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Government Paper Awards Are Announced

Joint Congressional Printing Committee Arranges for Six Months' Supply of Paper for the Government Printing Office at Somewhat Higher Prices Than Six Months Ago—Contractors Must Comply With Walsh-Healey Act.

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., November 30, 1936.—The Joint Congressional Committee on Printing today announced paper awards for the Government Printing Office for a six months supply beginning January 1, next. Bids were received on November 23.

Awards were made on every item on which bids were received and in all cases where there was a low bidder award was made to the low bidder, in accordance with the law. The awards were for bids a little higher than those received six months ago.

Where paper contractors come under the Walsh-Healey Act, that is for awards over \$10,000, they will have to comply with the law. However, compliance is not up to the Joint Committee on Printing for enforcement but up to the Department of Labor, charged with administering the Walsh-Healey Act.

The awards were as follows:

- No. 1, No bids received.
- No. 3, Perkins-Goodwin Co., 5.70 cents.
- No. 4, John F. Post, Inc., 5.67 cents.
- No. 5, Perkins-Goodwin Co., 5.70 cents.
- No. 6, Stanford Paper Co., 5.28 cents.
- No. 7, Fitchburg Paper Co., 5.28 cents.
- No. 8, John F. Post, Inc., 5.28 cents.
- No. 9, Whitaker Paper Co., 5.28 cents.
- No. 10, John F. Post, Inc., 5.31 cents.
- No. 11, Paper Corp. of U. S., 5.42 cents.
- No. 12, Paper Corp. of U. S., 5.16 cents.
- No. 13, John F. Post, Inc., 5.16 cents.
- No. 14, Barton, Duer & Koch Paper Co., 6.58 cents (70 lbs.) 6.07 cents (100 lbs.).
- No. 15, Walker Goulard Plehn Co., Inc., 5.68 cents.
- No. 16, Stanford Paper Co., 5.72 cents.
- No. 17, John F. Post, Inc., 5.41 cents.
- No. 18, Stanford Paper Co., 6.41 cents.
- No. 19, Old Dominion Paper Co., 11.439 cents (not subject to increase under Par. 15).
- No. 20, Old Dominion Paper Co., 9.167 cents (not subject to increase under Par. 15 and will accept award only in event not awarded Lots 21 and 22).
- No. 21, Aetna Paper Co., 9.338 cents.
- No. 22, Aetna Paper Co., 8.788 cents.
- No. 23, Aetna Paper Co., 11.088 cents.
- No. 24, Lee Paper Co., 15.87 cents.

- No. 25, Lee Paper Co., 15.87 cents.
- No. 26, Paper Corporation of U. S., 5.70 cents.
- No. 27, Whitaker Paper Co., 5.70 cents.
- No. 28, R. P. Andrews Paper Co., 5.70 cents.
- No. 29, Paper Corporation of U. S., 5.34 cents.
- No. 30, Dobler & Mudge, 5.34 cents.
- No. 33, Whitaker Paper Co., 10.30 cents.
- No. 34, R. P. Andrews Paper Co., 5.92 cents.
- No. 35, John F. Post, Inc., 6.54 cents.
- No. 36, John F. Post, Inc., 7.51 cents.
- No. 37, No bids received.
- No. 40, Aetna Paper Co., 9.338 cents.
- No. 43, Barton, Duer & Koch Paper Co., 5.14 cents.
- No. 44, Barton, Duer & Koch Paper Co., 5.89 cents.
- No. 47, Aetna Paper Co., 6.238 cents.
- No. 51, Perfect Safety Paper Co., 9.25 cents.
- No. 52, No bids received.
- No. 53, Mathers-Lamm Paper Co., 10.91 cents.
- No. 55, Paper Corp. of U. S., 5.23 cents.
- No. 56, Barton, Duer & Koch Paper Co., 5.19 cents.
- No. 57, Barton, Duer & Koch Paper Co., 6.23 cents.
- No. 58, Barton, Duer & Koch Paper Co., 4.92 cents.
- No. 59, Barton, Duer & Koch Paper Co., 4.88 cents.
- No. 60, Virginia Paper Co., 7.43 cents.
- No. 61, Virginia Paper Co., 6.20 cents.
- No. 63, Lee Paper Co., 21.19 cents.
- No. 64, Paper Corp. of U. S., 5.57 cents.
- No. 65, Stanford Paper Co., 11.25 cents.
- No. 66, Reese & Reese, Inc., 13.61 cents.
- No. 67, Reese & Reese, Inc., 13.61 cents.
- No. 69, Lee Paper Co., 20.73 cents.
- No. 70, Graham Paper Co., 6.65 cents (based on estimated quantity only).
- No. 71, Import Paper Co., 7.90 cents.
- No. 73, Barton, Duer & Koch Paper Co., 18.75 cents.
- No. 74, Lee Paper Co., 13.11 cents.
- No. 75, R. P. Andrews Paper Co., 20.60 cents.
- No. 76, Lee Paper Co., 14.66 cents.
- No. 78, R. P. Andrews Paper Co., 30.00 cents.
- No. 79, Lee Paper Co., 25.92 cents.
- No. 83, Lee Paper Co., 16.15 cents.
- No. 101, Aetna Paper Co., 7.06 cents.
- No. 102, Paper Corp. of U. S., 5.72 cents.
- No. 103, Barton, Duer & Koch Paper Co., 6.14 cents.

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Diversified Exhibits Displayed At Power Show

Products and Equipment Designed to Meet Current Needs Are Shown On Three Floors of Grand Central Palace—Memory of Dr. Rudolf Diesel Honored by Distinguished Group At Luncheon In Hotel Waldorf-Astoria.

The Twelfth National Exposition of Power and Mechanical Engineering opened last Monday at the Grand Central Palace, New York, and will be continued daily until next Saturday evening.

Three entire floors of the Grand Central Palace are devoted to exhibits of equipment and products designed to meet current needs. Machinery is shown in operation. All the effective principles of modern display are utilized to show products so that they may be easily inspected and so that attention is drawn to their new and important features. Competent men from exhibitors' technical staffs are on hand to answer visitors' questions, demonstrate products, and explain how principles may be applied to the specific problems which confront the inquirer. The comprehensive presentation, including the latest output of competitive manufacturers, provides visiting executives and engineers with a sound basis for their comparison of relative advantages.

Exhibits range from large, heavy equipment used in the generation of power to mechanical equipment for handling materials and tools. Classifications of equipment on display include: fuels, combustion equipment; refractories, steam generating equipment; steam distribution equipment; piping and fittings; prime movers, pumps and hydraulic equipment; electric generators and motors; electrical transmission, distribution, control; power transmission; control apparatus and precision instruments; power-driven machinery; tools and machine tools; material handling equipment; heating, ventilating, refrigeration, air conditioning; lubricants; operation and maintenance materials.

Machinery and operating plant equipment constitutes a major section of the Exposition. Steam generating equipment and accessories play a prominent part. Valves and controls of every type and the latest in pipe fittings in terms of their industrial applications are displayed. Many exhibits feature plant accessories. A complete line of pumping equipment offers unusual features from the standpoint of operating efficiency. Innumerable exhibits are devoted to the latest indicating, recording, and controlling devices applicable to temperature, flow, pressure, level, and time.

Diesel Day Luncheon

The fortieth anniversary of the introduction of Diesel power into the United States was observed on Wednesday, December 2, by a distinguished group of three hundred leaders in business, industry and engineering, at a luncheon at the Waldorf Astoria, arranged by the Diesel Committee of the Exposition of Power and Mechanical Engineering. The date coincided with "Diesel Day" at the Power Show.

Although millions of Diesel horsepower are installed in the country's railroads, mines, mills, ships, pumping stations and power houses and millions more employed in mobile units on engineering projects, on farms, in forests, and in countless other major industries, the luncheon was the first time the public interest had been focused on the progress and importance of the Diesel industry as a whole.

Dr. Rudolph Diesel, Paris-born Bavarian, first recognized and made practical the principle of converting low grade, low volatile fuel into power by subjecting it to ex-

treme high compression in an internal combustion engine. His memory was honored during a brief speaking schedule at the Waldorf luncheon. Part of the program was broadcast over a coast-to-coast radio network of the National Broadcasting Company.

Limitation of space prevents individual mention of all the various exhibits, but the following is a record of some of the displays of particular interest to the paper industry.

Allis-Chalmers Mfg. Co.

The feature of the attractive display of the Allis-Chalmers Manufacturing Company, of Milwaukee, Wis., is the demonstration of the company's Grid Controlled Power Rectifier. Electrically-Energized Grids for Controlling Mercury Arc Rectifiers and Inverters are now used extensively in paper mill drives.

Babcock & Wilcox Co.

Installations by the Babcock & Wilcox Company, of New York, N. Y., are illustrated at the large space occupied by this company. The B. & W. Type B Pulverizer and the B. & W. Steam Scrubber are both shown in operation. This unique exhibit is one of the principal centers of attraction at the Show.

The Bristol Co.

An unusually wide range of temperature recording instruments is displayed at the booth of the Bristol Company, of Waterbury, Conn. A new Power Frequency Recorder is prominently featured. This recorder possesses sensitivity, speed and stability. It is accurate within 1/100 of a cycle, regardless of line voltage, wave form or power factor.

Brown Instrument Co.

Central feature of the exhibit of the Brown Instrument Company, of Philadelphia, Pa., is an instrument panel board on which is mounted the indicating, recording and control instruments of the Brown-Minneapolis-Honeywell line. The following new items are displayed: Draft or Overfire Pressure Controller, Air Conditioning Instrument, Diesel Engine Pyrometers, and Combustion Safeguard Equipment.

Chase Brass & Copper Co.

Chase Extruded Condenser Tubes are displayed at the booth of the Chase Brass and Copper Company, of Waterbury, Conn. This company specializes in the manufacture of condenser tubes and its engineers assist clients to select the tube alloy that will work best in their condensers and heat exchangers.

Combustion Engineering Co.

As usual at the Power Show, the Combustion Engineering Company, of New York, N. Y., occupies one of the largest and most prominent booths. The exhibit comprises all types of modern steam generating units and includes CE boilers, stokers, furnaces, pulverized fuel systems and heat recovery equipment.

The Crane Co.

Fabricated Welded Piping and Pressure are demonstrated at the booth of the Crane Company, of Chicago,

Ill. The Crane No. 216 P Forged Steel Globe Valve is ideal for severe service such as throttling, soot-blower, blow-off, boiler-feed, drip and drain lines. Regardless of pressure or temperature there are Crane valves and fittings for all requirements.

The Foxboro Co.

One of the most instructive displays is that of the Foxboro Company, of Foxboro, Mass. A comprehensive line of Foxboro Recording Thermometers is shown. Foxboro gives bull's eye accuracy over the entire chart range. The rate of response is so fast as to assure a precise time-record of temperature change.

General Electric Co.

The exhibit of the General Electric Company, of Schenectady, N. Y., is attracting hosts of visitors. Here are displayed the latest developments of GE engineers, including the new Tungar Arc Welder for low-cost fabrication and repair of light steel parts, Combination Magnetic Switch for full voltage starting of induction motors, etc.

International Nickel Co.

Products of the International Nickel Company, of New York, N. Y. are shown at the big and artistic booth occupied by that organization. Nickel alloys displayed include Manganese Nickel, Inconel, Monel, Nichrome, Copper-Nickel, Ni-Resist, Stainless Steel, Ni-Hard, Nickel Alloy Steel, Nickel Brass, Nickel Aluminum, Nickel Cast Iron, etc.

Johns-Manville

J-M Insulations, Packings and Refractories are displayed and demonstrated at the large booth of Johns-Manville, New York. Designed for widely varied service conditions these products have in common important advantages—highly pertinent to efficient, economical power-plant operation.

Johnson Corporation

One of the features of the display of the Johnson Corporation, of Three Rivers, Mich., is a Two Valve Trap for Boiler Return Service and Lifting or Vacuum Service, which is shown in operation. Johnson Return Traps are simple, reliable and inexpensive units. The traps are built to give indefinite service.

Leeds & Northrup Co.

Measuring Instruments, Telemeters and Automatic Control Equipments are features of the booth of Leeds & Northrup Company, of Philadelphia, Pa. They operate on inherently correct principles and possess convenience, reliability, and low maintenance features which result from long specializations.

Link Belt Co.

In operation at the booth of the Link-Belt Company, of Chicago, Ill., are the Silent Chain Drive, Motorized Reducer, Motorized P.I.V. Gear and Worm Gear Reducer. The V.R.D. Variable Roller Drive is also demonstrated. This company offers a complete line of bearings for the free-turning of shafts throughout the plant.

Morse Chain Co.

The Morse Chain Company, of Ithaca, N. Y., demonstrates and operates its Kelpo Free Wheeling Clutch. The design and construction of this clutch, in every detail, represents careful engineering research, thorough development and precision manufacture. Its performance qualities are guaranteed.

Nash Engineering Co.

Vacuum Pumps and Air Compressors are ably demonstrated at the large booth of the Nash Engineering Company, of Norwalk, Conn. The Nash Vacuum Pump has but one moving part and is most simple and economical. Nash Air Compressors deliver absolutely clean air, free from dust, heat or oil and also have but one moving part.

The Norton Co.

Refractories and Abrasives are shown in the artistically decorated booth of the Norton Company, of Worcester, Mass. Alundum Filtering Devices are displayed. Alundum Ware has been used successfully for many years in filtering and extraction work in laboratory determinations because of its great resistance to reagents and solvents.

Philadelphia Gear Works

Speed Reducers and Industrial Gears are displayed at the booth of the Philadelphia Gear Works, of Philadelphia, Pa. A feature of this exhibit is the demonstration of the Philadelphia Moto Reducer which possesses an average output efficiency of better than 95 per cent. Its construction is compact and rugged.

J. E. Rhoads & Sons

Leather Belting and other specialties are demonstrated at the booth of J. E. Rhoads & Sons, of Philadelphia, Pa., makers of Tannate Products. This belting is famous for high quality and long service. It grips the pulleys properly and transmits power to machines for indefinite periods.

SKF Industries

The exhibit of the SKF Industries, Inc., of Philadelphia, Pa., is attracting innumerable visitors. Ball and Roller Bearings and Transmission Appliances are attractively featured. SKF Bearings are known to be efficient and trouble-free. They reduce manufacturing overhead and needless power consumption.

Taylor Instrument Companies

Industrial Thermometers with "Binoc" Tubing are displayed and demonstrated at the booth of the Taylor Instrument Companies, of Rochester, N. Y. The new Taylor "Binoc," the optically correct thermometer tubing, is attracting great interest among power plant engineers, executives and other technical experts.

Tide Water Oil Co.

The exhibit of the Tide Water Oil Company, of New York, N. Y., features a complete line of industrial lubricants. In the background of this artistic display is a large illuminated scenic exhibit of the circulation system of a steam engine. Tide Water engineers are present to solve all lubrication problems.

The Walworth Co.

Tools, Valves and Fittings are shown at the booth of the Walworth Company, of Boston, Mass. Walworth Valves and Pipe for the pulp and paper industry are well known and have proved their worth in paper mill service, especially the Gate Valve, Swing Check Valve and Corrosion Resistant Pipes.

Union Bag Simplifies Set-Up

In a move to simplify its corporate structure, the Union Bag and Paper Corporation announced early this week that it had absorbed all assets of its subsidiary, the Scutan Company, Inc., and dissolved the company. Operating as a division of the parent company, the Scutan unit will continue to make waterproof papers.

Lake St. John Reorganization Plan Approved

Bond and Debenture Holders Assent to Proposal At Well Attended Meeting Held In King Edward Hotel, Toronto — Preferred and Common Shareholders Agreed to Plan Previously—Operation Costs Reduced Materially.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., November 28, 1936—At a well attended special meeting of bond and debenture holders of the Lake St. John Power and Paper Company, held at the King Edward Hotel, Toronto, on November 26, the plan of capital reorganization was approved unanimously. Holders of present 6½ per cent, first mortgage 20-year bonds will receive \$120 principal amount of new 5½ per cent first mortgage bonds for each \$100 principal amount now held. They will receive \$2.50 in cash as interest for the period from January 1, 1936, to June 30, 1936, and 1/5 of the share of capital stock in the reorganized company.

Holders of the present 6½ per cent, 15-year mortgage debentures due 1942 will receive \$125 principal amount of new mortgage debentures for each \$100 principal amount now held. They will receive \$2 cash in payment of interest, for the first half of 1936 and ½ share of common stock in the reorganized company.

Preferred and Common Shareholders Agreed

At previous meetings preferred and common shareholders had also agreed to the plan. Holders of the present 7 per cent shares will get one new 6 per cent non-cumulative preferred share of \$100 par value and a majority of the new common shares, that is, 51,469 new common shares.

Holders of the present common shares are to receive one-quarter of a share of new common stock for each share of present common held; that is, they will get 25,000 new common shares.

Speaking for the Bondholders' Committee, D. H. MacDougall said that the cost per ton of operation has been reduced materially since 1932. Taking 1932 costs as a basis, they were reduced to 79 per cent in 1933, 71 per cent in 1934, 65 per cent in 1935, and 62½ per cent now. In other words, the cost per ton of paper has been reduced 37½ per cent since 1932.

Working Capital Has Improved

The working capital has improved materially also since the new board took charge on July 1, 1932. At the end of 1932 it was \$101,651. There was an increase each year, until now it exceeds \$1.7 million. An amount of \$998,677 owed to the bank has been paid off, and prior lien bonds, which had been deposited as security for the loan, have been released. The current assets are made up of: Cash, \$934,000; receivables, \$828,920, and inventories of \$962,013, or nearly \$1.9 million in all.

Forest Products Policy

The report that the Premiers of Ontario and Quebec will hold a second conference in connection with forest products policy is an indication that closer co-operation between the provinces is regarded as desirable. The first conference dealt with the newsprint industry, now happily in a better position, and resulted from the stand taken by Quebec against the chaotic condition of the industry due to internal complications.

The policies of the two provinces differ very materially on the subject of the export of pulpwood. That of Ontario favors the export of wood—a reversal of the former

method—while Quebec maintains an embargo on pulpwood from Crown lands, although it is reported that there is a possibility of a change. The argument for an embargo is that it compels the conversion of the wood into paper, thereby employing a very large amount of Canadian labor. The export of pulpwood, on the other hand, furnishes the raw material to American competitors, who utilize American help to convert the wood into the finished article. It is asserted, in support of the Ontario policy, that permission to export the wood gives employment to thousands of men in the bush, who otherwise would be on relief. Both methods have their strong adherents.

The next conference, it is suggested, will be of a broader scope than the first, and will deal with other aspects of the forest products industries. At present each province has its own policy, influenced by local conditions, and a desire to obtain maximum revenues. Any plan to co-ordinate the policies must come from the provinces, as the Federal Government has no jurisdiction, although the aid of Ottawa and the industry is essential. A national policy has been often advocated, but provincial rights cannot be ignored.

British Columbia Newsprint Situation

There is a feeling in British Columbia that a spot market for newsprint on the Pacific Coast will eventuate in the not far distant future, and there are no encouraging signs in favor of more contract business at this particular time. The prevailing contract figure is \$42.50 a ton, but this price only applies to regular customers. Recent advices intimate that the mills are not seeking new business, as they are now working at top capacity, and additional orders would be difficult to fill. Demand is more active than it has been for years, although the plants have been operating at 100 per cent for many months. Export prices have taken a drastic jump, in some cases as high as \$8.00 a ton, to bring them in some instances higher than the domestic quotations.

The Powell River Company, Pacific Mills, Ltd., are two of the largest producers of newsprint in the West, and have had to divert all their shipments to California, Oregon and Washington to railroad, via Vancouver and New Westminster because of the shipping strike in American ports, and this affects about 18 per cent of their business.

Newsprint Prices

Speaking of conditions in the newsprint line, a leading Ontario manufacturer states that it was unfortunate that the advance for 1937 was only \$1.50 per ton. This would not mean anything to the mills which already foresee that increasing costs of production will absorb the slight advance in price. On the other hand, augmented output should help to some extent, but manufacturers do not see any prosperity in the industry until a considerable advance in price can be secured. Most firms are, however looking forward hopefully to the latter part of next year. The fear of complications in Europe and possibly a general war, even if it might not occur for years, would no doubt help to keep the price steady, as those who are depending on overseas supplies, both in paper and pulp, would no doubt feel nervous about their security.

Activities of the Wisconsin Paper Industry

Merrill City Council Limits City Assessments on Grandfather Falls Mill to \$25,000 for Next Five Years—New Reservoirs Proposed by Government for Wolf River—The Total Cost of Construction Is Estimated at \$2,000,000.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., November 30, 1936—Because approximately two hundred men will be returned to employment when the new owners reopen the Grandfather Falls Paper Company mill at Merrill, Wis., the city council has voted to limit the city assessment of the property to \$25,000 for the next five years. James M. Ward, Detroit, and D. Clark Everest, Wausau, bought the mill recently, and are having it remodeled to manufacture sulphite specialties. The city offered its inducement of low taxes so as to prevent the unemployment situation created when the mill was closed.

Water Power Situation

Under a federal survey now in progress to create water storage for the Fox River, the government proposes to place reservoirs on the Wolf River, a tributary, at Post Lake, the Keshena Dalles, Leeman, New London, Waupaca and Shawano, Wis. These will back up the Embarrass, Little Wolf, Waupaca and Red Rivers as well as the Wolf. The idea of building water power dams has been abandoned because of the objections to destruction of scenic points, especially in the Menominee Indian Reservation, and only the reservoirs are contemplated. The total cost of the construction is estimated at \$2,000,000.

Such a plan will enable paper mills to maintain the necessary crest of 21¼ inches on the new control dam for Lake Winnebago at Menasha, Wis., where the flow of the Fox River through the water power area is regulated. The control dam is now being rebuilt of concrete and steel. If the necessary appropriation is obtained from Congress so the work can proceed, a menacing water power situation of many years' standing will be removed.

Paper and Pulp Classes Arranged

Employees of paper and pulp mills at Neenah, Wis., are to be offered a course in pulp and paper manufacture in evening classes of the vocational school. It is designed to assist workers in the cost, sales, accounting, purchasing, receiving, shipping, statistical and other administrative positions so they will know intimately the processes involved. L. J. McNamara, instructor in pulp and paper for the vocational schools of Wisconsin, will conduct the classes.

Badger Employees Hold Safety Dinner

Four hundred employees of the Badger Paper Mills, Inc., Peshtigo, Wis., were entertained at a dinner in the high school gymnasium last week, followed by a safety program. The speaker was T. H. Allen, safety engineer of the Hardware Mutual Casualty Company, Stevens Point, Wis. He placed emphasis on the value of industrial safety programs, and on the alertness of employees to avoid accidents and consequent financial loss. The program was conducted by Robert Murwin, chairman of the mill safety committee. The dinner probably will become an annual event.

Paper Chemistry Institute Doings

Dr. Harry F. Lewis, Dean of the Institute of Paper Chemistry, Appleton, Wis., began a western speaking tour under auspices of the American Chemical Society last

week. He will be touring for two weeks, speaking before local sections on "The Contribution of the Physical Sciences to the Pulp and Paper Industry." He spoke at St. Louis, Mo., November 27, and is due to appear at Los Angeles December 4, Sacramento December 5, Portland, Oregon, December 7, Seattle, December 8, Pullman, Wash., December 10, and Bozeman, Mont., December 12.

The Northeastern Wisconsin section of the American Chemical Society will meet at the Institute at Appleton Friday evening, December 4. Dr. Karl P. Link, professor of biochemistry at the college of agriculture of the University of Wisconsin, Madison, Wis., will be the speaker.

Samples of ancient paper for exhibit and study, and information on wools and dyes will be collected for the Institute by John M. Yonan of Appleton, Wis., on a tour of the Orient beginning December 1. He is an importer of oriental rugs, and has been commissioned as a good-will envoy of Rotary International on this trip. Starting from Italy, he will travel in the Near East. He plans to visit the island of Cyprus, Haifa, Jaffa, Beirut in Syria, Damascus and Bagdad. He will travel 350 miles across desert to Mosul, and on mule back into the Kurdistan Mountains to Senna. He will visit Mohamara, where the greatest Anglo-Persian oil fields are located, and will go to Afghanistan, tour Palestine, and also go through Arabia into Egypt, and then back to Italy.

Navigation Closed

The last coal shipments to paper mills of the Fox River Valley by barge have been made for the season. Navigation was closed for the winter season November 30 by the War Department. The closing date was extended a week later than usual so navigation companies could complete their coal shipments.

