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THE NEWS LETTER

OF THE

BUREAU OF PUBLIC ROADS

VOL. 4, NOS. 1-4 NOVEMBER, 1928 TO FEBRUARY, 1929 A. C. ROSE, EDITOR

CONTENTS

MOUNT VERNON HIGHWAY TO FOLLOW RIVER ROUTE - - - - -	1
HIGHWAY EDUCATION BOARD ISSUES NEW BULLETIN - - - - -	2
CURRENT CONDITION OF FEDERAL-AID ROAD WORK, AS OF DECEMBER 31, 1928	3
PROGRESS OF FEDERAL HIGHWAY LEGISLATION INTRODUCED IN THE SECOND SESSION OF THE SEVENTY-FIRST CONGRESS BEGINNING DECEMBER 3, 1928 - - - -	4
GASOLINE TAXES, FOR FIRST HALF OF YEAR 1928 - - - - -	8
A.A.S.H.O. ADOPTS CONFERENCE SPECIFICATIONS ON STEEL BRIDGES - - - - -	9
DIGEST OF ANTI ADVERTISING SIGN-LAWS COMPILED BY BUREAU - - - - -	10
CLEVELAND EXHIBIT TO GO TO RIO DE JANEIRO - - - - -	14
CONCRETE REPAIR - AN INSTRUCTIVE PAMPHLET OF THE INDIANA STATE HIGHWAY COMMISSION - - - - -	16

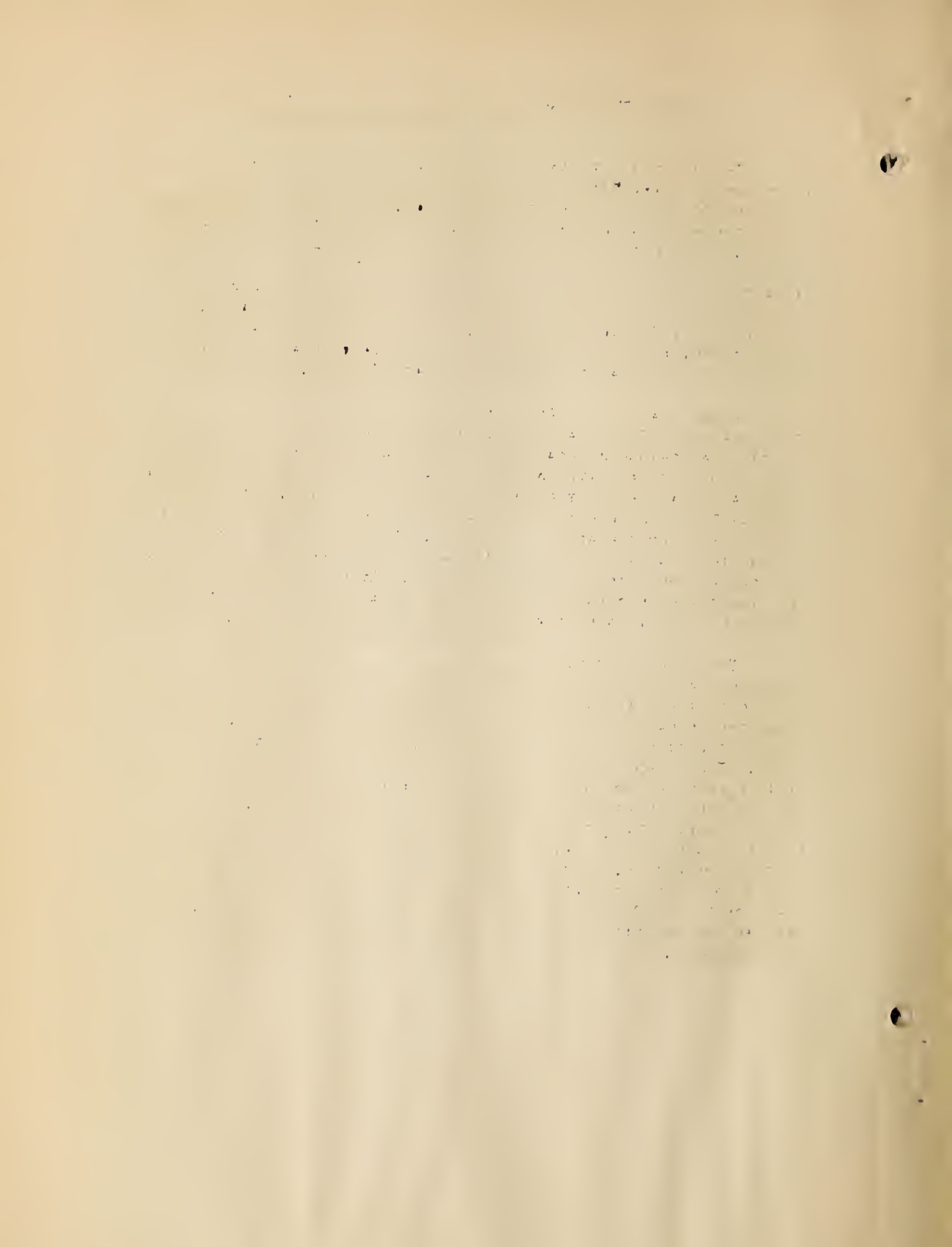
THE NEWS
1919

MOUNT VERNON HIGHWAY TO FOLLOW RIVER ROUTE

THE MEMORIAL HIGHWAY FROM THE VIRGINIA END OF THE ARLINGTON MEMORIAL BRIDGE TO MOUNT VERNON WILL BE CONSTRUCTED ALONG THE POTOMAC RIVER ROUTE FOR THE 15.4-MILE DISTANCE THROUGH THE PICTURESQUE VALLEY MADE FAMOUS BY THE NATION'S HISTORICAL FIGURES. OF THE TWO ROUTES SURVEYED BY THE BUREAU - THE OTHER EXTENDING OVER THE ROLLING HILLS OF THE OLD DOMINION AT SOME DISTANCE FROM THE RIVER - THE GEORGE WASHINGTON BICENTENARY COMMISSION, MEETING IN THE WHITE HOUSE, ON JANUARY 25, 1929, WITH PRESIDENT COOLIDGE PRESIDING, CHOSE THE RIVER LOCATION AS THE MOST DESIRABLE ON GROUNDS OF SCENIC ADVANTAGE AND COST - THE COST DIFFERENTIAL BEING ESTIMATED AT \$700,000.

AFTER LEAVING THE ARLINGTON MEMORIAL BRIDGE THE RIVER ROUTE TRAVERSES COLUMBIA ISLAND, PASSES UNDER BOTH THE HIGHWAY AND RAILROAD BRIDGE APPROACHES, AND FOLLOWS THE WESTERN SHORE LINE OF THE POTOMAC RIVER AS CLOSELY AS THE TOPOGRAPHY, ALIGNMENT, GRADES AND PLANS FOR FUTURE DEVELOPMENT WILL PERMIT. SHOULD GRAVELLY POINT BE SELECTED AS AN AIRPORT THE HIGHWAY IS LAID OUT TO MAKE THIS DEPOT READILY ACCESSIBLE. THE RIVER ROUTE PASSES THROUGH THE CENTER OF HISTORIC ALEXANDRIA, CROSSES HUNTING CREEK, AND FOLLOWS THE POTOMAC TO MOUNT VERNON. AT NO POINT ON THE ROAD WILL THE GRADE BE GREATER THAN 6 PER CENT AND FOR A CONSIDERABLE PORTION OF THE MILEAGE IT WILL BE LESS THAN ONE PER CENT.

THE RIGHT OF WAY, EXCEPT WITHIN THE MUNICIPALITY OF ALEXANDRIA WILL BE 200 FEET IN WIDTH, PROVIDING AMPLE ROOM FOR A 40-FOOT PAVEMENT FLANKED ON EACH SIDE BY 10-FOOT SHOULDERS, WHERE THE TERRAIN IS A SIDE HILL, TWO 20-FOOT PAVEMENTS WILL BE CONSTRUCTED AT DIFFERENT LEVELS DEPENDING UPON THE DEGREE OF THE SLOPE. THE ONE-DIRECTION TRAFFIC ON THE LOWER BRANCH WILL BE VISIBLE FROM THE UPPER BOULEVARD AND THE AREA BETWEEN THE TWO WILL BE USED FOR PARKING PURPOSES OR ROADSIDE PLANTING. THIS FORM OF CONSTRUCTION ON SLOPING TOPOGRAPHY WILL BE LESS EXPENSIVE THAN A SINGLE 40-FOOT PAVEMENT WHICH WOULD NECESSITATE HEAVY GRADING OPERATIONS. BETWEEN WASHINGTON AND ALEXANDRIA THE ROAD WILL BE DIVIDED INTO TWO LEVELS NEAR ABINGTON HOUSE, THE BIRTH-PLACE OF NELLIE CUSTIS AND IN THE VICINITY OF FOUR-MILE RUN. SIMILAR CONSTRUCTION WILL BE FOLLOWED AT 2 OR 3 LOCATIONS SOUTH OF ALEXANDRIA.



AUTOMOBILE PARKING AREAS WILL BE LAID OUT IN ATTRACTIVE SURROUNDINGS BETWEEN THE BOULEVARD AND THE BANK OF THE RIVER AT APPROPRIATE INTERVALS. THE ROUTE WILL BE BEAUTIFIED WITH CAREFULLY-SELECTED TREES AND SHRUBS PLANTED UNDER THE SUPERVISION OF LANDSCAPE EXPERTS.

THE PLANNING OF THE HIGHWAY INCLUDING THE SURVEYS HAS BEEN UNDER THE IMMEDIATE SUPERVISION OF THE DIVISION OF DESIGN. WITH THE COMPLETION OF THIS WORK THE DIRECTION OF THE BUILDING OF THE BOULEVARD WILL BE TAKEN OVER BY THE DIVISION OF CONSTRUCTION OF THE BUREAU. DURING 1929 IT IS PLANNED TO BEGIN THE CONSTRUCTION OF THE HEAVY FILLS ON SOLID GROUND AND THE HYDRAULIC FILLS ACROSS THE ESTUARIES OF THE RIVER, AND ALSO TO DEVELOP THE FOUNDATIONS FOR SOME OF THE MAJOR STRUCTURES. IT IS PLANNED TO COMPLETE THE GRADING OPERATIONS IN 1930 AND INITIATE THE PAVING OPERATIONS AND THE DEVELOPMENT OF THE PARKING AREAS. THE THIRD YEAR WILL BE DEVOTED TO THE COMPLETION OF THE PAVING, AND LANDSCAPING WORK.

HIGHWAY EDUCATION BOARD ISSUES NEW BULLETIN.

