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Continental Paper & Bag Sells Properties

Paper and Bag Holdings Are Acquired by Southern Kraft Corp., As Part of Program for Ultimate Liquidation of Continental—Mill Buildings and Real Estate At Rumford Have Been Transferred to the Oxford Paper Co.

The Continental Paper and Bag Corporation, a subsidiary of International Paper and Power Company, on Tuesday advised customers and trade creditors that it has sold its operating paper and bag properties to the Southern Kraft Corporation.

The properties acquired by the Southern Kraft Corporation are currently producing a substantial net operating profit. The Continental as a whole, however, has been showing heavy losses even before interest and depreciation because of taxes and other expenses at Rumford, Maine, and other mills now shut down. The mill buildings and real estate at Rumford, Maine, have been transferred to the Oxford Paper Company which owns adjacent properties and efforts are being made to work out satisfactory disposition of the other shut down mills.

As part of a program for the ultimate liquidation of the Continental Paper and Bag Corporation, all of the $997,700 outstanding First Collateral Mortgage 5 percent bonds due 1960 have been called for redemption as of December 31, 1936, and funds have been deposited with the respective trustees to cover the small amounts of underlying Marinette and Menominee Paper Company First Mortgage 7½ percent Bonds and Continental Paper and Bag Mills Corporation First and Refunding 6½ percent Bonds still outstanding. Other outside indebtedness and the major proportion of the current assets have been taken over by Southern Kraft Corporation.

Paper Converting Machine Co. to Build

The Paper Converting Machine Company, Harvey street, Green Bay, Wis., manufacturer of paper-converting machinery, has awarded general contract to E. H. Regal Construction Company, 136 South Adams street, Green Bay, for new one-story plant addition, 48x80 feet, for which superstructure will begin at once. A new office unit also will be built. The Wisconsin Bridge and Iron Company, Milwaukee, Wis., is engineer for work.

Claremont Paper Co. Joins TAPPI

The Claremont Paper Company, Claremont, N. H. has become a corporate member of the Technical Association of the Pulp and Paper Industry and is represented by W. C. Dawson, treasurer and mill manager. The Claremont Paper Company are manufacturers of black paper, crepe, saturating, white sulphate, kraft and sulphate specialties.

Grants Order to Open Malone Paper Mill

MALONE, N. Y., December 8, 1936—Federal court approval opening the way for trustees to proceed with a plan for reorganization of the Malone Paper Company and re-opening of its paper mill has been granted by Federal Judge Frederick H. Bryant after evidence showing the plan has been accepted by two-thirds of the creditors.

The order empowers the trustees, Louis Bittner, of New York City and Charles H. Clark and Clarence E. Kilburn, of Malone, to proceed with the reorganization plan which provides for incorporation of Malone Special Papers, Inc., as the corporation to carry out the reorganization plan.

Consummation of the reorganization plan is expected to be reached within the next three weeks and Judge Bryant set Dec. 19 as a date for a final hearing in the proceeding. Attorney William L. Allen, representing the Malone Special Papers, Inc., of whom George McKee, Sr., and George McKee Jr., formerly of Ogdensburg, are the principals, impressed upon the court the desire of his clients to proceed immediately with steps that would put the mill in early operation and three weeks was considered the minimum time in which the plan could be consummated.

Judge Bryant granted the order approving the reorganization plan after testimony had been entered by the three trustees in which opinion was expressed that the plan was highly feasible and fair to creditors.

The new company, under the plan, will have 1,500 shares of no par capital stock and $250,000 in 20-year four per cent bonds. George McKee, Sr., and his son have taken half the stock at $100 each share and half the bonds will be issued to settle all debts. Creditors may also subscribe to bonds at the rate of $30 in bonds for each $100 of indebtedness they hold.

Payment of taxes, totaling $11,500 and other obligations incurred, will require the raising of $20,000 in cash as the final step in the mill's opening. The Malone Chamber of Commerce will conduct an early campaign for the sale of bonds to raise this required amount.

Converting Plant at Carthage Nearly Ready

CARTHAGE, N. Y., December 7, 1936—The new converting plant of the National Paper Products Company, at Carthage, Division of Crown Zellerbach Corporation, is rapidly approaching completion.

Wisconsin Paper Mills Announce Wage Advances

Kimberly-Clark Corp. to Increase Hourly Rates of Employees In Badger State and Niagara Falls, N. Y., Plants, Effective December 27—Workers of Continental Paper & Bag Corp. At Marinette, Get 5 Per Cent Increases.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., December 7, 1936—Wage advances were announced last week by the Kimberly-Clark Corporation, Neenah, Wis., affecting employees of its mills in Wisconsin and Niagara Falls, N. Y.

The general council, made up of representatives of the management and the employees, in session November 30 to December 4, arrived at an agreement which advances hourly rates of men three cents and hourly rates of women's occupations two cents. These increases will become effective December 27, 1936.

According to the agreement, rate advances in certain individual cases will be modified to conform to decisions arrived at in the June meeting of the general council, when a classification of all jobs in the corporation's plants was affected, and basic standards of pay were established. The majority of occupations in Kimberly-Clark mills are on a six-hour basis.

These advances, in terms of added payroll cost, amount to approximately $275,000 per annum.

Employees of the Continental Paper and Bag Corporation's mills at Marinette, Wis., have been granted wage increases of five per cent. The new schedule went into effect December 1.

Northern Paper Mills Control

In a decision rendered by the United States Circuit Court of Appeals in Chicago last week, the present management of the Northern Paper Mills, Green Bay, Wis., won its fight for control of the company from Judson G. Rosebush, former vice-president and general manager. The mill is one of the largest in the country manufacturing tissue.

The court reversed two decrees of Judge F. A. Geiger of the eastern district United States Court at Milwaukee. One ordered the directors of the Northern to turn over to Mr. Rosebush the stock it had purchased out of his holdings. The other restrained the Northern directors from buying any more stock and from voting at a stockholders' meeting last spring.

Control of the Northern became an issue when the Patten Paper Company, Ltd., Appleton, Wis., of which Mr. Rosebush is president, petitioned for reorganization under the bankruptcy act. At that time a contract had been made with George F. Newton, of Iron Mountain, Mich., to purchase the control of the Northern for a syndicate. The sale was to include 40,000 shares of stock held by the Patten Company and Mr. Rosebush. The money thus received would have enabled the Patten Company to refinance without loss to stockholders. Although the decisions by Judge Geiger enabled the Patten interests to deliver the 40,000 shares of stock, Mr. Newton failed to go through with his contract.

Water Power Development

Approval was granted last week by the Wisconsin Public Service Commission to the Wisconsin Valley Improvement Company of Wausau, Wis., for a $764,000 financing plan for water power development on the Wisconsin River. The permit includes issuance of new capital stock totalling $414,000, and a bond issue of $350,000. The Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis., is to receive $700,000 of the fund, to reimburse it for financing construction of the vast reservoir just completed on the Big Eau Pleine River.

The remaining $64,000 will be used to finance construction of a canal diverting water from Lake St. Germain around the Rainbow reservoir, near Rhinelander, Wis., to the Wisconsin River at a point below the dam which creates the reservoir. The Rainbow project was finished last year.

The new stock and bond issues raise the total capital stock of the improvement company to $1,200,000 and bonds outstanding to $640,000. The company operates dams and reservoirs to control the flow of the Wisconsin River and improve water power, and its stockholders are the paper mills and utilities served by it. Tolls are paid annually by the water power users.

The Rainbow and Big Eau Pleine reservoirs are part of a $15,000,000 project to maintain uniform flowage.

Increased electrical power will be generated by the Wisconsin Public Service Corporation at the Grandfather Dam on the Wisconsin River near Merrill, Wis., recently purchased from the Frandfather Falls Paper Company. Overhauling of the plant has been in progress. Two of the electrical units have been converted to the three-phase circuit. The remaining unit is now being made a three-phase and will be completed in about two weeks. A high tension sub-station has been erected near the plant, and two spans of high tension line have been built to connect the station with the company's high line between Tomahawk and Merrill.