International Demolishing Old Mills

[FROM OUR REGULAR CORRESPONDENT]

Glens Falls, N. Y., November 30, 1936.—Announcement is made by officials of the International Paper Company of plans to demolish various idle and obsolete paper mills in the state. The policy has been in effect for some time, the mills of the company at Glens Park having been razed some time ago while a large portion of a branch mill at Glens Falls is now being razed. For several months past the tearing down of the old mill buildings at De Grasse has been under way while the plant at Pyrites is also being razed. Since late last summer the company has been trucking a huge pulpwood pile from Piercefield to its Corinth mills where considerable activity is being centered. Operations were suspended at Piercefield some time ago. Digesters are now being taken out of the latter plant and eventually the paper machines will be removed from the mill. It is not expected, however, that the mill will be demolished in view of its excellent condition. A portion of the Glens Falls mill is being used for housing a tissue machine. The company expects to lower its tax assessments considerably by dispensing with the idle mill buildings and future assessments on old sites will cover only land water power.

Value of Canada's Newsprint Exports Higher

Exports for Seven Months Ended October Amounted to 35,709,949 Cwts. Valued At \$61,960,708; Against 30,313,600 Cwts. Valued At \$51,663,116 in Corresponding Period of Preceding Year—Wood Pulp Exports Also Soar.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., November 30, 1936—The value of Canada's newsprint exports for the first seven months of the current fiscal year has been averaging nearly one and a half million dollars higher than in the similar period of the previous fiscal year, according to figures just released by the Dominion Bureau of Statistics. In October 5,614,653 cwts., valued at \$9,891,609, were exported, as compared with 4,808,421 cwts., valued at \$8,178,485 in October, 1935. For the seven months ending October the exports amounted to 35,709,949 cwts., valued at \$61,960,708, as compared with 30,313,600 cwts., valued at \$51,663,116 in the similar period of the previous year.

Exports of wood pulp and screenings in October amounted to 1,347,621 cwts., valued at \$2,879,191, as compared with 1,092,934 cwts., valued at \$2,268,586 in October 1935. For the seven months to October exports of wood pulp were valued at \$18,575,300, as compared with \$15,695,259 in the seven months to October, 1935.

Thus the exports of newsprint and wood pulp for the seven months ending October had a value of \$13,177,633 in excess of the export of these commodities in the similar period of last year.

Committee Rejects Plan for Price Bros.

The plan of reorganization of Price Bros. and Co. advanced by Pacona Ltd., has been rejected by the protective committee representing the preferred stockholders of the company. The committee announced that another plan would be submitted shortly "providing for removal of the company from bankruptcy, and for more advantageous result to the shareholders."

A new offer on the part of the shareholders has now been made and there are indications that this may be put into effect, with the prospect that the company will at last emerge from bankruptcy. The statement regarding the completed arrangement of an underwrite agreement follows:

"It is announced that Price Bros. & Co., Ltd., (in liquidation) has arranged with a syndicate headed by Royal Securities Corporation, Ltd., including that company; Kitcat and Aitken; Wood, Gundy & Co., Ltd.; W. C. Piefield and Co., Ltd.; R. O. Swezey and Co., Ltd., and Drury & Co., providing for the sale of \$12,000,000 20-year sinking fund bonds and \$3,000,000 two to six-year serial bonds, and that the company has also arranged for the underwriting of \$4,268,000 of 20-year convertible and 4 per cent debentures, convertible for ten years (but callable at par and accrued interest at any time after five years) into common stock at \$30.00 per share, which debentures will be offered to the present common shareholders pro rata.

"The preferred shareholders are to be asked to accept in exchange for their present 6½ per cent preferred stock a 5½ per cent preferred stock, cumulative from 1st January, 1939, and 1¾ shares of common stock per \$100.00 share of preferred stock now held.

"It is anticipated that the money so provided will retire the present bonds, pay all creditors and provide the company with net working capital of approximately \$6,000,000.

"Steps are being taken to call the necessary meetings of shareholders to authorize the carrying out of the said arrangements."

Newsprint Shortage Reports

Much interest has been taken here in the report from New York of the statement by L. B. Palmer, general manager of the American Newspaper Publishers' Association, describing reports of "an impending newsprint shortage" as "scare-head," and denying that there was any possibility of such a shortage for the rest of the year and for at least the first six months of 1937.

Charles Vining, president of the Newsprint Association of Canada, when asked about the matter, said: "I prefer not to comment on the remarks of Mr. Palmer, since the realities of supply and demand will demonstrate themselves in due course. There is no attempt by Canadian manufacturers to frighten anybody."

German Market for Maritime Pulpwood

A despatch from Saint John, N. B., says that there are prospects of increased Canadian exports to Germany as a result of the recent Canadian-German trade treaty, and that there has already been a considerable movement of pulpwood to Germany. Visiting pulpwood importers from Germany and Switzerland who were in the Maritimes, recently discussed prospects at an informal luncheon tendered them by the officers of the New Brunswick Lumber Export Company.

Kieckhefer to Build Mill at Plymouth, N. C.

A press dispatch from Plymouth, N. C., says "The Kieckhefer Container Corporation, who have been studying the Albermarle area with a view to locating a paper pulp plant in this area, has definitely determined upon Plymouth for the location of its proposed North Carolina plant, and contract for the first unit, to cost upwards of \$5,000,000, has been let to the Stewart Construction Company, of New York City, it was learned from reliable sources.

"The plant will be located on a 75-acre tract known as the Lucas farm on Roanoke River, near Plymouth. It is understood that the site was selected after assurances had been made by the Norfolk Southern Railroad company and state highway officials that railroad and highway facilities would be extended to the site."

American Pulp Corp. to Buy Plant

A press dispatch under date of December 1, 1936 from New Brunswick, N. J., says "the American Pulp Corporation, manufacturer of magazine paper in Jersey City, has signed an option for the purchase of the \$3,500,000 American Salpa plant at Spotswood, which has been idle five years, it was announced today. It is expected to take title to the plant in January and to employ 125 persons. The price was not disclosed."

Union Bag to Build Third Unit at Savannah

Additional Unit Will Have Same Productive Capacity as Each of First Two Units or 40,000 tons of Kraft Annually — New Unit is Estimated to cost \$3,500,000 Which Includes \$300,000 for Purchase of New Timber Lands.

Directors of Union Bag and Paper Corporation have voted to proceed with the construction of a third unit for the manufacture of kraft pulp and paper at the company's new mill at Savannah, Georgia, it was announced early this week by Alexander Calder, president, in a letter being mailed to stockholders. Estimated to cost \$3,500,000 (including \$300,000 available for the purchase of new timber lands), the third unit will have the same productive capacity as each of the first two units or 40,000 tons of kraft paper annually. In addition, the Savannah plant will produce 50,000 tons of low-cost pulp available for use in the company's northern mills in the manufacture of specialty papers, or for sale.

The new unit will be financed by long-term credit, the letter states. Average annual interest charges on the combined cost of the second and third units figure less than 2 per cent a year, assuming the entire amount of the loans were to be outstanding over a five-year period, due to the fact that interest is paid only from the time the money is actually borrowed, as needed.

The new unit is expected to come into production in the fall of 1937, following completion of the second unit, (now under construction) in July 1937. The first unit of the new Savannah mill came into production about three months ago, and its successful operation had much to do with the company's decision to proceed with the second and third units.

Purpose of the new addition is to make the company a completely integrated unit entirely independent of outside sources of pulp and paper supplies upon which it has been dependent for the last eight years, and to allow the transfer of production of bags and wrapping paper now being carried on in the north to the lower-cost southern plant, Mr. Calder said.

On the basis of current prices being paid for pulp and paper, it is estimated that the complete integration of the company's activities in the south will result in savings of over \$3,000,000 a year.

Capacity production of the three units, when completed, is assured, Mr. Calder said, reporting that "we are so far behind our orders today (due to shortage of paper) that we have been practically forced to withdraw from the sale of wrapping paper and confine our limited paper supply almost entirely to our bag factories. The total production of the three units at Savannah will give us no more paper than our present rate of bag and wrapping paper shipment requires."

Government Paper Bids

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 2, 1936—The Government Printing Office has received the following bids for 11,500 pounds (50,000 sheets) of 22½ x 28½ white sulphite index; Virginia Paper Company, 5.94 cents per pound; Whitaker Paper Company, 6.16 cents; Stanford Paper Company 7 cents; R. P. Andrews Paper Company, 6.15 cents; Old Dominion Paper Company, 6.49 cents; Mathers-Lamm Paper Company, 6.18 cents; Edgewater Paper Company, 6.13 cents; and J. R. Howarth Paper Company, 6.15 cents.

Carey Mfg. Co. Proposes Capital Changes

[FROM OUR REGULAR CORRESPONDENT]

DAYTON, Ohio, December 1, 1936.—Stockholders of the Philip Carey Manufacturing Company, one of the largest paper concerns in the lower section of the Miami Valley (Lockland) on November 27 received letters from that firm proposing a plan of capital changes with the view of eliminating unpaid back dividends on preferred stock and to effect a tax savings under the Federal surtax on undistributed profits.

The plan contemplated amendment to articles of incorporation to permit authorization of an issue of 5,000 shares of 5 per cent preferred stock, \$100 par value, in addition to present six per cent preferred stock.

Preferred shareholders would be given the option of taking \$1.50 in cash and one-fifth share of new preferred stock for each present share held, or of taking \$19.50 in cash for each share, representing the accumulated dividend.

"In the judgment of the Board of Directors," the letter states, "the company cannot pay this dividend in cash at this time without impairing the cash resources necessary for the operation of the business in the coming year, and therefore the board of directors will not adopt the plan and declare the dividend unless the election to receive payment therefor, at the above rate of \$1.50 in cash and \$20 in par value of five per cent preferred shares is made by the holders of a sufficient number of six per cent preferred shares to render the plan feasible, in the judgment of the Board of Directors."

Arrears on present preferred stock will amount to approximately \$295,000 on December 31, the letter which is signed by George D. Crabbs, president, states.

The company estimates that its 1936 earnings will exceed \$200,000.

Ohio Paper Concerns Increase Wages

[FROM OUR REGULAR CORRESPONDENT]

DAYTON, Ohio, December 1, 1936.—Several more paper companies have been added to the list of those granting wage increases, bonuses or gifts during the last quarter of the year.

Announcement just made at Chillicothe stated that both the Mead Corporation, of which George H. Mead of Dayton, is the head, and the Chillicothe Paper Company, will grant wage increases for their employees along with increases for certain salaried men not in the higher brackets.

The Chillicothe Paper Company decided on a 10 per cent increase in hourly wage rates and five per cent to classified salaried employees. The company's increases become effective December 13.

Salaries to \$200 a month on a four-week period will be increased five per cent. A forty-hour week also will be established by this concern, it was announced.

It was reported the Mead Corporation rates would be increased 10 per cent, also, and that the same rate of increase will extend to various other Mead plants, of which there are a number throughout the country.

Paper Association Active in Philadelphia

Coarse Paper Division of Philadelphia Paper Association to Meet in Adelphia Hotel Next Thursday—Philadelphia Paper and Cordage Association to Hold Christmas Party and Elect Officers for the Forthcoming Term.

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., November 30, 1936.—A bi-monthly meeting of the Coarse Paper Division of the Paper Trade Association will be held on Thursday evening next at 6 o'clock in Adelphia Hotel. T. H. B. Smythe will preside. The Philadelphia Paper and Cordage Association will hold its annual election and Christmas Party on Thursday, December, 17, in Hotel Adelphia. Harry S. Platt, chairman of the Nominating Committee is mailing out this week ballots to all the members, containing the proposed slate with blanks opposite each nominee's name, wherein they may write the name of the person of their choice in the event that they have a choice other than those printed on the ballot. Ballots will be void after December 12. The following are the names of those selected by the Nominating Committee: E. K. Lay, president; James Andrews, Schuylkill Paper Company, vice-president; T. W. Monteith, F. W. Winne, treasurer, and J. J. Shinnars, Acme Specialty Sales Co., secretary. Those nominated for Board of Directors are: F. I. Brower, E. L. Richards, J. R. Howarth, George K. Hooper, Vincent A. Dirvin, A. M. Coath and J. J. Shinnars. E. K. Lay who is chairman of the Entertainment Committee, states that many members have volunteered their automobiles to transport the sixty kiddies, to be entertained at this, their annual Christmas Party, to and from the Salvation Army Headquarters, and suggests if there are any among the members who would also like to help furnish transportation for these little charges, that they get in touch with his office, 940 Drexel Building.

Evolution of a Paper Business

Quaker City Paper Company has just issued a very interesting treatise, under the caption "The Evolution of a Paper Business," which contains very interesting facts, and which reads in part, as follows: "Thirty-one years ago the Quaker City Paper Company opened its doors at Sixth and Commerce Streets, Philadelphia. By 1925 it had expanded to such an extent that larger quarters were necessary, and the company moved to 70 North Second street. Here Quaker City remained for three years, when, due to increased business, the office and warehouse were relocated at 303-311 Vine street, in a building more suited to its growing needs, bounded on three sides by Vine, Orianna and Wood streets, and on the fourth side by a private drive.

"The directors and executives of the company have had a wide range of experience in the paper field. William F. Killhour, treasurer and one of the organizers of the company, has been active in the paper business since 1881, the greater part of this time in a credit and financial capacity; W. Brelsford Killhour, president, joined the company in 1921; Robert S. Reed, secretary and wrapping paper division sales manager, came in 1920; Assistant Treasurer George J. Geiss was also one of the founders of the company in 1905, Vice-president Lewis F. Elliott became associated with the company in 1918, and Vice-president Howard W. Lee in 1932, after a wide experience in the merchandising field.

"For many years the majority business of the company was in wrapping papers, bags and specialties. However, several years ago the management decided to experiment

in the printing paper field—and, finally, on November 1, 1934, engaged the services of a fine paper sales manager and definitely set up a separate department, known as the Fine Paper Division.

"At first the new division numbered only three people—the sales manager, Alexander R. Williams; and two salesmen—with desk space in the general offices, whereas today the division has a personnel of nine on its sales staff, exclusive of warehouse, stockroom and delivery employees especially trained to service printing paper orders.

Quaker City Paper Company is distributor for Allied Paper Mills, International Paper Company, Beveridge Paper Company, W. C. Hamilton & Sons, Albemarle Paper Manufacturing Company, Joseph Parker & Son Company, Waterfalls Paper Mills, Chemical Paper Manufacturing Company, Gunned Products Company, D. M. Bare Paper Company, Riegel Paper Corporation, Hollingsworth & Whitney Company, Union Bag and Paper Corporation, Schmidt & Ault Paper Company, Collins Manufacturing Company, Franklin Paper Company, C. A. Hubbard, West Virginia Pulp and Paper Company, American Paper Goods Company, United States Envelope Company, A. M. Collins Manufacturing Company, Claremont Paper Company, Brown Company, Pejepsot Paper Company, Crystal Tissue Company, Paterson Parchment Paper Company, Brownville Paper Company, Knowlton Brothers and Fort Howard Paper Company.

Paper Salesmen's Study Course

Fritz Peters, secretary of Ruttle, Shaw & Wetherill, Inc., and formerly lecturer of Graphic Arts, New York University, was the speaker at the third lecture of the Paper Salesmen's Study Course, held on Monday evening, November 23, at the Chamber of Commerce Building, under the auspices of the Paper Trade Association of Philadelphia. "The Mechanics of Job Printing" was the topic assigned to Mr. Peters. He explained the various types of presses—Platen, Vertical, Pony (cylinder) and smaller sizes of cylinder presses generally found in job plants, and then took up the subject of Composition (hand), Linotype, Monotype, Make-up and Lock-up and the problems of Make-Ready and explained the intricacies which arise from variation of paper, ink, etc. At the conclusion of his talk, Mr. Peters was plied with questions from those in the student group, which, in his inimitable way, he answered to the satisfaction of all those in his audience.

Paper Concerns Chartered

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, Mass., November 30, 1936—The Donlin Paper Company, has been incorporated with a capital of 500 common shares having no par value. Harold R. Summerlin is president; Preston M. Leete, 331 Pleasant street, Holyoke, treasurer, and James H. Mulcare is the third incorporator.

Ramac, Inc., paper products, has been incorporated with a capital of 100 common shares having no par value. John F. Dowling is president; Elizabeth J. Hancock, vice-president, and John S. Begley, 225 High street, Holyoke, treasurer.

New England Paper Mills Continue Very Active

Still Further Improvement Experienced In Both Fine and Wrapping Paper Markets—Demand for Box Board Fairly Satisfactory—Paper Stock Section Exhibits Very Strong Undertone—Twine Business Exceptionally Healthy.

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., November 30, 1936.—The wholesale paper business in Boston and vicinity continued favorable last week, with indications of still further improvement in both fine and wrapping paper markets. Mills are busy, at least one having enough orders on hand to require operation until February 1. The demand for box coverings fell off a bit just before Thanksgiving, but conditions in this commodity were regarded as good.

The box board market declined in demand to a certain extent, but was still rather active, with orders for material for Christmas purposes still coming in.

Paper stock as a whole continued strong, with an advancing trend. Under bagging, Australian wool pouches rose on the high side, making the quotation 2.75 @ 3.00 f.o.b. Boston, compared with a previous one of 2.75 @ 2.80. In foreign rags, dark cottons went up to 1.90 @ 2.05 from 1.85 @ 2.05 and old linsey garments to 2.25 @ 2.50 from 2.00 @ 2.37½, all prices f.o.b. Boston.

Twine business continued "in an amazingly healthy condition." Improvement has been under way since September. So far the second half of the current year, the volume of orders in some quarters has been materially more than that of the first six months of the year.

New England Paper Merchants Meet

At the meeting of the New England Paper Merchants Association, held Monday evening at the Hotel Touraine, there was a good attendance, forty, with practically all the officers and a substantial number of other members present. President Robert M. Stone was in the chair.

The president appointed the following committee to bring in a slate of officers to be voted on at the January meeting:

Floyd H. Blackman, of the D. F. Munroe Company; J. Frank Halloran, of the Century Paper Company, Inc., and W. N. Stetson, Jr., of Storrs & Bement Company.

John R. Campbell, Jr., Regional Representative for New England of the Federal Old Age Benefits Bureau, gave an extremely good address on the Social Security Act and Old Age Benefits, so interesting, in fact, that members asked a large number of questions, which he handled in a very instructive manner.

News of the Industry

Richard Testut, manager of the New England office of the Scott Paper Company, of Chester, Pa., gave a very interesting and instructive discussion on Scott products to the sales force of Carter, Rice & Co., Corp., Saturday morning. Streeter Bush, assistant sales manager of the wrapping paper department, presided.

The Arnold-Roberts Company is carrying a full line of Beckett Offset, made by the Beckett Paper Company, Hamilton, Ohio. Beckett Offset is now made in white, India, green, pink, gray, buff, blue and orchid, six new colors having been added. Rose white is supplied on making order of 5000 pounds. Finishes are ripple, linen, crash, fabric, leather, corduroy, stucco, handmade, chateau, wove and laid. In the colors 70-lb. basis only is standard, but all base weights are available on making orders. In colors no laid paper is stocked, but all fancy finishes are procurable. There are seven weights and seven stock sizes.

In one window of the Arnold-Roberts Company's office is an interesting display of printed specimens of Beckett Offset.

In another Arnold-Roberts window during Thanksgiving Week were displayed turkeys on cardboard, with real cornstalks in each corner in the rear, pumpkins, and in the center a large horn of plenty, overflowing with various fruits. Masses of brown and orange strips of paper completed the decoration. On a wall of the window were printed samples of paper handled by the company.

Charles A. Esty, president of Carter, Rice & Co., Corp., and George Wright, manager of the twine division of that company, have just returned to Boston, after making a tour of their Southern mills. They found that mills making twine in the South have never been in a more crowded condition as to orders on their books. They anticipate an advancing tendency in prices for at least some months to come. A number of the mills are booked to capacity up to the summer of 1937.

Leon M. Poore, treasurer and general manager of John Carter & Co., Inc., and B. J. Wiseman, head of the announcement department of that concern, went to New York Friday night to attend the meeting of the Eagle-A Announcement Association at the offices of the Kent Paper Company.

Alfred Bloch, president and treasurer of Alfred Bloch & Co., New York City, dealers in rags and paper stock, called on the trade last week.

W. D. Thompson, of the sales staff of the Baird & Bartlett Company, passed Thanksgiving with his family at his new home, Wolfboro, N. H.

A meeting of the Fine Paper Division of the New England Paper Merchants Association is to be held at the Boston Chamber of Commerce December 3.

A fire which broke out in a paper warehouse Friday night, owned by the *Boston Globe* at Tudor's Wharf, Hoosac Docks, Charlestown, destroyed newsprint of an estimated value of \$250,000, property of the *Globe*. A large quantity of inflammable roofing materials also in the warehouse was destroyed. The *Globe* maintains three other storage places and will not suffer a shortage of paper.

E. L. Mullaney Addresses Paper Salesmen

Eugene L. Mullaney, counselor at law, gave an interesting and instructive address on the old age pension provisions of the Social Security Act at the regular weekly luncheon and meeting of the Eastern Division of the Salesmen's Association of the Paper Industry, held in the Hotel Lexington, New York, last Monday.

Pulp and Paper Making in the South

W. G. MacNaughton, engineer of the News Print Service Bureau, will discuss pulp and paper making in the South next Monday at the regular weekly luncheon and meeting of the Eastern Division of the Salesmen's Association of the Paper Industry. Mr. MacNaughton was formerly connected with the Experimental Pulp and Paper Laboratory at Savannah, Ga.

