This will necessitate the widening of the streets at each end of the tunnel, and the subway should be of ample proportions for tracks, sidewalks and other necessities of the public besides rapid transit. The tunnel should also be planned so as to deflect into all other lines possible, at least on the north side of the city. The distance would perhaps slightly exceed a mile. By this method the most congested portion of the city could be relieved with the greatest possible dispatch and as the narrow streets preclude elevated railways a tunnel scheme seems a necessity.

The counsel for the Boston Railway Company, the New England Boot & Shoe Association and the common councils of several suburbs united in commending Mr. Spaulding's method.

The cost is estimated at \$918,720 per mile, and as the entire distance to be tunneled is five miles the total cost will be nearly \$4,500,000. The plan is to have the tunnel owned by the city alone.

Coming, as this plan does, from practical business men, it at least merits attention.

DUPLEX STREET RAILWAY TRACK.

THE engraving given below is from a scene during the recent laying of the Duplex Track Company's system on Fourth avenue, at Eighth street, on the New York & Harlem Railroad Company's line on New York City. The photograph was purposely taken during construction, and before the rails were surfaced or lined, to better show the parts which unite to form essentially a box rail. It will be seen that each of the two completed rails is formed of two parts, each of which is T headed

and perfect gauge. Every practical man will see at a glance the advantages of this construction in securing vertical as well as lateral stiffness and resistance. Creeping of either rails is made a most difficult and unlikely occurrence.

Track laying is made a comparatively easy matter while the paver has vastly less to contend with in this system. The tendency towards lateral displacement on curves is resisted by the pressure of the roadway on the chairs and the rail web on both sides of the track while the thickness of the rail heads avoids abrasion.



LAYING THE DUPLEX RAILWAY TRACK SYSTEM ON FOURTH AVENUE, NEW YORK CITY.

and resting in a slot of a cast iron chair. Also that the part forming the tread of the final rail overlaps the lower rail which supports the tread and whose upper flat surface constitutes the wagon track. Also that the combination rail is made jointless by breaking joints between the upper and lower sections as clearly shown in the engraving. The chairs rest on concrete foundation, which is almost exclusively used in Europe, where many foundations have been in constant service upwards of 30 years. The chair, which is a single casting has a slot for the tie-rod, which is placed at every other chair and which insures a perma-

The Duplex Company is to be congratulated on having laid their construction on the tracks of so well known a company and in the greatest city of the country, both of which circumstances will unite in causing the results of the work being watched with much interest by railway men everywhere.

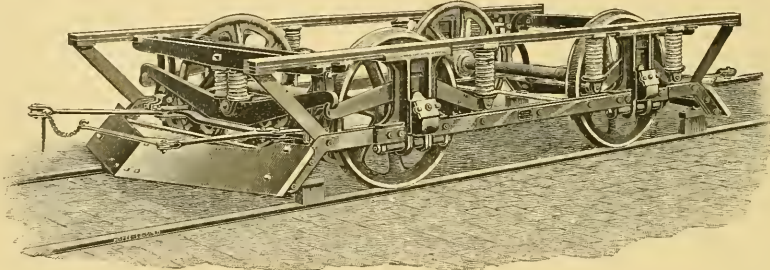
The contractors estimate their saving in time in laying this construction to amount to fully \$400 per day, and the finished track presents a construction that is pronounced perfect, and is a just cause for congratulation to all concerned.

THE EQUALIZING MOTOR TRUCK.

WE take pleasure in presenting to our readers this month, illustration of a new claimant for favor with the street car public, in the Equalizing Truck for electrical use, manufactured by the Sheffield Velocipede Car Company, of Three Rivers, Mich., which is attracting much attention.

The illustration shows on examination the principle features of the device, the leading one being the mechanism for equalization of strains. This principle is regarded as a very important one, and is very carefully carried out by the Sheffield Company, the excellence of whose other specialties is well known.

One end of the car is carried upon side equalizing bars, long coiled springs being introduced between the truck and the car body, giving exceptionally easy results in riding. The other end of the truck is carried by means



THE EQUALIZING MOTOR TRUCK.

of similar side equalizing bars, one end of these bars being cushioned against the main side sill of the car, the other end engaging with a cross equalizer, attached similarly on the other side, and being cushioned against suitable carrying bars in the center. As a result, the manufacturers claim a practical three-point suspension for the car body; on one end of the truck the car being supported over each of the wheels, whereas the support on the other end by means of the cross equalizer is carried to the center of the car. By this means all twisting strains are avoided and the shocks and jars incident to rapid speed are very largely absorbed and neutralized.

These points would seem to be of great importance in operation, and commend themselves to the careful investigation of those of our friends who are engaged in practical charge of these matters.

The construction is such that the two ends of the truck play freely in a vertical plane, without imparting disagreeable oscillation to the car body, and also give greater ease in the matter of curves and uneven track.

Another feature of these trucks is that the wheels are ground to an exact match in circumference, after being pressed on the axles, thus insuring not only the perfect pairing of the wheels, but that they shall run with absolute truth with regard to each other. The bearings, all of heavy gun metal, are carefully milled to fit the axles. By an ingenious device, the boxes are made self-oiling, and will run for a long time without attention. The

brakes are arranged on an entirely new plan, giving very much greater power than has heretofore been secured for this purpose. The brake shoes are of a very greatly improved form, and can be replaced, when worn, by the removal of a single key, which can be done with the loss of but a moment's time.

Removal of wheels when worn is accomplished by the taking out of a single heavy bolt on either side, a point that will commend itself to many.

Another feature which we think should not be overlooked, lies in the fact that the whole frame work of the truck being carried by the springs, additional elasticity is provided for the motor support over that afforded by other devices for this purpose, which materially assists in relieving strain in starting and also in reducing amount of electrical repairs.

The truck is so constructed that the center is left entirely open for the attachment of the motor, which is

very easily gotten at in case attention is necessary, from the fact that there is no complicated mechanism in the way. The truck is furnished properly arranged for either of the well-known systems of propulsion, and is in use on a number of prominent roads, results showing even more forcibly than had been expected, the great desirability of the special features of the device.

By means of this device, it is claimed that not only are the electrical repairs very greatly reduced, but greater ease is secured to the passenger, and the life of the whole apparatus, as well as the permanent way, is greatly increased.

All of these points appeal directly to the pocket book of the company, and are well worth investigation.

A CHANGE has been made in the superintendency of the Essex, Mass., road, whereby a Mr. Dodge succeeds a Mr. Cash. Here, then, is a street railway which can get along without cash, but we venture no other undertaking can.

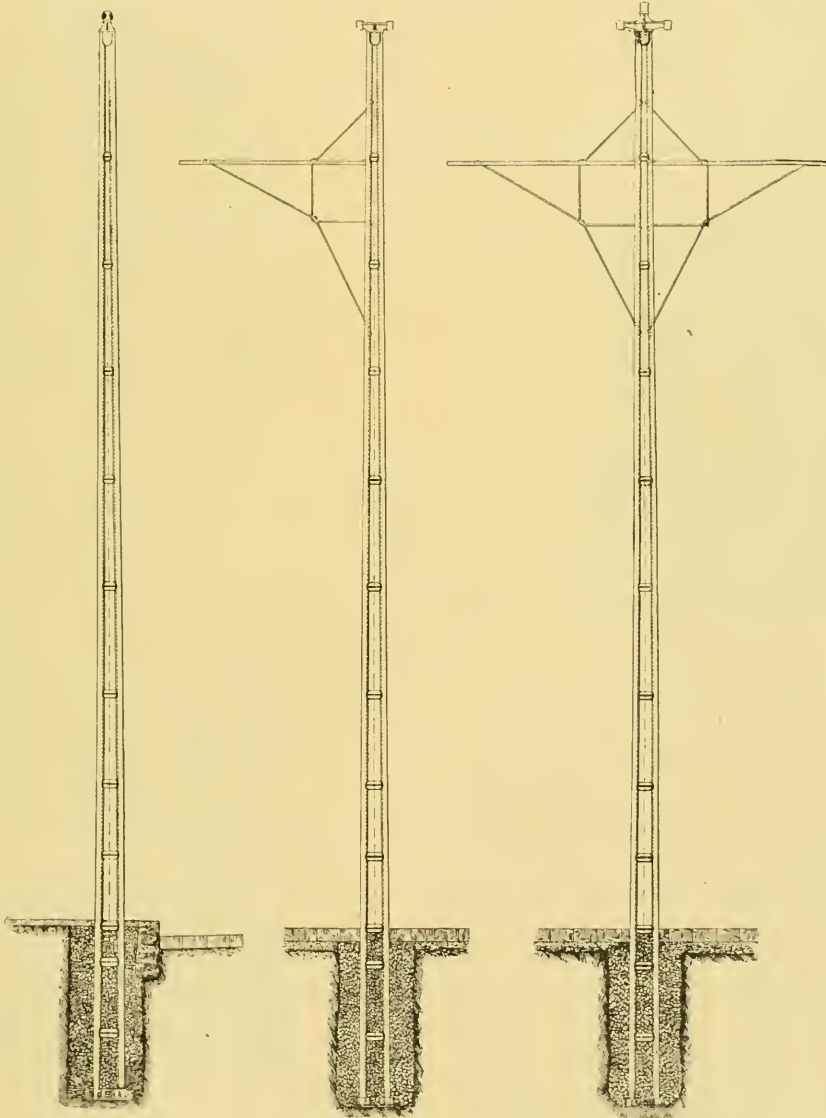
TO OPERATE cars all winter in Montreal, the city building inspector suggests placing the car bodies on rollers of similar shape to those used on steam road rollers. The city uses "snow rollers" to pack and smooth the snow as it falls, and the above suggestion is based on the rollers used by the city.

THE CANTON POLE.

SUPERINTENDENT A. G. DAVIDS of the Canton, O., Street Railway Company, is the inventor of a new pattern of poles for trolley and cross-wires of electric railways, and for electric light wires.

The poles are entirely of iron and aim to unite the greatest strength with the least weight. The three styles of poles are shown herewith.

any position. Its diameter is 5 inches at the base and 3 inches at the top. The double wrought iron bracket as shown on the right-hand pole weighs 33 pounds. The socket fittings weigh about 20 pounds. The horizontal bar is a small 2-foot-2½-inch channel bar. Altogether the new pole promises well, and the Wrought Iron Bridge Company of Canton, which has undertaken the management of it, have well-founded hopes of success. Superintendent Davids was one of the earliest railway



SIDE, SINGLE AND DOUBLE BRACKET POLE. WROUGHT IRON BRIDGE COMPANY, CANTON, OHIO.

The side pole, to the left in the engraving, has been tested by a pulling strain of 2,800 pounds, by a line from the top of the pole running off 90 feet at an angle to a fixed post. No perceptible spring was caused. The total weight of the 30-foot pole complete is 460 pounds. The pole is, naturally, easy to paint and can be placed in

electricians having been superintendent of an electric railway ever since the construction of the Richmond road, where he was in charge from the first. He has made a careful observing study of equipment, and his new poles are the result. They are highly complimented by all who have seen them.

W. G. ELLIS & SONS.

THE rugged, intelligent face of W. G. Ellis adorns the pages of the STREET RAILWAY REVIEW in this issue. The Scotch race has produced numbers of men who are main-stays of their adopted country and W. G. Ellis is no exception to his class.

At an early age Mr. Ellis left the Scottish hills to try his fortune among the colonies and Australian gold fields attracted his attentions. Thither he went and amid the hardships of that difficult life spent seven years. On his return to his native soil he found that the chances for advancement were not sufficient to suit his ambition, so with undaunted courage he came to this country in 1863, with \$2,500 in good gold. The precious metal at this time was at its highest premium and Mr. Ellis with a firm



W. G. ELLIS.

faith in the stability of the government bought government notes and so doubled the money. The proceeds he invested in bonds at 7 per cent. His respect for his adopted country is deep as his veneration for the country of his nativity is strong.

Working for a few weeks in the carriage factory of Jas. Dunn, his attention was directed to carriage manufacture. Entering a co-partnership with A. M. Huntington, which lasted for 8 years, Mr. Ellis in 1875 began business for himself, erecting an extensive plant near the site of his present magnificent residence.

In 1888, his sons David and William entered the firm. William died in 1890 and James took his place and the carriage business was mainly given up to the young men.

After retiring from the carriage business Mr. Ellis gave his attention to the manufacture of cars.

With characteristic foresight, energy and intelligence, Mr. Ellis visited all the largest street car building plants in the country. A location for a plant was secured on the line of the railroad, and capital was at hand to establish necessary buildings. These he leased, and January 1, 1889, commenced work in this new branch of business, employing nineteen mechanics. Slow, but sure, was the progress of the enterprise. There was

much to be learned, but he started in with the motto, that his work should recommend itself. To-day eighty first-class mechanics are employed, and his cars are in demand by the largest firms in the United States: The West End Co., Boston; Valley City & Cable Car Co., Grand Rapids, Mich.; Thompson-Houston Electric Car Co., Boston; Union Electric Car Co., Boston, and vari-



ROBERT G. ELLIS.

ous other lines being among the customers, A ready market is found for all manufactured work, and the only difficulty is in filling orders as wanted. Associated with him in the car business are his two sons, George and Robert whose portraits we are able to present with their father's as representative men and citizens.