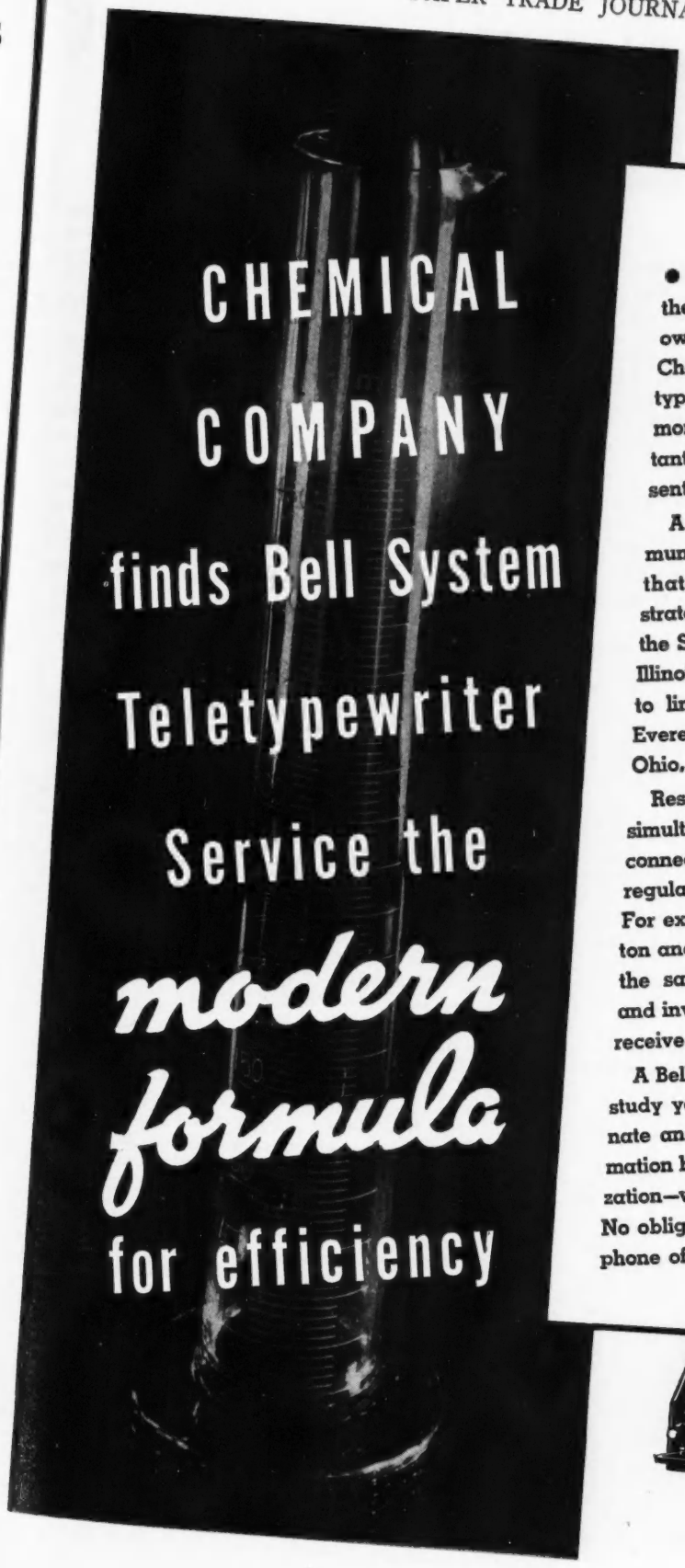
Approximately one-third of the work has been completed on the government control dam on the Fox River at Menasha, Wis. A coffer dam has been completed on the remainder of the project and sheet piling is being driven preparatory to the final pouring of concrete. A crew of 42 men is working steadily, and the work will be completed in about six weeks. The Lake States Engineering Company, Chicago, is doing the construction work The dam replaces an obsolete wooden structure.

S. R. Stilp To Retire

S. R. Stilp, chief mill manager and director of the Kimberly-Clark Corporation, Neenah, Wis., has announced his intention to retire from active service January 1. He has been connected with the company for 46 years.

Mr. Stilp began as a mill hand in 1890 at the original Neenah mill, and soon was given a clerkship in the Neenah office. A number of years later he became office manager of the mill at Kimberly, Wis. In 1920 he became the first manager of the company's new mills at Niagara Falls, N. Y.

He was sent to Kapuskasing, Canada, in 1927 to direct operations of the Spruce Falls Power and Paper Company, owned jointly by Kimberly-Clark and the New York Times. He remained there two years until 1929, when he returned to Neenah to become chief mill manager for the corporation. Mr. Stilp was elected to the board of directors in February, 1928. He resides at 402 East Wisconsin Avenue, Neenah.

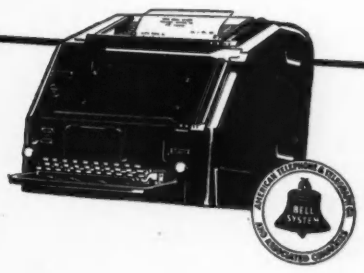


● THE manner in which one industry utilizes the accomplishments of another to increase its own efficiency is demonstrated by Monsanto Chemical Company's use of Bell System Teletypewriter Service. Monsanto needed faster, more accurate communication between distant offices and plants. A Bell System representative was called in to analyze the problem.

A study was made of the company's communication needs and it was recommended that teletypewriter service be installed at strategic points—private line service between the St. Louis headquarters and the Monsanto, Illinois, plant; teletypewriter exchange service to link production plants at Anniston, Ala., Everett, Mass., Camden, N. J., and Dayton, Ohio, with St. Louis and the New York office.

Results: Orders typed at one office are now simultaneously, accurately reproduced at any connected point, on the Monsanto Company's regular forms, with all necessary carbons. For example, St. Louis gives orders to Anniston and receives information on shipments on the same connection. Shipments are made and invoices mailed the same day orders are received. Customers get quicker service.

A Bell System representative will be glad to study your communication problem—co-ordinate and speed up the transmission of information between separate units of your organization—whether 300 yards or 3000 miles apart. No obligation. Simply call your nearest telephone office.



Ontario Forest Policy Aids Newsprint Output

Production Increased From 599,000 Tons In 1933 to 781,000 Tons In Province Last Year—Current Year's Output Will Exceed 1935 Figures By Approximately 250,000 Tons—United States Paper Mills Require 52-Inch Logs

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., December 7, 1936—The Hon. Peter Heean, Minister of Lands and Forests for Ontario, says that the forest policy of the government had resulted in augmented newsprint production. In Ontario it had increased from 599,000 tons in 1933, to 781,000 tons last year, and would reveal a minimum production in 1936 of 250,000 tons in excess of the 1935 figure. Mr. Heenan said that in the Thunder Bay district from 1917 to 1934 a former administration made arrangements for four companies, and alienated 11,000 square miles of territory containing hundreds of thousands of cords of pulpwood. It was also provided that 12,000 men should be employed in the bush, but since the date of this agreement, none of the 12,000 men had been given work, and the wood remained uncut except for a small quantity of perhaps 20,000 cords. Mr. Heenan added that the last estimate intimated that Ontario had 210,000,000 merchantable and accessible cords of pulpwood. His department was having the mature timber harvested leaving the young growth room to develop. Old mills, both in the lumber and paper making line, that had been closed for years, were now being opened up.

Speaking at a recent meeting in East Hastings, Thomas Murray, M. P., for Renfrew, outlined something of the hardships that the timber industry had come through. He denied the rumor that the Ontario government had anything to do with the extra length of the pulpwood log. He asserted that this extra 4 inches are required by the market in which the pulpwood is now sold—the United States —where the mills wanted the 52-inch log. Mr. Murray stated that his firm had not been able to sell any pulpwood logs for years, and demanded whether it would not be better for the settlers to sell 52 inch logs for export than not to sell any at all.

New Pulp Mill Projects

Frank L. Buckley, who has been working on a pulp mill project at Prince Rupert, B. C., for some months, reports good progress. Accompanied by W. J. Clarke, of Quebec, representing pulp and paper interests, L. A. De Guere, Wisconsin pulp mill expert, and representatives of Northern Construction Company and Walsh Construction Company, Mr. Buckley spent a week in the north investigating the sites for the mills. The company is to be known as Canadian-American Pulp and Paper Company, and probably will be financed jointly by Canadian, English and American capital.