GOVERNMENT PAPER AWARDS ARE ANNOUNCED

(Continued from page 17)

- No. 104, Aetna Paper Co., 6.69 cents.
 No. 109, Aetna Paper Co., 9.578 cents.
 No. 110, Aetna Paper Co., 8.348 cents.
 No. 111, Aetna Paper Co., 7.738 cents.
 No. 112, Aetna Paper Co., 7.738 cents.
 No. 113, Aetna Paper Co., 7.988 cents.
 No. 114, Aetna Paper Co., 8.978 cents.
 No. 115, Aetna Paper Co., 8.468 cents.
 No. 116, Aetna Paper Co., 8.198 cents.
 No. 117, Aetna Paper Co., 8.568 cents.
 No. 120, Aetna Paper Co., 11.178 cents.
 No. 121, Aetna Paper Co., 9.228 cents.
 No. 122, Aetna Paper Co., 9.228 cents.
 No. 123, Aetna Paper Co., 10.238 cents (No. 26) 9.978 cents (Nos. 32 and 40).
 No. 125, Mathers-Lamm Paper Co., 20.98 cents.
 No. 126, Mathers-Lamm Paper Co., 17.50 cents.
 No. 128, Old Dominion Paper Co., 21,749 cents.
 No. 129, Old Dominion Paper Co., 21,749 cents.
 No. 140, Old Dominion Paper Co., 22,747 cents.
 No. 141, Old Dominion Paper Co., 21,749 cents.
 No. 151, Virginia Paper Co., 6.42 cents.
 No. 152, Aetna Paper Co., 6.54 cents.
 No. 153, Aetna Paper Co., 7.51 cents.
 No. 154, Aetna Paper Co., 8.888 cents.
 No. 155, Aetna Paper Co., 9.088 cents.
 No. 156, Aetna Paper Co., 9.088 cents.
 No. 157, Aetna Paper Co., 9.288 cents.
 No. 160, Aetna Paper Co., 9.228 cents.
 No. 161, Aetna Paper Co., 9.328 cents.
 No. 162, Aetna Paper Co., 9.228 cents.
 No. 163, Aetna Paper Co., 9.328 cents.
 No. 164, Aetna Paper Co., 9.988 cents.
 No. 165, Aetna Paper Co., 9.988 cents.
 No. 168, Virginia Paper Co., 14.00 cents.
 No. 169, Virginia Paper Co., 14.00 cents.
 No. 170, Virginia Paper Co., 14.00 cents.
 No. 171, Virginia Paper Co., 14.25 cents.
 No. 172, Virginia Paper Co., 15.00 cents.
 No. 173, Virginia Paper Co., 15.25 cents.
 No. 176, Mathers-Lamm Paper Co., 20.84 cents.
 No. 177, Mathers-Lamm Paper Co., 20.84 cents.
 No. 178, Mathers-Lamm Paper Co., 20.84 cents.
 No. 179, Mathers-Lamm Paper Co., 20.84 cents.
 No. 180, Mudge Paper Co., 20.20 cents.
 No. 181, Mudge Paper Co., 20.20 cents.
 No. 184, Mathers-Lamm Paper Co., 5.86 cents.
 No. 185, Mathers-Lamm Paper Co., 6.16 cents.
 No. 186, Mathers-Lamm Paper Co., 6.64 cents.
 No. 187, Mathers-Lamm Paper Co., 6.64 cents.
 No. 190, Aetna Paper Co., 8.978 cents.
 No. 191, Mathers-Lamm Paper Co., 13.12 cents.
 No. 192, Aetna Paper Co., 9.278 cents.
 No. 193, Barton, Duer & Koch Paper Co., 11.47 cents.
 No. 196, Whiting & Co., Inc., 16.81 cents.
 No. 197, Mathers-Lamm Paper Co., 10.51 cents.
 No. 198, No bids received.
 No. 201, John F. Post, Inc., 6.69 cents.
 No. 202, John F. Post, Inc., 7.66 cents.
 No. 203, Stanford Paper Co., 9.14 cents.
 No. 204, Stanford Paper Co., 8.74 cents.
 No. 205, R. P. Andrews Paper Co., 12.24 cents.
 No. 209, Barton, Duer & Koch Paper Co., 3.93 cents.
 No. 210, Barton, Duer & Koch Paper Co., 3.68 cents.
 No. 211, Barton, Duer & Koch Paper Co., 5.08 cents.
 No. 213, No bids received.
 No. 214, No bids received.
 No. 215, No bids received.
 No. 217, Barton, Duer & Koch Paper Co., 4.245 cents.
 No. 218, Barton, Duer & Koch Paper Co., 4.245 cents.
 No. 219, Barton, Duer & Koch Paper Co., 3.995 cents.
 No. 220, No bids received.
 No. 251, J. R. Howarth Paper Co., 9.45 cents.
 No. 252, Old Dominion Paper Co., \$5.269 per M sheets.
 No. 254, L. Hyman & Sons, 5.49 cents.
 No. 255, Graham Paper Co., 5.49 cents (based in estimated quantity only).
 No. 256, Barton, Duer & Koch Paper Co., 6.82 cents.
 No. 257, Barton, Duer & Koch Paper Co., 6.93 cents.
 No. 258, L. Hyman & Sons, 5.49 cents.
 No. 259, R. P. Andrews Paper Co., 5.50 cents.
 No. 260, No bids received.
 No. 261, No bids received.
 No. 262, Mathers-Lamm Paper Co., 5.89 cents.
 No. 263, Barton, Duer & Koch Paper Co., 6.00 cents.
 No. 264, Mathers-Lamm Paper Co., 3.43 cents.
 No. 265, Virginia Paper Co., 6.08 cents.
 No. 271, Whitaker Paper Co., 4.98 cents.
 No. 276, Barton, Duer & Koch Paper Co., 7.00 cents.
 No. 277, Barton, Duer & Koch Paper Co., 7.75 cents.
 No. 280, No bids received.
 No. 281, No bids received.
 No. 302, Virginia Paper Co., \$21.11 per M sheets.
 No. 303, Virginia Paper Co., \$28.79 per M sheets.
 No. 304, Barton, Duer & Koch Paper Co., \$43.25 per M sheets.
 No. 305, Virginia Paper Co., \$24.96 per M sheets.
 No. 306, Barton, Duer & Koch Paper Co., 4.65 cents.
 No. 307, Barton, Duer & Koch Paper Co., 4.65 cents.
 No. 308, Barton, Duer & Koch Paper Co., 4.65 cents.
 No. 309, Barton, Duer & Koch Paper Co., 4.65 cents.
 No. 310, Barton, Duer & Koch Paper Co., 4.65 cents.
 No. 325, Whitaker Paper Co., 4.65 cents (half of quantity); R. P. Andrews Paper Co., 4.65 cents (half of quantity).
 No. 351, Barton, Duer & Koch Paper Co., \$6.16 per 100 sheets.
 No. 352, Barton, Duer & Koch Paper Co., \$18.03 per 100 sheets.
 No. 360, Virginia Paper Co., 2.159 cents.
 No. 361, Container Corp. of America, 1.875 cents (for 500,000 pounds only).
 No. 362, Mathers-Lamm Paper Co., 4.028 cents.
 No. 363, No bids received.
 No. 364, Dabler & Mudge, 2.46 cents.
 No. 365, Virginia Paper Co., 2.399 cents.
 No. 366, Barton, Duer & Koch Paper Co., 3.30 cents.
 No. 367, Barton, Duer & Koch Paper Co., 3.30 cents.
 No. 368, R. P. Andrews Paper Co., 4.60 cents.

Ruberoid Buys Lang Co.

The Ruberoid Company, manufacturers of roofing materials, whose main office is in New York City, with plant at Joliet, Ill., has bought the Lang Company, also a maker of roofing materials, whose main office is in Philadelphia, and plant in Gloucester City, N. J.

Obituary

William Bonifas

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., November 30, 1936—William Bonifas, aged 71, vice-president, and a director for the last twenty-three years of the Kimberly-Clark Corporation, Neenah, Wis., died November 24 at his home at Escanaba, Mich. He was one of the largest producers and buyers of pulpwood in the Middle West.

Mr. Bonifas, an immigrant from Luxemburg, began as a lumberjack in his early twenties at Garden, Mich. Later he became associated with his brothers John, James and Isaac as pulpwood operators, and for many years produced pulpwood in large quantities for the Kimberly-Clark Corporation and other paper mills in the Fox River Valley.

After logging off the Garden peninsula, Mr. Bonifas moved his operations to Bonifas, near Watersmeet, Mich. The William Bonifas Lumber Company was incorporated in 1909. Both Mr. Bonifas and Kimberly-Clark had large timber tracts adjoining each other, particularly in Gogebic County, and in 1912 it was decided to merge the woods operations of the two concerns.

At that time the William Bonifas Company became a subsidiary of Kimberly-Clark. F. J. Sensenbrenner, president of Kimberly-Clark, became president of the William Bonifas Lumber Company, and Mr. Bonifas continued to serve as vice-president and general manager until his retirement last summer. In 1917 Mr. Bonifas moved his offices to Escanaba, where he also took up residence. He became a director of Kimberly-Clark in 1913.

The career of Mr. Bonifas was the colorful one of a lumberjack who rose to riches. He was a physical giant who could outwork the logging crews. Through his timber operations and investments in General Motors stock shortly after its organization, he is reputed to have amassed a fortune of \$25,000,000. He gave liberally to charity, and donated a considerable acreage near Mercer, Wis., for the establishment of the Forestry School of Notre Dame University.

Funeral services were held Saturday, November 28, at Escanaba. They took place at St. Joseph's Church, for which he provided funds last summer for rebuilding the structure and the convent.

Albert A. Howard

HAGERSTOWN, Md., November 23, 1936—Albert A. Howard, aged 80, pioneer paper maker, died at his home here on November 11. Born and reared in Cecil County, he spent most of his life here and for twenty years was superintendent of the Antietam Paper Company. His father and brothers, coming to this country from England, were all engaged in the same trade.

In addition to his wife, these survive: children, Mrs. Paul E. Gruber, Hagerstown; W. Russell Howard, Hagerstown; Arthur P. Howard, Worcester, Mass.; and Edwin H. Howard, an instructor at Washington and Lee University; sister, Mrs. Emily Guild, Newark, Del.; brothers, Charles E. Howard, Funkstown, Md., and John C. Howard, Wilmington, Del.

Jesse Linton

PROVIDENCE, R. I., November 30, 1936—Jesse Linton, aged 59, vice-president and general manager of the Springfield Glazed Paper Company, Springfield, and well-known musician, died on November 18 at his home, 28 Denver street, Pawtucket.

At one time Mr. Linton was associated in the glazed

paper business on North Bend street, Pawtucket, with his father, the late Hugh Linton.

Mr. Linton was a member of the old Providence Opera House Orchestra for many years, and of the former Reeves Band, directed by the late D. W. Reeves. He also played under the direction of the late Bowen R. Church, cornetist.

A prominent amateur golfer, Mr. Linton won an invitation tournament in Springfield in 1922. He was a life member of the Metacomet Golf Club and a member of the Musicians Protective Union and the Pawtucket Congregational Church.

Survivors besides his widow are a daughter, Miss Barbara Linton; a son, Louis E. Linton; a brother, Hugh E. A. Linton, all of Pawtucket, and a sister, Mrs. Elizabeth Lougee of Evanston, Ill.

Fellowship In Forest Chemistry Established

The Dow Chemical Company, of Midland, Mich., has established a fellowship in wood and cellulose chemistry at the New York State College of Forestry at Syracuse University. This fellowship is to run for three years and may be extended further by agreement between the college authorities and representatives of the chemical company. The investigations under this fellowship will have particular emphasis with relation to the chemical utilization of wood and its several constituents.

William R. Davis, of Port Jefferson, L. I., N. Y., has qualified as an acceptable candidate for this fellowship and has been appointed by Dean Samuel N. Spring of the College of Forestry. The investigations, which Mr. Davis will carry on, will be under the immediate supervision of Dr. Floyd C. Peterson. He will be assisted in the direction of this work by a committee consisting of W. R. Collins and S. L. Bass of the Dow Chemical Company and Professor Clarence E. Libby, head of the Department of Pulp and Paper Manufacture at the State College.

"The College of Forestry in accepting this fellowship," says Professor Libby, "feels gratified to know that the fundamental nature of its instruction in chemistry, which is the basis of its pulp and paper curriculum, is sufficiently appreciated by this chemical manufacturer to influence them to establish an unsolicited fellowship at the college. During the past two years the Dow Company has employed a considerable number of graduates of the Pulp and Paper Department of the College of Forestry for cellulose development work."

News of the Industry

F. E. Bronson, president of the Bronson Company, Ottawa, manufacturers of pulp, has been appointed by the King Government as chairman of the Federal District Commission. The Commission has jurisdiction over all the important plans being carried out by the government in the Capital City, including parks, drives, beauty spots, etc.

A provincial charter has been granted to Canadian Kraft Mills Ltd., with an authorized capital of \$100,000 and head office in Toronto, to manufacture, sell and deal in all kinds of paper, paper board, wood pulp, and all by-products and compounds thereof. Among the provisional incorporators are: Norman E. Strickland, John G. Osler, and James S. Graham, all of Toronto.

The Holden Lumber Company, Ltd., has been granted a provisional charter with an authorized capital of \$40,000 and head office in the Township of Widdifield, in the district of Nipissing, to carry on in all its branches a lumber and timber business, as well as operating saw mills, pulp mills, pulp board, etc.



CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Paper Mills

Construction News

Monroe, Mich.—The River Raisin Paper Company, manufacturer of corrugated board, box board and kindred products, has plans under way for new additions to mill, with installation of new equipment. Details of project are being determined and it is proposed to begin work early next year. Cost estimated close to \$200,000, including equipment.

West Monroe, La.—The Brown Paper Mill Company, Inc., has approved plans for new one-story addition to mill, to be used primarily for storage and distribution, providing large increased capacity for this department. Cost close to \$100,000, with equipment. General contract has been let to the Forcum-James Company, Dyersburg, La., and superstructure will be placed under way at once.

Tacoma, Wash.—The Shaffer Pulp Company, East 11th street and Hylebos Waterway, manufacturer of unbleached sulphite pulp, has awarded general contract to the Hart Construction Company, 711 Middle Waterway, for new additions to mill, recently referred to in these columns, comprising extension to digester house and other divisions. Equipment will be installed to increase mill capacity to about 125 tons per day, including machinery for processed pulp production for raw material for rayon manufacture. Entire project is reported to cost in excess of \$125,000, with equipment. Arthur W. Berggren is president.

Plymouth, N. C.—The Kieckhefer Container Company, West Canal street, Milwaukee, Wis., manufacturer of corrugated paper boxes and containers, has taken option on tract of about 75 acres of land in vicinity of Plymouth, as site for proposed new pulp mill in Southern district. Property has frontage on Roanoke, Cashie and Middle Rivers, and considerable portion of site has been previously cleared. Plant will consist of several large units, with power house, machine shop, pumping station and other mechanical divisions. Entire project is reported to cost in excess of \$1,000,000. Proposed to carry out work during 1937. Pulp wood supply will be secured from Bertie, Martin, Washington and neighboring counties in North Carolina.

Niagara Falls, N. Y.—The Kimberly-Clark Corporation, Packard road, manufacturer of book and other paper, has begun superstructure for new five-story addition to local mill, recently referred to in these columns, and will push to early completion in 1937. It is reported to cost approximately \$300,000, including equipment. Wright & Kremers, Inc., Pine avenue and Main street, Niagara Falls, is general contractor.

St. Louis, Mo.—The Ruberoid Company, 9215 River-view drive, manufacturer of roofing papers and kindred roofing products, has approved plans for new addition to local mill, to be one-story, 80 x 805 feet. It will be equipped to increase present plant capacity over 50 per

cent. General erection contract has been let to H. B. Deal & Company, Inc., 1218 Olive street, St. Louis, and work will be placed under way at once. Work is scheduled for completion by next June and will cost close to \$250,000, including machinery. Morris F. Marks, Ambassador Building, St. Louis, is engineer. Company headquarters are at 500 Fifth avenue, New York, N. Y.

Everett, Wash.—The Soudview Pulp Company, manufacturer of bleached sulphite pulp, is awarding miscellaneous sub-contracts for new mill units now in course of erection, previously referred to in these columns, including roofing work to the Puget Sound Sheet Metal Works, 3631 East Marginal way, Seattle; for plumbing, to the Brown Plumbing Company, Everett; and for brick work to the Seattle Brick and Tile Company, Ninth street South, Seattle. Project consists of three new buildings for acid works, pulp department, storage and distribution, as well as new filter plant and improvements in present mill units. Expansion will provide for an increase in rated output from 6,000 to 9,500 tons per month, and is estimated to cost close to \$2,000,000, including machinery. The Austin Company, Dexter-Horton Building, Seattle, is general contractor. Lee S. Burdon is manager at mill.

Ilchester, Md.—The Bartgis Brothers Company, manufacturer of manila wrapping papers and other stocks, has plans nearing completion for new addition to mill, including improvements in present plant. New unit will be two-story and is estimated to cost close to \$45,000, including equipment.

Windsor, Ont.—Perga Containers, Ltd., manufacturer of paper boxes and containers, etc., is considering construction of new mill on local site, to be one-story, estimated to cost close to \$55,000, including equipment. E. J. Staley is general manager.

Dolbeau, Que.—Plans for reorganization of the Lake St. John Power and Paper Company, Ltd., have been approved by stockholders of the St. Lawrence Company, Ltd., Montreal, Que., parent organization, and will be carried out at once.

Cardiff, England—The Coating Mill Company, Ltd., Cardiff, recently formed with capital of \$500,000, by interests identified with the South Wales & Monmouthshire Trading Estates, Ltd., same place, has plans maturing for new pulp and paper mill. A tract of about 10 acres of land has been acquired at Nantgarw, near Cardiff, and will be used as plant site. New mill will comprise several large operating units, with power house, pumping station, machine shop and other mechanical departments, and is estimated to cost close to \$400,000, including equipment. It will be built by the parent organization noted.

Zidovitz, Czechoslovakia—The Ministry of Industry, Prague, is developing plans for the construction of a new pulp and paper mill on large tract of land at Zidovitz, project to be carried out by a syndicate, now being organized



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under the direction of the Ministry. New plant will consist of several one and multi-story units, and will be equipped to manufacture wrapping papers and kindred stocks. Work is scheduled to begin early in 1937 and is estimated to cost over \$1,500,000, with machinery, for which orders will be placed in near future.

New Companies, Etc.

Holyoke, Mass.—The Donlin Paper Company has been incorporated with capital of 500 shares of stock, no par value, to manufacture and deal in paper products. Harold R. Summerlin is president; Preston M. Leete, 331 Pleasant street, Holyoke, is treasurer and representative.

New York, N. Y.—The National Paper Products Company, Inc., has been chartered with capital of 200 shares of stock, no par value, by Pacific Coast interests, to manufacture and deal in paper products of various kinds. New company is represented by Pillsbury, Madison & Sutro, Standard Oil Building, San Francisco, Cal., attorneys.

Precision Scientific Literature

The Precision Scientific Company, 1736-54 North Springfield avenue, Chicago has issued the following bulletins:

Bulletin TS 3000, 24 pages and cover, tells how to conduct accurate B.t.u. tests with a Flow-Type Gas Calorimeter. Crammed full of information from cover to cover, this new manual contains detailed instructions, approved by the U. S. Bureau of Standards, on how to set up the apparatus and conduct an accurate test; also includes essential calorimeter tables reproduced from Bureau of Standards Circular No. 65, now out of print. Covers the subject of flow calorimetry in a complete, practical and concise manner. Shows assembled and cross-sectional diagrams of the calorimeter, outline of test procedure; lists necessary precautions and significance of errors; includes a brief bibliography and information on calorimeter parts and accessories.

Bulletin TS 3110, 8 pages, contains useful information and operating instructions pertaining to Wet Test Laboratory Gas Meters. Tells how to set up and operate the meter for most accurate results; includes correction factors for gas volume, table showing gas rate per hour, information on meter parts and accessories.

Kalamazoo TAPPI to Meet

The Kalamazoo Valley Section of the Technical Association of the Pulp and Paper Industry will meet at 6:30 P. M. Thursday, December 10 at the Park American Hotel, Kalamazoo, Mich. The speaker will be Newton L. Nourse, manager of the Pulp Sales Division of the Brown Company, Portland, Maine, who will talk on "Pulp Characteristics and Beating." Anyone interested is welcome to attend.

G. E. Fuller Goes With St. Croix Paper Co.

[FROM OUR REGULAR CORRESPONDENT]

GLENS FALLS, N. Y., November 30, 1936—George E. Fuller, ground wood superintendent of Finch Pruyn & Co., has resigned in order to take the position as general plant superintendent with the St. Croix Paper Company, of Woodland, Me. He has been in the employ of the company for nearly twenty years. His resignation becomes effective December 1 and announcement was made that his successor would be Fred Johnson, formerly a foreman. Employees plan to stage a farewell party for Mr. Fuller before he leaves for his new position.

To Attend Berry Conference

O. F. Marquardt of New York, president of the National Paper Trade Association of the United States, Inc., announced today that the Executive Committee of the Association had authorized A. H. Chamberlain, executive secretary, and J. K. Javits of Javits & Javits, Attorneys, Counsel for the Association, to attend as observers the conference called by Major George L. Berry, the President's Coordinator for Industrial Cooperation to be held in Washington, December 10 and 11.

The National Paper Trade Association of the United States, Inc. represents the wholesalers of paper and paper products in the United States. There are about sixteen hundred concerns principally engaged in this business.

In explaining the position of the association and its members with regard to attendance at the Berry conference, Mr. Marquardt said:

"As wholesalers we recognize our obligations to our employees in the matter of wages and hours and to the public in the matter of prices and service. We are fully in accord with the policies of the President which call for maintaining the purchasing power of employees. We have always contended, and we believe that the President recognizes that a necessary corollary to that principle is the principle of fair profits for business. Without fair profits there can be no employment, no adequate wages, and no expansion or new construction to employ our durable goods industries. We welcome the Berry conference as an opportunity for the voluntary expression by business of its views and as a step in the direction of the self regulation of business in the public interest.

"At the proper time we expect to present definite recommendations to business interests and to our legislative representatives which we believe can legally effect these principles in a constitutional way. We believe that more and more dependence must be placed on intra and inter industry contracts to effect economic reforms, that the public should be protected against imposition through a quasi judicial body, divorced from any prosecuting agency, to approve such contracts as being in the public interest, and that fair qualifying conditions should be imposed as a condition to the exercise of these rights. The problems of the "chiseling" minority, and of assuring fair wage and hour standards can, we believe, be progressively solved.

"However, we believe that the best interests of the conference and of American business require that we think before we act. We believe also that democratic principles demand that any program decided upon have the complete support of our membership. At this time, therefore, our executive committee is sending observers to the Berry conference rather than accredited representatives so that an orderly development of any suggested program may be had.

"Our members have recognized that an increasing public evaluation of the functional status of trades and industries is at hand. We recognize that the public demands that business assume the social responsibility of caring for its workers. Our members as a unit support these views and propose to cooperate toward carrying them out. Each individual business man must cooperate with his fellows through trade associations unless he is to go down and be lost in the realignment of economic forces now taking place. Our Association intends to lead the paper trade along the paths of business improvement through business cooperation. We have stated that no member of the trade can afford to withhold participation in this effort if he wants the cooperation of his employees and the public."

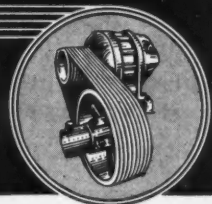
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FUTURE MEETINGS

NEW ENGLAND SECTION, Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Nonotuck Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION, Technical Association of the Pulp and Paper Industry—Fourth Friday of each month at the Engineers Club, Philadelphia, Pa.

LARGEST STATES SECTION, Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway, Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION, Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park-American Hotel, Kalamazoo, Mich.

BIG EXPANSION IN PAPER BOX DEMAND

Accompanying the unbroken advance of industrial acceleration, both manufacturers and wholesalers of paper boxes have made substantial progress this year. Distribution of gift and set-up boxes, folding boxes, and corrugated and solid fiber shipping containers during the first ten months of 1936 ranged from 10 to 20 per cent larger than the comparative 1935 total. The buying wave gathered force during the third quarter, normally the dull period, and many factories booked larger orders than in any corresponding three months since 1929, with some showing increased profit ratios.

Beginning the fourth quarter with the rise unchecked, the year is expected to close with the industry in the strongest position in nearly a decade. Plant enlargement and installation of new equipment have spread to nearly all divisions. For some types of machinery, orders have been so numerous that manufacturers have fallen four months behind shipping dates. Possible shortage of some raw materials is causing concern.

Price average of the finished product has remained almost constant, notwithstanding advances in raw materials and wages. Despite intensified competition early mark-ups are considered inevitable, manufacturers reaching a point where they no longer can absorb these added costs. With more concerns on a better operating basis, the inclining sales trend, and the widening use of paper boxes, further gains are indicated for 1937. These were

some of the major developments revealed by a survey of the paper box industry, which has just been completed by Dun & Bradstreet, Inc.

New uses for display and advertising purposes have brought a constant widening of the popularity of folding boxes this year. Improvement in the quality of the boxes, due to better supplies, superior basic materials, and new machinery, have enabled manufacturers in this division to maintain their pre-eminence in the industry. During every month of 1936 production exceeded that in the corresponding one of the two years preceding. Both September and October output were close to the year's peak recorded for August.

Gains in production for the ten months ranged from 10 to 20 per cent in dollar value over the 1935 comparative total. Increases were largest in the producing centers of the Middle West and West, as the East lagged behind the general rate of advance. This narrowed the average rise for the country to 10 to 11 per cent. For the first time in years orders are being placed for delivery as far ahead as next spring, the expected strengthening of prices probably accounting for some of the heavy future commitments.

Less pressure is being exerted for excessively low prices, but the latter are widely out of alignment with the rise in dollar sales, which is attributable solely to the increase in the number of folding boxes used. After the prolonged period of depressed prices, it is difficult to raise the level quickly to a position that would give an adequate return on capital investments of the industry, in view of wage advances, higher taxes, and pay roll levies.

Halting suddenly the receding trend of the first five months, demand for set-up paper boxes turned abruptly upward in June. Orders to manufacturers poured in rapidly from all lines, but were particularly abundant from the textile, shoe, candy, grocery, cosmetic, and drug trades. By the end of October the increase of 5 to 8 per cent over the 1935 output recorded for the first five months had been widened to 10 to 20 per cent, with the gain in novelty gift and Christmas boxes running as high as 30 per cent.

During the summer most factories were on capacity schedules and starting with September many were forced to go on double and triple shifts to catch up with overdue shipments. The tight delivery situation developed a sellers' market in this division for the first time in ten years. The increase in the dollar value of output was further augmented by the decided shift to boxes of better quality and strength. Dealers in merchandise to be delivered and exhibited in boxes now insist on sturdiness as well as good appearance.

With the improvement made this year in both construction and attractiveness, sales of set-up boxes have been keeping fairly even with the rate of progress recorded for the folding box division. Selling prices generally have been firm, while base materials have been raised two or three times since Spring. As a result, deliveries are being made on orders booked during the summer at prices which permit little profit at the current costs of production.

Concomitant with the widening distribution of consumer merchandise, production of corrugated and solid fiber shipping containers gained steadily during the third quarter, extending the almost uninterrupted rise since the first of the year. Manufacturers have been pressed to meet delivery dates, despite the increase in operating schedules. At some centers production reached a seven-year peak in October, surpassing the level of the comparative 1935 month, which had marked the high since the upswing started.

On the average the advance in activity for the ten months of 1936 amounted to 15 per cent over the corresponding period of 1935. Due to the difference in local economic conditions, the percentage of increase varied considerably from one section of the country to another. Of the five geographical areas the largest rise was 22 per cent for the Pacific Coast, followed by 21 per cent for the South. For the Middle West it was 17 per cent over 1935, and for the East and Central 13 and 12 per cent, respectively.

Quotations in this division continue low, in spite of several minor mark-ups. The prevailing price level can best be gauged by its relation to the all-commodity index of the Bureau of Labor Statistics. The latter has maintained an uninterrupted increase since the depression low to the present position of 82 per cent of the 1926 average., while the index for corrugated and solid fiber shipping containers stands at only 58 per cent of its 1926 level.