GEORGE ELLIS.

Mr. George Ellis, who travels a considerable portion of the time, and is best known to the street-railway fraternity is a young man of unusual energy and business ability.

The Ellis Car Company is constantly enlarging its scope, and has made a specialty the past few months of snow plows for electric and horse lines.

CAUGHT ON THE RUSH TRIP.

American Street Railway Association.

JOHN G. HOLMES, PRESIDENT, Pittsburg, Pa.
 THOMAS H. McLEAN, FIRST VICE-PRESIDENT, New York, N. Y.
 JAMES B. SPEED, SECOND VICE-PRESIDENT, Louisville, Ky.
 ALBION E. LANG, THIRD VICE-PRESIDENT, Toledo, O.
 WM. J. RICHARDSON, SECRETARY AND TREASURER, Brooklyn, N. Y.
 EXECUTIVE COMMITTEE—THE PRESIDENT, VICE-PRESIDENTS, and HENRY M. WATSON, Buffalo, N. Y.; LEWIS PERRINE, JR., Trenton, N. J.; W. WORTH BEAN, St. Joseph, Mich.; MURRY A. VERNER, Pittsburg, Pa., and THOMAS C. PENNINGTON, Chicago, Ill.
 Next meeting will be held in Cleveland, O.

Massachusetts Street Railway Association.

President, CHAS. B. PRATT, Salem; Vice-Presidents, H. M. WHITNEY, Boston, AMOS F. BREED, LYNN, FRANK S. STEVENS; Secretary and Treasurer, J. H. EATON Lawrence.
 Meets first Wednesday of each month.

Ohio State Tramway Association.

JOHN N. STEWART, Ashtabula, President; JOHN HARRIS, Cincinnati, Vice President; J. B. HANNA, Cleveland, Secretary and Treasurer; E. K. STEWART, Columbus, Chairman Executive Committee.

The Street Railway Association of the State of New Jersey.

President, JOHN H. BONN, Hoboken; Vice President, THOS. C. BARR, Newark, Secretary and Treasurer, CHARLES Y. BAMFORD, Trenton; Executive Committee. OFFICERS and C. B. THURSTON, Jersey City; H. ROMAINE, Patterson; LEWIS PERRINE, JR., Trenton.

The Street Railway Association of the State of New York.

JOHN N. BECKLEY, PRESIDENT, Rochester, N. Y.
 THOS. H. McLEAN, VICE PRESIDENT, New York, N. Y.
 GEO. LAW, SECOND VICE PRESIDENT, New York, N. Y.
 WM. J. RICHARDSON, SECRETARY AND TREASURER, Brooklyn, N. Y.
 EXECUTIVE COMMITTEE—D. F. LEWIS, Brooklyn, N. Y.; C. DENSMORE WYMAN, New York, N. Y., CHAS. CLEMENSHAW, Troy, N. Y.
 The next meeting will be held at Saratoga, September 20, 1892.

Alabama.

BIRMINGHAM.—The electric cars are now running, to the great joy of the city and the comfort of the public. The company is a strong one and called the Birmingham Railway & Electric Company, organized with a capital of \$1,900,000. The officers are as follows: T. T. Hillman president; Robert Jemison, first vice-president and general manager; William A. Walker, second vice-president; J. A. Stratton, secretary and treasurer; W. L. Timberlake, superintendent. The directors are: T. T. Hillman, Robert Jemison, R. H. Pearson, George L. Morris, E. W. Linn, William A. Walker, T. C. Thompson, Joseph R. Smith, Sr., and W. T. Underwood. The electric power is furnished by the Electric Light Company. Putting it in displaces 200 mules.

Arkansas.

SEARCY.—Work has begun on the Searcy Street Railway. There will be about 1½ miles of track, which will connect Galloway College in the eastern suburbs with the Searcy College in the west end.

California.

OAKLAND.—The Consolidated Piedmont Cable Company announces that they will begin work on their Fourteenth street cable road, and on the cable road to Mountain View Cemetery, this winter.

The horse-car line on Telegraph avenue will soon be transformed into an electric road. A car load of ties are on the ground and the necessary rails have been purchased.

SACRAMENTO.—The road from Perkins to Sacramento is now an assured thing. The subscriptions now amount to between \$14,000 and \$15,000. One gentleman, who is at present not in the State, has given his promise to subscribe \$5,000 more. This will bring the amount of subscriptions nearly up to what is necessary, and all that remains now is to lay the track and wires.

The Central Company has absorbed the horse-car lines owned by R. S. Carey. The Central promises to equip the absorbed lines electrically

R. S. CAREY on retiring from his railway business was presented with a gold-headed cane by his employes.

SAN DIEGO.—Active work has commenced upon the 11 street horse-car line turning it into an electric system.

SANTA CRUZ.—The trial trip of the Santa Cruz, Garfield Park & Capitola Electric Railway Company has been made with great success. Everything worked perfectly. The formal opening will take place soon, when the company will entertain the citizens and invited guests.

SAN FRANCISCO.—California Cable Railroad Company stock has been booming, going to 119½.

Now that the litigation over the extension of Mission street has been settled the City Railroad Company has begun building its cable road. A short piece is being built out near Thirty-third street and College avenue, and in a few months, the company says, a cable will be put in on Mission, from the ferry to the terminus, in place of the horse-car line. Work is also in progress on the Page street branch, from Twelfth and Mission to Masonic avenue.

THE Metropolitan Electric Railway Company has let contracts for \$300,000 worth of work and material. This is to include the construction and equipment of a power-house at Carl and Tillmann streets, and cars and motors for the entire system. The power-house will cost \$20,000, without the machinery and fixtures, and the cars will cost from \$6,000 to \$7,000 each. The trolley system will be used.

THE Board of Supervisors has finally passed the order granting to Irwin C. Stump, Abner Doble and others a franchise for the construction of a street railroad along Sixth, Brannan and Eighth to South San Francisco.

Canada.

HAMILTON.—Chas. Black has been appointed manager of the Niagara Falls Street Car Company, and removes thither for his duties.

MONTREAL.—Mr. Beckerdike has applied to the City Council for right to run an overhead system over St. James, Ste. Cunegonde and St. Henri streets to Lachine.

QUEENSTOWN.—An electric line will be probably built from Chipewa and Queenstown next spring, and English capital is behind it.

Colorado.

ASPEN.—This city is to have an electric street car line next year. This is now a settled fact. J. R. Pemberton, of Detroit, Mich., is interested. The old horse car line will be utilized.

BOULDER.—The Boulder Street Railway, which suspended operations some time ago, is running cars again.

DENVER.—The tramway company will build another mammoth car house. It will be used to house electric cars, and will be situated at Thirty-first and Gilpin. John W. Roberts is the architect. It will be two stories in height, with dimensions 265x125 feet. There will be an office on the lower floor and a reading room and billiard room above for conductors.

THE Metropolitan Railway has been allowed to extend its lines.

Connecticut.

NORWICH.—The Norwich Street Railway wishes to put in an electrical equipment.

Delaware.

CAPE MAY.—Residents of Cape May have a plan under consideration to build an electric railway along the entire beach front.

Florida.

ST. AUGUSTINE.—The Council has granted franchise for a street railway.

Georgia.

GREENVILLE.—The street car line in Greenville is to be extended and better equipped.

MONTGOMERY.—The proposed electric car line in Montgomery has received a black eye from the City Council, that body refusing to grant them the franchise asked for, by a vote of 4 to 5.

ROME.—The sale of the Rome street railway to Washington capitalists has now been consummated.

Bonds to amount of \$100,000 are issued and sold to the American Security Company, of Washington City, and an electric road is assured.

Illinois.

LASALLE.—All the street cars have been supplied with Burton Electric Heaters, which are working finely.

MOLINE.—The new scheme for the transmission of mails by street car has been inaugurated.

The board of directors of the Central Street Railway Company elected officers for the coming year as follows: President, S. H. Velie; vice-president, E. H. Guyer; secretary, J. H. Porter; treasurer, C. F. Hemenway. Messrs. Velie and Guyer succeed Messrs. Moore and Corwall, and the other two officers were re-elected. W. R. Moore, the retiring president, has been one of the executive officers of the road since its organization and president for three years, and has given much of his time to it, so much in fact that he finds it necessary to devote himself to his law practice, to which he will give his entire time hereafter. It had been known for three or four months that he would not accept a re-election.

PEORIA.—The Fort Clark Street Railway Company will lay new tracks on Jefferson street between Main and Fulton streets. Some of the iron is there already.

WAUKEGAN.—The new company chartered lately is the Chicago West Ridge & Waukegan Electric Railway Company with a capital of \$1,500,000. Otin Maxson, Frederick S. Capron, Charles Steinbeiss and Frank H. Holand are named as incorporators.

Indiana.

ANDERSON.—The electric road will have to fight the Pan Handle to obtain leave to cross the latter's tracks.

HAMMOND.—The street railway ordinance has passed the council. J. W. Ulm is the most interested party in the promotion of the scheme.

LAFAYETTE.—The Lafayette road asks right to relay tracks and make extension on its electric line.

LOGANSPORT.—The new electric line is running to the intense delight of the citizens. The Edison system is used in conjunction with Sprague. The engine, a McIntosh & Seymour make, is a 110-horse-power, was put in under the supervision of R. M. Prior, of New York, an experienced gentleman in this line.

MUNCIE.—The steam motor car at Muncie was derailed by miscreants lately. The car was badly smashed.

MARION.—Tracklaying has been recommenced on second electric road here, the "Queen City." The line, embracing seven miles of track, will be finished by the first of the year. When completed Marion will have sixteen miles of electric street railway, equipped with twenty modern cars, motors and trailers.

TERRE HAUTE.—The strikers have resumed work and left all differences in the hands of a joint committee.

Iowa.

DAVENPORT.—The employes of the old Allen electric street car line in Davenport, who had to sue for wages due them when the transfer was made to the Syndicate, have obtained judgment for the full amount, aggregating about \$1,000.

DUBUQUE.—Two Dubuque youths recently boarded a street car and shot the driver because he refused to deliver up his cash to them. Both boys are under arrest.

The Chicago syndicate which bought the the Davenport consolidated street car lines has proposed to buy a controlling interest in the three electric lines at Dubuque provided the storage battery system is taken off Main street. The owners accept this condition, but the consolidation cannot be effected for some time. The local stockholders in the Allen & Swiney line have sold out to Dr. Allen, representing the Chicago interests.

DES MOINES.—The Warren Investment Company proposes an electric railway to Indianola, a distance of about twenty miles. The company asks Indianola to give a \$25,000 bonus.

KEOKUK.—A syndicate composed of Chicago and outside capitalists has made an offer for the purchase of the three street railway lines of Dubuque, Iowa. It is expected that the lines will pass under its control within the next six months. About fourteen miles of track are already laid. The three lines will be operated as one system and the overhead electric system will be used. D. H. Lauterback is at the head of the company.

The International Trust Company, of Boston, asks that a receiver be appointed for the Keokuk Electric Railway & Power Company.

OTTUMWA.—The Steam Heat and Electric Light Company and the Electric Railway Company, of Ottumwa, have been consolidated into one, called the Ottumwa Electric Railway Company, and the capital stock increased from \$200,000 to \$500,000.

BURTON electric heaters are causing great pleasure to the people of this city.

PRESIDENT Damon, of the Electric road, says that a large part of the stock is held by home capitalists. The new company intends to put in an electric line to South Ottumwa as soon as the bridge is put in.

SIoux CITY.—The resignation of John A. Wattles, general manager of the Sioux City Elevated Railway & Transit Company is announced.

SUPERINTENDENT Peavey, of the electric street railways, says that his company has abandoned the plan of building a new two-story power house at the corner of Second and Water streets which it has had under contemplation.

Kansas.

KANSAS CITY.—Thayer & Enright will make another attempt to get a franchise for an electric line on Seventh street. The road ought to be built.

SOUTH COVINGTON.—It is reported that the South Covington & Cincinnati Street Railway Company intends to operate four electric cars from the terminus of the new bridge in this city to Fountain Square, Cincinnati, by the first of the coming year.

LOUISVILLE.—The suburb of Parkland now has a fine electric line to the city.

Maryland.

BALTIMORE.—The Baltimore City Passenger Railway Company, through Governor Bowie, has awarded the contract for all the castings of the line of the new cable lines about to be built. The firm receiving the order is Davis & Thomas, Catasqua, Pa. The order was placed through Reed & Stickney, of this city. The price is \$28 per ton. The same firm furnished castings for the Third avenue cable line in New York city.

The contract for the North avenue electric system has been let. The work must be completed by June 1, 1892, and the cost not less than \$75,000 per mile.