D. McIvor, M. P. for Fort William, states that one of the largest and finest factories in Canada for the manufacture of products subsidiary to the pulpwood industry, will be constructed on Island No. 2 in the near future. E. E. Johnson, of the Pigeon Timber Company, whose name has been mentioned in connection with the project says that while plans have been discussed, he is not able to give any details as yet.

Great Lakes Reorganization

A meeting of the holders of the five percent first mortgage, 20 year sinking fund bonds of the Great Lakes Paper Company, Port Arthur, Ont., will be held in Toronto at the King Edward Hotel, on December 22, to consider resolutions in regard to extending the time for payment of the interest on the bonds which fell due on the first of October, 1936, and those which will fall due on the first of April, 1937. Payment of these bonds has been postponed until July 2nd, 1938, and July 2nd, 1939, respectively. The postponed interest and coupons will become payable at the face amount thereof, without any interest thereon, and the trustee authorized to grant such extension accordingly. It is expected that the resolutions will carry.

News of the Industry

The net profit of Dryden Paper Company, Ltd., Dryden, Ont., for the year ended September 30, amounted to $34,243 compared with a deficit of $21,434 in the previous year. Operating profit was $175,308 against $102,783 in the preceding period. The balance sheet showed current assets of $579,201 and current liabilities of $60,747, leaving working capital at $519,454. Working capital a year ago was $532,306.

British Columbia Pulp and Paper Company, operating at Woodfire and Port Alice, B. C., is carrying out a $400,000 improvement program to meet increasing market demands, especially from Japan, which is buying in much greater volume now that the trade war with Canada has been terminated.

Vancouver Kraft, Ltd., now known as Port Mellon Operating Company, is carrying out a million and a half dollar renovation and replacement program at its Howe Sound plant and will be in full operation early in the year, manufacturing pulp to be converted into wrapping and other paper in the Leadbetter mills of the Northwest States.

George Whalen, formerly an executive of the Whalen Pulp and Paper Company, which is now the British Columbia Pulp and Paper Company, is negotiating in behalf of British principals for a pulp mill site on the Fraser River. It is reported that the water frontage and plant formerly owned by Brunette Lumber Company has been acquired under option at a price approximately $200,000.

G. T. Clarkson, Toronto, receiver and manager of the Abitibi Power and Paper Company, Ltd., Iroquois Falls, Ont., announces that the company's railway running from that point will be extended into the Abitibi limits for 2½ miles. The company will also construct a spur line approximately three miles long. The receiver has been authorized to spend up to $17,000 on the work. Mr. Clarkson has also received authority to purchase tractors for hauling wood in the neighborhood of the Mattagami River. He refused to comment on a New York report that the reorganization plan for the Abitibi Company will be ready for shareholders early next year. He, however, intimated that work was still in progress on the report.

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.

Paper Business Conditions Improve In Chicago

Advance Quotations for Coated and Uncoated Book Papers Have Psychological Effect Upon Other Grades of Fine Paper—Kraft Paper Market Continues to Display Strength—The Demand for Newsprint Paper Persistent.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., November 30, 1936—The marked advances in the book paper market of $5 on all grades of uncoated and of $7.00 on coated grades, were easily the high light of the Chicago paper market this week. While the advances were reported not to have affected covers, manifolds, writings and other lines, the results were having at least a psychological effect. More evidence of strength is reported as expected from the already strong kraft paper market. The sulphite bond market is standing on the flat price figure with no change over last week.

Demand within the paper board industry for waste papers has had a continued good effect on the local waste paper market while the board market itself is said to be in a slightly more improved position than last week. Covers were little changed and bonds and ledgers, as indicated above, were following about the same course. However, in ground woods and newsprint offices, further indication of a broadening out of demand and resultant market strength was noted by market commentators.

Paper Salesmen Meet

The Midwest Division of the Salesmen's Association of the Paper Industry spent a part of its Monday evening, November 16, discussing the rise in the book paper markets and the various ramifications dealing with this change with respect to customer contacts. The Association also welcomed the news that two of its ailing members were about to get back into circulation. The former chairman of the golf committee, Ben Babbitt, of the Brown Company, is recovering from a bit of gallstone trouble while Creighton Whiting, of American Writing, is convalescing following an operation for the removal of his appendix. Both are expected back into the thick of activity in plenty of time to enjoy the annual Christmas party which is one of the high lights of the season.

Associations Open Chicago Offices

The growing importance of the Chicago paper market is indicated by the fact that at least two national associations devoted to the interests of the paper trade have opened offices in this city to better service members in this territory. The two associations are the Sulphite Paper Manufacturers Association and the Groundwood Paper Manufacturers Association. It is reported that the secretaries of the two associations will divide their time between the Chicago and New York headquarters. Dr. E. O. Merchant, of the Ground Wood group and T. J. Burke, of the Sulphite Group, are well known in Chicago.

News of the Industry

Fibre Making Processes, a Chicago organization, is reported as having been appointed exclusive agent in the United States for the Rosenblad Blow Steam Condenser plant and for the Spiral Heat Exchanger for Sulphate and Soda mills produced by the same firm. The Heat Exchanger has a number of applications of interest to the industry while the condensers are reported as economical for making clean hot water from the blow stream. The Fibre Making Processes organization is expected to have experienced kraft mill experts available to service the product in the United States.

The James White Paper Company, 219 West Monroe street, Chicago, is advertising the prominence of brown as a color in the business world. "The Cover House Suggests Browns" is the title of an impressive folder, with dural binding utilized impressively, which provides six samples of covers with colored book papers to match. A number of valuable suggestions to the printer and advertiser user are listed in the folder.

A catalog describing its full line of materials handling equipment has been published recently by the Barrett-Cravens Company of Chicago. The 124 page catalog has approximately 400 illustrations showing the uses of the Barrett-Cravens line under various and varying conditions. Many of the illustrations provide unusually practical technical descriptions of the use of the product.

Manufacturers in Illinois as well as a number of jobbers are again becoming interested in the possibility of amending the Illinois sales tax laws to eliminate the charging of the tax on so-called "production" sales. These manufacturers are referring to the charging of a tax on merchandise which is used by the consumer to fabricate their own merchandise for ultimate consumption. A meeting was held at the LaSalle Hotel on November 19 to discuss the matter. In previous instances George Cobean, of the J. W. Butler Paper Company, has been one of those basically interested in improving the situation with respect to the state sales tax.

The Illinois legislature meets in a continuation of its second special session next week to endeavor to enact legislation retaining the Occupational Sales Tax at the 3 per cent rate. By previously enacted law, the 3 per cent tax would return to 2 per cent on January 1 next. Relief requirements are said to be so great that the State cannot yet afford to meet a 1 per cent reduction in the sales tax. Thus the special session will enact legislation eliminating any possibility of there being an interval when the 3 per cent rate will not be available.

According to the Chicago headquarters of the Link-Belt Company that concern has recently acquired the rights in the United States and North America for the manufacture and sale of a rotary louvre drier produced by Dunford & Elliott. The drier is in the form of a mechanically rotated horizontal cylindrical drum with internal channels near the circumference. The drier is reported as exceptionally good for the drying of bark, sawdust, wood chips and other materials of a similar nature.

Some indication of the way in which paper is moving through retail channels in the Chicago area may be gained from the report of Horders, Inc., local stationery chain, which reported net sales of $320,456 for October, representing the largest October sales in the history of the concern. The volume represented an increase of 23.9 per cent over October, 1935 and was approximately at the peak sales gained in October of 1929.

The one hundred best entries in the Outdoor Advertising Arts Award of the Chicago Federated Advertising Club are to be exhibited at Marshall Field & Co. until Nov. 28.

New Pulp Bleaching Equipment for West Virginia

Moore & White Co. of Philadelphia, Constructing Seven Vertical Bleachers for the Piedmont Plant—Other Bleaching Equipment Being Built for the New Mill at Charleston, S. C.—New Jersey Paper Houses Consolidate.

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., December 7, 1936—Moore and White Company, sole manufacturers of pulp bleaching equipment, is constructing seven vertical bleacher units for West Virginia Pulp and Paper Company, at Piedmont, West Virginia. This company is also building other bleaching equipment for the new mill of West Virginia Pulp and Paper Company, located at Charleston, N. C., and has under construction changes to toilet tissue machine for Scott Paper Company at Cheser, Pennsylvania.