"HIGHWAY CONSTRUCTION ADMINISTRATION AND FINANCE" IS THE TITLE OF A BOOKLET RECENTLY PUBLISHED FOR FREE DISTRIBUTION BY THE HIGHWAY EDUCATION BOARD WITH HEADQUARTERS IN THE ARCHITECTS BUILDING, WASHINGTON, D. C. THE AUTHOR OF THE BULLETIN IS E. W. JAMES, CHIEF OF THE DIVISION OF DESIGN OF THE BUREAU. THE SUBJECT MATTER CONSISTS OF A SERIES OF ARTICLES FIRST PUBLISHED IN SPANISH IN THE MAGAZINE "INGENERIA INTERNACIONAL". THE INTRODUCTION BY MR. MACDONALD CONSISTS OF A HISTORICAL RESUME OF HIGHWAY CONDITIONS IN THE OLD AND NEW WORLDS AT VARIOUS PERIODS. THE EIGHT CHAPTERS WHICH FOLLOW DESCRIBE THE PLANNING OF A NATIONAL HIGHWAY SYSTEM, EARTH ROAD DESIGN AND CONSTRUCTION, GRAVEL AND OTHER LIGHT ROAD SURFACES, WATER-BOUND MACADAM AND BROKEN STONE ROADS, BITUMINOUS SURFACES OF MODERATE COST, HIGHER TYPE PAVEMENTS, COST REPORTS FOR FIELD ENGINEERING, AND THE FINANCING OF A NATIONAL HIGHWAY SYSTEM.

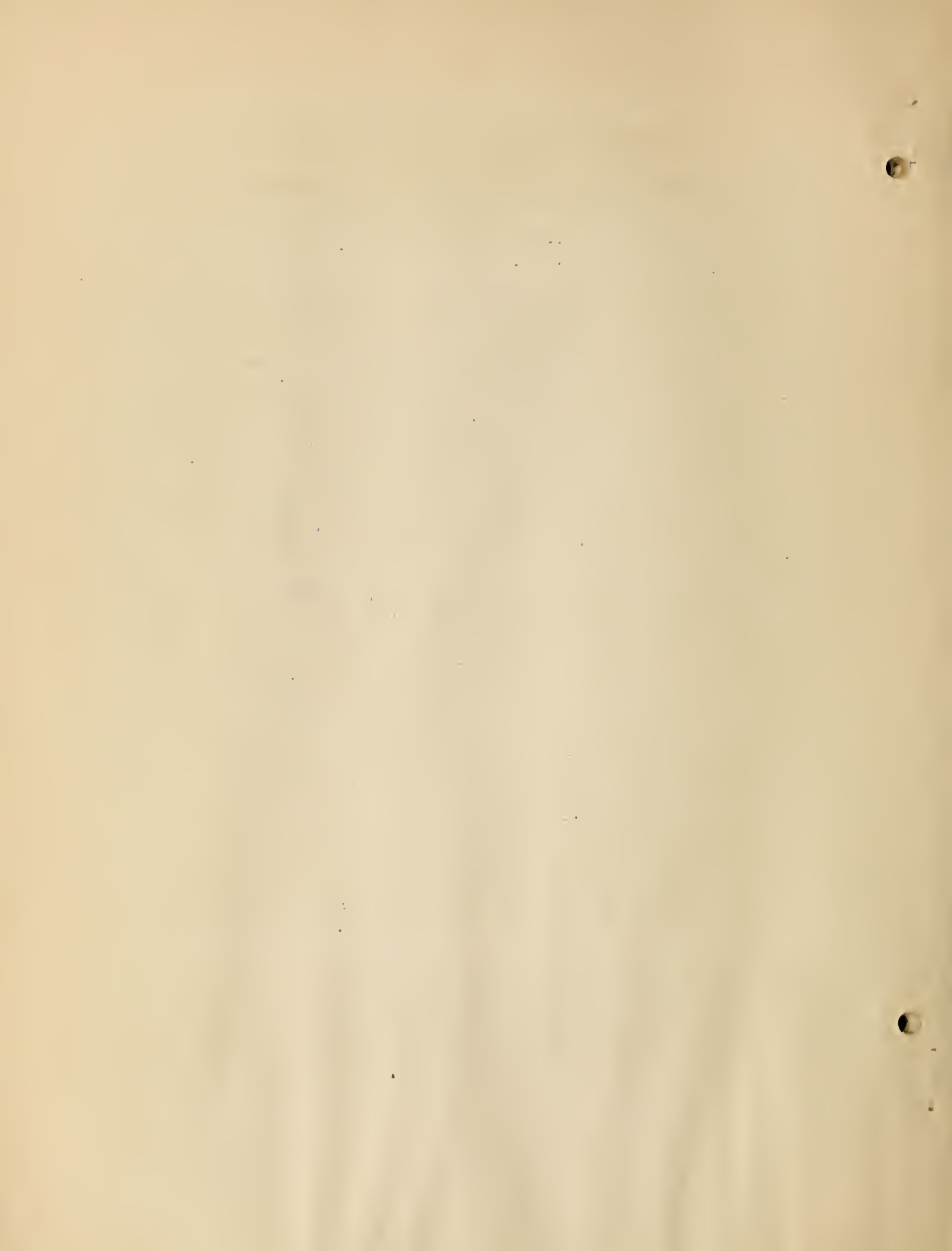
A. J. 1



PROGRESS OF FEDERAL HIGHWAY LEGISLATION
INTRODUCED IN THE
SECOND SESSION OF THE SEVENTY-FIRST CONGRESS
BEGINNING DECEMBER 3, 1928

(NOT FOR RELEASE)

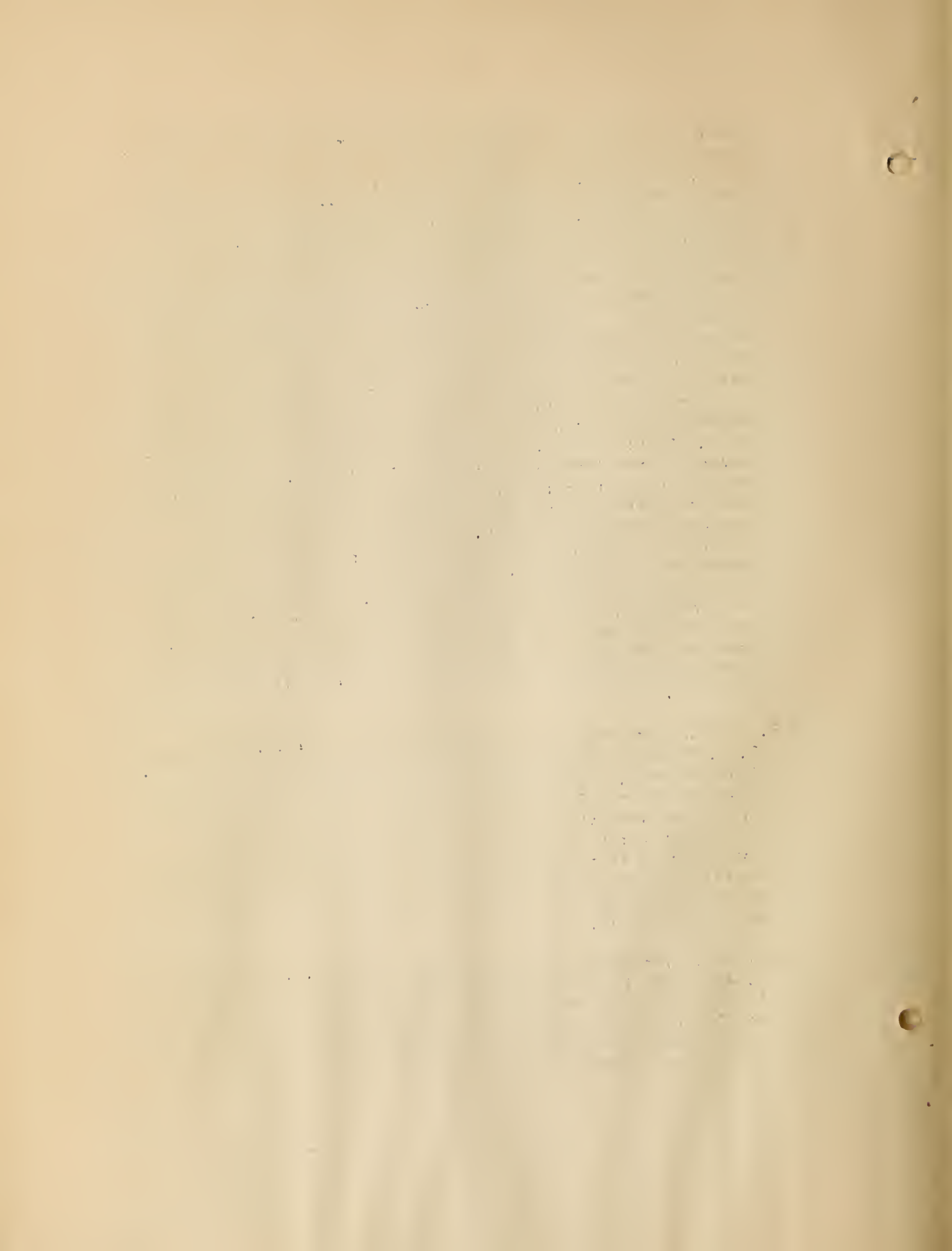
- H.R. 14665.- INTRODUCED IN THE HOUSE ON DECEMBER 4, 1928, BY D. B. COLTON OF UTAH AND REFERRED TO THE COMMITTEE ON POST OFFICES AND POST ROADS. PROVIDES FOR THE AMENDMENT OF EXISTING FEDERAL-AID ROAD LEGISLATION BY AUTHORIZING AN APPROPRIATION OF \$3,500,000 FOR EACH OF THE FISCAL YEARS 1929, 1930, AND 1931, FOR THE CONSTRUCTION AND MAINTENANCE OF THE MAIN ROADS THROUGH UNAPPROPRIATED OR UNRESERVED PUBLIC LANDS, NON-TAXABLE INDIAN LANDS, OR OTHER FEDERAL RESERVATIONS. THE SUMS FOR THE THREE YEARS ARE AUTHORIZED TO BE ALLOCATED AMONG THE STATES HAVING MORE THAN 5 PER CENTUM OF THEIR AREA IN PUBLIC LANDS IN PROPORTION TO THE AREA OF THE PUBLIC LAND IN EACH STATE AS COMPARED WITH THE TOTAL PUBLIC LAND IN ALL THE STATES.
- H.R. 15386.- INTRODUCED IN THE HOUSE ON DECEMBER 20, 1928 AND REFERRED TO THE COMMITTEE ON APPROPRIATIONS. THIS IS THE DEPARTMENT OF AGRICULTURE APPROPRIATION BILL FOR THE FISCAL YEAR ENDING JUNE 30, 1930. PROVIDES FOR FOREST ROADS AND TRAILS UNDER SECTION 23 OF THE FEDERAL HIGHWAY ACT, AN APPROPRIATION OF \$8,000,000 COMPOSED OF \$3,945,000, PART OF THE \$7,400,00 AUTHORIZED TO BE APPROPRIATED FOR THE FISCAL YEAR 1929, AND \$4,055,000, PART OF THE AMOUNT AUTHORIZED TO BE APPROPRIATED FOR THE FISCAL YEAR 1930. PROVIDES FOR FEDERAL-AID ROAD CONSTRUCTION \$74,000,000 COMPOSED OF \$31,800,000 THE REMAINDER OF THE SUM OF \$75,000,000 AUTHORIZED TO BE APPROPRIATED FOR THE FISCAL YEAR 1928, AND \$42,200,000, PART OF THE \$75,000,000 AUTHORIZED TO BE APPROPRIATED FOR THE FISCAL YEAR 1929. PROVIDES FOR THE CONSTRUCTION OF THE MOUNT VERNON MEMORIAL HIGHWAY BY THE APPROPRIATION OF THE UNEXPENDED BALANCE OF THE \$2,500,000 FOR THIS PURPOSE CONTAINED IN THE SECOND DEFICIENCY ACT FOR THE FISCAL YEAR 1928.
- H.R. 15621.- INTRODUCED IN THE HOUSE ON DECEMBER 20, 1928, BY J. S. PARKER OF NEW YORK AND REFERRED TO THE COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE. PROVIDES FOR THE REGULATION OF INTERSTATE COMMERCE BY MOTOR VEHICLES OPERATING AS COMMON CARRIERS OF PERSONS ON THE PUBLIC HIGHWAYS. PROVIDES