FORTRESS MONROE.—Acting Secretary Grant has approved the amended plans for the location of the electric railway through the Fort Monroe military reservation.

HAGERSTOWN.—Col. McCarty and his engineers are laying out the routes of the electric road to Gettysburg. It is said that the erection of an expensive central plant and sheds, (probably costing \$30,000) and eight neat stations on different parts of the battlefield are in contemplation.

Massachusetts.

ATTLEBORO.—The Attleboro, North Attleboro & Wrentham Electric Street Railway is now managed by Vice President L. W. Dillon.

The Springfield Street Railway Company's stables were damaged by fire recently to the extent of \$10,000, insured. Fire started in the oil-room.

BOSTON.—President Breed of the Lynn & Boston Street Railway says that the entire seventy miles of track in Lynn will be equipped with electrical apparatus within one year. He also states that his company has in view a scheme for connecting Lynn, Salem and Newburyport with an electric line. It is probable that if a line of this kind is built the Naumkeag Street Railway Company of Salem will have a hand in it.

The railway directors have just declared the usual dividends of 4 and 5 per cent on the preferred and common stocks respectively. Both are made payable Jan. 1, 1892, to stockholders on record Dec. 19.

One of the most important events of the month has been the annual election of the West End Company. President Henry M. Whitney has again demonstrated his ability as a financier of the broadest gauge. The board is now composed of Henry M. Whitney, T. Jefferson Coolidge, Nathaniel Thayer, Wm. Powell Mason, Theophilus Parsons, Walter Hunnewell, Walter S. Swan, G. T. W. Braman, Isaac T. Burr, Jos. S. Fay, jr., Eustace C. Fitt, H. D. Hyde, E. D. Jordan, Samuel Little and Dexter N. Richards. The West End stockholders, and indeed, the people of Boston, should congratulate themselves on the election of the board of directors in charge of the transportation interests of the city.

BROCKTON.—Petition has been filed by the Whitman Street Railway Company, asking—through its president, George H. Campbell—for authority to lease its road to the Brockton Street Railway Company.

ESSEX.—A. C. Dodge has been appointed superintendent of the Essex Electric Street Railway, in place of Mr. Cash.

HOLYOKE.—Superintendent W. S. Loomis has resigned but will continue as managing director. Chas. L. Chapman of Springfield, who has been in street railway work several years, has been elected to fill the position.

MARLBORO.—H. E. Bradford, has been appointed superintendent of the street railway.

NAUMKEAG.—The Naumkeag street railway has practically bought the Essex electric road of Salem and Peabody, but as the Naumkeag could not, under the law purchase the road, it has been bought by President Orne of the Naumkeag road and friends.

NEWTON.—A petition has been received from the incorporation of the Newton & Boston Street Railway Company, represented by Joseph N. Keller and others, asking for a location for a street railway line, to be operated by storage battery or some other electric propulsion, between Newtonville, Newton Centre and Chestnut Hill.

SPRINGFIELD.—A delegation of the solid business men of Hartford, Conn., recently visited the Springfield road.

Some of the party were prejudiced against the electric system but went away very much pleased with it.

It looks now as though Hartford would adopt the trolley system.

WORCESTER.—At the annual meeting of the Worcester Consolidated Street Railway, C. B. Pratt, G. H. Seeley, N. S. Liscomb, A. G. Bullock, Geo. McAleer, N. Seeley, H. S. Seeley, G. A. Gaskill and Josiah H. Clark were elected directors, the last two names being new members occasioned by increasing the board to nine. The progress of the road in 10 years has been marked and shows an increase in cars from 13 to 96; tracks, from 4 to 24 miles; employes, from 30 to 187; property, from \$110,000 to \$775,000, and receipts from \$43,000 to \$274,000. The greatest contrast is in the change from horses to electricity on the Leicester-Spencer line. There is serious talk of building lines the coming season to Shewsbury, Millbury, West Boylston, and even to Marlborough.

The North End Railway Company has permission to extend its tracks to West Boylston and Clinton. To West Boylston is about four miles, and from West Boylston to Clinton, by the most available route, about six miles. The scheme will require a capital stock of about \$200,000. It is believed by those most interested that this amount can easily be raised, and that the investment would prove profitable.

Minnesota.

DULUTH.—The Duluth Street Railway will extend branches to Lakeside, Lester Park, West Duluth and New Duluth.

MANKATO.—The Street Railway Company has accepted the franchises granted and will have an electric system in order by July 1, 1893.

Michigan.

ALPENA.—Alpena is considering the proposition of outside parties to build a street railway in that city.

BATTLE CREEK.—The electric street cars have made their first trip. Everything worked smoothly and the people are greatly pleased with the innovation.

The electric railroad has effected a settlement with the Michigan Central railroad, by which the former is allowed to cross the latter's line whenever necessary in the city.

GRAND RAPIDS.—Reed's Lake electric seems to have given up the ghost.

The consolidated company have presented the Policemen's Benefit Association with a check for \$500, in recognition of their services during the strike last summer. The case of the company against the dynamiters has been dismissed owing to a technical weakness in the indictment.

KALAMAZOO.—The Knickerbocker Trust Company asks that a receiver be appointed for the Kalamazoo City Electric. W. R. Adams of New York City, was appointed.

Missouri.

CARROLLTOWN.—R. D. Apperson and J. A. Garrett apply for street car franchise.

ST. LOUIS.—Mr. Thomas K. Skinker, who represents the company managed by Robert E. Carr that intends to build an electric road from Clayton to Forrest Park, has got the assent from the Commissioners of the Board of Public Improvements to lay a track on the Skinker road. The road will be four and a half miles long, and will run from Clayton to a junction with the Lindell road of Manager G. D. Capen in Forest Park.

A device for electric street railways is to be tried by the St. Louis Underground Traction Company, who are preparing to build a track in the western part of the city on which to try an electric car with an underground conductor for the current. Yokes, slot and conduit similar to those of a cable road will be used, and the wire strung through the conduit will be insulated in a lead casing to prevent leakage of the current. Brushes, which distribute the current from the wire to a plate suspended in the conduit from the car, are placed at intervals.

The St. Louis & Suburban Railroad has discontinued locomotives and will substitute electricity. The old cable section will be run with electricity very soon.

The St. Louis & Suburban Railway Company is erecting a one-story brick power house to be erected on the north side of Maple street, between Hodlamont and Rosedale, at a cost of \$26,000. The building will cover 31 x 400 feet of ground.

The transportation of mails by street cars in St. Louis has been indefinitely postponed.

CHARLES MAFFIT, the street railroad manager, is laying his lines for a county electric road from the western side of Forest Park to Clayton, and will employ the overhead system. In the course of a few days he will apply to the County Court for his franchise.

Mississippi.

VICKSBURG.—The battle between the city and the railway has ended by a sheriff and posse tearing up the two miles of electric railway track. The company has done nothing in regard to it so far.

Montana.

HELENA.—Merritt, Grommon & Winne have closed a deal on behalf of the Denver & Helena Investment Company for the sale of the Union Electric Railway Company's lines at Helena, Mont., to New York parties for \$85,000. Denver people take stock in the new concern amounting to \$40,000.

OURAY.—Otto Mears is once again on the war path. This time it is the famous Red Mountain toll road which is to suffer at the hands of the inexorable law of the nineteenth century progress.

ARTICLES of incorporation have been filed with the secretary of state for the organization of the Ouray and Ironton Electric Railroad Light and Power Company. The directors of the new road are Otto Mears and Fred Watson, of Denver; Charles Mullen, of Ouray; J. H. Cassonova, of Phillipsburg, Pa. and W. A. Wallace, of Clearfield, Pa. The capital is \$800,000. The road is in the old Red Mountain toll road.

MISSOULA.—At a meeting of the Missoula Council, the Street Railway Company was granted an extension of six months time in which to complete the construction of their line.

Nebraska.

KERNEY.—The Kearney Electric Railway is keeping up with the "Kearney gait." For \$1 a month tickets are now granted which allow any number of rides. Electric car heaters are used on the road.

New Jersey.

ASBURY PARK.—The Seashore Electric Railway Company is anxious to make a double track belt line of its present road, and in order to raise money for this purpose, it wants the Alderman to extend the franchise of the company from twenty to fifty years.

JERSEY CITY.—Jersey City will have rapid transit as fast as the Bergen road can put up the wires.

New York.

ASTORIA.—The Astoria Street Railroad Company has been incorporated to operate a double-track street surface railroad from the foot of Fulton street, at East River, to the town of Newtown, at and in Grand avenue by the most direct and feasible route. The length of the road is not to exceed two miles, and the capital is \$100,000. The directors are: Edward M. Tyrrell, James Henry Christian, Brooklyn; Michael Conway, James Robinson, James W. Lamb, James P. Nixon, Jas. E. McWilliams, Long Island City; Anthony Miller, New York; John J. Delaney, College Point.

ALBANY.—The new superintendent of the Greenbush horse road is J. W. Goeway.

BROOKLYN.—The State Board of Railroad Commissioners has received a joint application from the Brooklyn City Railroad Company, the Atlantic Avenue Railroad Company, the Coney Island & Brooklyn Railroad Company, and the Brooklyn City & Newtown Railroad Company, for the approval by the Board of a change of motive power from horses to the overhead single trolley system of electricity on all their routes except those now operated by such power or for which permission to make such change has already been granted.

F. C. BUCKHOUT and F. R. JORGENSEN are securing permission from property holders to run a surface road on Bedford avenue.

THE Brooklyn Heights Cable Company, which operates the cable road on Montague street, is trying to extend its line to South Ferry.

J. D. MORRIS, of the Brooklyn City Railway Company, asks for a grant of seventeen acres of land under the water on the coast at Gravesend to finish up their land and water pleasure grounds.

BUFFALO.—Self-acting gongs are asked by some citizens, but half a dozen "gonging" at once will assuredly break up this wild desire for more noise.

ELMIRA.—The State Board of Railroad Commissioners has approved the change of motor power from horses to electricity on that portion of the Elmira & Horse Heads Railroad running upon West Water, Main and Third streets, Clinton street, Park Place and College avenue.

GLOVERSVILLE.—Chas. Gibson of Schenectady, has the right of way for an electric line to Johnstown and Gloversville. The road will be fourteen miles long and cost \$18,000 per mile. The Edison system will be used. Work begins next spring.

MORRISANIA.—The Morrisania Horsecar Company has purchased for \$30,000 the Balton property on Main street, West Farms, for the site of a power house for their new trolley system. The building and plant which they propose to erect will cost over \$250,000.

NEW YORK CITY.—The consents of the 540 property owners on Broadway have been obtained already by the Rapid Transit Commission for the proposed underground railroad. There are 235 owners on the Boulevard up to 190th street, and above that to the city limit some sixty. The city's consent on the \$34,600,000 of its property on the route has been obtained.

THE Harlem Bridge, Morrisania & Fordham Railroad Company has begun work on the change from horse to electricity. Still some moss backs kick saying that they prefer "slowness to electrocution!"

THE Manhattan Elevated Railway's net earnings for the past year were, \$4,559,619.79, total number of passengers carried since the opening of the roads, 1,591,869,927.

THE Third Avenue road paid a 12 per cent. dividend and had \$115,000 left over during the past year.

THE Third Avenue Road has received a new compound engine from Rhode Island Locomotive works. It weighs two tons and has a high pressure cylinder 12 $\frac{1}{2}$ inches in diameter and a low pressure of 20 inches.

THE syndicate in which John Weber, a wealthy brewer and the Brooklyn City Railroad Company are heavily interested, is about to establish a pleasure resort at Unionville, New Utrecht, at a cost of \$500,000.

ALBERT J. ELIAS, President of the Third Avenue Railroad Company, has received a permit from the Superintendent of Buildings for the construction of a nine-story building, to be used as a power-house and cable station and also for manufacturing purposes. It is to be located at the Bowery and Bayard street. The structure will have a frontage of 100 feet and a depth of 263 feet, and will cost \$950,000.

ROCHESTER.—The street railway employes have organized, and the greatest amity is shown between the employes and the company.

STATEN ISLAND.—The Port Richmond & Prohibition Park Electric Railroad Company has been incorporated with a capital of \$50,000 for constructing a street surface railroad about two miles in length from Port Richmond to the Prohibition Park. The directors are W. J. Demorest et al., of New York City.

WESTCHESTER.—The Williamsbridge, Woodlawn & Westchester Railroad Company has been incorporated to operate a surface road by electricity, probably through the villages of Mt. Vernon, South Mt. Vernon, Williamsburg and the town of Westchester, and to that portion of New York City known as Fordham. Its length is to be 24 miles, capital \$240,000, consisting of \$100 shares, and directors George H. Humphrey, et al of New York.

Ohio.

BUCYRUS.—Directors of the Bucyrus-Galion Railway have elected officers as follows: President, C. W. Fisher; vice-president, O. L. Hays; secretary, C. J. Scroggs; treasurer, J. B. Gormly; general manager, W. C. Lemert; chief engineer, N. A. Sager.