Paper Houses Merge

Announcement has just been made of the merger of the Lewmar Paper Company, 116 Sussev Avenue, Newark, with the Paper House of New Jersey, Inc., 98 Branford Place, same city, effective December 1. Early in January the stocks of Paper House of New Jersey will be moved to the Lewmar quarters, thus augmenting the Lewmar lines considerably. Eventually the firms will be known as Lewmar Paper Company, with "Paper House of New Jersey" carried as a slogan.

Herman Ostroff continues as president of Lewmar; Joseph Weisman as vice-president and Mac L. Weisman as treasurer. Jacob Bagish, formerly head of Paper House of New Jersey will act as secretary of Lewmar. Jack Davies, Harold Person, Edward Trippett and L. Beekman will comprise the sales staff.

Paper House of New Jersey has previously carried some International Paper Company lines; it is their intention, however, to carry all International lines. They will also extend the lines of the following: Riegel Paper Corporation, Whiting-Plover Paper Company, Waterfalls Paper Mills, Consolidated Water Power and Paper Company. Heretofore both houses carried Martin Cantine lines, and this policy will be continued.

Lewmar has been at its present address six years. Commencing business twelve years ago at 72 Clinton street, this company mover to 72 Mechanic street. Paper House of New Jersey was established in 1930 at 25 William street. Increased business two years ago necessitated its removal to the quarters now being vacated.

Paper Stock Merchants Meet

At a dinner meeting of the Philadelphia Waste Merchants Association on Thursday evening of last week in the Adelphia Hotel, the following were nominated for the ensuing year: James M. O'Neill, of Patrick O'Neill and Company, president; William Lemly of the William Lemly Company, vice-president; William Simmons of John Simmons' Sons, treasurer, and Dominic A. DiSanti of Alexander DiSanti and Son, secretary.

The Executive Committee nominated is composed of the following: William J. McGarity, Jr., of the Penn Paper and Stock Company; Harry M. Bailey, of the Heminway Company; Edward Orr, of the Pioneer Paper Stock Company; George A. Dilenno, of the George A. Dilenno Company; Louis Bantiboglio, of the N. Bantiboglio Company of Camden, N. J.; John Beitchman, of Beitchman Brothers, and Arthur Feierman, of the Arthur Feierman Company.

Election of officers will take place the first Thursday in March, 1937. A banquet committee was appointed and will make its report at the March meeting.

Paper Salesmen's Study Course

The fourth in the series of lectures being conducted for paper salesmen under the auspices of Philadelphia Paper Trade Association, was held in the plant of the International Printing Ink Company, through the courtesy of John H. King, manager of the Philadelphia plant. This company has 28 plants throughout the United States, one in Canada and one in China. The student group assembled in the auditorium of the I. P. I. Company and listened to three very interesting addresses by W. S. Law, of New York City; William N. Davies, also of New York City; and E. D. Perry, from the Philadelphia plant, after which a tour of the plant was made and the various procedures in the manufacture of ink were demonstrated to all those present. Mr. Law spoke on "Application of Ink to Paper"; Mr. Davies on "How Ink Gets on Paper and Different Types of Presses"; and Mr. Perry talked on "The Chemistry of Printing."

Edward A. Keller Passes On

Edward A. Keller, vice-president and general manager of Garrett-Buchanan Company, friend, associate and counsellor, has passed into the Valley from which there is no returning. It is very difficult for all those who were privileged to know him, to realize this. So closely associated was he with all the activities of the Paper Trades Association of Philadelphia, so familiar was his presence in his office at Garrett-Buchanan's, it does not seem possible we will not see him again. He has been a part, a cherished and valued part of the paper trade life, and he can have no successor. There was only one Edward A. Keller.

In 1901, at the age of fourteen Mr. Keller began his career with Garrett-Buchanan Company as office boy. As time went on, he assisted in the out-of-town shipping department, later he became floor salesman, after which he was manager of the ruling department. Following this he was interested in cardboard, and when managership was open he was appointed manager of this particular department, in addition to which he had charge of floor salesmen. Even though Mr. Keller was vice-president and general manager and manager of the cardboard department, he was always interested in the activities of the entire sales organization.

He was a member of Poor Richard Club, Down Town Club, and St. John's Assembly No. 28. During 1935, he was secretary of the Board of Governors of the Philadelphia Paper Trade Association.

Mr. Keller died suddenly from a heart attack on Friday, December 4. His death under any circumstance would have been a shock to all of us, but, coming as it did, the shock was intensified.

Surviving him are his widow, Isabelle S. and his daughter, Margaretta, aged 16.

Mr. Keller will be missed not only by those in the paper trade but also by many organizations and individuals where his sympathetic and cooperating hand has been extended.

Michigan Superintendents Meet at Kalamazoo

KALAMAZOO, Mich., November 28, 1936—The Michigan Division of the American Pulp and Paper Mill Superintendents' Association held their November meeting and Ladies' Night at the Park-American Hotel on Saturday, November 28, 1936.

E. C. Peterson Speaks

The business session was called to order by Chairman Otto Fisher at 3:30 P. M. Routine business was disposed of and Mr. Fisher then introduced E. C. Petersen of the Goodrich Tire and Rubber Company of Akron, Ohio as the speaker.

Mr. Petersen's talk was mainly on rubber rolls, table rolls and press rolls, explaining the manufacturing operations, and their problems encountered in new developments of their product. The frankness of some parts of his address was unusual and was thoroughly appreciated by the members present. A portion of the address was his comments on the recently enacted Robinson-Patman bill and its relative effect on the paper industry. Altogether, it was an exceptional, meaty address and was enthusiastically received.

O. W. Callighan Leads Open Forum

The Open Forum which followed was led off by O. W. Callighan and a most spirited series of discussions followed in which Mr. Petersen answered innumerable questions and imparted further information not embodied in his address. Adjournment at 6:00 P. M.

At 7:45 the doors of the main dining room were thrown open, and nearly 150 people, including the superintendents, their wives, sweethearts, and invited guests, sat down to an evening of feast and fun. Eddie Smith's Revelers furnished the music for the dinner and dance; genial "Pat" Stephenson was master of ceremonies and kept things moving; Homer Stafford won the prize for selling the most tickets, and the floor show was entirely local talent. Enough dancers from the Lewis School of Dancing to put on a Ziegfeld revue were in evidence, and Miss Carolyn Plummer, who in private life is Secretary to Art Fitzgerald at the K. V. P., proved herself to be a runner-up to Jane Frohman. Dancing followed until 2:00 A. M.

Those Who Attended

Among those noted attending the banquet were: Hoke Martin, Hercules Powder Company; Mr. and Mrs. R. L. Zellers, French Paper Company; Paul H. Dumas, "unattached"; Mr. and Mrs. L. H. Breyfogle, Draper Felts; Mr. and Mrs. Jacob Parent, Noble Wood Company; Mr. and Mrs. E. E. Ihlst; Mr. and Mrs. R. W. Holden, Stowe Woodard Company; Mr. and Mrs. Norman J. Cowie, Hawthorne Paper Company; Mr. and Mrs. Jake Boodt, Kalamazoo Paper Company; Mr. and Mrs. A. L. Sherwood, Sutherland Paper Company; Mr. and Mrs. Robert Van Kirk; Mr. and Mrs. Charles Noble, Staley Sales Corporation; Mr. and Mrs. E. K. Brown, Paper Makers Chemical Corporation; Mr. and Mrs. R. C. Hughes, Paper Makers Chemical Corporation; Mr. and Mrs. E. J. Turner, Paper Makers Chemical Corporation; E. M. Cowling and lady, Hawthorne Paper Company.

Mr. and Mrs. Art Woollam, Woollam Supply Company; Dr. and Mrs. E. A. Honey; C. W. Richards, Krebs Pigment & Color Company; Mr. and Mrs. Allen Milham, Bryant Paper Company; Mr. and Mrs. Jos. E. Loughead, Loughead Company; J. P. Strasser, Stein Hall Manufacturing Company; Mr. James Noud and wife; R. W. Van Peenan, Paper Mill Supplies; Paul de Guchery, Michigan Paper Company; H. F. Heller, Hercules Powder Company; J. B. Deibel, Price & Pierce; Miss Wainwright.