THAT OPERATORS OF MOTOR CARRIERS IN INTERSTATE COMMERCE MUST OBTAIN CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY FROM THE INTERSTATE COMMERCE COMMISSION ACTING THROUGH JOINT BOARDS MADE UP IN EACH CASE OF REPRESENTATIVES OF THE BOARDS OF THE SEVERAL STATES IN WHICH ANY PART OF THE INTERSTATE OPERATION IS, OR IS PROPOSED TO BE, CONDUCTED. NO CERTIFICATE SHALL BE ISSUED OR REMAIN IN FORCE UNLESS THE HOLDER THEREOF SHALL COMPLY WITH THE RULINGS OF THE INTERSTATE COMMERCE COMMISSION GOVERNING THE FILING OF BONDS, POLICIES OF INSURANCE, OR SECURITY TO COVER THE LIABILITIES ARISING FROM THE INJURY OR DEATH OF PERSONS, OR THE DAMAGE TO PROPERTY, AS A RESULT OF THE NEGLIGENT OPERATION OF THE MOTOR VEHICLES. PROVIDED ALSO THAT THE RATES, FARES, AND CHARGES OF MOTOR CARRIERS SHALL BE ADOPTED AND MAINTAINED JUST AND REASONABLE AS DETERMINED BY THE INTERSTATE COMMERCE COMMISSION. PROVIDES FOR APPEALS FROM THE DECISIONS OF THE JOINT BOARDS TO THE INTERSTATE COMMERCE COMMISSION. FOR UNLAWFUL OPERATION OR VIOLATION OF THE ACT PROVIDES A FINE OF NOT MORE THAN \$100 FOR THE FIRST OFFENSE AND NOT MORE THAN \$500 FOR ANY SUBSEQUENT OFFENSE. NOTHING IN THE ACT SHALL BE CONSTRUED TO AFFECT THE POWERS OF TAXATION OF THE SEVERAL STATES OR TO AUTHORIZE A MOTOR CARRIER TO DO AN INTRASTATE BUSINESS ON THE HIGHWAYS OF ANY STATE. IT IS NOT INTENDED TO INTERFERE WITH THE EXCLUSIVE EXERCISE BY THE STATE OF THE POWER OF REGULATION OF MOTOR CARRIERS ENGAGED IN INTRASTATE COMMERCE, NOR WITH THE EXERCISE BY THE STATE OF ITS POLICE POWERS WITH REGARD TO MOTOR CARRIERS ENGAGED IN INTERSTATE COMMERCE.

H.R. 16307.- INTRODUCED IN THE HOUSE ON JANUARY 15, 1929 BY C. L. BEEDY OF MAINE AND REFERRED TO THE COMMITTEE ON ROADS. PROVIDES THAT, NOTWITHSTANDING EXISTING FEDERAL-AID ROAD LEGISLATION, THE SECRETARY OF AGRICULTURE MAY EXTEND FEDERAL AID IN THE IMPROVEMENT OF ANY HIGHWAY WHICH LEADS DIRECTLY TO OR FROM A TOLL BRIDGE WHEN AN AGREEMENT, UPON TERMS SATISFACTORY TO THE SECRETARY, HAS BEEN ENTERED INTO FOR THE FREEING OF SUCH BRIDGE OF ALL TOLL CHARGES WITHIN A REASONABLE TIME AND FOR ITS MAINTENANCE AND OPERATION THEREAFTER AS A FREE BRIDGE.

H.R. 16308.- INTRODUCED IN THE HOUSE ON JANUARY 15, 1929, BY C. ADKINS OF ILLINOIS AND REFERRED TO THE COMMITTEE ON ROADS. PROVIDES FOR THE ESTABLISHMENT OF THE LINCOLN MEMORIAL HIGHWAY COMMISSION TO MAKE A SURVEY AND RECOMMENDATIONS WITH REGARD TO THE CONSTRUCTION OF A HIGHWAY BETWEEN THE CITIES OF CHARLESTON AND FARMINGTON, ILL., AND PASSING THROUGH SHILOH



CEMETERY AND OTHER PLACES IN COLES COUNTY, ILL., HISTORICALLY CONNECTED WITH THE LIFE OF ABRAHAM LINCOLN IN ILLINOIS PRIOR TO HIS ASSUMING THE DUTIES OF THE PRESIDENCY.

- S. 4601.- INTRODUCED IN THE SENATE ON DECEMBER 5, 1928, BY T. L. ODDIE OF NEVADA AND REFERRED TO THE COMMITTEE ON POST OFFICES AND POST ROADS. THIS BILL IS IDENTICAL WITH H.R. 14665 AS DESCRIBED ABOVE.
- S. 4659.- INTRODUCED IN THE SENATE ON DECEMBER 5, 1928, BY S. W. BROOKHART OF IOWA AND REFERRED TO THE COMMITTEE ON COMMERCE. PROVIDES REGULATIONS FOR THE CONSTRUCTION, RECONSTRUCTION, REPAIR, MAINTENANCE, AND OPERATION OF BRIDGES AND APPROACHES THERETO OVER ANY OF THE NAVIGABLE WATERS OF THE UNITED STATES. INCLUDES REGULATIONS FOR PRIVATELY AND PUBLICLY CONSTRUCTED, OWNED AND OPERATED TOLL BRIDGES.
- S. 4980.- INTRODUCED IN THE SENATE ON DECEMBER 17, 1928, BY S. W. BROOKHART OF IOWA. AUTHORIZES THE SECRETARY OF AGRICULTURE TO ACQUIRE ANY TOLL BRIDGES WITHIN THE UNITED STATES, OR CONNECTING WITH ANY FOREIGN COUNTRY, THE FREE OPERATION OF WHICH HE DEEMS ADVANTAGEOUS IN THE INTEREST OF INTERSTATE AND FOREIGN COMMERCE, IMPROVEMENT OF THE POSTAL SERVICE, AND PROVISION FOR THE NATIONAL DEFENSE. SUCH ACQUISITION SHALL, IN THE SECRETARY'S DISCRETION, BE MADE BY PURCHASE OR BY CONDEMNATION.
- S. 5085.- INTRODUCED IN THE SENATE ON DECEMBER 21, 1928, BY J. E. WATSON, OF INDIANA, AND REFERRED TO THE COMMITTEE ON INTERSTATE COMMERCE. THIS BILL IS IDENTICAL WITH H.R. 13621 AS DESCRIBED ABOVE.
- S. 5201.- INTRODUCED IN THE SENATE ON JANUARY 5, 1929, BY J. T. ROBINSON OF ARKANSAS AND REFERRED TO THE COMMITTEE ON AGRICULTURE AND FORESTRY. AUTHORIZES AN APPROPRIATION OF \$3,654,000 FOR THE RELIEF OF THE STATES OF MISSOURI, MISSISSIPPI, LOUISIANA, AND ARKANSAS IN THE MATTER OF ROADS AND BRIDGES DAMAGED OR DESTROYED BY THE FLOODS OF 1927.
- S. CON. RES. 25.- INTRODUCED IN THE SENATE ON DECEMBER 10, 1928, BY T. L. ODDIE OF NEVADA, AND REFERRED TO THE COMMITTEE TO AUDIT AND CONTROL THE CONTINGENT EXPENSES OF THE SENATE. PROVIDES THAT A JOINT SELECT COMMITTEE BE CREATED, TO BE KNOWN AS THE SELECT JOINT COMMITTEE TO INVESTIGATE TOLL BRIDGES ON THE PUBLIC HIGHWAYS AND FERRIES, WHICH COMMITTEE SHALL CONSIST OF 3 SENATORS WHO ARE MEMBERS OF THE COMMITTEE ON POST OFFICES AND POST ROADS, TO BE APPOINTED BY THE VICE PRESIDENT, AND

THREE MEMBERS OF THE HOUSE OF REPRESENTATIVES WHO ARE MEMBERS OF THE COMMITTEE ON ROADS, TO BE APPOINTED BY THE SPEAKER, SAID APPOINTMENTS TO BE MADE FROM AMONG THOSE WHO ARE MEMBERS OF THE SEVENTY-FIRST CONGRESS.

H. J. RES. 341.- INTRODUCED IN THE HOUSE ON DECEMBER 7, 1928, BY C. J. MCLEOD OF MICHIGAN, AND REFERRED TO THE COMMITTEE ON FOREIGN AFFAIRS, AUTHORIZES AND DIRECTS THE PRESIDENT TO INVITE THE GOVERNMENT OF EACH NATION ON THE CONTINENTS OF SOUTH AND NORTH AMERICA AND OF CENTRAL AMERICA TO NAME AN ENGINEER AND AN ECONOMIST TO REPRESENT SUCH COUNTRY IN A JOINT CONFERENCE, TO BE HELD AS SOON AS PRACTICABLE AT WASHINGTON, D. C., UPON QUESTIONS RELATING TO THE CONSTRUCTION OF AN INTER-AMERICAN HIGHWAY ON THE WESTERN HEMISPHERE.

H. J. RES. 355.- INTRODUCED IN THE HOUSE ON DECEMBER 15, 1928, BY C. COLE OF IOWA, AND REFERRED TO THE COMMITTEE ON FOREIGN AFFAIRS. AUTHORIZES AN APPROPRIATION OF \$50,000,000 TO ENABLE THE SECRETARY OF STATE TO COOPERATE WITH THE SEVERAL GOVERNMENTS, MEMBERS OF THE PAN AMERICAN UNION, IN THE UNDERTAKING AND FINANCING AND BUILDING AN INTER-AMERICAN HIGHWAY OR HIGHWAYS.



A.A.S.H.O. ADOPTS CONFERENCE SPECIFICATIONS ON STEEL BRIDGES

CONTRIBUTED BY E. F. KELLEY,
CHIEF OF THE DIVISION OF TESTS.

THE CONFERENCE SPECIFICATIONS FOR STEEL HIGHWAY BRIDGES HAVE RECENTLY BEEN ADOPTED BY THE COMMITTEE ON BRIDGES AND STRUCTURES OF THE AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS AS A TENTATIVE REVISION OF THE EXISTING STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES AND INCIDENTAL STRUCTURES OF THE ASSOCIATION.