BRIDGEPORT.—The council has granted J. M. Sweney & Co right to build an electric road.

CLEVELAND.—The city council with rare good sense has declined to lower the car fare to 6 tickets for a quarter and 12 for fifty cents. The local conditions are such that the reduction would work as hardship to the East Cleveland road. The ordinance was rejected 14 to 6.

THE seventh annual dress ball of the Cleveland Street Railway Employes' Benefit Association was held recently with great eclat.

THE Cleveland City Cable road will build a waiting room for passengers. The cost of the structure will be \$1,800, and an effort will probably be made to complete it this fall.

CLYDE.—Talk is still abroad of running an electric line from here to Fremont.

COLUMBUS.—The Worthington, Clintonville & Columbus Street Railway Company, Columbus, capital stock \$10,000, is incorporated.

EVENTUALLY the Consolidated will increase their power to between 2,000 and 3,000-horse-power. They will either put in three engines of 700 or two of 1,000 horse power each. Their condition at present is such that they are afraid to run additional cars, for fear of overloading some of the machinery at the power-house, which would compel them to lay up some of their cars and badly cripple them. New dynamos will be put in also.

H. C. COOKE, A. B. Clark, et. al., have filed papers for the incorporation of the Worthington Street Railway Company.

DAYTON.—Street car stables have, of late years been improved in Dayton, and they can now boast of having some very fine buildings connected with the street car service. Among these are the Third street stables, the Fifth street car house, the Green Line stables, the Oakwood stables, and last but not least, the White Line's fine power house, manufacturing and repair plant and iron car sheds.

DELAWARE.—The County Commissioners have granted a petition, as far as it is in their authority, to J. K. Newcomer and his assigns to lay and operate an electric street railway system on the streets of this city.

EAST LIVERPOOL.—The East Liverpool & Wellington Street Railway Company has been incorporated. Capital \$300,000. A. L. Johnson and S. H. Short of Cleveland are interested.

TOLEDO.—The street railways will hereafter have safety gates on their cars, by order of the City Council.

Oregon.

PORTLAND.—The new power-house now building at the foot of Jackson street for the East Side Street Railway Company is about ready for use. The structure is 100 feet long and 35 feet wide, and is covered with sheet iron.

The Third Street Line will soon be changed to electricity. By January 1st, the new Pullman cars will be running.

SALEM.—The county court has granted the Electric Street Railway line right of way on south Commercial street to the Rural Cemetery, a distance of about 1 mile.

Pennsylvania.

ASHLAND.—The Tamaqua & Lansford Street Railway Company, with an authorized capital of \$50,000, has been chartered. F. P. Spriese is president; Robert Harris, secretary, and Hon. D. D. Phillips, of Gordon, the treasurer.

ALTOONA.—The rain and wind storm recently blew out the wall of the electric road's power house and seriously injured Engineer Heilman.

COLUMBUS.—The track of the electric line is now complete from the bell tower in Broad street to North Highlands Park. The poles and trolley wires are being put up very fast. The company expects to run the first cars soon.

GERMANTOWN.—The People's Passenger Railway Company has begun the work of extending its Chelten avenue branch in Germantown, from Pulaski avenue, along Rittenhouse street to Fairmount Park, a distance of one mile.

PITTSBURG.—The Pittsburg & Birmingham Traction Company has acquired a controlling interest in the Tenth street bridges. The company wished to make an electric line of the short line division, but the bridge people would not go to the expense, so the \$80-per-share transaction. It is reported that a new inclined plane will be built at Eleventh street. Another deal is the contemplated absorption of the Suburban Rapid Transit Railway by the Birmingham people.

Work on the bridge line begins immediately.

PITTSBURG.—The Citizens' Co., at its annual meeting elected officers J. G. Holmes, president; H. S. A. Stewart, vice-president; Nathaniel Holmes, secretary. There was an increase of 836,437 passengers over the previous year. The Sharpesbury Electric Line was opened December 1st for business.

HARRISBURGH.—The East Harrisburgh Railway Company will put up its own repair shops.

At the annual meeting of the Pittsburg Traction Company, G. W. Elkins, of Philadelphia, was elected to fill vacancy caused by the death of W. H. Kimbill, and the remaining old members were re-elected. Officers for the year are: Geo. W. Elkins, president; T. S. Bigelow, vice-president; J. S. Traggardt, secretary and treasurer; Geo. C. Wilson, Solicitor.

The Second Avenue Passenger Electric Railway elected the following officers: President, James D. Callery; secretary, J. C. Reilly; treasurer J. W. Taylor; directors, J. D. Callery, J. C. Reilly, W. J. Burns, George C. Wilson and W. V. Callery. The year has been a prosperous one.

The outlying districts of the Thirty-second and Thirty-fifth wards want an electric road to the city. W. B. Lupton acted as chairman of a meeting which subscribed 675 shares.

The Pittsburg Second Avenue Passenger Railway is to equip throughout with Westinghouse motors, single-reduction type.

The Pittsburg, Knoxville & St. Clair Electric Railway, rights, franchises, road bed, etc., have been sold at the suit of the receiver, to Murray Verner, for \$2,500, subject to a mortgage of \$60,000 and receiver's certificates amounting to \$18,000, \$78,000 in all, making the price of the road \$80,500.

Duquesne Heights residents intend to operate an electric street railway between Third avenue and Market street, and the Heights by way of the Mt. Washington road. The proposed capital stock is \$100,000.

Pittston.—The Wyoming Valley Traction Company has bought the Pittston street railway system. Pittston and Wilkes-Barre will be soon connected by an electric road.

Philadelphia.—City Solicitor Warwick has accepted the sureties offered by the North eastern L. and the road will probably be built.

The Peoples' Passenger Railway Company wants to put electricity on the line from the depot at Eighth and Dauphin streets on Germantown avenue to Chestnut Hill.

Shenandoah.—The ground for the Mahaney City, Shenandoah, Girardville & Ashland Electric Railway, was broken recently. The line will be one of the longest in the state.

Sunbury.—The Sunbury & Northumberland will run with horses until a new equipment can be secured.

Wilkes-Barre.—The Pittston Street Railway franchise has been sold to the Wilkes-Barre Traction Company. The new officers are: J. J. Patterson, president, and John Graham, secretary and treasurer. The Wilkes-Barre Company has elected officers as follows: J. J. Patterson was chosen president to succeed John B. Reynolds; John Graham treasurer, to succeed Pierce Butler, the latter who held the office of secretary and treasurer being chosen secretary. Several extensions are being pushed very rapidly.

South Carolina.

Spartansburg.—The City Council has asked an opinion on the street railway question, and wishes to grant a second franchise if Col. Lefwich has forfeited his rights.

Tennessee.

Chattanooga.—The Electric Railway Company will furnish power to Chattanooga parties from its plant.

Nashville.—The United Electric Railway Company has moved into its commodious offices at 313 Cedar street.

The employes of the electric railway and power companies have all stopped work on account of not being paid regularly.

Texas.

Denison.—C. W. Batsell, of Sherman, is completing his arrangements for substituting electric for mule power on his Sherman Street Railway, and also extend the system. He has purchased five new cars in St. Louis. He expects to have the new service in operation by April next.

AUSTIN.—The roadbed and equipment for the electric road, the Austin Rapid Transit line, is at hand and the road running.

THE following rapid transit company is incorporated: Austin Dam Street Railway Company, capital \$100,000; directors: Wm. Metzger and Thornton Snell, of Clinton, Ill.; Richard Snell, of Kansas City; and D. C. McMartin, George Penn and H. N. Burns, of Austin, Tex.

CORSICANA.—H. C. Damon received a letter from the New York syndicate to buy the street car line and other interests here, stating that the option given had been accepted and the arrangements to pay the money would be telegraphed to-day. This syndicate proposes to buy the ice plant, electric light works and street railway, changing the power from mule to electricity. It is also proposed to extend the line a mile east from the fair grounds to the city water works lake, which is to be made a boating, fishing and pleasure resort.

GALVESTON.—The City Council has granted franchise to the South Galveston & Gulf Shore Electric Railway Company. The new line will run through portions of the city now without railway facilities, thence down the beach to South Galveston, about thirteen miles.

HOUSTON.—The Houston City Street Railway Company will erect a brick shop 250x141 feet, and make their own cars. The electric equipment is being rushed, and the city will have one of the best equipped roads in the State. The Short system is used.

Utah.

SALT LAKE CITY.—Jarvis & Conklin sue the City Railway Company for restraint and accounting. A receiver is asked for, and the plaintiffs allege damage to \$400,000 worth of property and stock.

Virginia.

RICHMOND.—The Seven Pines Railway Company has had under consideration for some time the idea of changing that line from a steam railway to an electric car line.

Washington.

SEATTLE.—The City Council has granted to the Rainier Railway & Power Company a franchise to construct and conduct an electric railroad on Third street. The line will run about twelve miles and cost \$500,000. Work will begin very soon. The officers of the company are D. T. Denny, president; Roger S. Greene, vice-president; George Kinnear, treasurer; John B. Denny, secretary; and D. T. Denny general manager.

TACOMA.—The Point Defiance Street Railway is now operated by electricity.

West Virginia.

RONCEVERTE.—The Ronceverte Electric Company has been incorporated for the purpose of operating electric street railways, and supplying electric power for the same. The principal office is to be kept at Ronceverte. The capital is \$300,000. Col. E. C. Best, of Ronceverte, and other parties, from Baltimore, are the incorporators.

Wisconsin.

KENOSHA.—The common council will grant a franchise for an electric street railway in this city to J. W. Munson, a Chicago capitalist, whose summer house is at this place. It will connect the outskirts with the business portion of the city. The track-laying will commence as soon as possible.

MILWAUKEE.—The Real Estate Board proposes through cars to all parts of the city. This will require considerable extensions but it will pay in the end.

THE Barre Sliding Railway wishes to run a line to Chicago. The officers are: Astor Cissam, president; M. A. Myers, secretary, Chicago.

RACINE.—The Belle City Railway Company is to put in an electric power plant and has begun to lay broad gauge track.

SUPERIOR.—C. P. Kingsbury of Muskegon, Mich., has been appointed superintendent of transportation of the Douglas County Street Railway, and will enter upon his duties at once. Mr. Kingsbury is a gentleman of some fifty years of age, and has had twenty-eight years of active service in the street railway business, having been for a number of years general manager of the system in Muskegon.

Wyoming.

CHEYENNE.—The Cheyenne Street Railway Company has in storage 9,000 ties. This will suffice for nearly four miles of track.

LARAMIE.—The Laramie Tramway Company, of which F. M. McHale of Denver, president, has just issued \$60,000 in bonds secured by a first mortgage upon their property. The Title Guarantee & Loan Company is named as the trustee.

STREET RAILWAY PATENTS.

Selected list of patents relating to Street Railway Inventions, granted during the past thirty days; reported especially for the STREET RAILWAY REVIEW, by Munn & Co., Patent Attorneys, 361 Broadway, N. Y.

ISSUE OF NOVEMBER 10, 1891.

Electric Railway System, H. C. Camp, St. Paul, Minn.....	462,688
Device for removing Ice From Overhead Wires, G. Hipwood, Boston, Mass.....	462,707
Electric Railway Motor, C. J. Van Depoele, Lynn, Mass.....	462,751
Combined Car Step and Gate, W. E. Ludlow, Toledo, O.....	462,769
Car Brake, J. F. Pfetch, Erie, Pa.....	462,993
Electric Railway System, G. T. Woods, New York, N. Y.....	463,020
Reversible Electric Trolley, J. W. Bates & C. E. Blake, Minne- apolis, Minn.....	463,024

ISSUE OF NOVEMBER 17, 1891.

Crossing for Electric Railway Conductors, W. J. Silver, Salt Lake City, Utah.....	463,310
Motor Car for Electric Railways, T. E. Adams, Cleveland, O.....	463,359
Electrical Conduit, J. C. Love, Philadelphia, Pa.....	463,197
Power Storing Mechanism for Electric Locomotives, J. A. Hockett, Sterling, Kan.....	463,315
Electric Locomotive, S. H. Short, Cleveland, O.....	463,356

ISSUE OF NOVEMBER 24, 1891.

Electric Motor Mechanism, S. E. Mower, New Haven, Conn.....	463,639
Self Lubricating Trolley Wheel, W. Duncan, Alleghany, Pa.....	463,733
Electric Conductor for Railways, C. E. Sargent, Chicago, Ill.....	463,760
Trolley for Electric Railways, G. H. Alton, Lynn, Mass.....	463,765
Switch for Electric Railways, F. O. Blackwell, Boston, Mass.....	463,766
Trolley Wire Hanger, E. T. Birdsall, New York, N. Y.....	463,824

ISSUE OF DECEMBER 1, 1891.