Mr. and Mrs. Buster Griffith, Heller Merz Company; Mr. and Mrs. Harold Annis, Allied Paper Company; Mr. and Mrs. F. B. Eilers, Orr Felts; Edward Osborn, Allied Paper Company; J. H. Weber, Allied Paper Company; Arnold Weller, Sutherland Paper Company; H. E. Stafford, (with the best girl in the world but not in love with him); Mr. and Mrs. John J. Nylund, DuPont Company; Mr. and Mrs. Carl Schneider, Hawthorne Paper Company; Mr. and Mrs. S. V. Cottrell, National Aniline and Chemical Company; Mr. and Mrs. Marvin C. Jones, Michigan Carton Company; Robert Stewart, Kalamazoo Vegetable Parchment Company; E. J. Moran and Miss Margaret May; Mr. and Mrs. C. "Baldy" Smith; Wm. H. Astle, Michigan Paper Company.

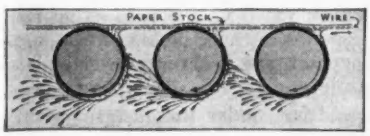
Ray L. Barton, Michigan Paper Company; Mr. and Mrs. James Wise, Kalamazoo Paper Company; M. J. Redmond, Kalamazoo Paper Company; Abraham Vandenberg; A. Van Ernst, Rex Paper Company; Mr. and Mrs. Arthur Cole, Rex Paper Company; Henry Nendorf, Rex Paper Company; Mr. and Mrs. Jos. C. Widmeyer, Allied Paper Company; Wayne E. Crotty, Bryant Paper Company; Mr. and Mrs. Otto Fisher, Bryant Paper Company; Mr. and Mrs. L. M. Mongreig, U. S. Rubber Company.

Mr. Leo A. Willoughby, Bryant Paper Company; L. P. Fortier, Everett Pulp and Paper Company; Mr. and Mrs. L. E. Fitzgerald, Hercules Powder Company; Mr. and Mrs. O. W. Callighan, Edgar Clays; Mr. and Mrs. H. C. Pearson, Pioneer Paper Stock Company; W. A. Kirkpatrick, Allied Paper Company, and Edna Boodt; C. E. Mueller and Miss Nolan, Paper Makers Chemical Corporation; B. P. Stephenson, Crescent Engraving Company; Mr. and Mrs. E. A. Dunton, Sutherland Paper Company; Mr. and Mrs. J. A. Heenan; Mr. and Mrs. G. H. Rentrop, Westinghouse Company; Mr. and Mrs. Paul Haas, Kalamazoo Vegetable Parchment Company; Mr. and Mrs. Earl Weismaster; Lawrence Lynd, R. T. Vanderbilt Company; H. E. Stratton, PAPER TRADE JOURNAL.

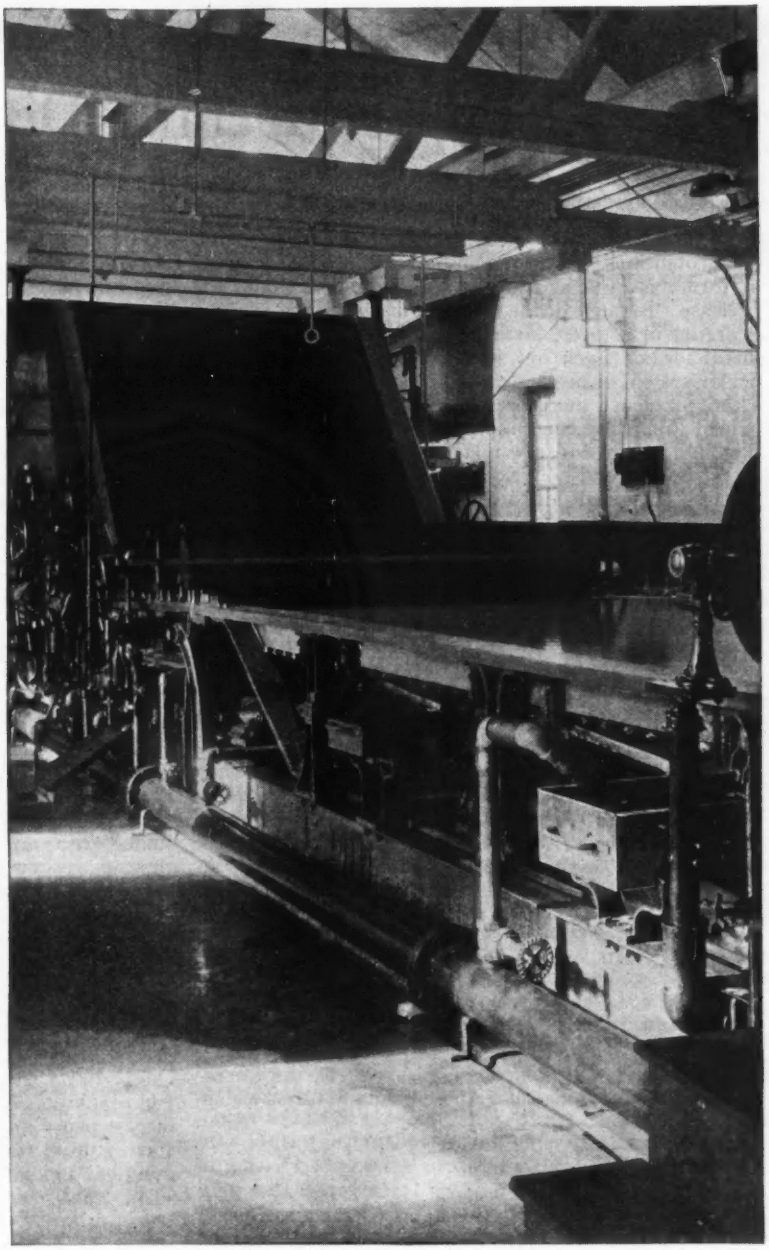
Cold Weather Responsible for Printing Paper Troubles

With the advent of cold weather, printing papers require certain handling precautions not necessary during the summer months, according to advice from the National Bureau of Standards. Paper brought into the pressroom from freight cars, motor trucks or unheated warehouses during cold weather is usually many degrees colder than the room air. When the paper is exposed while still colder than the air, the edges absorb moisture rapidly by condensation from the warm air in contact with it and wavy edges develop very quickly. The results of tests with large piles of paper on skids and with paper in cases indicate that it warms very slowly. Paper 50 deg. F. colder than room air required 96 hours to reach temperature equilibrium with the air. Hence, all paper brought into the pressroom from colder surroundings should be left sealed in cases, or covered with waterproof wrappers if on skids, for several days before exposing the paper to the room atmosphere. If this precaution is not taken, wavy edges are almost certain to be encountered during the winter season. This is one of the findings of research on lithographic papers being made in cooperation with the Lithographic Technical Foundation.

Brass Table Rolls throw water up against bottom of the wire



Duk-Bak Table Rolls throw water down, without disturbing formation



WATER DOES TRAVEL UP-HILL

YOU won't have to go far to see this phenomenon. Just step into your own plant and examine the metal table rolls on the Fourdrinier. Watch closely now . . . the water clings to the metal surface and, instead of being removed, a great part is whirled back up against the sheet.

Correct this condition by switching to Duk-Bak Rolls. Their specially made mirror-smooth rubber cover has a low affinity for water—hurls it down and away. And with that water goes your problem of a spotted sheet.

A more uniform, even sheet is obtained with the use of Duk-Bak Rolls because they maintain the level of the wire. They are ground straight and true and move evenly with the wire without developing high or low spots. Duk-Bak Rolls are built to last. Their special rubber cover can be reground easily, and permits straightening of roll if bent by dropping. Ends are sealed with rubber to guard against corrosion.

If you are rebuilding your Fourdrinier, or if you're buying a new machine, specify Duk-Bak Rolls—and be sure of better paper at lower cost. The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.

Goodrich

Duk Bak

TABLE-ROLL COVERINGS

Common Sense Engineering Applied to Paper Machine Drainage

By A. E. Broughton, Glens Falls, N. Y.