SEVERAL YEARS AGO THE ASSOCIATION OF STATE HIGHWAY OFFICIALS AND THE AMERICAN RAILWAY ENGINEERING ASSOCIATION, RECOGNIZING THE DESIRABILITY OF UNIFORMITY IN THE STEEL BRIDGE SPECIFICATIONS OF THE TWO ORGANIZATIONS, APPOINTED A CONFERENCE COMMITTEE WITH INSTRUCTIONS TO PRODUCE, IF POSSIBLE, A UNIFORM SPECIFICATION WHICH WOULD BE ACCEPTABLE TO BOTH ASSOCIATIONS. THE CONFERENCE COMMITTEE, COMPOSED OF THREE REPRESENTATIVES OF EACH ASSOCIATION, HELD ITS ORGANIZATION MEETING IN JANUARY, 1925. AS A RESULT OF 16 COMMITTEE MEETINGS HELD DURING THE ENSUING THREE YEARS, THERE WAS FINALLY RECOMMENDED TO THE PARENT COMMITTEES, EARLY IN 1928, A COMPLETE SPECIFICATION FOR STEEL HIGHWAY BRIDGES UPON THE DETAILS OF WHICH THE MEMBERS OF THE CONFERENCE HAD REACHED AN AGREEMENT. FOLLOWING THIS, THE PROPOSED SPECIFICATION WAS DISCUSSED IN DETAIL AT TWO REGULAR MEETINGS OF THE COMMITTEE ON BRIDGES AND STRUCTURES AND, AGREEMENT HAVING BEEN REACHED REGARDING CERTAIN REVISIONS WHICH WERE DESIRED, THE COMMITTEE HAS FORMALLY APPROVED THE CONFERENCE SPECIFICATION AS A TENTATIVE STANDARD.

THE NEW SPECIFICATION REPRESENTS A GREAT IMPROVEMENT OVER ANY EXISTING SPECIFICATION FOR STEEL HIGHWAY BRIDGES. IT ELIMINATES MANY OF THE WEAK POINTS IN THE PRESENT SPECIFICATION OF THE AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS AND EMBRACES THE BEST OF THE LATE DEVELOPMENTS IN THE REQUIREMENTS FOR BRIDGE DESIGN. PROBABLY THE MOST OUTSTANDING CHANGE IN THE NEW SPECIFICATION IS IN THE REQUIREMENTS FOR WORKING UNIT STRESSES. THIS CHANGE IS A FORWARD STEP IN LINE WITH THE PRESENT TREND IN BRIDGE DESIGNING WHICH WILL RESULT IN A BETTER BALANCED DESIGN OF STRUCTURES AND GREATER ULTIMATE ECONOMY.

THE CONFERENCE SPECIFICATION HAS ALSO BEEN ENDORSED BY COMMITTEE XV ON IRON AND STEEL STRUCTURES OF THE AMERICAN RAILWAY ENGINEERING ASSOCIATION AS A TENTATIVE STANDARD. IT IS EXPECTED THAT IT WILL BE CONTINUED IN A TENTATIVE STATUS DURING THE COMING YEAR, AT THE END OF WHICH TIME, IF NO SERIOUS FAULTS IN THESE REQUIREMENTS HAVE BEEN FOUND, ITS ADVANCEMENT TO STANDARD BY BOTH ASSOCIATIONS WILL BE RECOMMENDED.



DIGEST OF
ANTI-ADVERTISING SIGN-LAWS COMPILED BY BUREAU

A MIMEOGRAPHED DIGEST OF THE STATE LAWS PROHIBITING ADVERTISING SIGNS ALONG THE HIGHWAYS OF THE SEVERAL STATES HAS BEEN MADE AVAILABLE FOR DISTRIBUTION BY THE BUREAU. THIS COMPENDIUM OF LEGAL DATA IS PRIMARILY INTENDED TO GIVE ADEQUATE INFORMATION ON THE SUBJECT TO THE MANY INQUIRERS WHO ARE CONCERNED WITH THE MENACE OF ADVERTISING SIGNS TO THE SAFETY OF THE TRAVELLING PUBLIC AND TO THE UNDISTURBED ENJOYMENT OF NATURAL SCENIC ATTRACTIONS.

THE STATE LAWS GOVERNING ADVERTISING SIGNS RANGE ALL THE WAY FROM THE MOST GENERAL RULES AND REGULATIONS TO CERTAIN WELL-DEFINED STIPULATIONS. ONLY 7 STATES ARE WITHOUT STATE REGULATION - ARKANSAS, KANSAS, NEW MEXICO, OKLAHOMA, SOUTH CAROLINA, TEXAS AND WYOMING.

CONNECTICUT, MASSACHUSETTS, AND VERMONT HAVE THE BEST DEFINED AND MOST RIGID LAWS. IN ORDER TO ERECT COMMERCIAL ADVERTISING SIGNS IN THESE STATES, AN AGENCY MUST BE LICENSED BY STATE AUTHORITIES AT CERTAIN ANNUAL FEES, AND IF THE AGENCY IS NOT A RESIDENT OF THE STATE, A BOND MUST BE FURNISHED. ALL LICENSES MUST SHOW THE NUMBER OF SIGNS AND GIVE THE DATE OF EXPIRATION OF THE PERMIT.

CONNECTICUT LEVIES A LICENSE FEE OF \$100 PER YEAR, AND AN ANNUAL PERMIT FEE RANGING FROM \$3 FOR EVERY 300 SQUARE FEET OR LESS OF ADVERTISING SPACE TO \$9 FOR FROM 600 TO 900 SQUARE FEET. FEES APPLY TO EACH SIDE OF THE PANEL AND SIGNS WITH AN AREA GREATER THAN 900 SQUARE FEET ARE NOT PERMITTED. IN MASSACHUSETTS THE FEE IS FIXED WITH REGARD TO ADMINISTRATIVE COSTS AND VARIES THROUGHOUT THE COMMONWEALTH. VERMONT LEVIES AN ANNUAL LICENSE FEE OF 3 CENTS FOR EACH SQUARE FOOT OF ADVERTISING SPACE.

IN CONNECTICUT EACH APPLICATION FOR A PERMIT MUST BEAR THE WRITTEN CONSENT OF THE OWNERS OF THE PROPERTY ON WHICH THE SIGN IS TO BE ERECTED. EACH PERMIT MUST STATE THE SIZE OF THE DISPLAY, AND EACH SIGN MUST SHOW THE NAME OF THE AGENCY DISPLAYING, OWNING, OR LEASING BILLBOARDS. NO DIRECTION OR DANGER SIGN SHALL BEAR ADVERTISING MATTER.

IN VERMONT, THE APPLICATION FOR A LICENSE SHALL STATE THE PROPERTY UPON WHICH ADVERTISING IS TO BE DISPLAYED, THE POPULATION OF THE CITY, VILLAGE, OR TOWN; THE SIZE, AND DESCRIPTION OF



SIGN AND THE DISTANCE AT WHICH IT MAY BE READ FROM A STATE HIGHWAY, RAILROAD OR RAILWAY TRACK, PUBLIC PARK, OR NAVIGABLE RIVER.

THE STATE AUTHORITIES OF THESE THREE COMMONWEALTHS ARE VESTED WITH THE RIGHT TO EXACT FINES FOR NONCONFORMING SIGNS AND TO REMOVE THEM. THE COST OF REMOVAL, AFTER DUE NOTICE HAS BEEN SERVED, IS COLLECTED FROM THE AGENCIES OR THE SURETIES ON THEIR BONDS. CONNECTICUT IMPOSES A FINE OF \$100 FOR EACH NONCONFORMING SIGN; MASSACHUSETTS, A FINE OF NOT MORE THAN \$100 WITH AN ADDITIONAL \$500 FOR CONTINUED VIOLATION; AND VERMONT, A FINE OF \$100, OR IMPRISONMENT FOR 30 DAYS, OR BOTH.

ADVERTISING SIGNS IN CONNECTICUT MAY NOT BE PLACED WITHIN 15 FEET OF THE RIGHT OF WAY OF A HIGHWAY, AND IN MASSACHUSETTS WITHIN 500 FEET. IN THESE TWO STATES, CITIES AND TOWNS MAY FURTHER REGULATE AND RESTRICT ADVERTISING SIGNS IN A MANNER NOT INCONSISTENT WITH STATE LAWS.

LOCAL AUTHORITIES OF THE THREE STATES MAY REMOVE NONCONFORMING SIGNS WITHIN THEIR JURISDICTIONS. LAWS OF THE THREE COMMONWEALTHS, AS WELL AS THE LAWS OF OTHER STATES, PERMIT CERTAIN ADVERTISING BY MANUFACTURERS OR LAND OWNERS LOCATED ADJACENT TO HIGHWAYS.

SEVEN OTHER STATES - FLORIDA, GEORGIA, MISSISSIPPI, NEBRASKA, NEVADA, NORTH CAROLINA AND TENNESSEE - IMPOSE FEES FOR ADVERTISING SIGNS. MISSISSIPPI PRESCRIBES A FEE OF 75 CENTS FOR EACH SIGN WITH 10 AND UP TO 100 SQUARE FEET OF AREA, \$1.50 FOR AN AREA BETWEEN 100 AND 300 SQUARE FEET, AND \$2.50 FOR AN AREA OF MORE THAN 300 SQUARE FEET.

NORTH CAROLINA EXACTS AN ANNUAL LICENSE FEE, BASED UPON THE POPULATION OF CITIES AND TOWNS, OF FROM \$5 FOR CITIES OF 5,000 INHABITANTS UP TO \$50 FOR CITIES OF OVER 35,000. FURTHERMORE, NO ADVERTISING SIGNS ARE PLACED ON PRIVATE PROPERTY WITHOUT THE CONSENT OF THE OWNER AND NO SIGNS ARE PLACED WITHIN THE LIMITS OF HIGHWAYS UNDER PENALTY OF A FINE OF \$50, OR IMPRISONMENT OF NOT MORE THAN 30 DAYS. LOCAL AUTHORITIES REGULATE ADVERTISING SIGNS WITHIN THEIR JURISDICTIONS.

TENNESSEE FORBIDS THE ERECTION OF SIGNS UPON THE RIGHT OF WAY OF ANY STATE HIGHWAY, AND PROHIBITS ERECTION OF SIGNS RESEMBLING RAILROAD CROSSING SYMBOLS ON ANY PUBLIC HIGHWAY OR STREET OR ON PRIVATE PROPERTY WITHIN ONE-QUARTER MILE OF ANY PUBLIC ROAD



OR STREET. THE STATE LICENSES ELECTRIC SIGNS ANNUALLY ACCORDING TO POPULATION, THE FEES RANGING FROM \$10 FOR CITIES AND TOWNS OF LESS THAN 5,000 PEOPLE TO \$50 FOR THOSE WITH MORE THAN 50,000 INHABITANTS. IT IMPOSES AN ADDITIONAL ANNUAL FEE VARYING FROM \$7.50 UPON AGENCIES POSTING BILLS OR OTHER PRINTED MATTER IN COUNTIES OF LESS THAN 20,000 PEOPLE TO \$75 IN COUNTIES WITH 60,000 OR MORE.

IN FLORIDA, THE STATE ROAD DEPARTMENT PROHIBITS ADVERTISING SIGNS ON STATE HIGHWAYS AND IMPOSES ON AGENCIES IN THE BILL-POSTING BUSINESS A LICENSE TAX RANGING FROM \$5 IN CITIES AND TOWNS OF LESS THAN 10,000 INHABITANTS TO \$30 IN CITIES AND TOWNS OF 10,000 OR MORE.

NEBRASKA REQUIRES A STATE PERMIT FOR ADVERTISING SIGNS, WITH A FEE VARYING FROM 25 CENTS TO \$5 FOR EACH SIGN, AND NO SIGN MAY HAVE MORE THAN 10 SQUARE FEET. ALSO SIGNS MAY NOT BE ERECTED WITHIN 300 FEET OF THE INTERSECTION OF CROSSROADS, AND RAILROAD CROSSINGS, AND A FINE OF FROM \$10 TO \$100 IS LEVIED FOR VIOLATION OF THE LAW. ALL NON-LICENSED SIGNS ARE REMOVED BY STATE AUTHORITIES.