Crossing for Trolley Wires, R. M. Jones, Salt Lake City, Utah.....	464,129
Trolley Wheel for Electric Railways, S. W. Kimble, Denver, Colo.....	464,370
Trolley Wire Hanger, S. W. Kimble, Denver, Colo.....	464,371
Hanger for Trolley Wires, T. E. Adams, Cleveland, O.....	464,411
Street Car, G. T. Chapman, White Plains, N. Y.....	464,450

A GREAT COUNTRY.

Owing to the great amount of interest shown in the Northwestern states, and especially in Montana and Washington, the Northern Pacific Railroad has prepared two folders, entitled "Golden Montana" and "Fruitful Washington," which contain a great many interesting and valuable details in reference to climate, topography, agriculture, stock-raising, mining, lumbering, government and railroad lands, homesteads, and other subjects of interest to the capitalist, business man or settler. These folders can now be obtained on application to the General Passenger Agent of the road.

It should be borne in mind by travelers to the Northwest that, among other things, the Northern Pacific Railroad offers the following advantages: It is the direct line to principal points in Minnesota, North Dakota, Montana, Idaho, Oregon and Washington; it has two trains daily to Helena, and Butte, Mont., Spokane, Tacoma and Seattle, Wash., and Portland, Ore.; it has complete equipment of Pullman first-class sleeping cars, dining cars, day coaches, Pullman tourist and free colonist sleepers, the cars being new, comfortable and neat; it has through sleeping car service every day from Chicago, Ill., to Montana and Pacific Coast points, of Pullman first class and tourist sleeping cars in connection with the Wisconsin Central Line, and vestibuled first-class sleepers via C. M. & St. P. Ry.; it passes through the grandest scenery of seven states and the great young cities of the Northwest. The service is complete in every respect, the "Yellowstone Park and Dining Car Route" being, in fact, a thoroughly first-class line to travel over.

District Passenger Agent of the company will supply publications referred to above, with maps, time tables, rates or other special information may be had by addressing Chas. S. Fee, G.P. & T.A., St. Paul, Minn.

REVIEW OF THE YEAR WITH OUR ADVERTISERS.

What the Leading Supply Houses Have Done in 1891—Largely Increased Business Reported in Every Branch of the Trade—A Highly Satisfactory Showing—Indications Point to a Large Demand for Next Year.

THE three hundred and sixty-five days of 1891 are rapidly drawing to a close, and at this time it seems most fitting that we should, even though very briefly, sum up the results of the year's business in that now commanding industry, the manufacture and sale of street railway supplies.

In this connection, it is but just to recognize the debt which the railway companies of the country, and the world, owe to the energy and intelligent efforts of those from whom they buy, and who work out their difficult problems and furnish the finished and perfected product. Until within the past few years, only the large railway companies felt they could afford to experiment, while the smaller ones looked on and anxiously waited the results, hoping there might evolve something of value within their reach. Now all is changed, and street railway inventors and manufacturers boldly put thousands, which, in not a few instances, mount into the hundreds of thousands, into experimental work, and, having solved problems far beyond the understanding of the average manager and director, bring forth the perfected work, and put the stamp of a strong guarantee upon its being able to fulfill its own promises.

In all this the railway interests have received a wonderful and unprecedented impetus, though we doubt that in every case the hurried president and manager stops to consider how great his debt, and how much of credit belongs to these indefatigable workers.

It is, then, with feelings of unusual pleasure that we are able to chronicle the business of 1891, so full of satisfaction to the seller, and that the net increase over last year is so large. While fewer very large roads have entirely changed equipment, the aggregate of new small lines, and the additions to those built in 1890, combine to form a business where totals are well up in the millions.

The firms mentioned below are well known as among the largest in the country, and represent every branch of supplies used by railway companies. We congratulate them on the deserved success which has attended earnest, honest endeavors; we congratulate the railways of the land that they have to deal with so high-minded a class of business men: the STREET RAILWAY REVIEW congratulates itself, that for the part it has been permitted to work out in bringing the two classes to a better acquaintance with each other. That the acquaintance has been a pleasant one, it is unnecessary to prove, and that it has been profitable, the large orders booked by the manufacturers and the larger dividends paid to railway stockholders fully substantiate. For our part of the transaction we have but to thank both parties to the arrangement and then plunge in medias res.

THE DUPLEX STREET RAILWAY TRACK COMPANY, who with general offices at 51 Wall street, New York, are under the direct supervision of Mr. John D. Elwell, has been reorganized during the year, and has exclusive control of the Gibbon patents.

The company reports that great interest is taken in its construction for the New York & Harlem Railroad Company, which is now in progress on Fourth avenue, New York.

Several orders for track have already resulted from the work shown there, and the company has contracts for track for immediate construction in Richmond, and other points further south, which will keep it quite busy during the winter season.

As early in spring as work can be resumed it has orders from three prominent railroads in the East, and a number of western contracts pending. It expects to roll its rails for the western roads in Chicago.

There can be no doubt of the favor with which the Duplex system is received by street railway men who have suffered from "low" joints in their track. With the Duplex track, this is impossible, as there is no complete break anywhere in its length: one-half of the rail always being solid at every connection of the other half of the rail. The solid head covering each tram connection, and the solid tram directly under and supporting each head connection.

PRICE RAILWAY APPLIANCE COMPANY, has attracted a no small amount of attention, the patents being those of James M. Price of Philadelphia, where the general office of the company is located. Their track construction is a radical departure both in shape of rail and the manner of its connection with the stringer upon which the rail rests, thoroughly protecting the wood from wet. The system contemplates the greatest wear of rail, with an easy riding track, and a minimum of waste material when worn out, for the scrap heap. Their "Plate and Sleeper Joint" especially contemplates the prevention of sagging and knocking at the joints, and the whole system has been devised with a view to rapid and solid construction work. A considerable amount of the rail is now being laid on lines in the city of Philadelphia. The results of the year with the Price Appliance Company have been very gratifying.

E. SAXTON,

engineer and contractor for construction of cable railways, has found the past an extremely busy year, having devoted most of his time to the construction work of the Pennsylvania avenue and Fourteenth street cable lines of the Washington & Georgetown road at the National Capital.

THE GOUBERT MANUFACTURING COMPANY,

at 32 Cortland street, New York City, are doing a very large business in their well known "Goubert Feed-water Heater," and report the following recent sales:

The Edison Electric Illuminating Company, of New York, one 400-horse-power, one 600-horse-power and one 2000-horse-power; J. B. Ford & Co., Wyandotte, Mich., 1000-horse-power; Hathaway Manufacturing Company, New Bedford, Mass., 1200-horse-power; Ottumwa Railway Electric & Steam Company, Ottumwa Ia., 350-horse-power; The De La Vergne Refrigerating Machine Company, New York City, 2250-horse-power; Lonsdale Company, Lonsdale, R. I., 1000-horse-power; Wamsutta Mills, New Bedford, Mass., 1600-horse-power; Detroit Electric Light & Power Company, Detroit, Mich., 1000-horse-power, besides quite a number of smaller heaters.

THE STANWOOD MANUFACTURING COMPANY,

of Chicago, has been kept constantly busy throughout the year, and have been in receipt of a large number of duplicate orders from companies who purchased trial orders a year ago.

The works have not only been pushed to their utmost capacity but it has been found necessary to add a large amount of new machinery, which has been especially constructed for the purpose, and which has now placed them in position to turn out work more rapidly than ever before.

T. H. Stanwood, president of the company and inventor of the step, is a man with whom the street railway managers have found it a pleasure to deal, in addition to which the intrinsic merits of the step combines to cause no wonder that the volume of business reported has been so large. There has not been a single company which has tried this step which has not been pleased with it, and those who have once used it, invariably specify the Stanwood step when ordering new equipment.

THE PROUTY MOTOR

is the invention of E. Prouty, of Chicago, whose fame as the inventor of the Prouty Printing Press extends throughout the country. With the smallest possible space on the front platform of an ordinary sized car, and by placing all the other machinery beneath the car he has devised a steam motor that is attracting a great deal of attention. His system of making the exhaust steam both invisible and inaudible is most ingenious. A public exhibition will be made in a week or two in this city. Although only before the public during the past few months, he has been in receipt of hundreds of inquiries, showing the demand for such a motor.

T. C. WHITE & CO.,

in the handsome Bank of Commerce Building, St. Louis, have found a strong demand for their various lines of rails, chairs, turn and transfer tables, track castings, cars and general street railway materials, of which they handle a complete stock.

I. H. RANDALL,

of Boston, has sold a larger number of his advertising racks for street cars than ever before, owing to the more general appreciation of the revenue a company may derive from the source, and to additional cars being put on and equipped by roads already using them. His orders for the several styles of street cars have been large and increasing in number throughout the year, which has been the most successful one in the history of this company.

HOLMES, BOOTH & HAYDENS,

whose factories are at Waterbury, Conn., and New York office at 25 Park Place, under the management of Thomas L. Scovil, have had a heavy trade in bare and insulated wire, especially their "K. K." line wire, which is one of their leading patents. The demand for copper magnet, flexible silk wire, and round and flat copper bars for station work has been large.

THE CROWN LUBRICATOR COMPANY

is a Chicago institution, and is full of orders for the necessary materials to grease the wheels of commerce. The output the past year shows an increase of 50 per cent. over last, and many orders for next year's delivery have been received by both old and new customers. Manager Davis is thoroughly alive to the special wants of the street railway trade and carries oils and greases for all purposes. During the year their capital stock has been increased from \$25,000 to \$50,000.

M'INTOSH, SEYMOUR & COMPANY

of Auburn, N. Y., find the sales for 1891 fully 50 per cent. in excess of last year. Most of the output was compound engines averaging 200 or 250-horse-power each, and more than half of which have gone into electric railways. An increase in their shops, of 160 x 117 feet gives them a building 117 x 430 feet. An electric crane has been put in which travels 365 feet per minute. During the present and past two years the shops have worked 23 out of the 24 hours. Their engines and machinery go to all parts of the world. They are now making a planer to plane 122 inches by 122 inches by 20 feet. Also a cylinder boring machine which will bore a cylinder 60 inches diameter. The table of this machine is 10 feet wide and 12 feet long. The principal agencies are in most excellent hands and are: New York, Pierce & Thomas, 42 Cortland street; Boston, J. A. Grant & Co., 8 Oliver street and Chicago, Sargent & Sundy, 339 Rookery Building. There is very little of business in any of the territories named that does not hear among the first from the gentlemen just mentioned, and all who once have dealings with them are glad to continue the same.

DORNER & DUTTON,

the well-known Cleveland firm, report a satisfactory year, having sold a large number of their patent track cleaners and have met with good success with their patent motor truck, which is one of their specialties.

PECKHAM WHEEL AND MOTOR TRUCK,

of which E. Peckham, Kingston, N. Y., is president, has received its share of business in 1891, and their trucks are giving good service in different parts of the country. During the year the company has increased their facilities and also brought out a new electric motor truck for electric cars.

THE NORTHERN CAR COMPANY

has recently been reorganized with a capital of \$250,000, of which \$150,000 is paid in. The new officers are: C. P. Jones, president; W. E. Steele, vice-president; D. M. Gilmore, treasurer and general manager and George P. Stearns, secretary. The superintendent is C. B. Manier, who was connected with the Gilbert Car Company for 23 years as workman, foreman and superintendent. The works can now turn out one car per day, and will now make an active fight for its share of the business.

THE RAILWAY REGISTER COMPANY

and Edward Beadle, general manager at 1193 Broadway, New York, are always mentioned together. It is one of the oldest, best known and popular companies with which it is the good fortune of the street railway manager and buyer to deal. During the year the general office of the company was burned, causing no little annoyance to Mr. Beadle who, however, kept business moving just the same and patrons had no cause, even had they been so disposed, to complain. Several styles of portable and stationary registers are handled, together with a line of bell punches, and every appliance necessary for the collection and registration of fares. This company has been before the public many years and never fails to protect and promote the interests of its patrons in every possible way. The business of the year now closing has proved a most satisfactory one, while the prospects for 1892 are encouraging in a high degree.

THE BROWNELL CAR COMPANY,

of St. Louis, report a very prosperous year, having had their works running to their full capacity through the season, and having sent cars to all parts of the United States. The special feature of the year with them, has been the invention, construction and recent introduction in some of the largest cities of their new "Accelerator" car, a description of which we recently published. At the present time this car is being run on the cable lines of the North Chicago Street Railroad, and is meeting with very good success. Its principal feature is that of an unusually large platform, and a set of double doors at each end of the car, which on rush trips and during heavy loads, permits of easy entrance and exit of passengers with the least possible loss of time, the arrangement being such that a passenger may stand with one foot on the step, and the other within the car. Space is also left at each end of the two side seats to further facilitate easy movement of passengers. This car attracted no small amount of attention at the Pittsburgh Convention, and has been favorably considered with a view of adoption by a number of large companies.