The drainage of paper machines is subject to so many varying conditions that it is absolutely useless to write down formulas of heat transfer or theoretical values of heat release. Because of the impossibility of telling exactly what occurs in a drier, birth has been given to hosts of empirical ideas. Each one of these ideas requires some particular system or mechanical scheme to correct or eliminate the problem; therefore, the more ideas, the more equipment. It is my contention that, outside of the steam turning into water and giving up its heat, there is absolutely no other condition existing in the driers. If the water and entrained air are removed consistently and evenly, the efficiency of the drier section, as far as a drainage system controls it, is at its maximum.

The problem of drainage on paper machines seems to converge into two schemes; individual drier control and block drier control. Under individual drier control are such systems as individual traps, ejectors, fixed orifices and the system I am about to describe. Under block drier control are all types of recirculating systems. It is my wish in this article to explain, as much in detail as possible, a simple, foolproof, and absolutely efficient drainage system.

The theory employed is directly opposite to all other known schemes and systems used to drain the water and air from the driers. Practically the same pressure is maintained in the return header as in the driers above. By the use of the simple and well-known swing check valve, a situation is set up whereby each drier is equipped with an *automatically gradated orifice in its syphon.* The syphons and return headers are small and the expense of installation is very low. There are no mechanical means of evacuation and, therefore, nothing to get out of order.

Description and Operation

Referring to Fig. 1 with the simple drier D, the steam inlet S and syphon return R emptying into return header H through a swing check valve C, the return header H does not need to be bigger than three inches on the largest machine made. The syphon pipe R should never be larger than one-half inch inside and outside the driers.

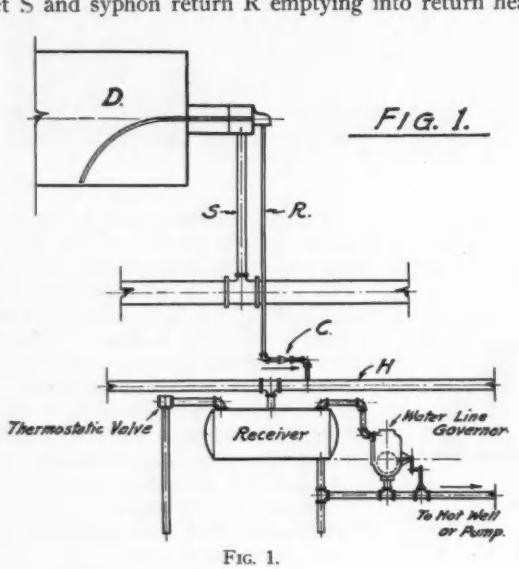


FIG. 1.

The largest ordinary drier, under the fastest operating conditions, will consume no more than eleven hundred pounds of steam per hour, and the average consumption in the average paper machine varies from one hundred and fifty to eight hundred pounds per hour. A syphon arrangement, sized as shown in Fig. 1, will take care of nineteen hundred pounds of water per hour per drier, which is more than ample.

The return header H is drained several times into a small receiver, and from this receiver, the water of condensation is carried by gravity through a water line governor, maintaining a water line at the base of the receiver and allowing the condensate to escape either to the hot-well direct or to a suitable pumping unit, but remaining sealed against the loss of steam. On the top of this return receiver are installed several large thermostatic traps of a special design. These traps will close against steam, but will remain open for air regardless of temperature.

On starting up the machine, the steam rushes in through the steam inlet S, referring to Fig. 1, filling the drier from the top down. Air being much heavier, the steam immediately rises to the top and begins to push the air out through syphon pipe R into header H and into the return receiver, where it is vented direct to atmosphere through the special thermostatic traps. Any water that comes out with the air, travels into this same receiver and through the water line governor to the hot-well or pump. Due to the thermostatic valve being open on the return receiver, the return header H is vented, and, therefore, a condition of constant flow is maintained from the drier D into the return header H. The check valve has disappeared as a check, being wide open, and the entrained air is escaping very rapidly. Because of this very rapid air release, the largest paper machine made, equipped in this way, can be started up to full drying capacity in not to exceed twenty minutes, and all the operator has to do is turn on the steam valve.

Finally, the steam replaces all the air in the drier and enters the syphon R and fills up the header H and its receiver. This steam, coming behind the thermostatic traps, closes them, and the header H immediately rises to the same pressure as in drier D, since its vent has been closed. The steady flow from drier D to header H ceases. Condensation, however, is occurring in drier D due to radiation and the end of the syphon pipe becomes submerged in this condensate inside the drier shutting off any possible steam from drier D to syphon R. The steam in syphon R outside the drier down to the check C is condensing due to radiation and this pipe naturally drops its pressure below that of drier D. This drop cannot be relieved from the bottom through header H and the other driers in the section because the check C stops it. The greater pressure in drier D, than in syphon R, forces the water covering the end of syphon R up into the syphon and over the hill where it drops by gravity through the check C into header H and away. In other words, the water is being removed

from drier D in little slugs. The drop in pressure in syphon R occurs so rapidly that these little slugs or cycles of drainage are occurring at least one or two times per second and, on a large machine, even oftener. Due to friction, each return slug of water that is carried up into syphon R starts fast and then seems to slow up a trifle. When it gets over the top bend of the syphon, it seems to spread out and follow the inner periphery of the syphon pipe and due to this slowing up process, it appears to be a steady stream released from the drier, when it is observed in the pipe R outside the drier. *This steady stream, perhaps half the size of a lead pencil, is traveling through the check C constantly, the check opening up enough to accommodate the water running through it, check C then becoming a gradated orifice, absolutely automatic for all conditions.*

Header H, due to radiation, is having a constant tendency to decrease its pressure, and since its supply comes from the drier D, it also is doing its share to keep the evacuation moving rapidly. The pressure in this header H is at all times equivalent to that in drier D, less the energy necessary to force the water from the bottom of the syphon pipe to the top of the bend. The condensate, being under a maintained pressure, is practically at the same temperature as the steam itself and is released through the water line governor either to the hot-well or to a pump without loss of heat units.

There has been a condition of drainage set up, that allows nature to operate completely, positively, and maintain approximately the same pressure on the return header as in the driers themselves. Not one ounce of steam is ever allowed to escape; the air is released automatically and the water of condensation can be returned to any desired point with all of its original heat contained. Everything else is automatic, non-depreciating and absolutely free from any mechanical difficulties. This condition will continue for the life of the machine.

Gradating Pressures Often Unnecessary

It is commonly believed by paper makers that it is necessary to decrease the pressure at the wet end of paper machines in order to obtain the quality required in the sheet and in some cases this is so. We maintain that by carrying one pressure from end to end in the drier section, the gradation of temperature will be obtained through the cooling effect of the wet sheet of paper on the first few driers. This gradual control of the temperature is much more perfect than can be obtained by any attempted mechanical radation of pressure.

One Explanation of Cockle

Drainage systems for paper machines have been used for forty or fifty years. The systems, with which the old paper makers were brought up, were all recirculating of one type or another. They all circulated from the dry end to the wet, through two or three stages. The air forced into the wet end driers, due to the slower circulation, became pocketed. While of the same temperature as the steam, it lacked the latent heat content of a like quantity of steam. This, while keeping the drier temperature at the equivalent temperature of the steam itself, did not maintain an equal rate of heat flow through the drier shell due to the lower latent heat content of the mixture of air and steam, and gave a higher heat value on the surface of the drier than its balancing rate of heat flow. In other words, the drier operated exactly as if it were supplied with superheated steam.

With high temperatures, the tendency was to cockle because the heating of the surface of the sheet was not followed rapidly enough by the latent heat power to penetrate into the middle. The natural impulse, in a case of this kind, would be and is to decrease the surface temperature of the wet end driers by further decreasing the pressure in them until a point was reached where the detrimental effects of the unbalanced condition of sensible and latent heat in the drier section was overcome. This was a costly solution as it cut down the drying capacity of the entire paper machine and forced a higher operating pressure on the dry end and a higher back pressure on the engine in order to accommodate a desired speed or production rate.

It has been my observation on many paper machines changed from gradated pressure to one pressure, that the raising of the pressure at the wet end has largely eliminated cockle, decreased shrinkage and bettered the quality of the product made.