GEORGIA LEVIES AN ANNUAL TAX OF \$1 ON EACH AGENCY FOR EACH LOCATION DEFINED AS 75 LINEAL FEET OR A FRACTION THEREOF. NO ADVERTISING SIGNS ARE ALLOWED ON THE DIXIE HIGHWAY IN BIBB COUNTY. CHATHAM COUNTY IS EMPOWERED TO REGULATE SIGNS WITHIN ITS OWN JURISDICTION.

NEVADA LEVIES AN ANNUAL LICENSE FEE OF \$5 ON ADVERTISING AGENCIES, THE LICENSE TO BE ISSUED BY THE COUNTY CLERK OF THE COUNTY IN WHICH IT IS TO BE ERECTED. MONEY FROM LICENSES IS AP-PORTIONED TO THE ROAD FUNDS OF THE COUNTIES. NO PERMIT IS ISSUED FOR BILLBOARDS ON ANY LOCATION WHICH MAY MEASUREABLY DESTROY THE NATURAL BEAUTY OF THE SCENERY OR OBSCURE A VIEW OF THE ROAD AHEAD. AN AGENCY ERECTING NONCONFORMING SIGNS IS SUBJECT TO A FINE OF \$25 TO \$100, OR IMPRISONMENT FROM 10 TO 30 DAYS.

IN 9 OTHER STATES - COLORADO, ILLINOIS, IOWA, MAINE, MINNESOTA, NEW HAMPSHIRE, NORTH DAKOTA, SOUTH DAKOTA, AND WEST VIRGINIA - NO ADVERTISING AGENCY MAY ERECT OR MAINTAIN ANY COMMERCIAL ADVERTISING SIGN UPON ANY HIGHWAY OR RIGHT OF WAY. IN 8 OF THESE STATES THE AUTHORITIES HAVE POWER TO REMOVE ALL NON-CONFORMING SIGNS, AND IN 7 STATES TO LEVY FINES OF FROM \$5 TO \$1,000, OR IMPRISONMENT OF FROM 1 TO 6 MONTHS. THREE OF THE STATES REGULATE THE DISTANCES, FROM RAILROAD CROSSINGS, ROAD INTERSECTIONS, AND CURVES, AT WHICH SIGNS MAY BE PLACED, TO A



ZONE RANGING FROM 300 TO 1,000 FEET AWAY. MINNESOTA AND NORTH DAKOTA DO NOT PERMIT ADVERTISING MATTER UPON DIRECTIONAL SIGNS. IN SOUTH DAKOTA, NO ADVERTISING SIGN OUTSIDE OF CITY LIMITS MAY HAVE MORE THAN 20 PER CENT OF THE SURFACE COLORED RED.

THE LAWS OF 16 OTHER STATES - CALIFORNIA, IDAHO, LOUISIANA, MARYLAND, MICHIGAN, MISSOURI, MONTANA, NEW JERSEY, NEW YORK, OHIO, OREGON, PENNSYLVANIA, RHODE ISLAND, UTAH, WASHINGTON, AND WISCONSIN - PROHIBIT THE ERECTION OF ADVERTISING SIGNS ON PRIVATE PROPERTY WITHOUT THE CONSENT OF THE OWNER AND ON RIGHT OF WAYS OF HIGHWAYS WITHOUT THE CONSENT OF THE STATE, CITY OR COUNTY AUTHORITIES.

THE MAJORITY OF THESE STATES DESIGNATE THE DISTANCE FROM RAILROAD CROSSINGS, INTERSECTING HIGHWAYS, AND CURVES, AT WHICH SIGNS MAY BE PLACED, TO A ZONE FROM 300 TO 1,000 FEET AWAY, WITH FINES OF \$10 TO \$500 OR IMPRISONMENT FROM 10 TO 60 DAYS FOR VIOLATION OF THE LAW. A FEW OF THE STATES ARE EMPOWERED TO REMOVE NONCONFORMING ADVERTISING SIGNS. IN OTHERS, LOCAL AUTHORITIES MAY REGULATE AND REMOVE OBJECTIONABLE SIGNS IN TERRITORY UNDER THEIR JURISDICTION. PENNSYLVANIA, MICHIGAN, AND IDAHO PERMIT NO ADVERTISING UPON DIRECTIONAL SIGNS. FINES COLLECTED IN MISSOURI ARE CREDITED TO THE STATE ROAD FUND FOR MAINTENANCE DISBURSEMENTS.

IN 6 STATES - ALABAMA, ARIZONA, DELAWARE, INDIANA, KENTUCKY, AND VIRGINIA - THE LAWS GOVERNING ADVERTISING SIGNS MERELY STATE THAT NO PERSON SHALL ERECT OR MAINTAIN ANY ADVERTISING SIGN UPON ANY HIGHWAY OR RIGHT OF WAY WITHOUT THE CONSENT OF THE STATE AUTHORITIES.

WHILE ARKANSAS HAS NO STATE LAW, AUTHORITY GOVERNING ADVERTISING SIGNS IS VESTED IN THE COUNTY COURTS BUT THE LEGISLATION IS NOT SPECIFIC. IN TEXAS, CITIES OF MORE THAN 5,000 INHABITANTS HAVE POWER TO LICENSE, REGULATE, CONTROL, OR PROHIBIT THE ERECTION OF SIGNS OR BILLBOARDS AS PROVIDED BY CHARTERS OR ORDINANCES. IN OKLAHOMA, COUNTY AND TOWNSHIP BOARDS ARE CHARGED WITH THE IMPROVEMENT OF THE PUBLIC HIGHWAYS, AND THEY HAVE POWER TO REMOVE ALL THE OBSTRUCTIONS UPON HIGHWAYS UNDER THEIR JURISDICTION

WHILE WYOMING HAS NO STATE LAW, THE HIGHWAY DEPARTMENT CLAIMS JURISDICTION OVER RIGHT OF WAYS AND ASSUMES AUTHORITY TO REFUSE PERMISSION TO ERECT ADVERTISING SIGNS AND TO REMOVE ANY IN THESE AREAS.



IN KANSAS, COUNTY COMMISSIONERS OF EACH COUNTY ARE AUTHORIZED TO REMOVE ALL ADVERTISING SIGNS EXCEEDING 4 FEET IN HEIGHT WITHIN 50 YARDS OF ANY RAILROAD GRADE CROSSING, ABRUPT CORNER IN THE HIGHWAY, OR ENTRANCE TO A DRIVEWAY LEADING FROM THE HIGHWAY, AFTER NOTICE HAS BEEN SERVED ON THE OWNER. THE COST OF THE REMOVAL WORK IS ENTERED UPON THE TAX ROLLS IN ADDITION TO A PENALTY OF 10 PER CENT OF THE COST.

NEW JERSEY PROHIBITS ADVERTISING SIGNS ON THE PALISADES ALONG THE HUDSON RIVER. NEW YORK PROHIBITS ADVERTISING SIGNS IN ADIRONDACK PARK, AND DELAWARE PROHIBITS THEM FOR 200 FEET ON EITHER SIDE OF THE RIGHT OF WAY OF ANY HIGHWAY ENTERING WILMINGTON FOR A DISTANCE OF 1 MILE FROM THE CITY LIMITS.

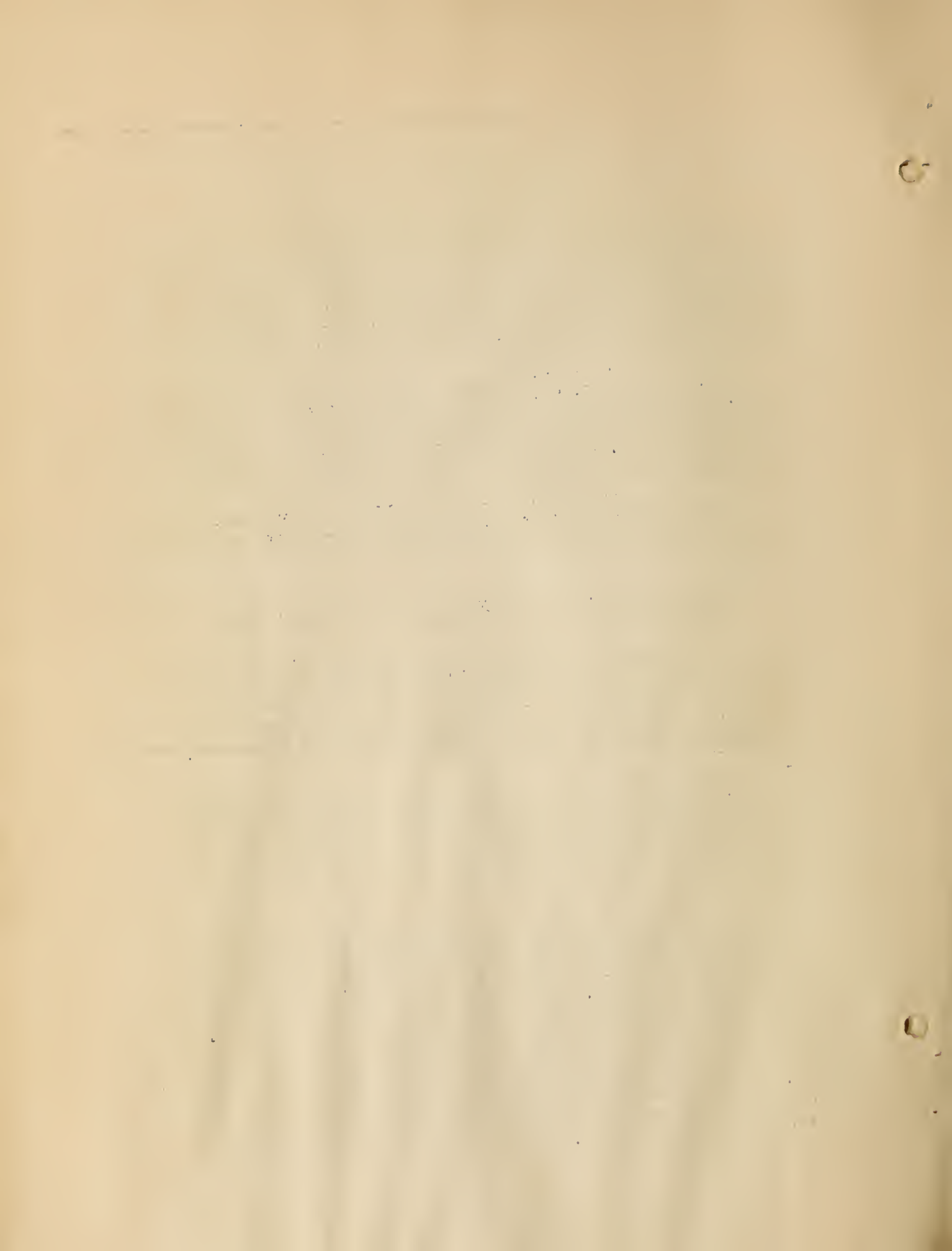
NO ADVERTISING SIGNS ARE PERMITTED ON SWAMPS AND TIDAL OVERFLOW LANDS IN LOUISIANA EXCEPT UNDER LEASE FROM THE OWNERS.