Manufacturers of paper boxes have made but infrequent use of the advantages of Section 77-B of the New Bankruptcy Act. During the first ten months of the current year only 2 cases were reported, one a manufacturer in Brooklyn, N. Y., and the other in New York, N. Y. There also were but 2 cases in 1935, the manufacturers being located at Cleveland, Ohio, and Baltimore, Md., while the one listed in 1934 was a manufacturer of paper cans at Cudahy, Wis.

Failures of manufacturers of paper boxes have been at about the same rate as in the two years previous. For the first ten months of 1936 a total of 11 compared with 12 for the full year of 1935 and also with 12 in 1934. The defaulted indebtedness, however, has been curtailed abruptly. From \$2,166,418 in 1934, the total dropped to \$383,374 in 1935, and for the ten months of 1936 to \$315,821.

J. L. Riegel Heads Paper Division

Representative leaders in the paper industry have organized under the chairmanship of John L. Riegel, vice-president of the Riegel Paper Corporation, to form the paper industries division of the United Hospital Campaign Committee in presenting the facts of the voluntary hospital situation to the people of New York. Cooperating with this group are similar divisions representing all branches of commerce and industry in a city-wide organization. These volunteer workers are helping to raise funds to ensure full maintenance of this essential community health protection. The campaign committee has its headquarters at 57 William street, New York.

Production Ratio Report

The statistics are based upon paper production reports to the American Paper and Pulp Association.

The following data have been revised to include the holidays previously excluded from the reports.

COMPARATIVE MONTHLY SUMMARIES

| Months | 1936 | 1935 | 1934 |
|-----------|-------|-------|-------|
| January | 76.1% | 65.8% | ..... |
| February | 77.9% | 70.0% | ..... |
| March | 76.0% | 70.5% | ..... |
| April | 82.3% | 70.0% | ..... |
| May | 81.6% | 69.4% | ..... |
| June | 80.7% | 72.3% | ..... |
| July | 77.3% | 65.0% | ..... |
| August | 81.5% | 70.9% | ..... |
| September | 80.5% | 71.9% | 36.8% |
| October | 87.6% | 75.6% | 64.7% |
| November | ..... | 75.3% | 61.7% |
| December | ..... | 71.2% | 59.5% |
| Year | ..... | 70.5% | ..... |

COMPARATIVE WEEKLY SUMMARIES

| CURRENT WEEKS, 1936 | CORRESPONDING WEEKS, 1935 |
|---------------------|---------------------------|
| *November 7..... | November 9..... |
| *November 14..... | November 16..... |
| *November 21..... | November 23..... |

The following statistics show the number of mills reporting by ratio groups:

| Ratio Limits | Number of Mills Reporting, Current Weeks | | |
|----------------------------|--|---------------|---------------|
| | Nov. 7, 1936 | Nov. 14, 1936 | Nov. 21, 1936 |
| 0% to 50%..... | 54 | 56 | 40 |
| 51% to 100%..... | 271 | 257 | 202 |
| Total Mills Reporting..... | 325 | 313 | 242 |

* Subject to revision until all reports are received.

PAPERBOARD OPERATING RATIOS

According to reports from the National Paperboard Association, per cents of operation, based on "Inch-Hours," were as follows:

| Months | 1936 | 1935 | 1934 | Months | 1936 | 1935 | 1934 |
|------------------------------|------|------|-------|-------------------------------|-------|------|-------|
| January | 61% | 61% | ..... | July | 69% | 59% | ..... |
| February | 67% | 67% | ..... | August | 75% | 65% | ..... |
| March | 68% | 67% | ..... | September | 76% | 69% | 62% |
| April | 70% | 61% | ..... | October | 82% | 76% | 63% |
| May | 68% | 61% | ..... | November | ..... | 70% | 56% |
| June | 68% | 65% | ..... | December | ..... | 60% | 52% |
| Week ending Nov. 7, 1936—79% | | | | Week ending Nov. 21, 1936—80% | | | |
| | | | | Week ending Nov. 14, 1936—81% | | | |

Titanium Pigment Corp. Formed

On October 31, 1936, the Titanium Pigment Company, Inc., was dissolved and effective November 2, 1936, a new selling organization known as Titanium Pigment Corporation, subsidiary of National Lead Company, was organized under the laws of the state of New Jersey, to act as the sole sales agent for Titanox Pigments. The headquarters of the new corporation and the Eastern sales office will be located at 111 Broadway, New York City. The Western sales office will be located at Carondelet Station, St. Louis, Missouri.

The officers of the Titanium Pigment Corporation are: Ralph M. Roosevelt, president; C. F. Garesche, vice-president; F. H. Dow, secretary-treasurer; A. L. Hoffman, assistant secretary-treasurer; I. D. Hagar, general sales manager; G. W. Corddry, Eastern sales manager and D. W. Edgerly, Western sales manager.

The manufacture of Titanox Pigments will be carried on by the National Lead Company, Titanium Division, operating plants at St. Louis, Mo., and Sayreville, N. J.

River Raisin Paper Co. Builds

MONROE, Mich., November 30, 1936—Work on a building to cost \$200,000 has been started by the River Raisin Paper Company here. Company officials said increasing business necessitated the addition.

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Section of the

Technical Association of the Pulp and Paper Industry

Edited by **Ronald G. Macdonald, Secretary**

Cellulose Derivatives*

By **Ralph E. Montonna¹**

It was just a little more than a hundred years ago that the first carbohydrate derivative was described in the literature by Braconnot (1) who treated starch with nitric acid and obtained a substance which he called "xyloidine." Five years later Pelouze (2) made the first cellulose derivative by treating paper with nitric acid. But the real inception of cellulose nitrate dates from the work of Schoenbein (3, 4) who used mixed acid on cellulose. Simultaneously but quite independently Boettger and Otto (5, 6) made the same discovery. In the century following these discoveries hundreds of cellulose derivatives have been discovered and prepared and great industries are based on this raw material. Although only three of these derivatives have attained any great amount of industrial importance and only one of them generally uses wood as the source of cellulose, it seems logical to review briefly the work which has been done on other derivatives of cellulose and to discuss the possibilities for industrial development which may lead to greater use of wood cellulose.

Cellulose nitrate, acetate and xanthate are too well known to require discussion but the higher aliphatic esters, the esters of many other types of acids and mixed esters are not so well known, although an enormous amount of work has been done in this field, especially in the last quarter century. During this time, likewise, a whole literature has grown up regarding a new class of cellulose derivatives, the ethers. Although none of them has yet attained industrial importance, their properties are varied and interesting and they hold forth promise of great development in the future. As a class they are not well known and much of the information concerning them must be sought in the patent literature. Because of their general method of formation they would seem to be peculiarly suitable for preparation from wood cellulose. Finally, there have appeared recently a few notices of attempts to prepare cellulose derivatives containing nitrogen in the obvious hope of imparting to the fibers some of the desirable characteristics associated with animal fibers. Obviously so wide a field cannot be treated comprehensively in a paper of this length and no claim is made that this review is exhaustive, but an attempt will be made to outline the developments of the last few years along the lines indicated.

Aliphatic Esters

Cellulose propionate is formed by the action of propionic anhydride or propionyl chloride on cellulose in the

presence of propionic acid and suitable catalysts such as free hydrochloric acid, monochloroacetic acid and sulphuric acid. (7,8,9,10,11).

The tri-propionate is the desirable ester and its properties are about the same as the acetate. Some of its proposed uses are for the manufacture of films, laminated glass, plastics, filaments, coating and water proofing composition and the rot-proofing of fabrics, but it does not seem to be superior to the triacetate and up to the present has been much more expensive.

Cellulose lactate or hydroxypropionate (12, 13) has been made by heating cotton with twenty parts of eighty per cent lactic acid for three hours at 80° C. or better by the action of lactic acid or its alkali salts and thionyl chloride on cellulose. Very little is known of the properties of this compound but it forms an interesting subject for research since lactic acid can be obtained cheaply from waste skim milk in dairy countries.

Cellulose butyrate has been prepared by Weber and Cross (14,15) by evaporating to dryness 162 parts of cellulose (preferably regenerated) and 198 parts of magnesium butyrate in concentrated aqueous solution and then treating with 213 parts of butyryl chloride and 25 parts of butyric anhydride. As the temperature rises and the mass thickens nitrobenzene is added as a diluent to keep the temperature at 70° C. This ester together with the acetate and propionate have been described by Stein (16). The general method of preparation is to treat cellulose with butyryl chloride or butyric anhydride and a catalyst such as zinc chloride (17), ethyl sulphuric acid (18) or aliphatic sulphonic acids (19) in the presence of such diluents as benzene or butyric acid (20). Pre-treatment of the cellulose with sulphuric and butyric acids (21) or with formic acid (22) seems to be desirable to give a tri-butyrate. The product dissolves in the usual solvents forming highly viscous solutions, but otherwise differs but little from the acetate in properties. Besides the greatly increased cost, there are difficulties of manufacture due to the odors from the butyric acid. Cellulose isobutyrate (tri-esters) (23) has also been made but appears to be very similar to the normal ester. These esters have been proposed for filament formation, lacquers, insulating and waterproofing materials, mildew and rot-proofing of canvas (24) and an anti-fouling paint but, in general, their cost is prohibitive and offsets any other apparent advantages.

The higher aliphatic esters have been studied during the past decade and appear to have some desirable prop-

* Paper presented at the 90th meeting of the American Chemical Society in San Francisco, August, 1935 and just released to the Paper Trade Journal.

¹ Professor of Chemical Engineering, University of Minnesota.

erties. The stearates were first made by Gruen and Wittka (25) by treating cellulose with stearyl chloride in benzene and pyridine. It is like the original cellulose in appearance but although insoluble in cellulose solvents dissolves in fatty acids and their glycerides at 200 deg. C. Cellulose dilaurate prepared in similar manner is much more soluble. Studies of these esters have been continued by Gault and Ehrmann (26, 27, 28, 29) who have prepared the distearate, dipalmitate, dilaurate and caproates. Hess and Messmer (30) have prepared the trilaurates and tripalmitate of cellulose which are insoluble in ordinary solvents. If hydrocellulose is used, according to Gault and Ehrmann, the distearate, dipalmitate and dilaurate are amorphous substances giving colloidal solutions in most organic solvents such as aromatic hydrocarbons, chloroform and the halides of ethylene but insoluble in alcohol and acetone. Normal cellulose, however, yielded an insoluble palmitate. Films from benzene or chloroform are translucent but remarkably flexible, non-inflammable and water resistant. In general, the solubility of the esters decreases with increase in the number of carbon atoms in the acid radical but increases with the copper number of the hydrocellulose. The esters are thermoplastic depending, in large degree, upon the amount of degradation of the cellulose. Kita, Nakashima and Sakurada (31) state in contradiction to Hess and Messmer that the tri-esters of lauric, palmitic and stearic acids are soluble in benzene, carbon tetrachloride, chloroform and ether. By means of X-ray studies Nowakowski (32) has concluded that the internal structure of the cellulose is completely destroyed by the esterification with long aliphatic chains.

These higher esters are so new and have been studied so little that their properties and uses are not well defined. They appear to be particularly adaptable as plastic materials possessing as they do, thermoplastic properties. They are also very useful as lacquer ingredients, particularly in anti-rust paints and as a moisture repellent in coated textiles. Their solubility in benzene and similar cheap solvents makes them particularly desirable. They have also been proposed for the manufacture of safety glass where their resistance to light and water and the toughness of their films would seem to render them highly desirable. Altogether they hold forth interesting possibilities and should be a fertile field for research.

Cellulose Formate

Cellulose formate appeared to offer a fruitful field of investigation for several reasons, viz:

1. Since formic acid is the esterifying agent instead of an anhydride, all the acid would be available for the reaction instead of only half as in the case of the acetate.

2. Formic acid can now be obtained more cheaply than formerly, especially if anhydrous acid is not required.

3. It appeared that formic acid of 90 per cent strength or less could be used for esterification (33, 34) although Woodbridge (35) claimed that no ester resulted unless the anhydrous acid was used.

4. The formate ester should be very stable due to the compact character of the acyl group introduced and due to its peculiar structure might offer unique properties.

5. Interesting light might be thrown on the structure of cellulose if formolysis could be controlled by the concentration of acid used, as acetolysis cannot, resulting in higher yields of cellobiose octaformate.

For these reasons an investigation of cellulose formate was undertaken by the author with Gustave Heinemann (36). It was found that a water content of more than 4-5 per cent rendered formic acid incapable of esterifying cellulose but with 98 per cent formic acid and sulphuric

acid as a catalyst the monoformate was formed in 3-4 hours at 50-80 deg. C. gradually cooling to room temperature as the reaction progressed. Acid of 96 per cent strength mixed with sufficient acetyl chloride to remove the water would produce a diformate under similar conditions. The acetyl chloride treatment made possible the use of 90 per cent acid for producing the monoformate. Cellulose triformate could not be produced in a single treatment but, by precipitating the diformate, drying and retreating with 99 per cent formic acid a triformate ester resulted. All these esters are white friable powders. The monoformate is soluble in alkali sulfocyanates, pyridine and zinc chloride solutions, but insoluble in acetone, nitrobenzene, alcohol or alcohol-ether. The diformate has greater solubility being somewhat soluble in acetone but insoluble in alcohol and alcohol-ether. The triformate is still more soluble. All the esters appeared to be somewhat unstable on standing, slowly losing formic acid even at room temperature. A cellulose diformate-monoacetate was formed by treating the diformate with acetic anhydride. This mixed ester was soluble in the same solvents, especially pyridine and acetone, but insoluble in chloroform, carbon tetrachloride and ethyl acetate. Sulphuric acid proved to be the best catalyst in agreement with Berl and Smith (37) and Bemberg (38) and Woodbridge (39) in spite of the statement of Heuser (40) that sulfuric acid cannot be used because of its dehydrating action on formic acid. This ester has been proposed for plastics, rayon, and insulators but unless very cheap anhydrous formic acid is available and some method of stabilizing it can be devised, it does not seem to hold great promise for industrial development. Its solubility relations are interesting especially in inorganic salt solutions. Jurling (41) claims to avoid a brittle product by the use of high concentrations of formic acid at 0-5 deg. C. in the presence of a catalyst.

Cellulose Benzoate

Cellulose benzoate was first prepared by Cross and Bevan (42) by a modification of the Schotten-Baumann reaction using benzoyl chloride and caustic soda. The reaction was further investigated by Skraup (43) and later by Hauser and Muschner (44) who claimed that Cross and Bevan were in error and that not more than a monobenzoate could be made by this procedure. Briggs (45) who evidently worked in Cross and Bevan's laboratory answered their charges claiming that they used the wrong procedure in first saturating their cellulose with benzoyl chloride. The principal differences seem to be in their analysis of the product and in the method of preparation of the cellulose. Ost and Klein (46) found that with caustic soda about 2½ benzoate residues per C₆ molecule was the highest obtainable ester. Since it seemed evident that a weaker base should be used they tried the method of Wohl (47) which gave tribenzoate. These disagreements by previous investigators and recent developments tending toward cheaper benzoyl chloride led the author to investigate this ester with Julius R. Katz (48).

Preliminary investigations soon disclosed that the method of Wohl (49) was best adapted to its preparation. Other benzoylating agents such as benzoyl cyanide or benzoic anhydride did not prove as good as the chloride. Calcium and sodium carbonates were tried as acid removers but gave only small yields of cellulose benzoate. It soon became evident that the pyridine played a more complex role than simply that of removing the acid and that only such bases could be used as would form a weak compound with the benzoyl chloride which would break up at the temperature of the reaction. Primary and secondary amines could be

ruled out because they reacted irreversibly with the acid chloride and because acylation, a one-phase reaction, proceeded much more rapidly than esterification of the cellulose. Tertiary amines will fulfill these requirements and it is true that dimethylaniline and triethylamine gave small yields of tri-benzoate. But the best acid fixing agents were tertiary nitrogen compounds where the nitrogen forms part of the ring such as pyridine, quinoline and acridine. The prime requisites for an acid fixing agent are that it form a compound with benzoyl chloride which will break up at a low enough temperature so that benzooylation of the cellulose can occur without too much degradation. Acridine gave lower yields because its compound with benzoyl chloride is more stable than those of quinoline or pyridine. Incidentally a high grade chemical pulp prepared in our laboratory from aspen wood reacted much more rapidly and gave a better product than standard cellulose. This ester has not been investigated enough as to its properties and uses. It seems to possess the marked stability which one would expect would be conferred upon it by the benzoyl groups. The higher esters are amorphous and soluble at least in part in chloroform, tetrachlorethane, acetone, glacial acetic acid and nitrobenzene. They are insoluble in water, ether and alcohol. It has been proposed to use them as insulating material, lacquers and plastics, but as yet they have attained no commercial importance although they certainly do possess interesting possibilities.

Miscellaneous Esters

Due to the scarcity of acetic acid for making cellulose acetate for aeroplane dope during the war, Levey (50) in searching for a substitute ester prepared cellulose phthalate by acting on a highly degraded cellulose with phthalic anhydride dissolved in ethyl phthalate with zinc chloride as a catalyst. The esterification produced was only slight, however, as there appeared to be only one phthalate residue for each eight C_6 residues. The ester is insoluble in all ordinary solvents and does not appear to be of any particular use.

The good properties and stability of the cellulose benzoates except for their cost, the similarity of furoic or pyromucic acid to benzoic and the recent extensive commercial development of furfural from which furoic acid can be obtained easily and cheaply led Kobe and Montonna (51) to prepare the cellulose esters of this acid. The procedure was a slight modification of the Schotten-Baumann reaction such as was employed by Wohl (52) and Ost and Klein (53) for the preparation of the benzoate esters. Two types of products are produced, fibrous esters analyzing from 2.5 to 3 furoate residues per C_6 unit and soluble dark-colored furoylated degradation products analyzing more than three furoate residues. The fibrous esters were colored and were insoluble in all the usual cellulose ester solvents. Analysis by the method of Woodbridge (54) gave good results but showed quite clearly that one acyl residue was much more firmly bound than the other two, this being probably the one united with the primary alcohol group. The furoylated degradation products which were not investigated much offer interesting possibilities for further research since they are soluble and appear to have plastic properties. Incidentally this is probably the first "all-cellulose" ester since furfural, the source of the acid, is made by hydrolysis of oxycellulose. But its insolubility and lack of color stability show little possibility for commercial development.

Cellulose oxalate mixed esters have been obtained by Frank and Caro (55) by treating cellulose in pyridine with an ester-half-acid chloride of oxalic acid. In this way cellulose allyloxalate, iso-amyl oxalate, menthyl oxalate and cetyl oxalate were produced. These esters have interesting

properties but low resistance to hydrolyzing agents. Montgomery (56) suggests a very interesting use of cellulose oxalate as an intermediate in the preparation of formic acid similar to its preparation from glycerol oxalate. The yield of formic acid is 74 percent of theory.

Cellulose crotonates have been formed by treating cellulose with crotonic anhydride in benzene using sulphuric acid as a catalyst. (57,58). Cellulose cinnamate has been made by the Schotten-Baumann reaction in nitrobenzene at 100-120 degrees C. (59). The latter ester has great stability to both heat and hydrolysis but neither of these esters has been developed commercially.

Mixed Esters

The number and variety of mixed esters that have been produced are so great that it is impossible to treat the subject adequately in this paper. Mixed aceto-nitrates may be prepared by nitrating partially acetylated celluloses. They have maximum stability with minimum inflammability. Cellulose aceto-propiono- and butyro-nitrates have been prepared by Ohl (60) by treating simultaneously with esterifying and nitrating agents. At least 3 per cent nitrogen should be present to give esters which are stable and suitable for explosives, lacquers and films. Berthou (61) states that the nitro- and acetyl-laurates from cellulose possess excellent film and thread forming properties.

Mixed acetates with propionic, n- and isobutyric, n- and iso-valeric, caproic, capric, lauric, myristic, palmitic, stearic, crotonic, cinnamic, benzoic, acetyl-salicylic and phenyl acetic acids have been made. (62-36).

One method (64) uses 15 parts of the higher acid and an equal amount of acetic anhydride dissolved in 15-25 parts of monochloroacetic acid with addition of .05 parts of magnesium perchlorate at 60-65° for 2-48 hours. While another method (65) mixes the higher acid with chloroacetic anhydride and magnesium perchlorate. In general these esters are soluble in acetone and chlorinated hydrocarbons and are suitable for forming filaments. (66).

Mixed esters are also made by treating cellulose formate, acetate, butyrate or benzoate with a solution of an acid having an ionization constant higher than that of the ester acid, e.g., oxalic, tartaric, lactic, pyruvic, maleic, glyceric, salicylic, glutaric, adipic, cinnamic or acrylic, the solvent being one which will dissolve the ester. (67). About sixty such esters have been made which are soluble in a wide range of solvents and produce excellent lacquers and transparent films. The range of properties attainable in these compounds is almost infinite in variety and it is highly probable that further study will bring out some which will be commercially feasible.

Lilienfeld (68, 69) has produced a series of mono-hydroxy alkyl acid compounds of cellulose by the action of mono-halogen derivatives of aliphatic acids on viscose which results in substances soluble in warm or hot water and giving hard, transparent, insoluble films on drying. They are also suitable for spinning. He neutralizes cellulose xanthate with acetic acid and then treats it with the mono-halogen acid. Monochloroacetic, α -bromo- and α -chloropropionic, β -iodopropionic, brom-succinic and β -bromoisobutyric acids have all been used in this manner.

Cellulose Ethers

Although the alkyl derivatives of the simple sugars had been known for many years it was not until Suida (70) studied the effect of various radicals on the dyeing properties of textile fibers that cellulose ethers were first mentioned in the literature. Even then these derivatives aroused little interest until 1912 when almost simultaneously patents for cellulose ethers appeared in three different countries. Leuchs in Germany and Dreyfus in France used hal-

ogen alkyls on dried soda cellulose below 100 degrees with or without suitable solvents while Lilienfeld in Austria used alkyl sulphates on aqueous soda cellulose up to 130 degrees. The development of these interesting and useful derivatives was slow during the first decade following these patents due to the World War but in the last ten years interest has grown apace. Over 1500 patents have been granted on cellulose ethers in the past decade and in 1931, as an example, over 800 papers dealt with this subject.

The general method of manufacture is the same for all these derivatives and the raw materials are simple, the only drawback being the cost of alkylating agent or rather the cost due to the large amount required as compared with the weight of cellulose. Alkali cellulose is the one component either in wet or dry state and thus wood cellulose is quite suitable for their preparation. Alkyl chlorides, bromides or iodides may be used as alkylating agents although unfortunately only the first is cheap enough and it is the least desirable owing to its greater inactivity. Ethyl and methyl sulfates may likewise be used for these lower ethers but for higher members since the sulfates are difficult to prepare alkyl sulphites may be used. (71). Alkyl p-toluene sulfonates may also serve as useful alkylating agents. (72).

The properties which make these derivatives of such extreme interest are of great variety. They dissolve readily and to a high degree in a wide range of solvents including cold water but not hot water. They have extreme permanency, stability and neutrality including especially high resistance to acids and alkalis. They are of extraordinary suppleness, flexibility, strength and toughness and yet are hard. They have a low hygroscopicity and so do not blush or fog when used as lacquers and finally they are relatively much less inflammable than any known esters. These extremely desirable properties give them a marked tendency to usurp the field of usefulness of cellulose derivatives which is only restrained on the one hand by their present higher cost and on the other by their newness and our lack of adequate information concerning them.

The three ethers which seem to have the best commercial possibilities and have received most attention are the methyl, ethyl and benzyl celluloses. Methyl and ethyl cellulose are made by two general methods employing either the alkyl chloride or the di-alkyl sulphate. In either case soda cellulose is used and may be either dried and mixed with solid caustic or have a certain amount of water present. Because of the gaseous nature of the alkyl chlorides their reaction must be carried out under pressure but the alkyl sulfates may be used in open vessels. The properties of the resulting product may be varied considerably by variation of such conditions as strength of alkali used, time of aging the soda cellulose, proportions of agents used, temperature of alkylation, etc. The wide variety of conditions and methods of alkylation are fully treated by Worden. (73). Both these ethers may be obtained in crystalline state. The trimethyl ether is more soluble in water than the tri-ethyl although both are soluble in a wide variety of organic solvents. As made commercially they are not homogeneous substances but mixtures like the esters. Many uses have been proposed for these ethers and they seem well adapted to a wide range of products. They have been used for lacquers and for rendering rayon fast to boiling (74); for plastic compositions (75); for photographic film spools (76); as a softening agent in artificial resins; and for making opaque washable playing cards. They give excellent films from benzene having 20-25 per cent greater solidity and tensile strength.