THE BALL ENGINE COMPANY,

of Erie, started the year's business full of orders, with shop running night and day. During the fall of 1890 they had just completed a new foundry and store room, and added a number of new tools, which was expected to relieve the pressure of business. It soon became apparent that a further increase was necessary and a new shop was commenced April 3d and completed September 1st. The services of C. W. Lawrie, mechanical engineer, were also secured during the year. Shipments for the year were fully 25 per cent. over those of 1890. From January 1st to July 1st shops were run both night and day; and the night work was resumed again October 1st and still continues. Works are full and several months' orders for next year are booked. The first class work of this concern has commended it to electric railway and light men everywhere.

THE WIGHTMAN ELECTRIC MANUFACTURING COMPANY,

of Scranton, Pa., has enjoyed a good trade, and will be in their new factory before spring. This company states that the secret of their success lies in select advertising, the furnishing of superior apparatus, prompt shipments, and a constant effort to please all patrons. Their motors have been in service all the year on a number of roads, while the Wightman Speed Controller is being adopted on several roads to take the place of rheostat, reversing switch and troublesome cables, and it is meeting with much success.

An improvement has recently been introduced into the Wightman controlling apparatus which greatly reduces the liability to accidents. A reversal of the controlling switch brings the car to a gradual standstill whether the trolley remains on the wire or not. A connection is so made that one motor generates a current into the other, and a strong action is produced thereby. This improvement is going to be of great advantage on hilly roads. Their anti-"come-off" trolley which follows the wire even at a distance of three feet to one side is still growing in popularity. Altogether the Wightman is a progressive and busy institution.

THE VOGEL CABLE CONSTRUCTION COMPANY

have kept actively in the field under the presidency of G. A. Lederle and with W. C. Pratt as secretary and treasurer. They have recently introduced the Vogel grip on the Broadway cable line, St. Louis, where it is in daily use and giving good satisfaction.

ROBERT POOLE & SONS COMPANY

have turned out a large amount of heavy work during the year and have every reason to be satisfied with the quantity and quality built. They have recently received the contract for the new driving machinery for the Washington & Georgetown Railroad. This firm has built and installed some of the heaviest power plants in the world, and their reputation for high grade work is second to none in the country. Their works are very large and complete and their corps of mechanical engineers are men of long experience and of the highest standing.

THE INTERNATIONAL OKONITE COMPANY

report a large increase from all their branch houses, located in ten cities in the country, and a heavy foreign trade from London and South America. The Okonite factories have been run to full capacity, and the product shipped as fast as it could be turned out. The superior quality of this wire for feeder and underground purposes, where hard service is required, is fully recognized, and there is no wonder when the report comes, that 1891 has been composed of 365 red letter days for the Okonite Company. While incorporated as a "limited" company the volume and extent of its business has been enormous.

THE NEW DEPARTURE BELL

was indeed a new departure though it has come to stay. It is having a remarkable sale not only to rapid transit companies but to police and fire departments everywhere. It is to be found in all the large cities, and the company have been behind in filling orders for some time. They are adding large facilities and also promise something new in a few weeks. John H. Graham & Co., 113 Chambers street, New York, are the general agents.

THE MEAKER MANUFACTURING COMPANY,

whose portable and stationary registers are so widely known and used, has had an unprecedented year and shows immense gains. During the year President Meaker moved a large part of the manufacturing department to Chicago where the registers are put together and all repairs made for western customers. The parts are still made east, where their heavy machinery is, and shipped here. An improved register has been brought out within the past four months which is pronounced as nearly perfect as study and skill can produce.

HEALY MOTOR.

The Healy Steam Motor is enjoying great prosperity even in its youth. Two motors have been supplied to the Jefferson Avenue Railway Company and three to the East Detroit & Grosse Pointe Railway. Both of these companies are so pleased that they have ordered additional motors. The Owosso & Coruna Railway has bought two and orders have come in so fast that Mr. Healy has been unable to make his contemplated trip to Chicago. They have been unable to keep up with orders which come in faster than motors can be gotten out.

THE EASTERN ELECTRIC CABLE COMPANY

does not, however, confine its sales to the East, but has sold its share of the "Clark Wire" throughout the West and in greater amounts than ever before. The quality of the Clark wire is fully established and is guaranteed for both overhead, underground, and submarine uses. It was this wire of which the Inspector of the Boston Fire Underwriters' wrote—"A thoroughly reliable and desirable wire in every respect." The company also have had a large demand for the Clark Joint Gum and the Clark Insulated Wire for motor use.

THE LACLEDE CAR COMPANY,

of St. Louis, has undergone a reorganization during the year, the present owners being former officers.

The works have a national reputation, their cars are to be found in all parts of the country and the company scored the proud distinction of having booked the largest single street car order ever given—viz.: 375 cars for the Third Avenue Cable Road in New York City. Their works are full and the outlook for 1892 is all that could be wished.

THE LIMA REGISTER

takes its name from the city of its birth, and is another appliance brought out in 1891. The register is a very good one and is greatly liked wherever in use. Among the roads equipped are the Toledo (O.) Consolidated and the National Electric Traction & Lighting Company, of Vancouver, British Columbia. Other roads have been supplied and the company has been obliged to enlarge its manufacturing facilities already.

THE SHORT ELECTRIC RAILWAY COMPANY

has had its immense shops at Cleveland crowded with work throughout the year, the record of which for the Short Company and its generators and motors has been a highly gratifying one. Prof. S. H. Short has given his personal attention to the direction of all important matters, and has brought out numerous new devices for making the service better. The prominent feature of the year may be considered his gearless motor, the first of the kind put upon the market, and which has proved such an unqualified success for its intended work. The sales of single and double reduction motors have been large, and altogether, the year with the Short Company has been the most busy and most prosperous one in its history. The Short motors in service during the year have made a splendid record, not only for efficiency, but economy of wear. The new roads equipped during 1891 have operated successfully from the start, and the railway companies and the public are highly pleased. The outlook for 1892 is very good and points to greatly increased demand for the Short apparatus.

SMITH, OF NEW YORK,

needs no further specification to street railway readers, who immediately recognize the old and long tried house whose lamps are lighting up what would otherwise be the gloom in hundreds of street cars, and the light of whose head-lights tells the story of coming events, in the shape of cable and electric cars. When Willard H. Smith died some years ago, Mrs. Josephine D. Smith, with the assistance of her sons, took up the business, and have carried it forward ever since, not forgetting to keep right up to the times, as new requirements grew out of the new methods of traction. Their business has been phenomenally large the past year, including not only orders from old customers, but many from new companies.

THE FALLS RIVET & MACHINE COMPANY,

of Cuyahoga Falls, Ohio, has one of the most interesting plants of its kind in the country. They report an output of fully 50 per cent. over last year in their patent Friction Clutch Pulleys, Couplings, and Steel Rim Pulleys. Their work in the line of difficult and special construction has been larger than ever, and has gone into some of the finest plants in the country. Among electric railways supplied are those at Wheeling, W. Va., Beaver Falls and Reading, Pa., Cincinnati, Louisville, Cedar Rapids; and also a long list of the largest electric lighting stations in all parts of the land. They are now making several large friction clutch couplings for the Narraganset Electric Light Company of Providence, Brush Electric Company, Cleveland, Utica Electric Light Company, Utica, Masonic Temple, Chicago, and many others. Their orders from railway companies have been larger than ever before, and with their splendid facilities and corps of skilled mechanics, are in position to do the best possible work and on short notice. They also have just received an order from the University of Nebraska, located at Lincoln, Neb., for a complete line of shafting, consisting of ring oiling bearings, friction clutch pulleys, etc., to be used in its electrical department.

ADAMS & WESTLAKE CO.,

of Chicago, have done an enormous business the past year, the railway department being in charge of Ward W. Willett whose long experience and extensive acquaintance puts his company to the front in the street car trade. The high standard of the Adams & Westlake manufactures is known everywhere. Their lamp and headlight orders show a good gain over 1890, while the trade in brass trimmings of all kinds has been heavy.

ALLEN'S SAFETY BRAKE

invented by W. W. Allen, of St. Paul, is one of the noticeable inventions of the year and is attracting a great deal of attention. Further improvements have been made by Mr. Allen since it was first brought out. It is warranted to hold any car on any grade.

THE ELECTRIC SUPPLY COMPANY,

of Chicago, have evident cause to remember the year of our Lord one thousand eight hundred and ninety-one, as the year in which they occupied the big five story building where they now are. While the growth of this company has been remarkable from the start the past year was the one in which they were actually crowded out of old and by no means small quarters into their present extensive home. General Manager Terry and his heads of departments all report a phenomenal business.

JONES' POSITIVE NUT LOCKS

have had a firm hold on the trade during the past twelve months, and President Jones has been obliged to remove his headquarters to Chicago, and secure greatly increased manufacturing quarters. They are rightly named and when once in place are indeed positive in their action.

THE SESSIONS CAR

is another chapter in the history of 1891. It is the invention of an Oakland, Cal., banker, who is largely interested in street railways. Although on the market but a few months, several roads have adopted it. It is an open car above and a closed car below, and presents a new principle in "double decking." The territory east of the Rocky Mountains is handled by H. G. Bird, of Chicago.

THE AMERICAN CAR COMPANY

dates its existence from the present year though it is not yet six months old. Its home is in that city of street car works—St. Louis, and is in charge of Wm. Sutton and Emil Alexander, well known as street car builders of long experience. In the short time mentioned the company was organized, plant equipped and shops put in operation and cars built and delivered—one of the quickest manufacturing feats on record. The capacity of the establishment is large and already is crowded with orders.

BABCOCK-WILCOX COMPANY.

The past twelvemonth is said by Babcock-Wilcox people to be one of utmost prosperity. The firm is proud to say that the best of results have attended their work.

In the past year the New York house has sold for railway and electric light purposes, 20 installations aggregating 10,215-horse-power. In these sales there were several of more than 1000-horse-power. The London branch brought 42 into the field with an aggregate of 7,747-horse-power. These went all over the world, to Egypt, France and other parts besides England. Besides these figures 6,863-horse-power have been installed for railway work alone giving a grand total of 24,825-horse-power in the year past.

THE NEWBURYPORT CAR MANUFACTURING COMPANY,

from its home office, gives tidings that the past year has been a busy one. Much of the time, day and night, the factory was kept moving to get even with orders. They are now putting out big orders for the West End of Boston, for the Union Line of Providence, and many others. Dorner & Dutton's scrapers are on the boom as well as the Collett brake and reliable sand-box, of which James F. Shaw is agent. The marked increase in trade has been a matter of congratulation to all concerned.

ALBERT & J. M. ANDERSON,

of Boston, give grateful thanks that their Etna insulating material is getting to the front, and that their works are full of orders, besides congratulating themselves on greater facilities and enlarged room.

They have recently completed for their own use a 250-pound power hammer, which has proved to be a great success, and they are ready to take orders for this hammer in any size required. It is made on a new principle and they firmly believe that it is not equaled by any other hammer on the market.

THE ILLINOIS STEEL COMPANY,

whose mills are the largest in the West, located at South Chicago, Joliet, and on the North and West sides of this city, have been quite active in the street railway field during the past year, and have supplied a large amount of iron both for the new lines, and for the reconstruction of old, prominent among which is the Minneapolis Inter Urban and the Villard Syndicate Lines, of Milwaukee. They have made a special study of the requirements of a good street railway rail, and have every reason to be satisfied with the progress made by their company in this department during the year.

THE CALORIFIC VENTILATING COMPANY.

of Chicago, have made a great advance during the past twelve months, under the management of Mr. Garson Myers, president of the company.

They have just finished the equipment of 1,000 cars for the North Chicago Street Railroad, and the West Chicago Street Railroad, being the largest single order for car heaters ever filled by any heating company. The heater has also gone into service on a large number of lines in cities all over the country, and are giving the very best of satisfaction. Improvements have been made over the reconstruction of last year, and the company has also brought out within the past three months a new style which they have named the "Standard," which, while of somewhat different pattern, still retains the same general features of the old heater.

THE ELLIS CAR COMPANY,

as everybody knows, is the enterprise of W. G. Ellis & Sons and is located at Amesbury, Mass. Opened in 1889, the works have constantly grown in size and received additions the past year. They have, during the past few months made a specialty of snow plows and sweepers while the car department has been busy. The year has proved a good one and closes with a favorable outlook for 1892.

THE AMERICAN TRUST AND SAVINGS BANK,

of Chicago, has taken up this year and is now making a specialty of street railway securities. It is one of the most substantial and progressive banks in the city and has special facilities and connections in the East for placing reliable securities, as well as being in touch with a large amount of western capital.

CUSHION CAR WHEEL

describes a wheel introduced to the notice of the railway men this year. P. F. Leach, of Chicago, is vice-president and now has on exhibition in the Grand Pacific hotel one of his rubber cushion wheels which has made 60,000 miles under a passenger coach with but 3-32 of an inch wear. The same style of wheel, made lighter for street car service, is already on all the roads in Chicago and several other cities.

AUGUSTUS DAY

is a name very familiar to all street railroaders to whom his track scrapers and snow plows are well known. He continues to manufacture at Detroit, Mich.