CLEVELAND EXHIBIT OF BUREAU TO GO TO RIO DE JANEIRO

THE HISTORICAL EXHIBIT OF THE BUREAU DISPLAYED AT THE RECENT CONVENTION OF THE AMERICAN ROAD BUILDERS' ASSOCIATION IN CLEVELAND, OHIO, FROM JANUARY 14 TO 18, IS TO BE SENT TO BRAZIL FOR EXHIBITION AT THE SECOND PAN-AMERICAN CONFERENCE ON HIGHWAYS TO BE HELD IN RIO DE JANEIRO IN JUNE OF THIS YEAR.

THE EXHIBIT WHICH IS ENTITLED "THE ROAD FROM YESTERDAY TO NOW" CONSISTS OF 6 BRILLIANTLY-LIGHTED DISPLAY BOOTHS EACH INDICATIVE OF ONE OF THE STAGES IN THE PROGRESSIVE ROAD DEVELOPMENT OF THE NATION FROM 1904 DOWN TO THE PRESENT DAY, SURMOUNTED BY AN IMMENSE SIGN 66 FEET IN LENGTH AND OVER 9 FEET HIGH.

THE METHODS OF ROAD CONSTRUCTION AND THE CHARACTER OF THE TRAFFIC AT EACH PERIOD ARE DEPICTED BY MEANS OF COLORED ENLARGEMENTS OF ACTUAL PHOTOGRAPHS OF TYPICAL CONDITIONS AND APPROPRIATE LEGENDS. ON A CHANGING SIGN IN THE MIDDLE OF THE CENTER PANEL INFORMATION IS GIVEN AS TO THE MOTOR VEHICLE REGISTRATION AND THE MILEAGE OF SURFACED ROADS IN EXISTENCE AT THE PERIOD. THIS SIGN IS MADE UP OF 6 MECHANICALLY-ROTATED TRIANGLES UPON THE THREE FACES OF WHICH THE INFORMATION IS DISPLAYED. AS THE 6 CORRESPONDING FACES OF THE TRIANGLES ROTATE INTO THE PLANE OF THE REAR OF THE BOOTH THEY ARE STOPPED LONG ENOUGH TO BE EASILY READ AND THEN ROTATED UNTIL THE SECOND FACE COMES INTO POSITION AND SO ON.



RECESSED INTO THE VERTICAL COLUMNS CONNECTING THE 6 BOOTHS ARE RED ILLUMINATED BARS THE HEIGHT OF WHICH, TO A CONVENIENT SCALE, REPRESENTS THE MILEAGE OF SURFACED ROADS IN THE UNITED STATES AT EACH OF 7 PERIODS FROM 1900 TO 1928.

THE BOOTHS, WHICH ARE SHOD WITH BALL-BEARING CASTERS TO FACILITATE MOVEMENT, PORTRAY THE HIGHWAY TRANSPORTATION CONDITIONS PREVAILING IN 1904, 1909, 1914, 1921 AND 1928. THEY VISUALIZE THE KALEIDOSCOPIC CHANGES IN THE MAKING AND USE OF AMERICAN ROADS THAT HAVE TAKEN PLACE IN THE LAST QUARTER OF A CENTURY.

ON THE LARGE CANVAS THAT TOPS THE BOOTHS THE ARTIST HAS DEPICTED AT THE LEFT AN OLD-FASHIONED OX CART AS TYPICAL OF THE EARLY DAYS OF HIGHWAY TRANSPORTATION, AND AT THE RIGHT A SPEEDING MOTOR TRUCK ON A MODERN PAVEMENT AGAINST A DISTANT BACKGROUND OF SMOKE AND CITY SKYLINE CONVEYS A SENSE OF THE TREMENDOUS STRIDES THAT HAVE BEEN MADE IN ROAD BUILDING AND TRANSPORTATION IN THE 28 YEARS SINCE 1900.

IN THE CENTER OF THE CANVAS IS A LARGE PAINTING SUGGESTING THE DEVELOPMENT IN THE MODES OF THE HIGHWAY TRANSPORTATION FROM THE EARLIEST TIMES TO THE PRESENT. IN THE DISTANCE MAY BE SEEN THE INDIAN TRAVOIS, THEN THE MULES HAULING THE TOBACCO HOGSHEAD, NEXT TWO-WHEELED CARTS, AND CLOSER TO VIEW SUCCESSIVELY THE FOUR-WHEELED WAGON, THE PRIMITIVE AUTOMOBILE OF 1900 AND THEN THE DEVELOPMENTS IN THE MOTOR VEHICLE SUCH AS THE MOTOR TRUCK AND THE MOST MODERN AUTOMOBILE MODELS.

CONCRETE REPAIR - AN INSTRUCTIVE PAMPHLET
OF THE INDIANA STATE HIGHWAY COMMISSION

A PAMPHLET ISSUED BY A. H. HINKLE, SUPERINTENDENT OF MAINTENANCE, RELATIVE TO THE REPAIR OF CONCRETE (PORTLAND CEMENT) PAVEMENTS WITH QUICK-HARDENING CONCRETE MADE WITH ORDINARY PORTLAND CEMENT

1.- IMPORTANCE OF DOING GOOD WORK

WHERE IT IS DESIRABLE TO OPEN THE PATCH TO TRAFFIC AS SOON AS POSSIBLE AFTER IT IS MADE, IT IS NECESSARY THAT A CONCRETE BE USED THAT WILL ATTAIN STRENGTH RAPIDLY, SINCE THE PATCHES ARE USUALLY SMALL, AND HENCE SMALL AMOUNTS OF CONCRETE ARE WANTED AT INTERMITTENT PERIODS, THERE IS MUCH GREATER DANGER OF MAKING A POOR CONCRETE PATCH THAN IN A NEW CONCRETE SLAB IN THE ORIGINAL CONSTRUCTION, UNLESS GREAT CARE IS TAKEN IN DOING THE WORK. INASMUCH AS IT IS DESIRABLE TO MAKE A STRONGER CONCRETE AND ONE THAT WILL ATTAIN STRENGTH QUICKER THAN IN A NEW PAVEMENT, IT IS EXTREMELY IMPORTANT THAT WE COMPLY WITH EVERY DETAIL FOR MAKING A GOOD PATCH, FROM THE PREPARATION OF THE SUBGRADE TO THE FINISHING OF THE SURFACE, AND PROTECTING IT AGAINST TRAFFIC UNTIL SUFFICIENTLY STRONG. UNLESS THE WORK IS SO DONE AS TO COMPLY WITH ALL THE REQUIREMENTS TO MAKE A PERFECT REPAIR IT IS FAR BETTER THAT THE REPAIR BE MADE WITH SOMETHING ELSE THAN CONCRETE.

2.-CUTTING AWAY THE OLD CONCRETE

THIS CAN BE DONE WITH PICKS, CHISELS, CROWBARS OR JACK-HAMMER DRILL. THE USE OF A PAVING BREAKER OPERATED BY A SMALL PORTABLE AIR-COMPRESSOR IS THE MOST PRACTICAL METHOD, IF ANY QUANTITY OF WORK IS TO BE DONE. ALL THE BROKEN AND DISINTEGRATED CONCRETE SHOULD BE REMOVED AND THE OLD SLAB CUT BACK UNTIL SOLID, RIGID, CONCRETE IS REACHED WHICH HAS ON TOP A SMOOTH AND UNIFORM SURFACE. THE TOP EDGE OF THE OLD CONCRETE SHOULD BE TRIMMED BY HAND (WITH THE USE OF HAMMER AND CHISEL) TO A UNIFORM AND VERTICAL EDGE FOR A DEPTH OF ABOUT ONE INCH BELOW THE TOP SURFACE. THE REMAINDER OF THE VERTICAL EDGE OF THE CONCRETE SHOULD BE LEFT AS ROUGH AS POSSIBLE. THE BASE OF THE OLD CONCRETE SHOULD BE THOROUGHLY BRUSHED TO LOOSEN ANY SPALLED CONCRETE.



3.- PREPARING THE SUBGRADE

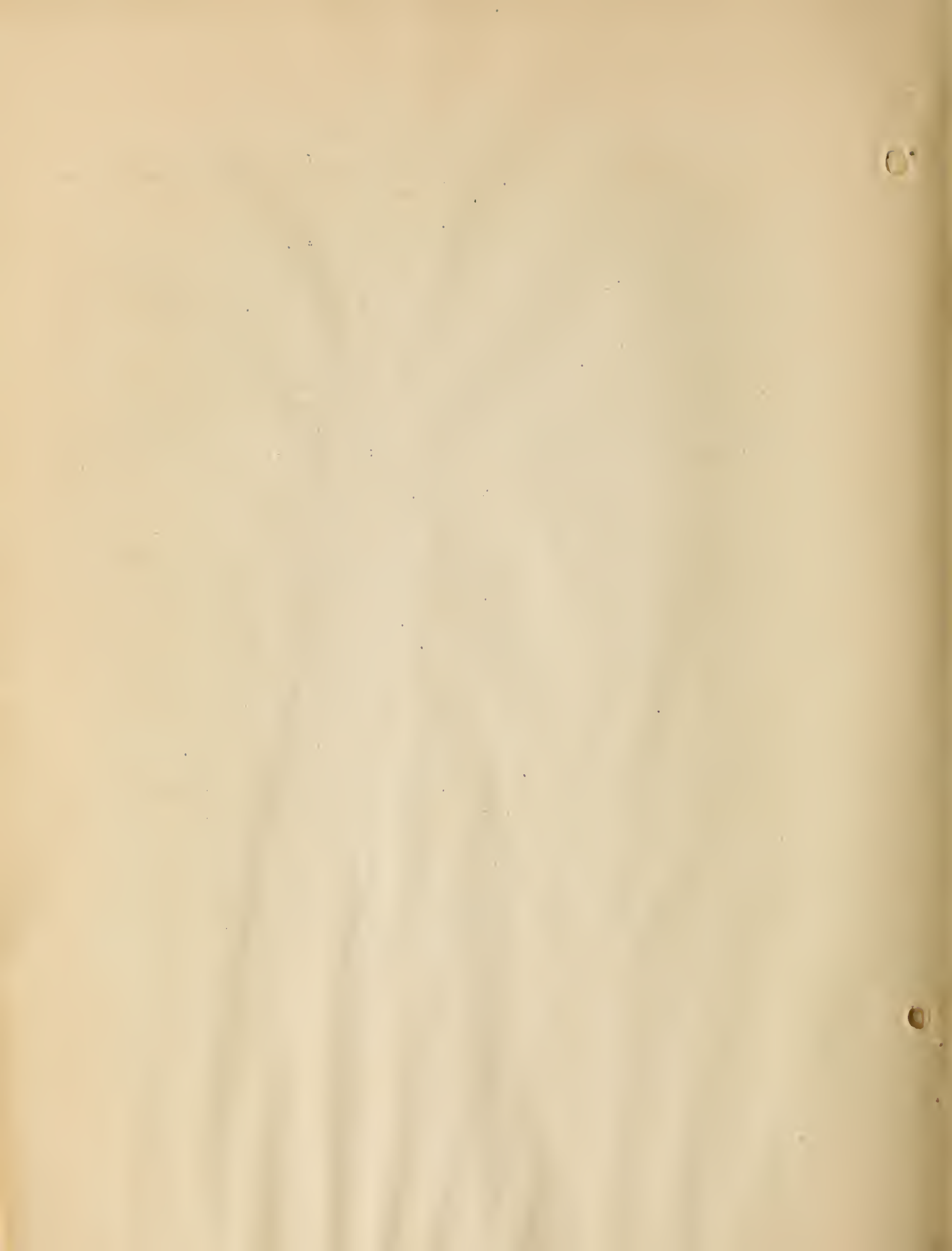
THE SUBGRADE ORDINARILY SHOULD BE EXCAVATED TO A GREATER DEPTH THAN THE ORIGINAL SLAB. AT ITS JUNCTION WITH THE OLD PAVEMENT THE NEW SLAB SHALL BE INCREASED 4 TO 6 INCHES DEEPER THAN THE THICKNESS OF THE OLD SLAB. ALSO, THE NEW CONCRETE SHOULD EXTEND BACK UNDER THE EDGE OF THE OLD SLAB. THE DEPTH OF THE NEW CONCRETE SHOULD DEPEND UPON THE NATURE OF THE SUBSOIL. THE OLD CONCRETE SLAB HAS FAILED FOR A REASON. QUITE FREQUENTLY THIS REASON WILL BE FOUND TO BE THE SOFT CLAY SUBSOIL. THEREFORE, THE THINNEST DEPTH OF THE NEW SLAB SHOULD USUALLY BE 2 TO 4 INCHES DEEPER THAN THE OLD PAVEMENT. IN VERY BAD SPONGY CLAY SOIL, NOT ONLY SHOULD THE DEPTH OF THE NEW SLAB BE INCREASED BUT IT IS ALSO AN ADDED FACTOR OF SAFETY TO TAMP INTO THE SUBGRADE A 3 TO 4-INCH LAYER OF CINDERS, GRAVEL, OR BROKEN STONE WITH AN OUTLET TO THE SIDE DITCH. THIS WILL REDUCE CAPILLARY ACTION IN THE CLAY AND ALSO HELP DRAIN THE SURROUNDING SUBGRADE.