Benzyl Cellulose

This ester was first made by Gomberg and Buchler. (77).

A resumé of patent applications regarding it is given by Clement and Riviere (78). Further work on it and on the p-chlorobenzyl and 1-2-4-chlorodinitrobenzyl ethers was done by Niethammer and Koenig (79, 80). Okada (81) has described the practical methods of manufacture. Usually 4 parts of caustic to one part of cellulose are used, the alkali cellulose is aged and treated under reflux with benzyl chloride at 50-150 degrees C. The resulting ether is insoluble in water, acetone and toluene but soluble in a wide variety of other solvents. It is very stable and less inflammable than celluloid or cellulose acetate. It is highly thermoplastic and impermeable to water, having a hygroscopicity of from .5 to 1 per cent. The viscosity of its solutions is very much lower than the corresponding nitrate or acetate. It is especially suitable for lacquer and film formation.

Miscellaneous Ethers

Hydroxyethyl cellulose is formed by treating cellulose in the presence of caustic with monochlorhydrin (82). The products are distinguished by their inertness and stability toward alkalis, their durability, transparency and flexibility. They are proposed for rayon and films.

The 2-4-dinitrochlorobenzyl ether of Niethammer and Koenig (83) may be reduced and diazotized and coupled to give dyed products in which the dye is an integral part of the structure. Similar ethers are made by treating cellulose with nitroleucotrope (nitrobenzylphenyl dimethyl ammonium chloride) which may be subsequently reduced and diazotized. (84). Wedekind (85) was the first to describe this kind of alkylating agent. The distinctive feature of these dyeings is their fastness to washing although they are no faster to light than the applied dyes.

Tri-phenyl methyl cellulose has been described (86) but does not appear to have any commercial significance.

Allyl cellulose was first made by Adams and Tomecko (87) but has been the subject of intensive study by Sakurada (88). It is prepared by the action of allyl bromide on paper in 40-50 per cent caustic soda and gives di- and tri-allyl ethers. Its commercial significance, if any, is not yet apparent. Wood (89, 90, 91) has produced methylene cellulose by the action of s-dichloro-di-methyl sulphate on soda cellulose.

Mixed ester-ethers have been made in large numbers, such as cellulose boro-acetate, lauro-myristate nitrobenzoate, aceto-stearate, ethyl cellulose silicate, ethyl cellulose phenyl acetate, methyl cellulose acetates, etc. The I. G. Farbenindustrie treat cellulose ethers or esters with inorganic acid chloride in the presence of acid binding substances such as ammonia, or organic bases. (92, 93).

Nitrogen Derivatives of Cellulose

Recently research has been directed to producing cellulose derivatives containing nitrogen to impart to the fibers some of the properties of animal fibers. The so-called immunized or amidated cotton (94, 95, 96, 97, 98) is made by treating cotton with p-toluene sulfochloride in an organic solvent. Esterification on the outside of the fibers makes it resist dyeing and water although it feels and looks like ordinary cotton. When treated with ammonia or organic bases it gives amidated cotton which cannot be told from cotton even under a microscope but has an affinity for acid dyestuffs greater than wool. (99, 100). Cellulose esters of glycollic, malonic, oxalic and other acids are treated with thionyl chloride in excess of aniline and give nitrogen containing esters having an affinity for wool dyes. (101). Cellulose derivatives containing nitrogen may be made from incompletely etherified celluloses by treatment with primary or secondary amines at 150-200 degrees C. under pressure. They have an affinity for acid dyestuffs.

Cellulose thiourethanes are made by the reaction of am-

monia derivatives in which an alcohol radical is substituted for one hydrogen of the ammonia and in which one other hydrogen can be replaced by the product resulting from the action of a monohalogen fatty acid on viscose. As an example viscose is treated with chloracetic acid and the product reacted with aniline giving cellulose phenyl thiourea (102, 103, 104). This review is too brief to cover the enormous amount of work on rare derivatives of cellulose adequately, but it serves to illustrate the fact that much more may be expected of cellulose in the future than has already been done. The way points clearly to increased chemical uses of wood cellulose, especially, as well as greater development of all sources of cellulose as a raw material.

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Book on Printing Papers

An excellent book has been published by the University of Chicago Press entitled "Printing Papers" and written by William Bond Wheelwright.

This 133 page cloth-bound book containing a foreword by Dr. Otto Kress covers most of the points that are frequent subjects of dispute between paper makers, ink makers and printers. As pointed out by Dr. Kress, "If paper, ink and the mechanical components required in the pressroom operation were all manufactured under one roof, then most of the so-called printing troubles would immediately vanish."

The book is based on the articles which have been appearing serially in *Paper and Printing Digest* under the title "Paper Facts for Printers." The titles of chapters in themselves give a clear idea of the book contents. Some of these are: The Fibrous Constituents of Paper; The Physical and Chemical Properties; Atmospheric Influences Upon Paper; Typical Pressroom Troubles; The Finishes of Printing Papers; Laboratory Tests; How to Judge Paper; Thickness of Paper as Related to Function; and Chronology of Papermaking.

Good typography and fifty-six interesting illustrations make the volume highly readable and if read by all concerned with the printing and printing paper manufacture, many of the more common so-called printing troubles will be taken care of without the necessity of expensive and some times futile misunderstanding.

The approaching holiday season provides an excellent opportunity for printing paper distributors and manufacturers to place this simple and entertaining book in the hands of those individuals who can gain much by a clearer knowledge of the nature of printing problems and their solution. Copies may be obtained from the Book Department of the Technical Association of the Pulp and Paper Industry, 122 E. 42nd street, New York, at \$2 each.

May Locate Pulp Plant at Plymouth, N. C.

"The Keickhefer Container Company is considering a proposal to locate a \$1,500,000 pulp or wood pulp plant in the vicinity of Plymouth," according to the News and Observer of Raleigh, N. C.

"Resolutions have been adopted by the Chamber of Commerce and by the town and county commissioners urging the company to take the step and engineers of the Atlantic Coast Line and Norfolk Southern railways and the State Highway and Public Works Commission already have been here to estimate the cost of spur tracks and roadways to the proposed plant.

"Company officials also are holding an option on the T. S. Lucas farm, including 75 acres of cleared land.

"It is understood that the plant, which would be located on the Roanoke, Cashie and Middle rivers and cover about 50 acres, would employ from 200 to 700 workers. It would purchase pine logs from Bertie, Washington, Martin and Tyrrell counties."

Pulp and Paper Industry Literature Review

Abstracts of Articles and Patents Compiled by the Abstracts and Bibliography Committee of the Technical Association of the Pulp and Paper Industry, A. Papineau-Couture, John F. Ohlson, C. E. Peterson and Clarence J. West, Chairman

Copies of United States Patents can be obtained from the United States Patent Office, Washington, D. C., for 10 cents each. Send currency, not stamps.

Cellulose

The Microstructure of Cellulose. Geo. J. Ritter. Rayon and Melliand Textile Monthly 16:522-524, 606-608 (1935).—Data obtained by different investigators on the rate of development of the crystalline structure of cotton and wood cellulose are given. Types of abnormalities in the structure of cotton and wood fibres are described. Several types of microstructural units can be separated from cellulose fibers by chemical means, namely, the concentric layers of the cell wall fibrils, and the microscopic substructures of the fibrils, including fusiform bodies, spherical units, ellipsoids and dermatosomes. In addition, there are the submicrostructural units, crystallites and primary valence chains that have been postulated from chemical and physical data. Two concepts concerning the probable cause for the increased resistance to fibrillation of refined cellulose fibers over that of delignified unrefined fibers are discussed. Two types of dissection, depending on the stage of refinement of the fibers, are described, namely, long slender fibrils obtained from highly refined undried stock and a beading effect obtained from fibers taken from raw stock. The phenomenon observed when cellulose is examined by means of a Spierer lens is discussed. The ash residue of fibers appears to be a continuous structure, even though it constitutes less than 1% of the untreated fibers.—A. P.-C.

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Studies on Reactions Relating to Carbohydrates and Polysaccharides. L. The Chemical Identity of Cotton and Wood Cellulose. J. Barsha and Harold Hibbert. J. Am. Chem. Soc. 58:1006-1007 (June, 1936).—The difficulties encountered in effecting complete methylation of refined sulphite wood pulps from spruce and maple, by means of dimethyl sulphate and sodium hydroxide, can be overcome readily by dissolving the partially methylated products in chloroform, reprecipitating into petroleum ether and subsequent remethylation with the same reagents. Using this technic, no chemical differences can be noted in the behavior of cotton and refined wood pulps, respectively, nor in their hydrolysis products. The previous assumption of the presence of a "resistant" type of cellulose in wood pulps responsible for incomplete methylation and differing therefore from cotton cellulose does not appear to be warranted.—A.P.-C.

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X-ray Studies of Crystallite Orientation in Cellulose Fibers. II Synthetic Fibers From Bacterial Cellulose Membranes. Wayne A. Sisson. J. Phys. Chem. 40: 343-359 (1936).—Cellulose membranes, chemically identical with cotton cellulose, synthesized from sugar solution by a bacterium in the presence of a nutrient medium, were used to study the type and degree relationship between deformation and orientation. The major determining factor in both mercerized and unmercerized membranes is the relative direction and extent of the flow, or change in dimension of the sample, rather than the nature, magnitude or direction of the forces producing the flow, a rule that may be generally applicable to all cellulose materials. The crystallite possesses a major orienting tendency with reference to the *b*-axis, and a minor or selective orienting tendency with reference to the (101) plane. This point must be considered in whatever final concept of the membrane crystallite is accepted.—A.P.-C.

The Degree of Polymerisation of Cellulose in Its Application to the Characteristics of the Pulp. August Noll. Papier-Fabr. 33, No. 46:377-380, (Nov. 17, 1935).—The author discusses the degree of polymerisation of cellulose as a function of the molecular weight, the viscosity law as a basis for the determination of the molecular weight (that is, the degree of polymerisation), the logarithmic function between the molecular weight (that is, the degree of polymerisation) and the copper and xanthate viscosity, the degree of polymerisation in relation to the beating process of pulp, and practical applications.—j.f.o.

The Present State of the Determination of Oxycellulose. P. Heermann. Rayon and Melliand Textile Monthly 16:525-526, 619-620 (1935).—A general discussion of the reactions used for the identification of oxycellulose, their significance and reliability.—A.P.-C.

Methods for Determining Cellulose in Bast Plants. F. Kalmanovitch and A. Kolotireva. Rayon and Melliand Textile Monthly 17, No. 6:391-393; No. 7:462-464; No. 8:529-530 (June-August, 1936).—The authors modified the method for determining cellulose according to Kiesel and Semiganovsky and compared the results with those of the standard Cross and Bevan method. The former is based on a hydrochloric acid hydrolysis and yields somewhat higher values than the Cross and Bevan method, due to the presence of certain cover tissues which are of no value as textile materials. A preliminary alkaline extraction permits removing this tissue by washing and gives more accurate data. The advantage over the Cross and Bevan method lies in the fact that the cellulose yield is determined directly, without the necessity of deducting values for pentosans and ash. In the conducting article the advantages of the former method for quick and simple control work in practical mill operation are pointed out.—C.J.W.

Lignin

Separation of Lignosulphonic Acids Which Can be Precipitated by Amines. W. Nippe. Ber 69B, 77 a, 6:1239-1245 (June 10, 1936).—Klason's alpha-lignosulphonic acid can be separated into three fractions, the first of which is precipitated by means of sodium chloride; from the filtrate the second is separated by alpha-naphthylamine dissolved

in sulphurous acid and from this filtrate the third is precipitated by means of benzidine hydrochloride. The three acids have been purified in the form of their sodium salts and characterized by their toluenesulphonic acid derivatives. Their sodium phenolates and enolates have also been prepared.—C.J.W.

Lignin. XV. K. Freudenberg, A. Janson, E. Knopf, and A. Haag. Ber. 69B, No. 6:1415-1425 (June 10, 1936).—Potash fusion of spruce lignin at 210°, followed by methylation and oxidation, gives 10-14% of veratric acid, some veratroylformic acid and 2-4% isohemipinic acid. Since the larger part of these aromatic acids is destroyed during decomposition, the 20% accounted for forms probably only one half of the total actually present. During the preparation of the wood meal, part of the lignin is removed by extraction with benzene-alcohol and sodium hydroxide, and another part with cold formic acid. The authors call this part the "unformed" lignin, while the insoluble part, which is isolated by the cuprammonium process, is called the "formed" lignin. The amount of "unformed" lignin in beech wood is much larger than that of spruce (about 12%); the yield of "formed" lignin is about 12% for beech and 24% for spruce; the methoxyl content of the beech lignin is 21%. On potash fusion beech lignin gives gallic acid in addition to protocatechuic acid. These findings support the earlier theory that the higher methoxyl content of beech lignin is due to the presence of methylated pyrogallol groups. The authors discuss the relationship of polymerized coniferyl alcohols of other phenylpropanes, such as sulphite liquor lactone and dehydro-di-isoeugenol to lignin, the probable change of lignin during isolation, and the relationship between the various aromatic wood constituents.—C.J.W.

Study of Beech Wood Lignin. E. Wedekind and O. Müller. Ber. 69B, No. 6:1517-1521 (June 10, 1936).—Beech lignin was prepared by Freudenberg's method, the yield amounting to 10-12 per cent, calculated on the air-dry wood. Acetylation of this lignin showed the presence of 8.5 per cent hydroxyl groups. On treatment of the beech wood lignin with phenol in the presence of a trace of hydrochloric acid, a phenol condensation product was obtained, which, on methylation with dimethyl sulphate, gave a methylated phenol lignin with 31.1 per cent methoxyl.—C.J.W.

The Behavior of the Apparent Lignin During the Decomposition of Rye Straw With Bisulphite. R. S. Hilpert and A. Bolling. Ber. 69B, No. 7:1598-1601 (July 8, 1936).—Rye straw, disintegrated by means of calcium bisulphite, gives a cellulose containing 9 per cent lignin. The latter must, therefore, be present in the straw in two different forms, the one capable of being attacked by bisulphite, and the other resistant to it. Hypochlorites remove 5 per cent of this lignin, giving a white cellulose still containing 4 per cent lignin. When the bisulphite pulp is treated with caustic soda, one third of the lignin content is dissolved, and after bleaching this pulp, a white cellulose with 4 per cent lignin is obtained. The lignin in the straw must therefore consist of four chemically different portions, which is contradictory to the usual conception. The discrepancy may be explained by considering lignin a reaction product composed of sensitive carbohydrates.—C.J.W.

Highly Polymerized Compounds. 142. Lignin. Ber. 69B, No. 7:1729-1737 (July 8, 1936).—According to Freudenberg, the molecular structure of lignin is similar to other highly polymerized natural substances. Only the soluble lignin compounds can be used for the determination of the molecular weight. They are relatively low-molecular and all their properties indicate that their molecules differ from those of cellulose and similar high

polymers. No definite data can be given concerning the constitution of the insoluble lignin, apart from the fact that it must be different from that of cellulose. The specific viscosity of dilute solutions of the soluble lignins has been determined; the results indicate that lignin cannot consist of long chain molecules.—C.J.W.

Comparative Study of Lignins Obtained by Treating Different Woods With Strong Acids. S. S. Ermolaeva and M. I. Kogurova. Bumazhnaya Prom. 14, no. 12:19-25 (1935); C. A. 30:5030.—The separation of amorphous and structural lignins in the residues, obtained by treating coniferous and hardwood sawdusts with 72 per cent sulphuric acid, was effected by hydrolyzing the residues with 15 parts of 7 per cent sulphuric acid, boiling the filtrates with 10 parts of water and filtering off the precipitates. The spruce and pine lignin is composed of 0.93-2.04 per cent amorphous lignin and 99.07-97.96 per cent structural lignin, and oak and birch lignin of 52.1-56.37 and 47.9-43.63 per cent, respectively. Similar results were obtained by treating the woods with 42 per cent hydrochloric acid.—C.J.W.

Action of Carbon Disulphide and Aqueous Potassium Hydroxide Solutions on Alkali Lignin. R. L. Glover and J. W. Bain. Can. J. Research 14B:65-75 (1936).—Carbon disulphide and aqueous potassium hydroxide act on alkali lignin, forming very viscous mixtures from which colloidal, lignin-like materials containing sulphur and of high molecular weight can be isolated. The hypothesis is advanced that a lignin xanthate may be a step in a theoretical series of reactions culminating in the formation of the materials isolated. The presence and condition of the sulphur in the isolated product are discussed from the standpoint of this hypothesis.—A.P.-C.

Some Characteristics of Wood Lignins. Elwin E. Harris. J. Am. Chem. Soc. 58:894-896 (June, 1936).—The previously reported differences between maple and spruce lignins by the sulphuric acid method have been found to exist between the lignins of other hardwoods and softwoods; four other hardwoods being very similar to maple and two other softwoods very similar to spruce. On the basis of ten methoxyl groups in the fully methylated lignin, hardwood lignins isolated by the sulphuric acid method contain six and softwood five methoxyl groups. About 30 per cent of the lignin in hardwoods and 15 per cent in softwoods is removed by the action of methyl alcohol-hydrochloric acid. With both hardwoods and softwoods the part removed is methylated by about one and one-half groups and the insoluble residue is demethylated by about one group. All these fractions from both hardwoods and softwoods by either the methyl alcohol-hydrochloric acid or sulphuric acid method of isolation can be methylated by dimethyl sulphate to ten methoxyl groups. Lignins from hardwoods or softwoods lost two methoxyl groups when treated with dry chlorine.—A.P.-C.

On the Nature of Lignin. Selman A. Waksman and T. C. Cordon. J. Am. Chem. Soc. 58:969-972 (June, 1936).—From a study of the yield and chemical nature of lignin prepared from wheat straw by treatment with concentrated sulphuric acid at different temperatures, with and without preliminary treatment with dilute acid, and also of alkali lignin from the same straw, it is concluded that the hypothesis proposed by Hilpert, that lignin does not exist in plant materials but is a result of the action of the acid upon certain carbohydrates, has no foundation.—A.P.-C.

Investigations Concerning Phenol Lignin and Methoxy Glycol Lignin From Spruce Wood. Walter Fuchs. J. Am. Chem. Soc. 58:673-680 (April, 1936).—A convenient method of preparing phenol lignin has been de-

vized. Phenol lignin and methoxy glycol lignin are closely related substances and represent mixtures which may be separated into several fractions, which were characterized by chemical and physical determination and shown by potentiometric titrations to be still mixtures of several compounds. On fusing with alkali both phenol lignin and methoxy glycol lignin give rise to protocatechuic acid and para-oxybenzoic acid. On oxidizing with nitric acid both lignins give rise to picric acid and benzene carboxylic acids. A. formula is given representing an ideal substance to which all chemical experiences collected in the investigation of spruce lignin may be traced and from which possibilities of further experimental work may be derived.—A.P.-C.

Lignin and Related Compounds. XXII. Fractionation of Methanol Lignin. Jack Compton, Margaret Greig and Harold Hibbert. *Can. J. Research* 14B:115-119 (1936).—Preparation of methanol lignin by the method of Brauns and Hibbert on a larger scale than that employed previously has disclosed the presence of a second fraction, soluble in ether-dioxane. The original methanol lignin and this new fraction are obtained in a pure state by fractionation with dioxane and benzene. The former has been shown to correspond to the methanol lignin from which the Brauns and Hibbert formula, $C_{42}H_{32}(OCH_3)_6(OH)_4$, was derived. The benzene-dioxane-soluble fraction has been methylated and acetylated and shown to have a different composition, the ratio of methoxyl to hydroxyl groups being 5:3.—A.P.-C.

The Chemistry of Australian Timbers. V. A Study of the Lignin Determination. (3). W. E. Cohen, Australian Council Sci. Ind. Research, Pamphlet No. 62, 30 p. (1936).—Extraction with organic solvents such as ether, alcohol-benzene, and alcohol, may cause errors in the lignin determination by the fixation of easily hydrolyzable furfural-yielding substances which produce insoluble residues on treatment with 72 per cent sulphuric acid. It is suggested that the solvents react or combine with these substances and that evaporation of the solvent by oven-drying the extracted wood may be largely responsible for the reaction. It is recommended that alcohol extraction be applied in all cases because it has a greater solvent action on extraneous materials. In connection with recently published statements that aldoses (particularly xylose) form lignin-like residues when treated with cold 72 per cent sulphuric acid, it is shown that the methoxyl and furfural distributions are related to the yield of lignin residue. Mild hydrolysis by boiling 3 per cent sulphuric acid eliminates furfural-yielding substances, and reduces methoxyl values and lignin residue to a constant minimum, and it is suggested that the true lignin content is then revealed. Sodium hydroxide (0.5 per cent) does not completely dissolve these substances, and the lignin yields are therefore too high; on the other hand the alkali does dissolve a small quantity of lignin which, however, may be precipitated if the alkaline extract is acidified. When acetic acid is used all furfural-yielding substances are not removed, and a similar result is obtained after pre-treatment with 3 per cent sodium sulphite which, however, does not show any apparent action on real lignin. Sodium sulphite readily dissolves the kino-like substances in eucalypt woods. The method of calculating lignin contents from lignin-methoxyl values probably gives values which are too high, because some of the lignin-methoxyl accounted for as lignin really belongs to the insoluble residues produced by furfural-yielding substances.—A.P.-C.

Studies on the Quantitative Estimation of Lignin. I. Factors Affecting the Determination by the Fuming Hydrochloric Acid Method. M. J. Goss and Max Phillips. *J. Assoc. Official Agr. Chem.* 19:341-350 (May 15, 1936).

—A study of the fuming hydrochloric acid method to determine the optimum conditions of carrying out the determination. Hydrolysis of the substances associated with the lignin, by boiling with dilute hydrochloric acid after treatment with fuming acid, is complete after 1 hr. of boiling, and the amount of lignin recovered is not appreciably affected by prolonging the boiling up to 10 hrs. Humine-like compounds that may be formed under certain conditions of treatment with fuming acid are not hydrolyzed by boiling with dilute acid, and are therefore counted as "lignin." The optimum temperature of action of fuming hydrochloric acid is 8° to 20° V., some of the non-lignin substances remaining unhydrolyzed at lower or higher temperatures. Treatment with fuming hydrochloric acid must be carried out for 1 to 24 hrs. to ensure hydrolysis of substances associated with lignin, and hydrochloric acid gas must be passed through the fuming acid for at least 2 hrs., longer periods having no appreciable effect on the results. A detailed description is given of the method revised to incorporate these findings.—A.P.-C.

Studies on the Quantitative Estimation of Lignin. II. A Comparison of the Modified Fuming Hydrochloric Acid Method and Other Methods Commonly Used. Max Phillips and M. J. Goss. *J. Assoc. Official Agr. Chem.* 19:350-356 (May 15, 1936).—A comparison was made between the percentages of lignin found in three different samples of wheat straw and spruce wood that had received the following preliminary treatments: (1) extracted with alcohol-benzene mixture, (2) extracted with alcohol-benzene followed by hot water, (3) extracted successively with alcohol-benzene, hot water and 1 per cent hydrochloric acid. The lignin determinations were made by: (a) the modified fuming hydrochloric acid method (preceding abstract), (b) the Schwalbe method, (c) the modified U. S. Forest Products Laboratory method, and (d) the Peterson, Walde and Hixon modification of the 72 per cent sulphuric acid method. With all four methods the percentages of lignin obtained decreased in proportion to the extent of the preliminary treatment of the sample. The difference between the percentages of lignin in samples extracted as in (1) and (3), respectively, was greatest by method (d), followed in turn by (c), (b), and (a). The results show that, unless the plant material is first extracted as in (3) erroneous lignin values are obtained. The per cent of lignin found by (a) is in all probability a closer approximation to the true lignin content of the plant material than is that found by the other three methods.—A.P.-C.

Microdetermination of Lignin. A. J. Bailey. *Mikrochemie* 19:98-107 (1936); *C. A.* 30:4433.—About three mg. of sample, prepared by careful reduction with a fine cabinet-maker's rasp, is treated with two drops of 40 per cent formaldehyde and 65.5 mg. of 72 per cent sulphuric acid. After standing 10 minutes, 110.5 mg. of concentrated sulphuric acid is added and the mixture stirred frequently. After the sample has all dissolved, seven drops of chloroform-acetic acid (1:6) is added and the solution diluted and mixed with four ml. of water. The chloroform is driven off on a water bath and the residue filtered off and weighed on platinum sponge. The lignin content of various samples of fir, hemlock and spruce woods are given, which shows that the method is good. 48 references.—C.J.W.

A New Lignin Reaction. O. v. Schickh. *Angew. Chem.* 49, No. 23:362 (June 6, 1936).—It is found that 2, 6-diaminopyridine dissolved in 18-36 per cent hydrochloric acid will give a blood red color with groundwood paper. Technical lignin, cellulose, cotton and paper free from lignin do not give this reaction.—C.J.W.