Flexibility

This system of drainage can be installed so as to accommodate any graduation of pressure that the operators require. For instance, it is essential on some grades of paper that the wet end pressure be considerably higher than the dry. On such sheets as crepe, a higher pressure on the first wet end driers will set the crepe and eliminate the objectionable carryover or stretch and resulting breakoffs at the first doctor. It will allow any crepe machine to operate much faster. Again, on some paper machines, it is essential to decrease the pressure at the wet end for a few driers. These same machines, however, may be operated much of the time on different grades where one pressure from end to end is beneficial, thereby decreasing the back pressure and gradating more perfectly the temperature throughout the whole dryer section. This can be accomplished with this system because the machine can be run one pressure from end to end or any gradation of pressures that the operators desire. This one fact represents a flexibility which allows a considerable decrease in operating pressure and an appreciable increase in the capacity to dry, which, if the sheet can be formed, means an increase in the operating production.

Other Benefits

Besides the several claims of accomplishment, the concrete benefits to be achieved by this installation, things that can be positively proven, there are also several abstract benefits that are hard to prove, but, nevertheless, are of real value. Some of these would be evenness of drying, ability to carry a little more moisture in the finished sheet, longer life of machine dressing, and the general atmosphere of a more constant, even and generally better drying condition. It is possible with this system to change from a light to a heavy sheet without loss of any production due to underdrying. The paper machine will be so active that an increase in drying capacity, due to an increase in pressure, will catch and maintain the same drying condition in a heavier sheet before it can get through the dryer section.

Steam Consumption

Again, it has been my observation that the steam consumption per pound of water evaporated from the sheet seems to vary according to the thickness of the sheet being dried. Such factors as slowness and freeness seem to determine the operating pressure and the speed of drying, but if the sheet remains the same thickness, the actual steam used per pound of water evaporated will remain approximately constant. The thinnest of tissue sheets will dry at the rate of about 1.1 pounds of steam per pound of water evaporated. Thicker sheets, such as newsprint, will dry at the rate of 1.29 pounds of steam per pound of water evaporated. A 16 caliper board requires about 1.48 pounds of steam per pound of water evaporated and

the heaviest board that I have observed, about 70 caliper, requires nearly 2 pounds of steam per pound of water evaporated. Using this interpretation of steam consumption and assuming a board machine making 16 caliper board, with the board entering 35 per cent bone dry and leaving 95 per cent bone dry, there will be approximately 1.72 pounds of water removed from each pound of finished product. At the rate of 1.48 pounds of steam per pound of water evaporated, the steam consumption will be very close to 2.55 pounds of steam per pound of board dried.

Economy of Operation

The reason this system is so economical is the fact that the steam enters the driers and remains there until completely condensed. I am firmly convinced that many of the rules governing the circulating of steam for the best drying conditions are in error. To get the most heat units out of steam in the shortest possible time, it must be stopped dead still while being condensed. If there is not sufficient exhaust, and live steam must be added to the exhaust, the steam consumption rises and so does the pressure. Where a steam engine is employed and there is insufficient exhaust for the drying operation, considerably less steam is used where the exhaust is employed in one section and the live steam in another. In every case where this drainage system has been employed on a paper machine, formerly equipped with a rapid circulating system, the decrease in actual steam used per pound of water evaporated has been at least .2 pounds of steam per pound of water evaporated and in many cases considerably more. There is usually no quicker way to save money in a mill than to decrease the amount of steam used for drying and, at the same time, even out the drying operation.

Government Paper Bids

[FROM OUR REGULAR CORRESPONDENT]

Washington, D. C., December 9, 1936—The Government Printing Office has received the following bids for 15,000 sheets of 22x28, 14 ply white railroad board; Virginia Paper Company, $51,83 per M sheets; George W. Millar & Co., $52.38; Reese & Reese, Inc., $48.50; Whitaker Paper Company, $41.92; Dobler & Mudge, $51.69; Old Dominion Paper Company, $52,368; and L. Hyman & Sons, $51.86.

For 18,450 pounds (50,000 sheets) of 75 per cent rag, 44x56 lithograph finish map paper; Barton, Duer & Koch Paper Comapny, 13.49c; Mudge Paper Company, 13.47c; R. P. Andrews Paper Company, 13.47c; Whiting Paper Company, 16c; Reese & Reese, Inc., 19.65c.

For 10,540 pounds (25,000 sheets) of 75 per cent rag, 44x46 lithograph finish map paper; Barton, Duer & Koch Paper Company, 13.49c; Mudge Paper Company, 13.47c; R. P. Andrews Paper Company, 13.47c; and Reese & Reese, Inc., 19.65.

For 50,000 sheets of 22x28, 4 ply white railroad board; Virginia Paper Company, $22.36 per M sheets; Reese & Reese, Inc., $23.75; Whitaker Paper Company, $22.57; Dobler & Mudge, $22.33; Old Dominion Paper Company, $22.587; and J. R. Howarth Paper Co., $26.64.

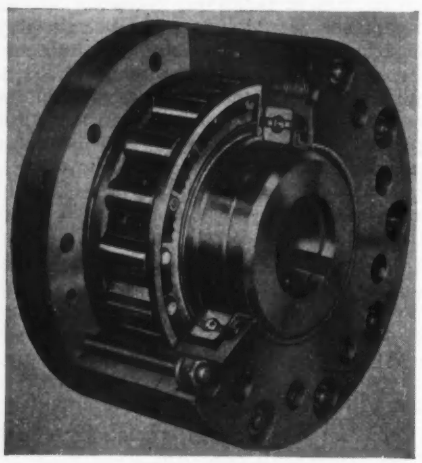
For 35,800 pounds (200,000 sheets) of white antique book paper; Fitchburg Paper Company, 5.46c; Cauthorne Paper Company, 5.41c; John F. Post, Inc., 5.41c; Whitaker Paper Company, 5.51c; Stanford Paper Company, 5.16c; R. P. Andrews Paper Company, 5.51c; Barton, Duer & Koch Paper Company, 5.16c; Paper Corporation of U. S., $5.41c; Reese & Reese, Inc., 5.41c; and Mathers-Lamm Paper Company, 5.19c.

For 5,000 pounds binders board; R. P. Andrews Paper Company, 4.6c; and Barton, Duer & Koch Paper Company, 4.6c.

New Type Free Wheeling Clutch

The Free Wheeling, or One Way Clutch coupling in industry has rapidly become recognized as a device that fits many important needs in various types of machinery. Logically, its functions serve to relieve driving or driven shaft loads where intermittent or standby service is needed, and its uses extend from the rachet feed mechanism of a small printing press to the clutch connection between huge turbines, gas or electric motors and the units driven by these sources of power.

A specially important feature provided in this new clutch is its very low and constant resistance to free-wheeling, regardless of whether the driving or driven element does the free-wheeling. This is accomplished by a series of individually sprung cams actuated by the



NEW TYPE FREE WHEELING CLUTCH

main drive gear and restrained from the action of centrifugal forces by retainer rings supporting each end of the cams. This design permits the use of a large number of cams which offers the maximum in capacity at a given diameter of clutch and provides smooth and immediate engagement at synchronization of speeds between driving and driven members.

Several sizes are available adapted to ¼ horse-power per hundred rpm. to 100 hp. per 100 rpm. and provided with flexible couplings in either the Morse Morflex rubber insert coupling or the Morse Chain Coupling, when required.

This free-wheeling clutch is manufactured by the Morse Chain Company, Detroit, Michigan, Division of Borg-Warner Corporation.

Pulpwood Output Increase

There is every evidence that there will be a considerable increase in the output of pulpwood in the various parts of Canada. Prices paid to individual cutters are from 25 to 50 cents more per cord and the market is a little stronger than it has been for some time. In the whole paper and pulp arena, the outlook for 1937 is encouraging, and it is predicted that owing to increased cost of production, particularly in logging activities, various lines of paper will be advanced in price at the beginning of the new year. A general summary would indicate that the volume with most concerns has been larger than that of 1935 by from 10 to 25 per cent, with an average of about 15 per cent. Carton and paper box factories, board mills and specialty plants, have been very busy during the past few weeks, and larger Christmas holiday orders have been received than in any other year since 1929.

Rubber Design Rolls

Paper Decorating with Fluid-type Inks

By J. B. Shaughnessy[1]

Several years ago, one of the foremost paper authorities, on his return from Europe, predicted a decided "swing" to the then-called aniline style of printing for paper decoration. He further said that this type of work would be done in the paper mill and, in all probability, as a part of the paper machine job.