4.- COMPOSITION AND PROPORTION OF CONCRETE

THE CONCRETE FOR THE PATCHES USUALLY SHOULD BE OF A BETTER GRADE THAN THAT USED IN GOOD NEW CONCRETE PAVING CONSTRUCTION AND IT SHOULD BE A CONCRETE THAT WILL ATTAIN STRENGTH QUICKLY SO AS TO ACCOMMODATE TRAFFIC WITH LITTLE DELAY. IF LARGE AREAS ARE TO BE REPLACED ECONOMY WOULD USUALLY REQUIRE A MIX NO RICHER THAN THE STANDARD-MIX CONCRETE FOR PAVING. IF ONLY SMALL AREAS ARE TO BE PATCHED WHEREIN THE QUANTITY OF CONCRETE INVOLVED IS SMALL, THE ADDED COST DUE TO USING A RICHER MIX WOULD NOT BE SO IMPOSSIBLE AN ITEM. THE TIME THAT TRAFFIC SHOULD BE KEPT OFF THE PATCH WILL DETERMINE THE MIX THAT SHOULD BE USED. THE QUICK-HARDENING CONCRETE WILL DEPEND FOR ITS EARLY STRENGTH UPON:

- 1.- RICHNESS OF THE MIX;
- 2.- FREEDOM FROM EXCESS WATER;
- 3.- USE OF CaCl_2 ;
- 4.- COMPARATIVELY HIGH ATMOSPHERIC TEMPERATURES;
- 5.- COARSE SAND AND PROPERLY-GRADED SAND AND COARSE AGGREGATE; AND
- 6.- TIME OF MIX.

ALL OF THE ABOVE FACTORS AFFECT THE TIME OF HARDENING OF THE CONCRETE MIX. IF WE COMBINE THE MOST FAVORABLE FEATURES OF ALL THE ABOVE FACTORS IN ONE MIX, WE CAN MAKE A CONCRETE WHICH ASSUMES AS MUCH STRENGTH IN TWO OR THREE DAYS AS THE ORDINARY CONCRETE MIX USED IN PAVING ASSUMES IN 21 DAYS.



TRAFFIC SHOULD BE KEPT OFF THE PATCH THE NUMBER OF DAYS SHOWN IN TABLE I. DURING COLD WEATHER, TRAFFIC SHOULD BE KEPT OFF THE NEW CONCRETE A LONGER PERIOD THAN GIVEN IN THE TABLE AS CONCRETE GAINS STRENGTH SLOWER AT LOW TEMPERATURES.

CEMENT SHOULD BE TESTED AT THE LABORATORY AND A REPORT ON SAME SECURED SO AS TO KNOW THAT IT PASSES THE REQUIRED TEST. IT IS IMPERATIVE THAT THE CEMENT BE OF GOOD QUALITY. OLD CEMENT THAT HAS BEEN KEPT IN A DAMP PLACE UNTIL IT HAS PARTLY CAKED SHOULD NOT BE USED FOR THIS MOST IMPORTANT WORK. SOME BRANDS OF CEMENT ATTAIN GREATER STRENGTH THAN OTHERS AT ANY EARLY DATE. IT IS DESIRABLE TO USE SUCH CEMENT FOR REPAIR PURPOSES, IF IT CAN BE CONVENIENTLY SECURED.

SAND SHOULD BE COMPARATIVELY COARSE AND 95 PER CENT OF IT SHOULD PASS A $\frac{1}{4}$ -INCH MESH SCREEN. IT SHOULD BE CLEAN AND FREE FROM SILT OR FOREIGN MATERIAL. THE SAND GRAINS SHOULD BE COMPOSED OF HARD GRITTY MATERIAL AND BE WHAT IS ORDINARILY KNOWN AS A "SHARP" SAND. SAND FROM MANY LOCAL BANKS, WHICH, THOUGH GRADED FAIRLY WELL, CONTAINS A LARGE PERCENTAGE OF SOFT PARTICLES, IS NOT DESIRABLE AS IT MAY PRODUCE A CONCRETE WHICH WILL NOT WITHSTAND THE ABRASION OF TRAFFIC. ANY AMOUNT OF SHALE IN THE SAND IS DETRIMENTAL TO IT AND MAY CAUSE FAILURE OF THE CONCRETE.

COARSE AGGREGATE SHOULD BE CRUSHED STONE OR GRAVEL FAIRLY WELL GRADED, FROM $\frac{1}{2}$ INCH TO $2\frac{1}{2}$ INCHES IN SIZE. IF THE CONCRETE IS TO BE USED TO FILL A CRACK OR VERY SMALL OPENING, THE MAXIMUM SIZE OF AGGREGATE WILL HAVE TO BE REDUCED ACCORDINGLY. IT IS IMPERATIVE THAT THIS COARSE AGGREGATE BE CLEAN AND FREE FROM PIECES OF WOOD, DIRT, SILT, SHALE OR ANY SOFT PARTICLES. ROCK OF SHALE FORMATION, ALTHOUGH APPARENTLY HARD AND SOLID WHEN FIRST QUARRIED, WILL CAUSE FAILURE OF THE CONCRETE EVEN THOUGH FOUND IN COMPARATIVELY SMALL QUANTITIES IN THE CONCRETE.

CALCIUM CHLORIDE WILL BE FURNISHED IN 100-POUND BAGS, WHICH MUST BE KEPT CLOSED AS THE EXPOSURE OF THE CALCIUM CHLORIDE TO THE AIR WILL PERMIT IT TO ABSORB MOISTURE FROM THE AIR AND BECOME LIQUID. IT IS QUITE IMPERATIVE THAT THE EXACT QUANTITY OF THIS MATERIAL BE USED IN EACH BATCH. AN EXCESS WILL WEAKEN THE CONCRETE AND INSUFFICIENT CALCIUM CHLORIDE WILL NOT HASTEN THE TIME OF SETTING TO PREVENT THE PAVEMENT FROM BEING INJURED BY TRAFFIC WHEN OPENED AFTER THE NUMBER OF DAYS GIVEN IN TABLE I. THE CALCIUM CHLORIDE MUST NOT BE ADDED DIRECTLY TO THE DRUM AS SMALL UNDISSOLVED PARTICLES REMAINING IN THE CONCRETE WILL CAUSE THE CONCRETE TO DISINTEGRATE. THE CALCIUM CHLORIDE SHALL BE

The first part of the document discusses the general principles of the system. It outlines the objectives and the scope of the project. The second part describes the methodology used in the study, including the data collection and analysis techniques. The third part presents the results of the study, and the fourth part discusses the conclusions and the implications of the findings.

The results of the study show that the system is effective in achieving its objectives. The data analysis indicates that there is a significant difference between the experimental and control groups. The conclusions drawn from the study are that the system is a viable option for the implementation of the project. The implications of the findings are that the system can be used as a model for other similar projects.

The study also identified some limitations and areas for future research. The limitations include the small sample size and the lack of long-term data. The areas for future research include the development of a more comprehensive system and the evaluation of the system's impact on the environment. The study concludes that the system is a promising approach to the problem at hand.

In conclusion, the study has shown that the system is effective in achieving its objectives. The data analysis indicates that there is a significant difference between the experimental and control groups. The conclusions drawn from the study are that the system is a viable option for the implementation of the project. The implications of the findings are that the system can be used as a model for other similar projects.

TABLE 1.- THE MIX OR PROPORTIONS OF MATERIALS REQUIRED TO OBTAIN CONCRETE THAT MAY BE OPENED TO TRAFFIC AFTER ANY NUMBER OF DAYS.

PROPORTIONS							
TIME	NUMBER	COARSE	POUNDS OF	WATER TO BE	BAGS OF		
PATCH	OF	SAND	AGGREGATE	CA ₂ OR	ADDED TO	CEMENT	
SHOULD BE	BAGS	0 TO $\frac{1}{4}$	$\frac{1}{2}$ TO $2\frac{1}{2}$	QUARTS OF	PRODUCE	PER CUBIC	
CLOSED TO	OF	INCH	INCHES	"STANDARD	SLUMP	YARD OF	
TRAFFIC	CEMENT			SOLUTION"	GIVEN BELOW	CONCRETE	
DAYS		CUBIC	CUBIC		INCHES		
		FEET	FEET				
* 2	1	0.5	1.9	2	1	11.8	
3	1	0.6	2.1	2	1	11.2	
5	1	1.0	2.7	2	$1\frac{1}{2}$	8.4	
12	1	1.3	3.0	2	$1\frac{1}{2}$	7.6	
15	1	2.0	3.0	2	$1\frac{1}{2}$	6.8	
STANDARD MIX TO BE USED WHERE CLOSING ROAD TO TRAFFIC IS NOT AN IMPORTANT ITEM AND WHERE LARGE AREAS ARE TO BE PATCHED.							
21	1	2.0	3.0	No CA ₂	$2\frac{1}{2}$	6.8	

NOTE - THE "STANDARD SOLUTION" IS MADE BY DISSOLVING COMMERCIAL CA₂ IN WATER AT THE RATE OF ONE POUND TO ENOUGH WATER TO PRODUCE ONE QUART OF THE SOLUTION. THE PURE CA₂ SHOULD NEVER BE ADDED DIRECTLY TO THE DRUM OF THE MIXER. THE "STANDARD SOLUTION" SHOULD BE ADDED TO THE WATER JUST BEFORE IT IS PUT INTO THE DRUM. SEE INSTRUCTIONS UNDER CALCIUM CHLORIDE.