The Micro-Determination of Lignin. A. J. Bailey. *Microchimie* 19:98-107 (1936).—This is a modification of the Ross and Potter method of lignin determination in order to reduce it to a micro-procedure. The sample is moistened with 40 per cent formaldehyde and then mixed with 72 per cent sulphuric acid; finally concentrated sulphuric acid is added until solution is complete. A chloroform-glacial acetic acid reagent is stirred in, water is added, and the mixture stirred well. The chloroform is driven off on a water bath, the lignin filtered on a tared platinum Gooch crucible and washed with hydrochloric acid. The lignin is dried at 130° C., then burned and the crucible reweighed. The loss in weight represents the lignin. 48 references.—C.J.W.

Raw Materials

The Origin and Development of Cultivated Plants. A. B. Stout. *PAPER TRADE J.* 102, No. 26:38-42 (June 25, 1936); *Tech. Assoc. Papers* 19:309-313 (June, 1936).—An address—A.P.-C.

Structure of the Middle Lamella. A. J. Bailey. *Paper Industry* 18:379-381 (Aug., 1936).—The results of experimental work on the structure of the middle lamella are reported. Digestion similar to commercial practice, except for a lower temperature, did not completely dissolve the middle lamella. Definite resistant segments in the lamella of Douglas fir were found which resisted solution by cooking liquor but which were dissolved by sodium hypochlorite. New morphological features, hiatus in the secondary wall of the summerwood tracheids of Douglas fir, accompanied by segmented lamella, the end of the lamella segments coinciding with the hiatus, were discovered and studied, and are illustrated by means of microphotographs.—A.P.-C.

A Study of Variation in Density of Pulpwood. J. D. Hale and J. B. Prince. *Pulp Paper Mag. Can.* 37:458-459 (July, 1936).—A brief description of the progress made in the investigation of the Forest products Laboratories of Canada on the variation of density of spruce and balsam pulpwoods.—A.P.-C.

Wood Measurement and Wood Yield. J. H. Böhmer. *Papir-J.* 24, No. 9: 89-92; No. 10:101-103; No. 11:115-118 (May 15, 31, June 15, 1936).—The deficiencies of different methods in use for measuring the volume of woods are discussed. Possible errors are pointed out and illustrated by examples. Emphasis is placed upon the facts that the cross section of a tree trunk is practically speaking never a circle, always more or less an ellipse, that the percentage of compression wood varies in the different sections of the same trunk, that no uniform practice exists with regard to measuring wood inclusive or exclusive of the bark and bast, etc. In conclusion, reference is made to wood yield studies carried out with different conifers, trees from different locations, and yields obtained from different sections of the same tree. The results are tabulated. The entire article refers exclusively to Norwegian conditions.—C.J.W.

Wood Measurement and Wood Yield. Ove Haslund. *Papir-J.* 24, No. 14:152-154 (July 31, 1936).—A polemic against the above article by Böhmer.—C.J.W.

Concerning Pulp Wood. Rudolf Sieber. *Papier-Fabr.* 34, No. 5; 33-36, (Feb. 2, 1936).—From data on previous investigations on specific volume; the author has plotted curves; on the percentage shrinkage vs. the moisture content of the wood; the specific heat of the wood vs. the water content, and the amount of wood necessary to put in a digester to obtain certain yields. Many examples of practical problems are solved by formulas derived from the curves.—J.F.O.

Chemical Studies on Woods. III. Compositions of the

Chief Conifers From Manchuria. Kitsuji Nishida, Hideo Hashima and Tokuchi Fukamizu. *Cellulose Ind. (Tokyo)* 12:48-52 (1936).—The compositions of 11 samples of *Taxus cuspidata* S. and Z., *Larix dahurica* Turcz., *Pinus koraiensis* S. and Z., *Picea obovata* Ledeb., *P. koraiensis* Nakai, *Abies hodophylla* Max. and *A. nephrolepis* Max., grown in various districts in Manchuria are tabulated.—A.P.-C.

Viscose Pulp and Pulp Woods. VIII. Composition and Cooking Test of Manchurian Fir (Abies Nephrolepis, Maxim). M. Shikata and K. Tadokoro. *J. Agr. Chem. Soc. Japan* 11:925-930 (1935).—This tree is inferior to Manchurian spruce as a viscose pulp wood, but by the calcium magnesium bisulphite method it yields a pulp which can be used as a viscose pulp.—A.P.-C.

Alkaline Processes

Remarks Concerning La Mont Installations in Soda Recovery Plants. G. Edling. *Svensk Pappers-Tidn.* 39, No. 7:114-119 (April 15, 1936).—This is a discussion of the dry substance and fuel value of black liquor, the efficiency of rotaries and disk evaporators, the advantages of installing La Mont systems in soda recovery plants, and the cost and operating safety of such installations. The La Mont system consists essentially of a steam producing surface composed of small pipes and inserted between the rotary and the evaporator and is claimed to result in an improved heat economy for the entire recovery plant. Graphs of two Swedish installations help to illustrate the system.—C.J.W.

Effect of the Kind of Wood (Pinus Silvestris and Picea Exelsa) on the quality of pulp for cable papers. V. A. Grabovskii and V. V. Yakimanskii. *Tsentral. Nauch.-Issledovatel. Inst. Bumazhnoi Prom. Materialui* 1935, No. 2:3-15; *C. A.* 30:5030.—Spruce and pine and mixts. of 75 per cent spruce and 25 per cent pine and equal parts of spruce and pine were charged in a 25 liter autoclave in separate containers and pulped with 4 volumes of solution (50 per cent black liquor of a definite composition), containing 74.5 sodium hydroxide, 18 sodium sulphide and 7.5 per cent sodium hydroxide (calculated as sodium oxide), at 174° for one and two hours (total heating 4 hours and 40 minutes to 5 hours) with blowings at 100° and 135°. The pulp yields were 41.4-43.2 per cent for spruce, 39.4-43.1 per cent for pine and 40-45 per cent for the mixed charge. Pine is more difficultly pulped than spruce, giving 1-1.5 per cent lower yields (because of the greater density of pine the yield per unit of the autoclave capacity is greater). The chemical constants of the two pulps are similar. The mechanical properties of pine pulp are higher than those of spruce. Sulphate pulps of spruce and pine or their mixtures can be used for the production of cable papers, though under equal conditions of pulping pine gives a harder product than does spruce.—C.J.W.

Pulp From Reeds. Hung-Yuan Chang and Teh-Hui Chang. *J. Chem. Eng. (China)* 3:43-46 (1936); *C. A.* 30:4665.—In the utilization of reeds for the manufacture of paper pulp the cost of the alkali is the dominating factor. The authors' experiments indicate that under commercial conditions recovery as high as 80-90 per cent can be easily achieved. For optimum operation a two-stage digestion process is preferred; first with one per cent caustic liquor at 110° for three hours and then with five per cent liquor at 165° for eight hours. A liquor composition with 40 per cent sodium sulphate shows beneficial effects. The pulp is easily bleached in all cases. The two-stage process has the additional advantage that black liquors from the final digestion can be used for primary digestion.—C.J.W.

Use of Wastes of Common-Flax Straw and Cotton in Paper Industry. M. Ya. Robinov. Tzentr. Nauch.-Issledovatel. Inst. Bumazhnoi Prom. Materialui 1935, no. 1:203-223; C. A. 30:5033.—The results of laboratory and large-scale sulphate and soda pulping of discarded common-flax straw, and "swing-turbine" and cotton wastes are discussed. Flax-straw waste freed from the chaff gives better results with 45.4-63.6 per cent of unbleached stuff in the laboratory and 41.8-44.9 per cent in factory pulping, depending on the conditions of processing. The "swing-turbine" flax waste gives a mean yield of 76.6 per cent in laboratory and 62 per cent in factory pulping. The yield of bleached stock was not determined. The consumption of active alkali (computed as sodium oxide) for flax straw in the factory cooking is 12.1-15 per cent, for "swing-turbine" waste 9.45 per cent and for cotton waste 7.2 per cent. The consumption of active chlorine in the mill is 3-6 per cent, depending on the pulping conditions. The combined bleaching (i. e., treating with weak alkalin solution at room temperature in the first stage) with an intermediate washing with warm water or dilute alkaline solution gives better results and reduces the consumption of active chlorine. For all these products the total time of stage cooking, with 4 atmospheres pressure during the active stage of pulping, is 12-13.5 hours. By the usual method of cooking as a working pressure of 4.75-5.3 atmospheres, the digestion is effected in 5-6 hours. The maximum temperature is 147-50°. These pulps can be substituted for rag halfstuff in the composition of high-grade rag papers. Though the mechanical properties of these papers are inferior to the paper containing in its composition a corresponding amount of linen, they are within the permissible limits of variation. The technical properties of these papers conform to the standard of corresponding grades of paper but are slightly contaminated with uncooked particles of chaffy materials and straw. Because of the comparatively large consumption of alkalies in the pulping of chaffy flax materials and of the advantages of sulphate method as compared with the soda cooking, the chemical reworking of these materials should be accompanied by an effective system of recovery.—C.J.W.

Some Timely Problems of Chemical Wood Utilization. K. E. Neumann. Papier-Fabr. 33, No. 30:249-254 (July 28, 1935).—The author reviews the present status of the following problems on which the Wood Research Institute at Eberswalde is working: the utilization of home-grown pine in the newsprint industry as a substitute for imported Scandinavian spruce, the recovery of rosin from old pine stumps with simultaneous utilization of the extracted wood chips for board manufacture, and the recovery of tanning agents from German trees and their bark, such as spruce, oak and willow.—C.J.W.

Production of Sudakov Halfstuff in Paper Industry. B. G. Milov. Bumazhnaya Prom. 15, no. 1:46-61 (1936); C. A. 30:5034.—A report of achievements of the past five years in the production of pulp and various grades of paper by the Sudakov method of reworking waste leafy woods.—C.J.W.

Industrial Evolution of the Chlorine Process for Cellulose. History and Future Prospects. U. Pomilio. Chim. E. L'Ind 18:6-13 (1936).—The author's process is described. Plant and results obtained originally in South America and recently in Italy (principally using straw) are described. Advantages are continuity of operation and elimination of incrustants and degradation of the cellulose.—A.P.-C.

Treatment of Lignocellulosic Material. Henry Dreyfus. U. S. pat. 2,047,314 (July 14, 1936).—Wood chips

are cooked with at least 25 times their weight of caustic soda, as a solution of 0.5 per cent to 4 per cent concentration, at high temperature (100° to 150°C.) and under a pressure higher than that of the alkaline solution at the temperature used. It is then treated in the cold and at atmospheric pressure with a more concentrated alkaline solution, and is finally bleached.—A.P.-C.

Modern Trends in the Manufacture of Kraft Pulp and Paper. R. M. Radsch. Paper Trade J. 103, No. 1:117-118 (July 2, 1936).—A brief outline.—A.P.-C.

Production of Rayon Pulp from Straw. Patentverwertung Dr. Martin Gunther. Fr. pat. 96,491.—Straw is cooked for 2 hrs. under a pressure of 4 to 10 atmospheres with spent liquor from the final boiling of a previous batch. The liquid is drained and the mass is steamed for from one to two hours under a pressure of 4 to 10 atmospheres. The condensate is removed and the mass is cooked for about 4 hrs. with a 4 per cent caustic soda solution under a pressure of 4 to 10 atmospheres. The pulp is bleached and requires a much lower bleach consumption than pulp produced by the usual processes.—A.P.-C.

The Distribution of Blow Heat in Alkaline Pulping. George H. Tomlinson and H. K. Collinge. Tech. Assoc. Papers 19:325-327 (June 1936); Paper Trade J. 103, No. 3:28-30 (July 16, 1936).—A heat balance of the blow heat at the Windsor Mills, Quebec, kraft mill of Howard Smith Paper Mills, Ltd., is presented and briefly discussed, indicating that, with some proposed modifications, the heat losses should not exceed about 15 per cent.—A.P.-C.

Influence of sulphide, carbon dioxide and sulphurous acid liquors on the cooking of straw pulp. K. A. Dolgoff. Zellstoff u. Papier, 16, No. 6:217-218 (June, 1936).—The results obtained from cooking straw by seven different methods are discussed. The conditions of the cooks are first given. Lowering the temperature from 155°C to 140°C gave a considerable increase in yield and also was easier to bleach. Sodium sulphite is the most active chemical for separating the straw into its single fibers.—J.F.O.

Black Liquors

Uses of Talloil. Tech. Bull. Paper Makers Assoc. Gt. Britain, Ireland 13, no. 8:109 (August, 1936).—Talloyl, a byproduct of the soda and sulphate processes, consists of resin and fatty acids, which are dissolved during the cooking process and gradually form a scum on the surface of the liquor. When skimmed off and treated with dilute sulphuric acid, crude talloyl is obtained, which, at this stage, is a dark colored and rather unpleasant smelling mixture. The refined product is manufactured into hard and semi-hard soaps which have good lathering and emulsifying properties, the main difficulty being the smell. This is said to have been masked successfully in recent tests. Other possible uses of talloyl include asphaltic and other emulsions, fruit tree sprays, varnishes for outdoor use, etc.—C.J.W.

Manufacture of Activated Carbon. R. G. W. Farnell. Brit. pat. 435,345, (Sept. 1, 1934).—The black-ash residue obtained in the digestion of esparto grass with alkali is dried, bleached with water until the pH is reduced to 9 or 10, heated at 700° to 1000° C. with stirring, preferably in an atmosphere of steam, sprayed with dilute hydrochloric or phosphoric acid, cooled, washed with water, and heated in air at 400° to 500° C.—A.P.-C.

Process and Apparatus for Evaporating Spent Pulp-ling Liquors. Hugh K. Moore, assignor to Brown Co. U. S. pat. 2,044,095 (June 16, 1936).—In a multiple-effect evaporating system the liquor from the last stage is exhausted into a tank maintained at a lower pressure, resulting in further evaporation by formation of "flash" steam and separation of dissolved solids.—A.P.-C.

Sulphur Process

Mitscherlich and the German Pulp Industry. D. Kruger. *Zellstoff u. Papier*, 16, No. 6:213-15 (June, 1936).—Discussion of the patents and research work done by Mitscherlich relating to the pulp industry.—J.F.O.

Apparatus for Producing Sulphite Liquor. Gustaf Haglund, assignor to Patentaktiebolaget Gröndal-Ramen. U. S. pat. 2,047,628 (July 14, 1936).—In a system for the preparation of sulphite liquor by passing sulphur dioxide countercurrent to milk of lime through a series of reaction chambers, means are provided for: (1) circulating the milk of lime through each separate chamber as many times and at such velocity as may be required, and (2) regulating or adjusting the supply of liquid from one chamber to another.—A.P.-C.

Manufacture of Bisulphite Liquor. Alvah L. Miller and George M. Darby, assignors to the Dorr Co., Inc. U. S. pat. 2,042,477 (June 2, 1936).—Raw sulphite liquor is produced by bubbling a gas containing over 10 per cent of sulphur dioxide through an excess of a slurry containing 1 part of 325-mesh limestone to 7.5 parts of water, separating the unreacted limestone from the liquor, and returning it into the cycle.—A.P.-C.

Production of Bisulphite Liquor. Alvah L. Miller, Ralph W. Shafor and George M. Darby, assignors to The Dorr Co., Inc. U. S. pat. 2,042,478 (June 2, 1936).—A slurry of finely pulverized limestone and water is passed through an absorbing tower with a gas containing sulphur dioxide wherein the sulphur dioxide is incompletely absorbed. The mixture is passed into an agitating tank held at a substantially constant definite temperature until chemical equilibrium has been substantially reached.—A.P.-C.

Apparatus for Producing Sulphur Dioxide From Sulphur Ores, etc. Harold O. C. Ingraham, assignor to General Chemical Co. U. S. pat. 2,030,021 (Feb. 4, 1936).—A suspension of finely divided material, such as iron or zinc sulphide fines, in an oxidizing gas, such as air, is introduced into an inlet at one end of a reaction chamber having a discharge opening adjacent a wall forming the opposite end of the chamber so that the solid materials are separated from reacted gases, and a connection is provided near the outlet end for introducing supplemental oxidizing gas into the reaction chamber, reacted gases being caused to flow through a chamber surrounding the reaction chamber and in contact with the outer walls of the latter.—A.P.-C.

Uncondensed Gases in Sulphite Cooking. O. Routala and O. Yli-Jama. *Finnish Paper and Timber J.* 18, special issue: 342-344, 346-348, 350-351 (April, 1936).—The relief gases escaping with steam from an autoclave or mill digester consist chiefly of sulphur dioxide, carbon dioxide and nitrogen. The amount of escaped nitrogen corresponds very closely to the amount of nitrogen in the air present in the digester before cooking. The amount of oxygen in the air can no longer be detected in the relief gas, at least not in its free state. Carbon dioxide is formed at the average rate of 1.63 per cent by weight of the cellulose present and seems to be in some relationship to the lime content of the cooking acid. It is quite probable that the carbon dioxide is derived from the aldonic acids observed by Hägglund in sulphite waste liquor. During the initial cooking stage (up to 100°C.) the gas contains about 85 per cent by volume of sulphur dioxide; when the temperature rises above 100°C., the chips are entirely saturated, their air content being deprived of the nitrogen, the oxygen having disappeared at the beginning of the cook. Throughout the actual and final cooking process, the sulphur dioxide content of the gas mixture increases in volume per cent, the partial pressure reaching a maximum at about

115° C. and 3.5 atmospheres, after which it begins to fall. The concentration and partial pressure of the carbon dioxide remains constant during the entire cooking process, reaching the maximum value (13 per cent) at the highest temperature before the final blowing. On the basis of the results obtained, the author makes the following suggestions: After the chips have been fully saturated during the initial cooking stage, it is advantageous to prepare space for the gases in the full digester by withdrawing some of the cooking liquor, and discontinuing the steam supply. The gas is then collecting in the top of the digester; it consists for the most part of useless constituents, such as nitrogen and carbon dioxide, which reduce the pressure of the sulphur dioxide. They may now be removed from the digester. The interruption in the steam feed and in the circulation of the digester should preferably take place at a temperature between 105 and 110° C.—C.J.W.

Impregnation of Chips With Acid and Acid and Gas Circulation. G. Soltau. *Svensk Pappers-Tidn.* 39, No. 11:202-203 (June 15, 1936).—The article discusses three recent publications by Kreissler, Samson and Bergson and points out some of the contradictions in them.—C.J.W.

A Survey of Pitch Troubles in the Manufacture and Use of Sulphite Pulp. Otto Kress and Lamar A. Moss. *Tech. Assoc. Papers* 19:186-187 (June, 1936); *Paper Trade J.* 102; No. 25:38-59 (June 18, 1936).—A critical survey was made of the literature relating to pitch trouble and the remedies proposed, with a bibliography of 103 references. A pitchy pulp was developed in the laboratory which behaved in a manner similar to the behavior of pitchy pulp in the mill, and the remedies and alleviations of pitch troubles proposed in the literature were studied in the laboratory, using as pitchy pulp the material prepared in the laboratory.—A.P.-C.

How Can Pitch be Avoided in Sulphite Pulp Manufacture? Verein Zellstoff-u. Papier-Chem. u.-Ing., *Jahresbericht 1934:71-73*; *Tech. Bull. Paper Makers' Assoc. Gt. Britain Ireland* 13, no. 5:71; no. 6:86 (May, June, 1936).—This is a discussion of several theories of which constituent of wood resin is responsible for the formation of pitch in sulphite pulp. The removal of the resin from the pulp has always been a problem. Its solution can be considered from two points of view: (a) to bring the resin in solution during cooking, which can only be solved by adopting a different cooking procedure and involves, naturally, many difficulties, and (b) to convert the resin into a form which is innocuous to the paper maker. Various experiments have been made to oxidize the resin. A number of patents have been obtained for the treatment of the resin in the wood or in the pulp, but the fact that they have not been widely adopted is probably due to the extra cost of chemicals, etc., which they demand. Remaining suggestions are: addition of alum to pulp before beating in order to fix the pitch to the fibers, or a similar use of an emulsifying agent; addition of caustic soda to the beater and, on completion of the beating, neutralization with alum.—C.J.W.

Combating Resin Difficulties in the Papermaking Machines of the "Sokol" Mill. K. V. Khodakov. *Tsentral. Nauch-Issledovatel. Inst. Bumazhnoi Prom. Materialui* 1935, no. 2:106-134; *C. A.* 30:5036.—Studies of the causes of "injurious resinification" in the process of sulphite pulping and its effect on the quality of resulting paper confirm the results of Konopatzkii (*Tech. Section* 99:118). Contrary to his results, a preliminary deresinification of wood by steaming showed no improvement. A settling tank for the removal of impurities from cooking acid is illustrated and described.—C.J.W.

Miscellaneous

Activities of the Italian Experimental Station During 1935. C. Levi. *Ind. Carta* 3, no. 2: 50-58 (Feb., 1936).—A report is presented by the director of the experimental station describing the activities of the institution during 1935.—C.J.W.

Early Facts About Paper Making. J. Vestergren. *Svensk Pappers-Tidn.* 39, no. 2: 15-17; no. 8: 141-147 (Jan. 31, April 30, 1936).—A brief illustrated historical account is given of early Chinese and Japanese paper making methods.—C.J. W.

The Historical Mission of Paper. Viktor Thiel. *Wochbl. Papierfabr.* 66, Special Number: 3-6 (Dec., 1935).—The story of paper from the time the Chinese first used it until the present day.—J.F.O.

Why 88:100 Per Cent Pulp. Charbula. *Wochbl. Papierfabr.* 67, No. 11: 208-09 (March 4, 1936).—In Germany, Austria and Italy, air dry pulp is 88 per cent while in United States, England, France and other countries air dry pulp is 90 per cent. The author would like to simplify the buying and selling of pulp by making all calculations on the absolute dry basis.—J.F.O.

Report Concerning the Leipzig Spring Fair of 1936. Technical Exhibits of the Leipzig Fair. *Wochbl. Papierfabr.* 67, No. 10: 190-93 (Mar. 7, 1936).—A short description of the fair, in particular the paper exhibits. Technical apparatus relating to the paper industry is described in the second article.—J.F.O.

For Reduction of Corrosion Losses. A. R. McAllister. *Paper Mill* 58, No. 46: 11, 13 (Nov. 16, 1935).—A brief discussion of the use of alloy steels in pulp and paper making for reducing losses due to corrosion.—A.P.-C.

Heavy Chemicals in the Paper Industry. H. Rawlinson. *Paper Maker* 91: TS23-27 (Feb., 1936).—An outline of the development of modern chemical industry as it affects those products of interest to the paper maker.—A.P.-C.

Instruments for Automatic Control of Pulp, Paper and Power. H. M. Schmitt. *Paper Mill* 58, No. 35: 15-17, 21 (Aug. 31, 1935).—A brief description of some instruments specifically designed to make automatic control possible at important processing stages in pulp, paper and power departments of the mill.—A.P.-C.

Uniformity Attained with Control Equipment. A. H. Stanton. *Paper Mill* 58, No. 34: 30, 32 (Aug. 24, 1935).—An outline of a few control equipment applications, indicating the extent to which the equipment manufacturer can assist in the solution of production control problems throughout the mill.—A.P.-C.

Proper Control—What It Means to Paper Makers. John F. Inderdohnen. *Paper Mill* 58, No. 37: 18, 21 (Sept. 14, 1935).—A brief outline of the extent to which instrumentation is used in controlling pulp and paper manufacturing processes.—A.P.-C.

Air Conditioning in Paper Mills. A. Galbraith. *Paper Maker* 90: TS166-169 (Nov., 1935).—A description of a modern air-conditioning plant for automatically maintaining air at a given temperature and humidity irrespective of outside conditions, and of the application of the system in the paper mill of Hoffmann & Engelmann A. G., Neustadt.—A.P.-C.

Automatic Control of Processes in Pulp and Paper Making. Sidney E. Meyers. *Paper Mill* 58, No. 34: 9, 11, 13 (Aug. 24, 1935).—A brief discussion of the various steps at which scientific control may be effectively applied to the processes of manufacturing pulp and paper.—A.P.-C.

Air Conditioning and Moisture Control. H. G. Rappolt. *Paper Mill* 58, No. 42: 9-13 (Oct. 19, 1935).—A

general discussion of the necessity and importance of air conditioning for controlling moisture content of paper at the paper machine, at the calenders, in the coating mill, in the finishing room, and for paper testing, with a brief description of the principle of the direct expansion type and of the air washer type of air conditioner.

Pulp and Paper Manufacturing Developments. Fred-eric C. Clark. *Paper Trade J.* 102, No. 14: 39-41 (April 2, 1936).—A brief outline indicating the more important developments during 1935, with bibliography of 28 refer-ences.—A.P.-C.