THE BURTON ELECTRIC HEATER,

while not one of the year's inventions was more prominently brought before the railway world this year, and has made a most satisfactory progress. Its merits were established last winter and this season the sales have been large, and for several months to such an extent that it was impossible to fill orders. The heater is cheap in first cost, will last indefinitely, occupies room of no value for any other purpose in a car, and is absolutely safe. Nearly every order has called out a prompt duplicate order and the Burton is conceded to be a grand success. To W. R. Mason, president of the company, is due in a large degree the prestige gained by the company, and its introduction in so widespread a territory.

WM. BARAGWANATHI & SONS CO.

is a Chicago institution and like it aims at big things. Their feed water heaters and purifiers have a thoroughly established reputation and their output in this line during the year has been more than double that of any previous year. Their sales of large sized heaters 500 and 1000-horse-power each have been especially gratifying.

THE JOHNSON COMPANY

has had literally "tons" of business, the tons however, running into the thousands. The output of the Johnson Girder Rail has been largely increased over any previous year. They have also brought out several new sections. In their special work of rolled steel curves, and difficult switch and crossing work, the demand has been greater than ever. With the mule has correspondingly gone the tram rail, and companies which at first hoped to finish wearing out the old flat rail have learned the economy of using the girder or T form.

C. E. LOSS & CO.,

Contractors for the construction of electric and other street railways have built several roads during the year. Mr. Loss suffered a nearly fatal attack of grippe early in the year and was obliged to seek rest and change of climate in a European trip. Since his recovery and return the Kankakee electric road was built and a large amount of other work completed. Mr. Loss now makes headquarters in Waukegan, Ill. The line he built at Pullman three years ago has never received a dollar's worth of repairs.

JOHN CROWTHER,

of Cincinnati, finds in 1891 a satisfactory twelve months in the sale of his cable pulleys, which are made in interchangeable parts, allowing for the renewal of worn portions without the loss of the balance of the wheel. They are made in several types for carrying, curve and terminal purposes and the demand throughout the year has been good.

H. W. JOHNS MANUFACTURING COMPANY

is synonymous with the name "Vulcabeston," which is one of its leading products, and of which the sale has increased so largely during the past year as to require a new factory which increases their facilities several times. Their steam packings of this material are in use on locomotives of many of the largest roads, and as packing for steam and air ends of automatic air brakes has shown a longer life than any other. They have also sold largely of their insulating pieces, such as lamp bases, switches, magnet wires, rheostats, trolley parts, field magnet spools, and many other parts for electrical plants.

SIOUX CITY ENGINE WORKS

have found the past year a most active one, having moved into their new shops and been obliged to add duplicate special machinery several times to keep up with the volume of business offered. Night work has also been a feature during the last half of the year. During the year 48 engines have been sold and delivered against 26 last year, while owing to building and changes one whole month was lost this season. Fifteen of their largest engines have gone east of the Mississippi river. A St. Louis branch has been established with English, Morse & Co., at 511 Commercial Exchange. Other branches are being opened. Every indication points to a largely increased business for next year, and the company intend to be prepared for it. They recommend their Gidding's automatic engines as able to give as good results as the smaller size Corliss and at much less first cost.

A. GROETZINGER & SONS,

of Alleghany, have for many years been connected with the tanning interest, and their products have always ranked among the best. During the year they have brought out a new product in rawhide goods, which they term "Dermaglutine," which is the result of long and costly experiments. Their success with the new venture has, however, far surpassed their best hopes, and has already assumed large proportions. Dermaglutine is the pure fibre and gelatine of the hide free from all foreign substances and properly preserved; and is rapidly taking the lead in articles manufactured of rawhide, and for rawhide pinions it is little less than a wonder.

THE BODIFIELD BELTING COMPANY,

of Cleveland, report an increase over 1890, of fully 50 per cent. of which the railway business constitutes an important part although their long established trade with lighting companies is a much greater feature of their output. They find a most promising outlook for their railway business for the coming year. Among more recent orders filled are 2 24-inch double belts for the East Liverpool & Wellsville Electric Railway; 2, 48-inch and 6, 25-inch double belts for the new power house of the East Cleveland Railroad, and the Rapid Transit Company at Ashtabula, O., have been belted up by them; as also the Wheeling, W. Va., Street Railroad and others.

AMERICAN CASUALTY INSURANCE AND SECURITY COMPANY

is a title of greater interest to street railway companies than one year ago; this company, under the general management of Beecher, Schenck & Benedict, of New York, having assumed all the accident risks of more than 100 street railways. This department of the company's extensive business, was the result of a plan evolved by Mr. Beecher, who, by the way, is a son of the famous Brooklyn divine.

During the year the company has made financial progress far beyond the expectations of its general managers, and the business has not only been large, but of an extremely profitable nature. Its premium receipts are now in excess of \$1,500,000 per annum, and its assets will exceed \$2,500,000, Jan. 1, 1892. The railroad department being an entirely new feature, has required considerable work in the way of educating its patrons. However, those who have adopted the company's protection have very substantially shown their appreciation thereof, by renewal of contracts, in some instances of a broader nature; and compliments have not been lacking from leading railway managers, for the prompt and able manner in which all claims have been handled. During the year, the Loss Departments, both in New York and Chicago, have been greatly increased to keep pace with the increased business, which is not confined to any one section of the country, but seems to be about evenly distributed from ocean to ocean, and from Canada to Mexico.

Very many flattering compliments have been received on the liberality and fairness of the forms of contract. It is only recently that the president of one of the railroad companies remarked that it was seldom that two parties to a contract were found so willing and anxious to cover the whole ground, and afford the protection sought for.

A large number of managers are at this writing closing contracts with the American Casualty Insurance & Security Co. for their accident claims for the coming year. F. P. Burke is superintendent of the railroad department.

THE WESTERN ELECTRIC COMPANY,

Chicago, has been at work the past few months bringing out a new railway motor which will be put on the market in 1892. Their sales of Washburn & Moen hard drawn copper wire have been large as also their weatherproof insulation feeder wires.

C. F. ORR & CO.,

at 179 Madison street, Chicago, make enough uniforms every year to clothe several regiments, and their street railway department is probably the most thorough and complete in the country. Every uniform is made from actual measure and as much care taken to insure a perfect fit as though it were a high priced garment. He has devised many improvements especially useful to conductors and his work is in daily wear on upwards of 2,500 street railway employees.

THE FULTON IRON WORKS,

of St. Louis, have watched the operation of the big power plants of the Broadway cable line in that city with much interest during the year and at its close have every reason to feel proud of the manner in which their work has stood the test of hard daily service in driving the cable cars. The amount of large and difficult machinery turned out at their works has greatly exceeded any former year and the new year opens with a "full house."

JOHN STEPHENSON COMPANY (LIMITED),

has probably had more years to review than any of its brethren in the railway supply business, but looking back it has no occasion to complain at the recognition which its work has received. While there are more builders now than existed 50 years ago, the demand has increased with the years, and those cars which have been in service for 20 years or more have borne daily testimony to the careful and painstaking policy of the builder. So it has come that the business with the Stephenson Company has been heavy during the past 12 months, not only at home, where the prophet in this case has not been without honor in his own country, but as well in distant lands, where the Stephenson Company has a practical monopoly of the business. New styles have been designed to meet new ideas in cars, and the output has been heavy every month; and compares favorably with any former year. So large has the work become, the company during the year was obliged to make purchases of large tracts of land, where, in 1892, immense additional shops will be built to take care of a business that has had a most wonderful expansion and growth.

THE FULTON FOUNDRY,

of Cleveland, brought out during the year just closing several new devices of value to railway companies, prominent among which is their new electric motor truck. The demand for their patent car wheel, especially designed for motor trucks, and their patent drawbar has been all the company could desire. They have also had a much heavier trade than heretofore in their line of electric motor supplies, which is very complete, while orders have been constantly increasing for their street railway supplies. A larger amount than ever of repairing has been received from old and new roads.

R. D. NUTTALL & CO.,

is one of the most progressive institutions with which it is the good fortune of the street railway fraternity to have business relations. Mr. Nuttall, the president, is an exceptionally young man to be at the head of so large an institution but he deserves the credit of having made it what it is. During the year he put in \$50,000 worth of gear cutting machinery, giving him the largest plant of the kind in the country. His iron gears, pinions, and rawhide pinions are in use on more than one hundred roads and his trolley with drum steel pole was one of the successes of the year.

H. WARD LEONARD & CO.,

whose office is in the Electrical Exchange Building, New York, is a firm which has come into existence this year. Mr. Leonard's reputation as consulting electrical engineer, places him among the best in the land, and the object of the organization, that of furnishing expert information on electrical subjects is a timely one, and from the start found a large demand. H. Ward Leonard & Co., charge a definite sum per year for their services as Consulting Engineers, and managers seem to like this feature of definiteness rather than a percentage share or a retainer and individual charge for individual service.

E. B. PRESTON & CO.,

of Chicago, report a very satisfactory year's trade with the street railways and that the demand is constantly increasing for their main driving leather belts, of which their famous "Acorn" brand is specially adapted to railway work. As illustrated in their trade mark the "Acorn" belt moves a no inconsiderable portion of the world and is found to fill the bill in a satisfactory manner wherever tried.

CILAS. MUNSON BELTING COMPANY,

of Chicago, is known from one end of the land to the other, and the volume of business in 1891 has been greatly in excess of any previous year. During the year the death occurred of Mr. Charles Munson, who however had not been actively connected in the management for two years past, so the event did not interfere with the policy and operation of the business. As an instance of the ability of the concern to furnish on short notice; three 60-inch belts, each 130 feet long were recently ordered by telegram to replace another make which had gone to pieces, and in less than five days the belts were on the pulleys and at work.

THE EDISON GENERAL ELECTRIC COMPANY

have been active in the field and installed a large number of electric roads with generators and motors, mention of which has previously been made in these columns. They have had a specially large demand for their single reduction motors of 15, 20, 25, and 30-horsepower, and the volume of business shows a good increase over 1890. The prospect for 1892 is much better even than at this time a year ago. For easy starting and high efficiency the Edison motors have carried out the promises of the builders.

ALLEN PAPER CAR WHEELS

are not only found in every part of the United States, but more of them to-day than ever before. Orders for renewals have been large, and new business eminently satisfactory. The paper car wheel for street railway use has been better demonstrated during the past year than ever and managers who once use them find very many advantages not possessed by the solid iron wheel.

THE DETROIT ELECTRIC WORKS

have had more than they could do the past year in filling orders for the Rae motor, which is one of the best in the market. The space allowed the railway manufacturing department was early in the year found to be wholly inadequate to the fast increasing demands. Steps were taken to secure a new factory and the close of 1891 witnesses its completion. With these very greatly increased facilities they enter upon the new year in shape to take care of all orders. The record of the Rae motor during the year fully warrants the prediction that the demand already large will be greatly increased. The company is financially strong and has good reason to be satisfied with the year's history.

SAWYER, MANNING & CO.,

at 86 Franklin street, New York, have found the making of their uniform cloths for railway uniforms, as a special department, a most satisfactory one. It is in charge of C. L. Bowler, who has had longer experience in this branch than almost any man in the country and the uniform cloths are made under his special direction, which largely accounts for their splendid wearing qualities.

THE ST. LOUIS CAR COMPANY

have one of the largest and best equipped car building establishments in the country and have enjoyed a heavier business the past year than at any time since its organization. Among the business features of the year has been several large orders for "rush" delivery, but which their facilities permitted not only of booking, but of getting out on time. The arrangement of their works is most convenient for handling cars in the several courses of construction, the material going in at one door and by a series of progression through as many shops finally appearing on the street at the farther end, complete and ready for shipment. The officers are J. H. Kobush, president, P. M. Kling, vice-president and manager and Geo. J. Kobush, secretary and treasurer.

To tell of all the new devices which the

WESTINGHOUSE, CHURCH, KERR & CO.

establishment have brought out would require a volume. They have installed a large number of the Roney Mechanical Stoker, and Westinghouse engines, and have successfully introduced their direct coupled slow speed, multipolar railway generators which are already made in sizes of 125, 250 and 500-horse-power. They have also been large contractors for complete power plants for railway and lighting service. The "Steam Loop"—a device without mechanism for separating from the steam and returning to the boiler all water of condensation or primage, has been one of the most practical and interesting applications of the year in mechanical lines. A large amount of interesting and valuable printed matter has been issued from the general office of value to all steam users. The company have every reason to be glad they were in business in the year of grace one thousand eight hundred and ninety-one.

THE ELECTRIC MERCHANDISE COMPANY

celebrated its first birthday during 1891, although its officers, and General Manager W. R. Mason, have all been in the business a long time. The year has certainly been a prosperous one to that concern, which at this writing are moving into additional quarters at their old place of business at 11 Adams street, Chicago, necessitated by the rapid growth of their interests. The Electric Merchandise is the only company exclusively engaged in electric railway supplies, and the superior quality of their goods and the promptness with which they have delivered same, have made theirs a very popular house. Orders from foreign countries have also been frequent. They have done an especially large business in overhead material, and as general agents of the Burton Electric Heater have been largely instrumental in its promotion. The perfecting of material for the building and operating of electric roads has been a close study of these gentlemen for a number of years which largely accounts for the satisfaction which follows the adoption of the supplies recommended by them. Their business has had a steady and large growth; and their stock includes every supply needed in the operation of a road.