STANDARD SLUMP TEST. FILL WITH CONCRETE A METAL FORM SHAPED AS A FRUSTRUM OF A CONE. FORM SHOULD BE 12 INCHES HIGH WITH A 4-INCH TOP DIAMETER AND 8-INCH BASE DIAMETER. SET THE FORM ON A LEVEL SURFACE AND AS THE CONCRETE IS PUT INTO THE FORM, TAMP LIGHTLY WITH A ROD UNTIL A SLIGHT FILM OF MORTAR APPEARS ON THE SURFACE. THEN REMOVE THE FORM AND IMMEDIATELY NOTE THE SETTLEMENT OR SLUMP OF THE CONCRETE THAT IS A MEASURE OF ITS CONSISTENCY.

* THIS MIXTURE TO BE USED FOR SMALL PATCHES THAT ARE TO BE OPENED TO TRAFFIC AT THE EARLIEST DATE POSSIBLE. ATMOSPHERIC TEMPERATURE SHOULD AVERAGE ABOUT 60° FAHRENHEIT.



ADDED IN THE FORM OF A "STANDARD SOLUTION" MADE BY THOROUGHLY DISSOLVING ONE POUND OF COMMERCIAL CALCIUM CHLORIDE IN ENOUGH WATER TO PRODUCE ONE QUART OF SOLUTION. (THIS AT THE RATE OF ABOUT $2\frac{1}{2}$ QUARTS OF THE $CaCl_2$ TO ONE GALLON OF WATER). THIS "STANDARD SOLUTION" SHOULD BE PLACED IN A KEG, JAR, OR BARREL AND LABELED "STANDARD SOLUTION". TWO QUARTS OF THE SOLUTION FOR EACH BAG OF CEMENT SHOULD BE ADDED TO THE MIXING WATER JUST BEFORE IT IS PUT INTO THE DRUM.

WATER MUST BE PURE AND FREE FROM VEGETABLE ACIDS. THE AMOUNT OF WATER WILL HAVE TO VARY SO AS TO MAKE THE CONCRETE OF THE PROPER CONSISTENCY. IN PRACTICE THIS WILL USUALLY BE FOUND TO VARY FROM 2 TO 5 GALLONS OF WATER PER SACK OF CEMENT. HOWEVER, WHEN ALL THE AGGREGATES ARE THOROUGHLY SATURATED WITH WATER, AS AFTER A RAIN, IT MAY BE FOUND THAT THE 2 QUARTS OF "STANDARD SOLUTION" WILL BE SUFFICIENT WATER TO MAKE THE REQUIRED CONSISTENCY. IT SHOULD BE REMEMBERED THAT EXCESS WATER WILL REDUCE THE STRENGTH OF THE CONCRETE AND DELAY THE HARDENING PROCESS AND NOT ONLY PERMANENTLY WEAKEN THE CONCRETE BUT ALSO LENGTHEN THE TIME TRAFFIC WILL HAVE TO BE KEPT OFF THE PATCH. IN ORDER TO SECURE THE QUICK HARDENING EFFECT THE CONCRETE WILL HAVE TO BE A SUFFICIENTLY DRY MIX THAT IT WILL SHOW NO MORE THAN THE SLUMP GIVEN IN TABLE 1, (SEE DESCRIPTION OF SLUMP TEST IN FOOT NOTE AFTER TABLE 1.) GREAT EMPHASIS SHOULD BE PLACED ON THE IMPORTANCE OF GUARDING AGAINST USING TOO MUCH WATER. THE USE OF 3 OR 4 PINTS MORE WATER THAN IS NECESSARY IN A ONE-SACK BATCH WILL REDUCE THE STRENGTH OF THE CONCRETE MORE THAN IT CAN BE INCREASED BY EXTENDING THE TIME OF MIX. HENCE, WHILE IT IS NECESSARY TO USE ENOUGH WATER SO AS TO MAKE A CONCRETE PLASTIC ENOUGH THAT IT CAN BE WORKED AND PROPERLY FINISHED, GUARD AGAINST USING TOO MUCH WATER.

5.- DAMPEN THE SUBGRADE AND OLD CONCRETE

THE SUBGRADE AND OLD CONCRETE WITH WHICH THE NEW CONCRETE COMES IN CONTACT, SHOULD BE WETTED BEFORE THE NEW CONCRETE IS PLACED. THE SUBGRADE SHOULD BE DAMP BUT NOT SOFT OR SLOPPY. THE EDGES OF THE OLD CONCRETE SHOULD BE SATURATED WITH WATER. IT IS VERY IMPERATIVE, HOWEVER, THAT NO FREE WATER BE PRESENT WHEN THE NEW CONCRETE IS APPLIED, AS THE CONCRETE THAT IS TO BE OPENED TO TRAFFIC SOON AFTER BEING PLACED DEPENDS LARGELY FOR ITS QUICK STRENGTH UPON HAVING NO EXCESS WATER.

6.- MIXING CONCRETE

ONLY MACHINE-MIXED CONCRETE SHOULD BE USED. IT IS ALMOST IMPOSSIBLE TO GET A MAXIMUM-STRENGTH CONCRETE, WHICH IS VERY IMPERATIVE IN REPAIR WORK, IF ONE DEPENDS ON HAND MIXING. THE USUAL TIME SPECIFIED FOR MIXING ORDINARY CONCRETE IN A MIXER IS ONE MINUTE. HOWEVER, TESTS SHOW THAT THE STRENGTH OF A DRY MIX MAY BE INCREASED AS MUCH AS 10 PER CENT BY MIXING ONE AND ONE-HALF MINUTES, INSTEAD OF ONE MINUTE, AND THE STRENGTH IS SLIGHTLY INCREASED BY EXTENDING THE TIME TO FIVE OR TEN MINUTES. HENCE, IN REPAIR WORK AND WHERE A SMALL MIXER IS USED, WHICH WILL GENERALLY BE LESS EFFICIENT THAN THE BIG PAVING MIXER, AND WHERE A DRY MIX IS REQUIRED FOR A MAXIMUM STRENGTH AND QUICK-HARDENING CONCRETE, THE TIME FOR MIXING MIGHT WELL BE PLACED AT NOT LESS THAN TWO MINUTES. THIS INCREASED TIME OF MIXING WILL ALSO MAKE THE FINISHING EASIER.

7.- PLACING AND FINISHING CONCRETE

CONCRETE SHOULD BE SHOVELED IN PLACE AND THOROUGHLY TAMPED IN LAYERS NOT EXCEEDING THREE INCHES IN DEPTH. THE SECRET OF THE EARLY STRENGTH OF THE CONCRETE WILL LARGELY LIE IN A COMPARATIVELY DRY MIX HAMMERED IN PLACE. A 10-POUND CONCRETE-TAMPER CAN BE USED FOR MUCH OF THIS WORK. A THIN-EDGED TAMPER HAVING A FACE, SAY 1 INCH BY 6 INCHES SHOULD BE AVAILABLE FOR TAMPING IN A NARROW OPENING AND ALONG THE EDGE UNDERNEATH THE OLD SLAB. THE CONCRETE SHALL BE FINISHED WITH A STRAIGHT EDGE AND A WOOD FLOAT, TO A REGULAR AND UNIFORM SURFACE TO COMPLY WITH THE EDGE OF THE SURFACE OF THE OLD PAVEMENT AND THE SIDE FORMS. THE STRAIGHT EDGE SHOULD BE USED BOTH TRANSVERSELY AND LONGITUDINALLY ON THE NEW CONCRETE WHERE THE PATCH IS NOT TOO LONG TO DO SO. WHERE A FULL WIDTH OF PAVEMENT IS BEING REPLACED FOR A LENGTH GREATER THAN IT IS PRACTICAL TO USE A STRAIGHT EDGE, A TEMPLET, CUT TO THE PROPER CROWN OF THE ROAD, SHOULD BE USED. THIS TEMPLET CAN BE USED BOTH AS A CUTTING EDGE AND TAMPER TO PRODUCE A UNIFORM SURFACE. AT EITHER END OF SUCH A PATCH A STRAIGHT EDGE SHOULD BE LAID LONGITUDINALLY TO INSURE A PROPER AND UNIFORM JUNCTION OF THE NEW CONCRETE WITH THE OLD PAVEMENT.

8.- COMPLETING PATCH AT END OF DAY

SINCE IN MAKING THESE PATCHES WE ARE DEALING WITH A QUICK-HARDENING CONCRETE, IT IS DESIRABLE THAT A PATCH BE ENTIRELY COMPLETED BEFORE LEAVING IT FOR ANY LENGTH OF TIME. DUE TO DIFFICULTY OF SHAPING UP THE SURFACE TO CONFORM WITH THE OLD CONCRETE SLAB WITH A DRY MIX, A PATCH SHOULD BE ENTIRELY FINISHED SOON AFTER THE CONCRETE IS PLACED. IT IS NECESSARY THAT A PATCH BE ENTIRELY COMPLETED, INCLUDING THE FINISHING, AT THE END OF A DAY'S WORK.

THE FOREMAN SHOULD SO PLAN HIS PROGRAM THAT HE CAN DO OTHER WORK FOR A FRACTION OF A DAY IF HE HAS NOT TIME TO ENTIRELY COMPLETE A PATCH BEFORE HIS WORKMEN WILL QUIT WORK. WHERE LARGE AREAS ARE BEING PLACED, A FORM BOARD SHOULD BE SET VERTICALLY AT THE CLOSE OF THE DAY'S WORK AND THE PATCH, INCLUDING THE FINISHING, COMPLETED TO THE SAME AS IS DONE IN THE PROPER CONSTRUCTION OF A NEW PAVEMENT. NO FEATHER-EDGE JUNCTION SHOULD BE PERMITTED, OWING TO THE FACT THAT WE ARE DEALING WITH A QUICK-HARDENING CONCRETE, WHEN USING CALCIUM CHLORIDE, IT IS NECESSARY TO DO THE FINISHING PROMPTLY AFTER THE CONCRETE IS PLACED AND TAMPED. AFTER THE CONCRETE HARDENS TO ANY EXTENT IT IS ALMOST IMPOSSIBLE TO MAKE A SMOOTH FINISH. IT IS IMPORTANT THAT THE TEMPLATE AND STRAIGHT EDGE BE USED ON FINISHING A PARTIALLY-COMPLETED PATCH SO THAT THE SURFACE OF THE ROAD WILL CONFORM WITH THE PROPER CROWN OF THE ROAD AND THE OLD CONCRETE SURFACE.

9.- PROTECTING NEW CONCRETE PATCH WHILE CURING

THE NEWLY-LAID CONCRETE SHOULD BE PROTECTED AGAINST ANY AND ALL KINDS OF TRAFFIC FOR THE NUMBER OF DAYS SPECIFIED IN TABLE I. IT IS DESIRABLE THAT EXTREMELY HEAVY TRUCKING BE KEPT OFF THE PATCH LONGER THAN THIS, PARTICULARLY IF THE CONCRETE IS LAID IN COLD WEATHER AS THE CONCRETE WILL HARDEN SLOWER IN COLD WEATHER. THE NEW CONCRETE SHOULD BE COVERED WITH SIX INCHES OF EARTH OR A LAYER OF STRAW OR SAWDUST, WHICH SHOULD BE KEPT DAMPENED WITH WATER. SUCH COVERING SHOULD BE KEPT ON THE NEW CONCRETE ABOUT TWO-THIRDS OF THE LENGTH OF THE TIME TRAFFIC IS REQUIRED TO STAY OFF OF THE SAME. THE CONCRETE SHOULD BE PROTECTED AGAINST FREEZING FOR THE SAME LENGTH OF TIME.