United States Patents on Paper Making. First Quar-ter, 1936. Clarence J. West. *Paper Trade J.* 102, No. 16: 33-35 (April 16, 1936).—A list in numerical sequence of patents relating to pulp and paper making issued at Washington during Jan., Feb. and March, 1936.—A.P.-C.

Relationship of Management to Technology. A. Byron Hunicke. *Paper Trade J.* 102, No. 18: 34-36 (April 30, 1936).—A general discussion.—A.P.-C.

Prevention of Accidents in Paper Mills. L. C. Mc-Nair. *Paper Maker* 91: TS11-16 (Jan., 1936).—A de-scription of a number of serious paper mill accidents with suggestions for their prevention and proposed rules relat-ing to the fencing of paper machines.—A.P.-C.

St. Anne's Board Mills, Bristol. Anon. *World's Paper Trade Rev.* 105: 336-354, 408-422 (Jan. 31, 1936).—A description of the mill and its equipment.—A.P.-C.

Semi-Plant Pulp Laboratories Included in New University of Washington Chemistry Building. Ken-neth A. Kobe. *Pacific Pulp & Paper Ind.* 9, No. 12: 11-13 (Dec., 1935).—A brief description of the new chemistry building of the University of Washington, and more particularly of facilities for pulp and paper research.—A.P.-C.

Future of Pulp and Paper Mill Waste. L. F. War-rick and J. M. Holderby. *Paper Mill* 58, No. 49: 15-17; No. 50: 18-22 (Dec. 7, 14, 1935).—A brief review of the general situation from the standpoint of stream pollution, outlining developments with particular reference to activi-ties in Wisconsin and presenting suggestions as to the future of pulp and paper mill wastes.—A.P.-C.

Education for the Pulp and Paper Mill Workers. J. N. Stephenson. *Pulp Paper Mag. Can.* 37: 149-150, 180, 182 (Feb., 1936).—A brief discussion of the advisability of encouraging employees to study so as to better fit them-selves for their present jobs and fit themselves to assume more responsible and better remunerated positions.—A.P.-C.

Improved Pulp and Paper Quality Through Incentives. Sanford E. Thompson. *Paper Trade J.* 102, No. 12: 39-43 (March 19, 1936).—A discussion of general principles involved in paper and pulp mill incentives, with illustrations of successful practice.—A.P.-C.

Process for Preventing the Growth of Microorgan-isms, Especially Mold Fungus in the Manufacture of Textiles and Wood Treating Industries. Voinvienti Osuusliike Valio, Helsingfors. *Nor. pat.* 55,449 (Nov. 23, 1933).—The material is treated with halogenized com-pounds, especially mercury compounds of chlorinated naphthalene.—J.F.O.

Fighting the Formation of Algae by Chlorinating the White Water. R. M. Pawlinowa. *Zellstoff u. Papier* 16, No. 4: 136-37 (April, 1936).—The author experi-mented with chlorine gas for preventing the formation of algae in a paper mill. Different amounts of chlorine gas were used until it was found out that 5 to 10 milligrams active chlorine per liter of white water was most suitable.—J.F.O.

Delaware Valley Discusses Microscopy

The Delaware Valley Section of the Technical Association of the Pulp and Paper Industry met at the Engineers Club, Philadelphia, Friday evening, November 27. H. C. Schwalbe, presided as chairman.

Dr. Schwartz Discusses Microscopic Technique

The first speaker was Prof. E. P. Schwartz of the Massachusetts Institute of Technology who talked on "Microscopical Investigation as an Aid to Research." Dr. Schwartz first showed a number of photographs in which the stroboscope was used to make a moving object appear to be standing still. This was followed by a number of stereoscopic pictures showing three dimension effects and is excellent for studying embossing and other relief objects. A number of microtones was also shown.

A photomicrograph of a ramie fiber was shown. This fiber is one of the most perfect in structure and consequently not of value in textile or paper making. The speaker showed how it is possible to relate the microscopic image to the properties of the finished product. Many suggestions regarding microscope technique were given.

Dr. Georgi on Cellulose Structure

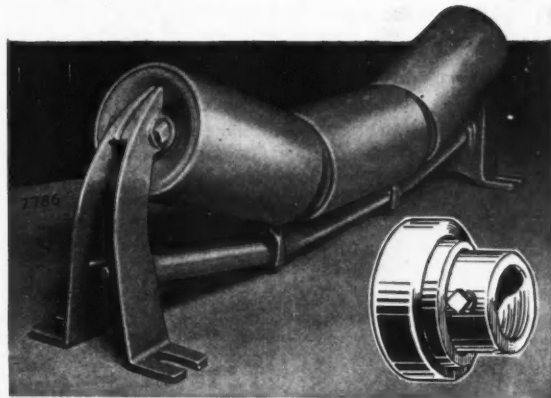
The second speaker was Dr. E. A. Georgi of the Hercules Powder Company Experimental Station who talked on the "Microscopy of the Cotton Cellulose Fiber." In this lecture Dr. Georgi reviewed the work of a number of investigators and pointed out why a number of recently offered theories of fiber cell structure was unsubstantiated and will require much more research before the true concept can be discovered.

Among those present were: C. A. Shubert, Dill & Collins Inc., Philadelphia; C. M. Dann, Krebs Pigment and Color Corporation, Newport, Del.; Leslie Justice, Valley Forge Laboratories, W. Conshohocken, Pa.; W. Y. Irwin Jr., Congoleum Nairn Inc., Cedarhurst, Md.; Sidney Hausman, Congoleum Nairn Inc., Cedarhurst, Md.; H. B. Preble, Congoleum Nairn Inc., Cedarhurst, Md.; E. A. Georgi, Hercules Powder Company, Wilmington, Del.; R. G. Macdonald, Secretary of TAPPI, New York; C. M. Connor, Valley Forge Laboratories, Conshohocken; G. L. Schwartz, Du Pont Experimental Station, Wilmington; C. E. Kinney, Hercules Powder Company, Wilmington; D. Manson Sutherland Jr., Trenton, N. J.; H. L. Becher, Agasote Millboard Company, Trenton, N. J.; S. M. Bratton, Pusey & Jones Corporation, Wilmington; E. F. Anderton, Scott Paper Company, Chester, Pa.; A. E. Waugh, U. S. Rubber Products Inc., Philadelphia; A. McInnes Jr., Pusey & Jones Corporation, Wilmington; M. C. Maxwell, McDowell Paper Mills, Manayunk, Pa.; R. W. Ball, Krebs Pigment and Color Corporation, Newport, Del.; A. Schnabel, Mazer Paper Mills, Lansdowne, Pa.; A. W. Aron, Mazer Paper Mills, Lansdowne; F. H. Steele, Pennsylvania Salt Manufacturing Company, Philadelphia; C. G. Albert, Edgar Brothers Company, Metuchen, N. J.; G. J. Lane, Edgar Brothers Company, Metuchen, N. J.; L. F. Derr, Goulds Pumps Inc., Philadelphia; H. F. Hoffman, General Dyestuff Corporation, Philadelphia; W. C. Jay, Sanitary Products Corporation, Philadelphia; A. A. Coffin, Titanium Pigment Corporation, New York; R. W. Kummer, Bennett Inc., Wilmington, Del.; J. M. Chesnutt, McDowell Paper Mills, Manayunk; S. D. Reynolds, Container Corporation of America, Manayunk; Jacob Edge, Downingtown Manufacturing Company, Downingtown, Pa.; W. E. Brow Container Corporation of America,

Manayunk; J. F. Halladay, Container Corporation of America, Manayunk; W. D. Harrison, Riegel Paper Corporation, Milford, N. J.; E. R. Feicht, Container Corporation of America, Manayunk; A. R. Shelander, E. Walpole, Mass.; G. E. Landt, Continental Diamond Fibre Company, Bridgeport, Pa.; F. J. McAndrews, McDowell Paper Mills, Manayunk; A. J. Arsenault, Continental Paper and Bag Corporation, York Haven, Pa.; E. J. Albert, Thwing-Albert Instrument Company, Philadelphia; G. B. Martin, General Dyestuff Corporation, Philadelphia; R. M. Bates, T. M. Royal & Co., Philadelphia; M. D. Reuben, Continental Paper and Bag Corporation, York Haven, Pa.; W. O. Emenheiser, Continental Paper and Bag Corporation, York Haven, Pa.; H. C. Speel, Atlas Powder Company, Wilmington; G. J. King, Atlas Powder Company, Wilmington; Paul Hodges, Scott Paper Company, Chester, Pa.; J. H. Fritz, National Oil Products Company, Harrison, N. J.; C. W. Rivise, Caesar & Rivise, Philadelphia.

Truss Frame Belt Conveyor Carrier

A new "truss-frame", sealed ball bearing, belt conveyor carrier, that is "light, strong and comparatively inexpensive", has recently been announced by Stephens-Adamson Manufacturing Company of Aurora, Ill. This carrier is of the 3-roll in line design with outer rollers inclined to give the belt a 20° trough. The whole roller



TRUSS FRAME BELT CONVEYOR CARRIER

assembly is tilted to center the belt without guide rollers and particular effort has been made to produce a carrier that would minimize wear and tear on the conveyor belt.

All parts are made of steel and malleable iron. The rollers are built of 5 inch diameter steel tubing with ends smoothly rounded over the pressed steel end plates to prevent any tendency to fray the belt. Roller ends are recessed to house the bearings and allow rollers to be closely spaced to eliminate danger of pinching belts. Renewable, cartridge type ball-bearings are used throughout. Each bearing has been packed with grease and sealed at the factory and should be good for several years of operation before attention is necessary.

The unique truss type frame appears to be unusually light and rigid, with the load carried by a tension rod instead of depending upon the stiffness of a heavy cross member for support. It is built in sizes from 18 inch to 48 inch wide belts.

Dorr Co. Announces Acquisition of ADKA Saveall

A distinctly new type of whitewater saveall, known as the Adka, and invented by Adolf Karlstrom, a Swedish engineer, is now being manufactured and sold in the United States and Canada by the Dorr Company, Inc., Engineers, 570 Lexington Avenue, New York City. The Adka saveall differs materially in theory and appearance from other whitewater savealls commonly used in North America—namely the screen, sedimentation and filter types. By means of a novel method of first aerating the white water and later reducing the air pressure over its surface, the fiber and filler are caused to float, buoyed up by air bubbles, and are removed by a suction pipe.

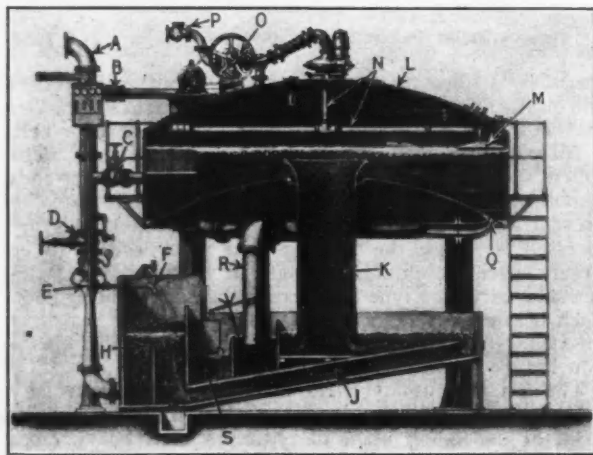
About 146 Units in Operation

Since 1927, when the first Adka installation was made, about 146 units have been put into commercial operation in Europe, Mexico and South America. At this writing, which marks the initial offering of the Adka in this country by the Dorr Company, there is one unit in use in the United States, and another in process of erection. The Adka saveall is thus a fully-developed and demonstrated unit, although to date its use in this country has been limited.

Advantages

The chief advantages of the Adka saveall are:

1. The recovered stock is returned direct to the feed end of the paper machine and consequently has the same value as the sheet at that stage of production—say \$50 per ton.
2. The stock is returned to the paper machine direct without causing variations in the basis weight of the sheet. The consequent elimination of retreatment in beaters, jordanans, etc., insures against loss in fiber length.
3. Color and furnish may be changed at will, without emptying and cleaning the saveall.
4. Clarified whitewater normally contains from 0.03 lbs. to 0.2 lbs. of solids per 1000 gallons, giving overall stock recoveries ranging up to 95-99 per cent, depending upon the stock content of the whitewater. The clarified water is clear enough to use almost anywhere instead of fresh water.



ADKA SAVEALL

5. The use of "sweetening" stock, to promote clarification, is unnecessary.

Method of Operation

Referring to the accompanying sectional view of the Adka saveall, operation is as follows:

White water is delivered to the Adka through pipe A. The small quantities of paper making chemicals used for flocculation are introduced at E and air is induced into the whitewater through pipe F, after which the water is discharged into the conditioning "box" H.

Compartments H and J of the box are provided to allow the undissolved air to escape and also to condition and flocculate the relatively short fibers and filler. On leaving the de-aerating duct J the conditioned white water travels up through tube K, into the evacuated tank L.

Due to the constantly decreasing pressure on the water rising in the draft tube K, minute air bubbles are released and become attached to the flocculated fiber and filler. Upon discharge from the draft tube into the "tank" L, the water is completely conditioned so that the paper stock rises to the surface and forms a layer which is easily removed by the suction nozzle M, as it sweeps along the surface in a circular path at the inner periphery of the tank.

Nozzle M is attached to a section of piping N connected with the wet vacuum pump O, which discharges the pulp directly to the paper machine. In addition to removing the constant volume of recovered stock, the vacuum pump also removes sufficient air to maintain a constant vacuum and water level in the tank.

The clarified water is discharged through four outlets, as at Q, which lead into a central discharge pipe R. Upon discharging from this type it can be reused through the connection S.

Commercial Sizes

The Adka Saveall is furnished complete, ready for erection and installation, with all necessary auxiliaries. There are nine standard sizes ranging from 8 ft. in diameter to 21 ft. 6 in. Corresponding capacities range from 100 to 1100 gallons per minute.

Operating Results

The first Adka saveall to be installed in the United States is that at the Thilmany Pulp and Paper Company, Kaukauna, Wis. This unit is a Number 45, Adka, 15 feet in diameter, with a capacity of 500 gallons per minute.

Interesting results have been obtained on this at Kaukauna. The feed to the unit is the average of the tray water, suction water and wet trim from a machine making sulphite furnishing waxing stock. It contained an average of 4 pounds of stock per 1,000 gallons and was fed at the rate of 450 gallons per minute. Under these conditions, the effluent was 390 gallons per minute and contained from 0.03 to 0.10 pounds of suspended solids per 1000 gallons, giving a recovery of 99.4 cent.

Descriptive Literature

The Dorr Company has just published a booklet describing and illustrating this new unit, complete with color diagrams showing its connection with the paper machine under several different conditions. This booklet will be sent on request to the company.



IMPORTS OF PAPER AND PAPER STOCK

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING NOVEMBER 28, 1936

CIGARETTE PAPER

Champagne Products Corp., *Normandie*, Havre, 309 cs.; Champagne Products Corp., *American Trader*, Havre, 61 cs.; De Mauduit Paper Corp., *American Trader*, Havre, 175 cs.; Standard Products Corp., *American Trader*, Havre, 23 cs.; Irving Trust Co., *American Trader*, Havre, 5 cs.

WALLPAPER.

F. J. Emmerich, *Hansa*, Hamburg, 17 bls., 6 cs.; ———, *Deutschland*, Hamburg, 11 cs.; ———, *Deutschland*, Bremen, 22 cs.

WALLBOARD

Treetex Corp., *Vingaren*, Gothenburg, 670 bdls.; ———, *Vingaren*, Gothenburg, 324 bdls.

NEWSPRINT

Parsons & Whittemore, Inc., *Vingaren* Gothenburg, 162 rolls; Perkins Goodwin & Co., *Hansa*, Hamburg, 886 rolls; N. Y. Post, *Rigel*, Port Alfred, 1624 rolls; Gilman Paper Co., *Rigel*, Port Alfred, 134 rolls; Perkins Goodwin & Co., *Deutschland*, Hamburg, 703 rolls; Jay Madden Corp., *Deutschland*, Bremen, 330 rolls; ———, *Binnendyk*, Rotterdam, 340 rolls.

PRINTING PAPER

Senefelder Co., Inc., *Hansa*, Hamburg, 13 cs.; Senefelder Co. Inc., *Deutschland*, Hamburg, 1 cs.; E. Dietzgen Co., *Deutschland*, Hamburg, 49 cs.; L. A. Consmiller, *Deutschland*, Bremen, 11 cs.; F. L. Kramer & Co., *American Trader*, London, 3 cs.

WRAPPING PAPER

Guaranty Trust Co., *Vingaren*, Gothenburg, 90 rolls; H. Reeve Angel & Co. Inc., *Westernland*, Antwerp, 2 cs.; ———, *Pr. Roosevelt*, Hamburg, 451 rolls; Globe Shipping Co., *Deutschland*, Hamburg, 107 rolls; American Express Co., *J. Jadot*, Antwerp, 2 cs.

FILTER PAPER

———, *Hansa*, Hamburg, 337 rolls; H. Reeve Angel & Co. Inc., *Berengaria*, Southampton, 5 cs.; E. Fougere & Co., *Berengaria*, Southampton, 87 cs.; ———, *Deutschland*, Hamburg, 4 cs.; H. Reeve Angel & Co. Inc., *American Trader*, London, 17 cs.

FILTER COMPOUND

A. W. Fenton, Co., *Hansa*, Hamburg, 100 bls.

DRAWING PAPER

Lansen Naeve Corp., *Deutschland*, Bremen, 3 cs.; Devoe & Reynolds Co., *American Trader*, Havre, 2 cs.; Saentis, Inc., *Binnendyk*, Rotterdam, 2 cs.

SURFACE COATED PAPER

Gevaert Co. of America, *E. Francqui*, Antwerp, 19 cs.; Globe Shipping Co., *Hansa*, Hamburg, 65 crates; Gevaert Co. of America, *Westernland*, Antwerp, 34 cs.; Globe Shipping Co., *Deutschland*, Bremen, 97 crates.

METAL COATED PAPER

K. Pauli Co., *Hansa*, Hamburg, 21 cs.; K. Pauli Co., *Deutschland*, Bremen, 30 cs.

BASIC PAPER

Globe Shipping Co., *Deutschland*, Bremen, 52 crates, 54 cases.

WRITING PAPER

Japan Paper Co., *American Trader*, London, 9 cs.

PHOTO PAPER

Medo Photo-Supply Co., *Berengaria*, Southampton, 2 cs.

COLORED PAPER

D. C. Andrews & Co., *Hansa*, Hamburg, 20 cs.; Fuchs & Lang Manfg. Co., *Deutschland*, Hamburg, 11 cs.

DECALCOMANIAS

Sellers Transportation Co., *Hansa*, Hamburg, 4 cs.; ———, *Hansa*, Hamburg, 2 cs.; Sellers Transportation Co., *Deutschland*, Hamburg, 20 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., *Samaria*, Liverpool, 56 cs. (duplex).

TISSUE PAPER

Atlantic F'd'g. Co., *Hansa*, Hamburg, 20 cs.; F. C. Strype, *Samaria*, Liverpool, 5 cs.; J. Romer, *Nagara Maru*, Osaka, 9 cs.

BOWL PAPER

Hurley Johnson Co., *American Shipper*, Liverpool, 10 bls.

IMITATION OPALINE

F. C. Strype, *Leerdam*, Rotterdam, 88 rolls.

STRAW BOARDS

———, *Leerdam*, Rotterdam, 70 rolls.

PAPER TUBES

———, *Hansa*, Hamburg, 165 pkgs.; ———, *Deutschland*, Hamburg, 126 pkgs.

CARD BOARD

American Express Co., *Hansa*, Hamburg, 50 cs.; ———, *Pr. Roosevelt*, Hamburg, 9 cs.

MISCELLANEOUS PAPER

Nevins Church Press, *Vingaren*, Gothenburg, 10 bls.; ———, *Vingaren*, Gothenburg, 189 rolls, 44 bls.; H. Reeve Angel & Co. Inc., *Vingaren*, Gothenburg, 146 cs. 28 rolls, 106 bls.; International F'd'g. Co., *E. Francqui*, Antwerp, 4 cs.; C. H. Asche Co., *E. Francqui*, Antwerp, 4 cs.; Keller Dorian Paper Co., *Normandie*, Havre, 20 cs.; ———, *Komaki Maru*, Kobe, 39 cs.; Keuffel & Esser Co., *Deutschland*, Hamburg, 16 rolls, 21 cs.; Jay Madden Corp., *Deutschland*, Hamburg, 55 bdls., 1 cs.

RAGS, BAGGINGS, ETC.

———, *Laura C.*, Trieste, 270 bls. rags; Manufacturers Trust Co. *Laura C.*, Naples, 73 bls. rags; Royal Manfg. Co., *E. Francqui*, Antwerp, 32 bls. cotton waste; ———, *Ilstein*, Antwerp, 91 bls. rags, 119 bls. bagging; D. M. Hicks, Inc., *Ilstein*, Antwerp, 107, bls. flax pulp; ———, *Exeter*, Alexandria, 130 bls. rags, 100 bls. bagging;

Irving Trust Co., *Exeter*, Alexandria, 41 bls. rags, 63 bls. bagging; Castle & Overton, Inc., *Exeter*, Alexandria, 192 bls. rags; R. Blank, *Exeter*, Alexandria, 30 bls. old cottons; W. Steck & Co., *Exeter*, Alexandria, 212 bls. rags, 225 bls. bagging; Banco Coml. Italiana Trust Co., *Exeter*, Alexandria, 109 bls. garments; E. J. Keller Co. Inc., *Exeter*, 336 bls. bagging; ———, *Westernland*, Antwerp, 118 bls. bagging; ———, *American Shipper*, Manchester, 158 bls. rags, 30 bls. bagging; M. Snedeker Corp., *American Shipper*, Belfast, 40 bls. paper stock; E. J. Keller Co. Inc., *Pr. Roosevelt*, ———, 243 bls. paper stock; E. J. Keller Co. Inc., *Komaki Maru*, ———, 400 bls. paper stock; G. M. Graves Co. Inc., *Caledonia*, Glasgow, 286 bls. paper stock; Darmstadt Scott & Courtney, *Exmoor*, Piraeus, 140 bls. old jute, 174 bls. paper stock; ———, *Pilsudski*, Gdynia, 49 bls. rags; J. J. Ryan & Sons, Inc., *Nagara Maru*, Osaka, 100 bls. cotton waste; Darmstadt Scott & Courtney, *Binnendyk*, Rotterdam, 8 bls. bagging; Great Eastern Packing & Paperstock Corp., *Binnendyk*, Rotterdam, 72 bls. bagging; E. J. Keller Co. Inc., *Potter*, ———, 56 bls. paper stock; E. J. Keller Co. Inc., *Western Prince*, ———, 205 bls. paper stock; E. J. Keller Co. Inc., *Black Hawk*, ———, 120 bls. bagging, 259 bls. paper stock; E. J. Keller Co. Inc., *Black Condor*, ———, 75 bls. paper stock; Hicks Costarino Co. Inc., *Sarcoxie*, Havre, 197 bls. rags; Stone Klous & Co., *Sarcoxie*, Havre, 12 bls. rags; R. Blank, *Sarcoxie*, Havre, 173 bls. rags; R. Blank, *Sarcoxie*, Havre, 183 bls. linsey garments, 50 bls. fustians; Irving Trust Co., *Sarcoxie*, Havre, 26 bls. rags; W. Steck & Co., *Sarcoxie*, Havre, 87 bls. rags; Katzenstein & Keene, Inc., *Sarcoxie*, Havre, 91 bls. rags; Banco, Coml. Italiana Trust Co., *Sarcoxie*, Havre, 57 bls. rags; ———, *Sarcoxie*, Havre, 209 bls. rags; Castle & Overton, Inc., *Sarcoxie*, Havre, 78 bls. rags, 172 bls. bagging, 76 bls. new cuttings; E. J. Keller Co. Inc., *Sarcoxie*, ———, 101 bls. paper stock; J. Eisenberg, *Sarcoxie*, Dunkirk, 37 bls. rags; ———, *Sarcoxie*, Dunkirk, 39 bls. rags; Castle & Overton, Inc., *Sarcoxie*, Dunkirk, 9 bls. new cuttings; Loumar Textile By Products Co., *Sarcoxie*, Dunkirk, 76 bls. bagging; Darmstadt Scott & Courtney, *Sarcoxie*, Dunkirk, 8 bls. thread waste.

GLUE STOCK, ETC.

Eastman Kodak Co., *Samaria*, Liverpool, 364 bags hide cuttings; ———, *J. Jadot*, Antwerp, 140 bls. hide cuttings; ———, *Deutschland*, Hamburg, 175 bags bone glue.