THE ECLIPSE CLUTCH WORKS

are located at Beloit, Wisconsin, and although having but recently entered the street railway field have every reason to be satisfied with the reception they have received. While manufacturing power-transmission machinery of every description they make a specialty of equipment for electric railway and electric light stations. Their friction clutch pulley and cut-off coupling are very simple in construction, and very strong, and possess great wearing qualities. The special claim for their clutch being its ability to take up the grip as gradually or suddenly as desired. The clutches have been in operation and have made splendid records for the past six years. They are now building an additional foundry 85 x 90 feet.

Their Chicago office is at 62 Canal street.

THE SHULTZ BELTING COMPANY

is one of the best known of St. Louis' manufacturing concerns and has its belts running in all parts of this country and have also shipped abroad. Their sales for electric railway work have been very active during the year and have given splendid satisfaction. They have just sold two woven leather link belts to the Citizens' Electric Railway Company, of Decatur, Ill.; 15 belts in the state of Montana, 5 belts in the state of Washington, 1 flat belt 48 inches double, to the Municipal Electric Light & Power Company, of St. Louis, who have been using one of their 48 inch double belts for 19 months. Also one double belt to Clinton, Mass, 30 inches wide, 175 feet long, and one 36 inches and 210 feet long.

From their eastern branch there has just been shipped to England: 1,000 feet double belt, 6 to 12 inches wide; 1,500 feet, single belt, 3 to 6 inches wide; and about \$1,100 worth of lace and belt leather. The Shultz Company is constantly widening its European territory.

THE LEWIS & FOWLER MANUFACTURING COMPANY

of whose volume and variety of business it is difficult to speak in the narrow limits of this annual review. That they have enjoyed an enormous business in past years is well known, and the report that 1891 showing a much larger balance of trade in their favor than ever before, was to be expected. Their product comprises everything from foot gongs and grab rails to the completed car, including everything that enters into the furnishing of its interior. Their fare registers and car heaters have been in active demand, and floor mats and centre lamps have been widely shipped, and on large orders, while they have been called on for frequent and difficult special track work in crossings, frogs and switches. Their sanding machines and snow plows and sweepers have had a wider sale than ever and being bought largely by cable and electric roads. During the year additions to the factory were found necessary, and with this new space the works present the same crowded appearance that existed before their addition. The quality of their work has been fully maintained. As for several years past the company chartered a special train of Pullman sleepers and generously tendered its use to a large number of invited guests to and from the annual convention of the American Street Railway Association. The outlook for 1892 is reported as in every way bright and promising. The

LEWIS & FOWLER GIRDER RAIL COMPANY,

the twin of the manufacturing company, confines itself to the manufacture of track material. Their box rail has been laid by some of the largest companies in the country, and with their patent fastenings makes a track construction the superiority of which is fully conceded by all users. The business in this line the past year has been very flattering both in size and number of orders.

ALFRED G. HATHAWAY,

of Cleveland, is one of the most progressive young men in the street railway supply trade; and on this account and the superior excellence of his transfer tables, has enjoyed this year a larger trade than ever before. Indeed the increase was such as to compel a large addition to his factory building. Street railways are not the only buyers to acknowledge the merits of the transfer table, orders having been received from several ore docks and mills, among which is the Riverside Worsted Mills Company, of Olneyville, R. I., which are the largest of their kind in the United States. Steam roads also are using the table, and a recent order has just been received from the Concord & Montreal R. R. of New Hampshire. Mr. Hathaway, in addition to the above, has constantly on hand a large stock of tram and T rails, switch castings, hand punches, shears, and has just added a valuable wheel press, especially designed for street railways, an illustration and description of which will be found elsewhere in this issue.

THE WALKER MANUFACTURING COMPANY

of Cleveland, has had a busy year, which will be long remembered as the one in which their new and very extensive shops were completed and occupied.

The demand for the Differential Drum has been good, it having been substituted on a number of cable plants for the solid rim, while the output of heavy driving machinery has been larger than ever before.

During the year, Mr. Walker made an extended trip through Europe, studying the latest in machinery building in the large plants of England and Germany. The description in another part of this number of the Walker plant will be read with interest, as illustrating the phenomenal growth which this company has enjoyed and of which the past year has shown the largest advance of any since organization.

THE ELLIOT FROG & SWITCH COMPANY,

at East St. Louis, have been called upon during 1891 to build and furnish a large number of special orders of switches, crossings and curves. Their plant is one of the best in the country and their facilities all that the largest, most difficult work can possibly require. Special attention is paid to this work, which is fully guaranteed. They have in hand a large amount of work for delivery early in 1892.

THE GREAT WESTERN ELECTRIC COMPANY

has had a busy year, during which the company has earned and paid good dividends, and found the necessity of moving from their quarters on Fifth avenue, Chicago, to Nos. 201, 203, 205 and 207 Canal street, where they require the entire space of four floors. Their stock of railway supplies of every possible description is one of the largest in the country and sales of K. K. wire and Sun Arc Lamps for railway circuits have been very heavy. Their line of poles and overhead material is specially complete as is their stock of tools needed by electric roads. The railway department is but one branch of an immense business which includes all kinds of electrical supplies.

THE UNIVERSAL ELECTRIC RAILWAY CONSTRUCTION COMPANY,

of Philadelphia, is another example of the year's progress, having brought out their equipment in the spring. Their controlling device for electric railway motors, which is at once a most simple, practical and effective appliance, has demonstrated its worth even in so short a period. Although subject to the inevitable delays necessary to the construction of special machinery for their factory, they have partially equipped the Duquesne Traction & Pleasant Valley Traction Company's lines at Pittsburg, and are now equipping lines in Altoona, Pa., Newark, and Atlantic City, N. J. Their new works at Holmsburg, on the outskirts of Philadelphia are nearly ready for occupancy, all of which makes a record of busy progress, and closes the first year's record of this already successful company;—a record of which Secretary W. C. McCurdy may well feel proud.

J. M. JONES' SONS

are the successors of a father, whose name as builder, was read upon many of the earliest roads in the country, and the good name he earned and deserved as a builder of first-class cars, is conscientiously maintained by the sons. The business of 1891 has, with them, been very good, and shows a satisfactory increase over past years. They have kept pace with the advances in car building, made necessary by the adoption of cable and other powers, and a large part of their building, the past twelve months, has been in orders from electric roads. Their plant is thoroughly equipped, and they are better conditioned than ever to take care of all new business.

THE BEMIS CAR BOX COMPANY,

of Springfield, Mass., is another of those companies whose record in past years is a sufficient guarantee of its work to-day. Thousands of their car boxes are in use on large and small cars all over the land. The demand this year has more than maintained the steady growth which has characterized the history of this company. They have also brought out one of the best trucks on the market for cable and electric cars, and which in the Pittsburg exhibit attracted much attention. They report the prospect for next year good.

THE M'GUIRE MANUFACTURING COMPANY.

The McGuire Manufacturing Company, of Chicago accepted an order for thirty of their Maximum Traction trucks and fifteen of their patent steel frame No. 19 B single trucks, under \$50 a day penalty, to deliver on board cars Chicago in 20 days from receipt of order, for San Francisco & San Mateo Street Railway Company, San Francisco, Cal.

This demonstrates the haste in which electric street railways are frequently constructed and equipped throughout the different parts of the country. The McGuire works are running day and night and have a capacity of ten trucks per day, and still it seems a penalty is necessary to insure such quick delivery.

This company report an increase in the volume of business, for 1891 over 1890, of at least 35 per cent. The two styles of trucks mentioned above were first introduced the early part of this year and the immense sale shown by the records of the company show that its ingenuity and enterprise have been well rewarded.

The McGuire people are, evidently, of the Chicago kind—right up abreast of the times—and sparing no effort to keep there. Nine patents were issued to the company on trucks for the year 1891.

HALE & KILBURN MANUFACTURING COMPANY

have increased largely both their output and facilities during 1891, and are supplying a large share of the seat trade for street railway service. They have studied the needs carefully and are making a large and varied assortment of styles from which to select.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY.

It is authoritatively stated that the reorganization of the Westinghouse Electric & Manufacturing Company was practically completed the first of the month by the payment into its treasury of \$1,000,000 in cash, by Messrs. August Belmont & Co., Lee, Higginson & Co., and Brayton Ives, in payment of a like amount of preferred stock in cancellation of a like amount of debt. The Reorganization Committee will complete its work by authorizing the Mercantile Trust Company to notify the holders of its receipts given to the W. E. & M. Company, the United States Electric Lighting Company, and the Consolidated Electric Light Company, that it will issue regular certificates in exchange for such trust receipts, thus bringing to a close a most skillful and successfully managed reorganization. This new condition of the company contrasts with that of one year ago in a most remarkable manner.

During the year, the company, without a dollar of new money, has not only continued its business, but has paid interest on its debt, cash for its supplies, and, out of the collections and earnings, has reduced the liabilities of itself and leased companies over \$750,000.

To-day the company has the available funds to cancel all its floating debt, and to provide the capital needed to care for a greatly increased business, and it has over three-quarters of a million of its stock in the treasury available for future purposes. Its accounts receivable and materials in stock nearly equal in value the entire issue of preferred stock, while it has in its treasury a large amount of bonds and stock of lighting and power companies available for further working capital.

The sales for 1891, which will aggregate \$3,000,000, are an indication of the possible proportions of the company. Not only has the company kept its business running, but it has, during the year, made greater improvements as respects the design, quality, efficiency, and cost of the apparatus manufactured, than during the whole of its previous career. The company has fully reorganized its business management, so that to-day it is ready to assume that position in the trade that ample capital and influence warrant.

CHAS. A. SCHIEREN & CO.

find a most gratifying and increasing demand for their various belts and particularly for their "Perforated Electric" which has scored a great success. The comparison with last year's business shows a good gain while the outlook for 1892 is even better than at this time last year.

The Chicago office under the able management of Mr. Burrell has been actively in the field and reports a large increase in sales over one year ago—both to old customers and a long array of new ones.

KUPFERLE BROTHERS,

of St. Louis, have one of the best equipped establishments in the country, and make a specialty of steam fitting for cable and electric roads, having done all the work at the Broadway cable plants in that city.

~~Street Railway System~~

THE GRIFFIN WHEEL & FOUNDRY COMPANY, of Chicago, have recently put a second cupola into blast, and are now turning out between 500 and 600 car wheels per day, which are being distributed to all parts of the country, from the Atlantic to the Pacific, and from the Lakes to the Gulf.

As a sample of the extent of this business, the writer was shown one day's shipments, which included steam and electric railway wheels to points in California, Washington, Utah, Colorado, Iowa, Illinois, Minnesota, Wisconsin and Ohio.

Their wheels for electric motors are fast achieving a reputation for excellence so long held by their steam road

THE Munson Belting Company has just shipped a 40-inch main and full equipment of other belts to the Gibbs Chair Company, of Kankakee, Ill.

McINTOSH-SEYMOUR engines are always up to date in new orders. Their Mr. Prior, of New York, has just installed a 110-horse-power at Logansport, Ind., for the electric railway line.

CHAS. A. SCHIEREN & Co. made a 20-inch perforated double ply leather belt last spring for the Franklin Electric Company, of Franklin Pa., which has given such good results, a second order has just been placed for a main belt.

L. M. RUMSEY, President
D. D. McLUDE, Vice-President
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FREIGHT CARS OF EVERY DESCRIPTION.
CAR WHEELS, CASTINGS AND FORGINGS.

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CAPACITY FORTY CARS PER DAY.

Madison, Ills., Nov. 27/91.

Messrs. Chas. A. Schieren & Co.,
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The main belting purchased of you some time since:

120 feet	50 inch	Double,		
99 "	34 "	" "		
105 "	24 "	" "		
116 "	20 "	" "		
111 "	18 "	" "		
98 "	14 "	" "		

has been in service now several months in our Works and we take pleasure in saying it has given entire satisfaction. We consider these belts the equal of any made.

With best regards, we are,

Yours very truly,

T. C. Salveter
Gen. Mgr.

wheels; and their list of customers is receiving large additions monthly. They report that they have recently closed long time contracts with a number of the largest systems in the country.

The record of the year shows a large advance in new territory occupied and continued satisfaction from all customers.

THE Short Electric Motor, through the agency of Mr. A. W. Dutton, their southwestern representative, has been introduced on the Houston, Texas, line. This means the introduction of the Short system more generally in the South.

H. WARD LEONARD is licensing various manufacturing and construction concerns under his recently patented system of motor regulation. The basis of the license is a charge of \$2.50 per K. W. (roughly per horse-power) in the motor. The royalty charge is not an annual charge, but is paid once for all in each case.

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2



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