OLD ROPE

Chase National Bank, *American Trader*, London, 46 coils.

CASEIN

Balfour Guthrie & Co., *Navemar*, Buenos Ayres, 833 bags.

CHINA CLAY

J. Dixon Crucible Co., *Hansa*, Hamburg, 1000 bags.

WOOD PULP

Perkins Goodwin & Co., *Vingaren*, Gothenburg, 279 bls. sulphate, 30 bls. sulphite; Gottesman & Co. Inc., *Vingaren*, Gothenburg, 2400 bls. sulphate, 300 bls. sulphite; Price & Pierce, Ltd., *Vingaren*, Gothenburg, 500 bls. unbleached sulphite; Bulkley Dunton & Co., *Vingaren*, ———, 1200 bls. sulphate; Pagel Horton & Co. Inc., *Norefjord*, Sikea, 150 bls. sulphite; Bulkley Dunton & Co., *Norefjord*, ———, 750 bls. wood pulp; Perkins Goodwin & Co., *Norefjord*, Wifstavarf, 1050 bls. sulphate, 600 bls. sulphite; Gottesman & Co. Inc., *Norefjord*, Wifstavarf, 1500 bls. sulphite; Gottesman & Co. Inc., *Norefjord*, Hernosand, 750 bls. kraft pulp; Bulkley Dunton & Co., *Gonzenheim*, ———, 125 bls. sulphite; Pagel Horton & Co. Inc., *Gonzenheim*, Gefle, 625 bls. sulphite, 2245 bls. sulphate; Stora Kopparberg Corp., *Gonzenheim*, Gefle, 1060 bls. wood pulp; Gottesman & Co. Inc., *Gonzenheim*, Hernosand, 2100 bls. kraft pulp; Price & Pierce, Ltd., *Gonzenheim*, Hernos-

and, 3000 bls. unbleached kraft pulp; M. Sone, *Laura C*, Trieste, 1342 bls. wood pulp; M. Sone, *Hansa*, Hamburg, 543 bls. wood pulp 85 tons; Castle & Overton, Inc., *Hansa*, Hamburg, 1425 bls. wood pulp 285 tons; Perkins Goodwin & Co., *Kentucky*, Gothenburg, 272 bls. sulphate; Pulp Specialties, Inc., *Kentucky*, Gothenburg, 131 bls. sulphate; Bankers Trust Co., *Kentucky*, Gothenburg, 148 bls. sulphite; D. M. Hicks, Inc., *Kentucky*, Gothenburg, 300 bls. sulphite; Trademans Nat'l. Bank Trust Co., *Consul Olsson*, Norrsundet, 1750 bls. sulphate, 381 tons; Price & Pierce, Ltd., *Consul Olsson*, Sweden, 900 bls. unbleached sulphite; Price & Pierce, Ltd., *Consul Olsson*, Hernosand, 15000 bls. unbleached kraft pulp; Price & Pierce, Ltd. *Consul Olsson*, Hernosand, 600 bls. mechanical pulp; E. M. Sargeant Pulp & Chemical Co., *Consul Olsson*, Hernosand, 300 bls. sulphite; Irving Trust Co., *Deutschland*, Bremen, 450 bls. mechanical pulp 76 tons; Gottesman & Co. Inc., *Anten*, Sweden, 3600 bls. wood pulp.

WOOD PULP BOARDS

Salwen Paper Co., *Vingaren*, Gothenburg, 33 bls.; ———, *Hansa*, Hamburg, 430 bls.

ALBANY IMPORTS

WEEK ENDING NOVEMBER 28, 1936

Pagel Horton & Co. Inc., *Norefjord*, Sikea, 7200 bls. sulphite; Bulkley Dunton & Co., *Norefjord*, ———, 2125 bls. sulphite; Gottesman & Co. Inc., *Norefjord*, Hudiksvall, 625 bls. sulphite; Perkins Goodwin & Co., *Norefjord*, Wifstavarf, 600 bls. sulphite; Bank of N. Y. Trust Co., *Norefjord*, Hernosand, 3000 bls. sulphate; ———, *Norefjord*, Hernosand, 3750 bls. sulphite; Central Hanover Bank Trust Co., *Norefjord*, Hernosand, 3000 bls. sulphite; National City Bank, *Norefjord*, Hernosand, 3000 bls. sulphite; ———, *Gonzenheim*, Norrsundet, 5625 bls. sulphate; Price & Pierce, Ltd., *Gonzenheim*, Gefle, 600 bls. bleached sulphite; Stora Kopparberg Corp., *Gonzenheim*, Gefle, 680 bls. wood pulp; Pagel Horton & Co. Inc., *Gonzenheim*, Gefle, 1750 bls. sulphate, 25,625 bls. sulphite; Gottesman & Co. Inc., *Gonzenheim*, Gefle, 2000 bls. sulphite; Bulkley Dunton & Co., *Gonzenheim*, ———, 4125 bls. wood pulp; Bank of N. Y. Trust Co., *Gonzenheim*, Hernosand, 3000 bls. kraft pulp; E. M. Sargeant Pulp & Chemical Co., *Kentucky*, Gothenburg, 718 bls. kraft soda pulp; Price & Pierce Ltd., *Taiwan*, ———, 2100 bls. bleached sulphite, 1800 bls. unbleached sulphite.

BOSTON IMPORTS

WEEK ENDING NOVEMBER 28, 1936

E. J. Keller Co. Inc., *Exeter*, ———, 93 bls. rags; ———, *Exeter*, Alexandria, 46 bls. rags; True & McClelland Co., *Exeter*, Marseilles, 38 bls. rags; ———, *Samaria*, Liverpool, 390 bags hide cuttings; G. F. Malcolm, Inc., *Samaria*, Liverpool, 13 cs. tissue paper; ———, *Leerdam*, Rotterdam, 17 bls. rags. 64 rolls straw boards; Royal Manfg. Co., *Sarcoxie*, Dunkirk, 44 bls. cotton, waste; ———, *Sarcoxie*, Dunkirk, 180 bls. paper stock; M. Sone, *Hagen*, Hamburg, 386 bls. wood pulp; Buckley Dunton & Co., *Stureholm*, ———, 1320 bls. wood pulp; E. J. Keller Co. Inc., *Satartia*, ———, 34 bls. paper stock.

CAMDEN IMPORTS

WEEK ENDING NOVEMBER 28, 1936

Price & Pierce, Ltd., *Consul Olsson*, Wallvik, 3000 bls. sulphate 500 tons.

PHILADELPHIA IMPORTS

WEEK ENDING NOVEMBER 28, 1936

Pagel Horton & Co. Inc., *Stureholm*, Sweden, 500 bls. wood pulp; Bulkley Dunton & Co., *Dalhem*, ———, 750 bls. wood pulp.

(Continued on page 52)

THE DRAPER FELTS

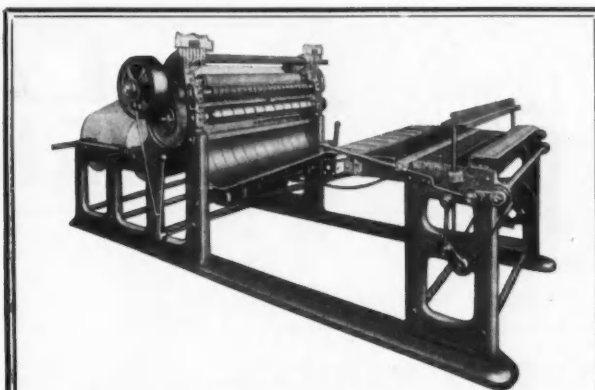
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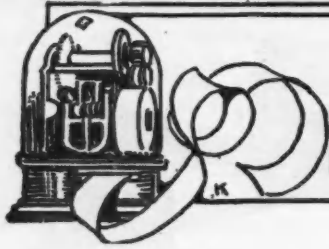
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LATEST MARKET REVIEW

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, December 2, 1936.

Sentiment in the local paper market continues to improve. Demand for the various grades of paper is well sustained. Sales forces of the leading paper organizations are exceptionally busy. Due to higher manufacturing and labor costs prices are firmer, in most instances.

The newsprint paper market is exhibiting a stronger undertone than for some time past. Demand from the newspaper publishers is brisk and manufacturing operations in the United States, Canada and Newfoundland have been speeded up to take care of the increased consumption.

Trading in the fine paper market is brisk. Book, cover, bond and ledger papers are moving in good volume. No further price changes have been reported since the recent advance on coated and uncoated book papers. The coarse paper market is displaying strength. Demand for box board is fairly active.

Mechanical Pulp

The ground wood pulp market is showing signs of improvement. Production in the United States, Canada and abroad is proceeding in sufficient volume to take care of current requirements, although accumulations are not excessive. Quotations on both domestic and foreign mechanical pulp are firmer.

Chemical Pulp

Business in the chemical pulp market is more active than for many years past. Demand for the various domestic and foreign grades is brisk. Bleachable grades of unbleached sulphite pulp are attracting more interest from the paper mills. The price situation is steady to firm.

Old Rope and Bagging

The position of the old rope market is practically unchanged. Demand for domestic and imported old manila rope is moderately active. Small mixed rope is moving slowly. Old rope prices are steady. The bagging market is strong. Scrap and gunny bagging are in excellent request. Prices are firm.

Rags

Conditions in the domestic rag market are fairly satisfactory. Demand for new and old cotton rags is well sustained. Offerings of No. 1 white shirt cuttings are limited. With the prevailing request for home and export account persistent, quotations are decidedly firm. Roofing grades continue steady.

Waste Paper

The local paper stock market is fairly buoyant. Board mill demand for the lower grades of waste paper is holding up well. Quotations on strictly folded news and No. 1 mixed paper are firm. The higher grades of paper stock

are little changed. Prices are generally holding to formerly quoted levels.

Twine

Steadiness prevails in the local twine market. Demand for the various varieties is well sustained. Supplies are moving into consumption in heavy volume and trading is expected to continue lively until after the holiday season, at least. Quotations on both hard and soft fiber twines continue firm.

IMPORTS OF PAPER AND PAPER STOCK

(Continued from page 50)

BALTIMORE IMPORTS

WEEK ENDING NOVEMBER 28, 1936

—, *Laura C*, Trieste, 2906 bls. wood pulp; Pagel Horton & Co. Inc., *Tennessee*, Sweden, 12983 bls. wood pulp; Pagel Horton & Co. Inc., *Dalhem*, Sweden, 1500 bls. wood pulp; Bulkley Dunton & Co., *Maasdam*, —, 344 bls. wood pulp; Bulkley Dunton & Co., *Tortugas*, —, 4210 bls. wood pulp; Bulkley Dunton & Co., *Tennessee*, —, 375 bls. wood pulp; Gottesman & Co. Inc., *Tennessee*, Sweden, 950 bls. wood pulp.

NORFOLK IMPORTS

WEEK ENDING NOVEMBER 28, 1936

Gottesman & Co. Inc., *Tortugas*, Sweden, 2750 bls. wood pulp; Price & Pierce, Ltd., *Tortugas*, —, 6720 bls. unbleached sulphite.

NEW ORLEANS IMPORTS

WEEK ENDING NOVEMBER 28, 1936

W. Steck & Co., *Binnendyk*, Rotterdam, 198 coils old rope.

MONTREAL IMPORTS

WEEK ENDING NOVEMBER 28, 1936

Price & Pierce, Ltd., *Fagerstrand*, —, 4500 bls. unbleached sulphite.

Imperial Paper Co. Has Good Year

[FROM OUR REGULAR CORRESPONDENT]

HUDSON FALLS, N. Y., November 30, 1936—In an address here before business men, Karl R. McBride, president of the Imperial Paper and Color Corporation, stated that during the past year the company experienced one of the greatest in its history. He believes that the good common sense cooperation existing in the plant is responsible alone for the present growth of the organization and he added that he was satisfied with the present organization as it is today. Among others at the meeting were A. S. Frasier, general superintendent; Harvey Morrisson, sales manager of the wall paper division; George Mellen, comptroller; John Gollen, of the studio research division, and L. N. Towne, superintendent of the color division.

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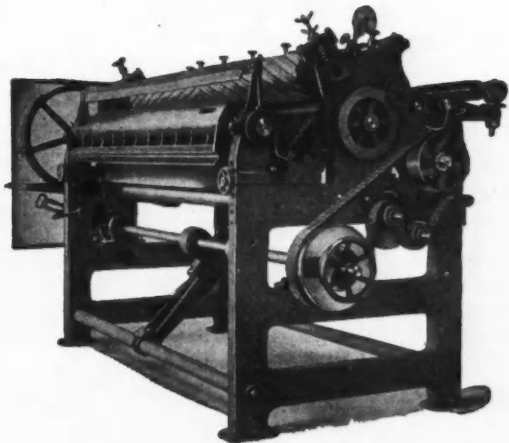
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Miscellaneous Markets

Office of the PAPER TRADE JOURNAL, Wednesday, December 2, 1936.

BLANC FIXE—Steadiness prevails in the blanc fixe market. Prices are holding to formerly quoted levels. The pulp is offered at from \$42.50 to \$45 per ton, in bulk; while the powder is selling at from 3 1/2 to 3 3/4 cents per pound, in barrels, at works.

BLEACHING POWDER—The position of the bleaching powder market is practically unchanged. Shipments against contract are moving with regularity. Prices are steady. Bleaching powder is quoted at from \$2 to \$2.25 per 100 pounds, in drums, at works.

CASEIN—The casein market continues firm. Domestic standard ground is quoted at 17 and finely ground at 17 1/2 cents; while French and Argentine standard ground are selling at 17 and finely ground at 17 1/2 cents per pound, all in bags, car lot quantities.

CAUSTIC SODA—Business in the caustic soda market is fairly active. The contract movement is normal. Solid caustic soda is still quoted at from \$2.55 to \$2.60; while the flake and ground are selling at from \$2.95 to \$3 per 100 pounds, in drums, at works.

CHINA CLAY—The china clay market is displaying strength. Prices are holding to schedule. Imported china clay is quoted at from \$13 to \$21 per ton, ship side; while domestic paper making clay is selling at from \$6.50 to \$12 per ton, at works.

CHLORINE—Paper mill demand for chlorine is fairly persistent. Shipments against contract are moving into consumption freely. Prices are generally well maintained. Chlorine is quoted at from \$2.15 to \$2.25 per 100 pounds, in car lots, at works.

ROSIN—The rosin market is firm. Paper making gum rosin is now quoted at \$7.85 and wood rosin at \$7.75 per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent rosin size is selling at \$3.60 per 100 pounds, in tank cars, at works.

SALT CAKE—Conditions in the salt cake market are satisfactory. Prices are steady and unchanged. Salt cake is quoted at from \$12 to \$13; chrome salt cake at from \$11 to \$12 per ton, at works; while imported salt cake is selling at from \$12 to \$13 per ton, ship side.

SODA ASH—The soda ash market is moderately active. Contract shipments are moving in good volume. Prices are steady. Quotations on soda ash, in car lots, at works, per 100 pounds, are as follows: in bulk, \$1.05; in bags, \$1.20; and in barrels, \$1.50.

STARCH—No radical changes transpired in the starch market. Demand is moderately active. The contract movement is well up to average. Special paper making starch is quoted at \$4 per 100 pounds, in bags; and at \$4.27 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA—The sulphate of alumina market is exhibiting a strong undertone. Contract shipments are normal. Commercial grades are quoted at from \$1.35 to \$1.60; while iron free is selling at from \$2 to \$2.25 per 100 pounds, in barrels, at works.

SULPHUR—The sulphur market is steady. Yearly contracts are quoted at \$18 per long ton, on orders of 1,000 tons, or over, and \$20 on smaller quantities. On spot and near by car loads, the quotation is \$21 per ton. All quotations are in car lots, at works.

TALC—Supplies of talc are moving into consumption in good volume for the season. Prices are holding to schedule. Domestic talc is quoted at from \$16 to \$18 per ton, at eastern mines; while imported talc is selling at from \$23 to \$30 per ton, on dock.

Market Quotations

Paper

Table listing Paper Rag Content Bond & Ledgers—Delivered Zone 1 with columns for Bonds, Rag Ext. No., and Ledgers.

Domestic Rags

Table listing Domestic Rags (Prices to Mill f. o. b. N. Y.) including Shirt Cuttings, New Rags, and O. D. Khaki Cuttings.

Sulphite Bond & Ledgers—Delivered Zone 1

Table listing Sulphite Bond & Ledgers—Delivered Zone 1 with columns for Bonds, Sulphite, and Ledgers.

Table listing various Paper products including Book, B Grade, Cased, Tissues, Fibre Papers, and News, per ton.

Table listing Mechanical Pulp (On Dock, Atlantic Ports) including No. 1 Imported, Dry, and Chemical Pulp.

Table listing Chemical Pulp (On Dock, Atlantic, Gulf and West Coast Ports) including Bleached Sulphite and Prime Qualities.

Table listing Bleached Sulphite (Domestic and Foreign) and Prime Qualities with various class and standard specifications.

Table listing Sulphate of Alumina and Sulphur products including Kraft Bleached, Kraft Light & Strong, and Soda Bleached.

Add 60 cents per short ton, dock charges, for Albany; \$2.00 for Lake Ports East and \$3.00 for Lake Ports West of Mackinac Straits.

Old Rags

Table listing Old Rags including White, No. 1, Repacked, White, No. 2, and Roofing Rags.

Foreign Rags

Table listing Foreign Rags (New Rags) including New Dark Cuttings, New Mixed Cuttings, New Light Silesias, and New Light Prints.

Old Rags

Table listing Old Rags including No. 1 White Linens, No. 2 White Linens, No. 3 White Linens, and Extra Light Prints.

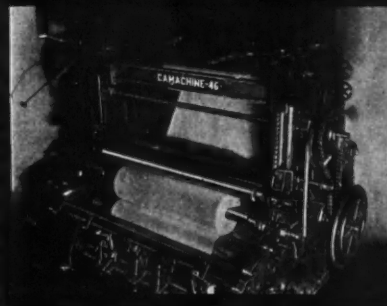
Old Rope and Bagging

Table listing Old Rope and Bagging (Prices to Mill f. o. b. N. Y.) including Gunny No. 1, Foreign, Domestic, and Jute Strings.

Old Waste Papers

Table listing Old Waste Papers (F. o. b. New York) including Shavings, White Envelope, Ordinary Hard, and Hard White No. 1.

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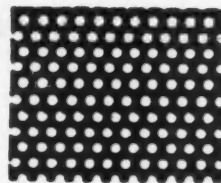
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ESTABLISHED 1872

SIXTY-FIFTH YEAR

THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY AND THE PIONEER PUBLICATION IN ITS FIELD

Published Every Thursday by the LOCKWOOD TRADE JOURNAL CO., Inc.

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Every ounce you are able to reduce the pressure in your dryers the better off you are. And the one practical way to do that is to deliver your sheet to the dryer with less moisture in it.

All of which is the same as saying that you should adopt the felt that will do the best job of extracting ahead of the dryer—adopt certain numbers from the Orr line particularly suited to your requirements.

The line is complete and felting specialists are quickly available.

THE ORR FELT AND BLANKET COMPANY

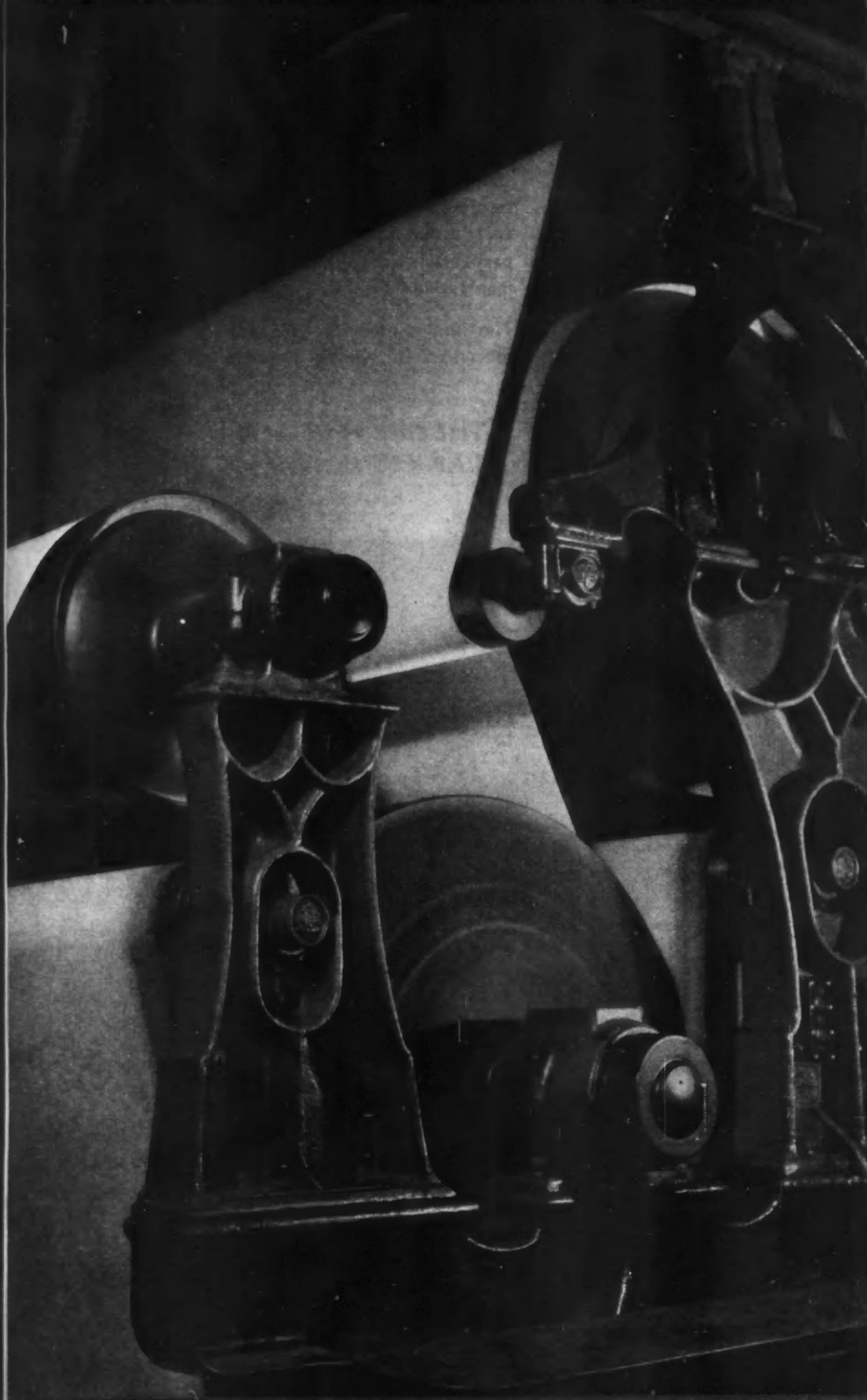
Piqua, Ohio

ORR FELTS

COST-CUTTING LUBRICANTS

for the PAPER MACHINE

CORRECT LUBRICATION



Probably no other machine in industry presents a wider range of lubrication problems than the paper machine. To meet this situation, Standard Oil of Indiana has developed a line of special lubricants, each of which is exactly fitted to its job. This means better performance, reduced maintenance, and savings in power.

It will be to your advantage, as it has been to others, to use the services of a Standard Oil engineer, who will show you where and how each of these products can be applied. His services are yours without cost or obligation.

STANDARD MOTOR JOURNAL OIL—
for continuous circulating systems of dryer bearing lubrication. Low cold test, high stability and resistance to oxidation.

ARCTIC MOTOR JOURNAL OIL—
for dryer roll bearings of the plain type lubricated by means of wick feed devices. Heavy bodied.

ARGON ENGINE OIL HEAVY—
for press roll bearings and hand oiled bearings on winders, reels and slitters. A fine quality filtered red engine oil of heavy body.

ARGON ENGINE OIL EXTRA HEAVY—
for oil lubricated calendar stack bearings. Particularly suited for heavy loads and moderately high temperatures.

STANDARD MARINE ENGINE OIL NO. 1—
for plain table roll bearings, wire roll bearings, breast roll bearings, etc. Heavy bodied, especially compounded to resist washing action of water.

SUPERLA GREASES, NO. 39, NO. 42 AND NO. 57—
highest grade lime-soap cup greases. Free from grit and corrosive substances, more stable in storage than other cup greases. Their clearness, transparency and color, when spread thin on a piece of glass, are indicative of their purity and high quality.

SUPERLA GREASES, NO. 2X AND NO. 4X—
specially manufactured to resist high temperatures. No. 2X has softer consistency. These greases are recommended for the lubrication of felt roll bearings, ball or roller bearings, plain bearings, etc.

CALUMET COMPOUNDS—
for gears. Made in 12 consistencies.

STANDARD OIL COMPANY (Indiana) (407)
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