We then had finishes, most of which did not lend themselves to good letterpress printing. Fancy finishes, mostly embossed, were not suitable for, or were too expensive for, average jobs that could use a decorated or fancy finished paper. It might be said, that the total tonnage sold to converters for printing by intaglio, coating, frictioning or flinting was not as great as two paper mills' direct sales to large paper users today, in fields that had not been touched in the past.

The demand for papers with designs, trademarks and decorations in the box, papetries, fancy finish offset, wrapper, greeting card fields, etc., was great. Quality paper manufacturers were beginning to find a demand in the market for papers having a good appearance that would cost less and yet be effective.

They investigated the aniline printing and staining field. In the first place, only machines of foreign manufacture were available and paper manufacturers lacked confidence in them because they knew nothing about the machines and were under the impression that they were complicated. This idea was soon eliminated and next they learned that aniline inks were "fugitive" and therefore limited in their use to those papers that would not come in contact with direct sunlight. However, they could use them on some types of work. The next thing that came up was "printing rolls." They had to be purchased in foreign countries and deliveries on them required two to four months and only those who planned far in advance could hope to use them.

The manufacturers had visions of their machines, if installed, being idle a great deal of the time due to lack of promptness in design roll delivery.

In most industries there are "pioneers." Likewise, in the paper industry, one or two of the braver members ventured forth and purchased aniline printing machines to "see what could be done." They were endeavoring to bolster up a steadily declining market that lacked "something." "Something new and different!"

After a time, they called on the resources of the ink companies and dyestuff manufacturers to do something about the ink. We must say it has been done, not entirely, but to a point where no one fears an aniline ink or that it will be "fugitive." It is no longer a "true" aniline ink. It is now just a "fluid" ink, still water-like, and using aniline dyestuff but pigmented and in some instances a lacquer. This was only part of the difficulty. Paper mills were getting inquiries and an occasional order that stipulated three weeks' and one month's delivery of paper, done in a specific design. Therefore, they cast about for a rubber design roll manufacturer. There was no such thing! Why should there be? There was no demand! Several people tried to make rolls and many were made but none were as good as the foreign rolls. The accuracy and fineness of detail were not apparent. The people lacked or did not have the proper technique for the manufacturing of these rolls.

Today, there is one complete domestic roll manufacturer equipped with the knowledge, experience and equipment to manufacture rubber printing or design rolls that will outlast and be more accurate than rolls of foreign manufacture. In many instances, they ship complete rubber rolls, ready to use, within three days from receipt of an order. Three and four years ago, shipment required four weeks' time. We know of one occasion where a paper mill was required to promise delivery of the "first paper" within a week. The complete trade mark rubber design roll was shipped to the mill 48-hours after receipt of the roll order!

It follows, therefore, that it is possible for a textile manufacturer to change a brand, order his wrapping paper, and ship goods in the same season. A shoe manufacturer might redesign his name or trade-mark and have boxes covered with the new design within three to four weeks. Greeting card manufacturers can include last-minute designs in current years' lines. Likewise, no longer conferences and large appropriations are necessary for users of wrapping papers to trade mark their papers; the cost is nominal and the advertising value great. Corrugated box manufacturers are printing overall patterns or designs on their board as it comes from the combiners and then feeding the boards through their presses to overprint the name and quantity of the specific item to go into the container. Several liquor manufacturers are now purchasing boxes done in this same manner.

Paper can be "watermarked" with rubber design rolls and an ink that penetrates the sheet making it more transparent in the mark, without disturbing the fibers in the sheet, and at a fraction of the cost of a "dandy roll." Perhaps, many will criticize the method or idea, but if it is not done in this manner it will never be done and the additional revenue will never be collected.

Staining of papers with rubber rolls and fluid inks is also an important feature. Small runs of tissue or light weight papers can be done, and done extremely well, on an aniline machine. We know of one manufacturer who has as many as 30 shades of tissue to do, on short notice. He saves money by running white and unbleached stock and staining for color shades. He runs the exact amount of paper required and cuts out the staining machine or switches to another color. Another mill runs a two-toned sheet with a fluid ink and it appears to be coated when completed.

The field of rubber design rolls in this new and versatile machine, employing fluid-type inks, has only been "scratched." With slight changes, unlimited effects and uses can be accomplished. The speed of these machines is being stepped up to the point where 800 to 1000 feet per minute is not far off. Drying is almost instantaneous and no festooning is necessary; neither is the printability of the paper affected. Inks can be changed to meet the requirements as to opacity, drying, brilliance, etc. Precision rubber printing and design rolls are here.

The answer to it all is: A creative thought on the part of the paper salesman or mill representative with vision will most certainly produce tonnage heretofore never in demand.

[1] Rubber Printing Products Co., Inc., subsidiary of American Wringer Co., Inc., Woonsocket, R. I.

Outlook for Newsprint Brighter

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., December 7, 1936—Stiffening of the prices of newsprint stocks on the local Stock Exchange continues. Some fortunes have already been made by those who bought some of the leading issues when they were selling for a song, to find them in the past few months rising to substantial worth.

The rise of 6 points or more in some paper stocks during the past week was no doubt largely influenced by the October production sales of newsprint, which set an all-time record. Added to this is the fact that the industry is now producing to the limit of effective capacity in order to supply contracts. Additional tonnage will no doubt come into operation in due course, but this is always a tedious and expensive process.

A further factor is the evident determination of the industry to get itself on solid financial footing again. The Price Bros. & Co.'s reorganization is proceeding, with very definite prospects of the company being taken out of bankruptcy at no distant date. Consolidated Paper has a plan which will tide it over the next few years, and there is a good deal of talk about Abitibi, with two or three plans working towards rehabilitation.

Boston Paper Industry News

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., December 7, 1936—A well attended meeting of the Paper Cost Finding Service was held at the Boston Chamber of Commerce Friday, with Harry J. Dowd, of H. J. Dowd Company, Cambridge, Mass., presiding, and John C. Hurd, secretary of the New England Paper Merchants Association, acting as secretary. There was an interesting discussion of current market conditions.

At a sales meeting of John Carter & Co., Inc., held at the office of the company Saturday morning, Morris Park, representative of the sales department of the Marvellum Company, Holyoke, Mass., was the speaker, demonstrating several of their lines, of which John Carter & Co. are distributors.

The Stone & Forsyth Company have decorated their office attractively, appropriate to the Christmas season, with the holiday colors of red and green and red prominent.

Albert E. Temple, who for the last twenty years has represented the Merrimac Paper Company, Lawrence, Mass., has joined forces with Percy D. Wells.

Dickinson Division May Be Razed

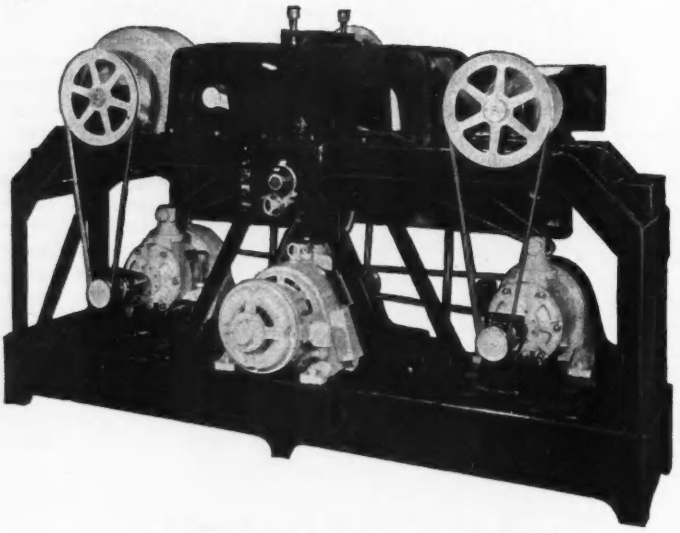
[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, Mass., December 8, 1936—If approved by the heads of the WPA another former division of the American Writing Paper Company Inc., the George R. Dickinson Division will become a pile of brick and lumber. John J. Martin, co-ordinator for the WPA locally has forwarded such a project for acceptance. The property was bought some months ago by the municipal lighting department of the city it being the next to the municipal lighting plant. The mill was the second large paper mill to be built in Holyoke and was for years a money-maker, when operated by Mr. Dickinson. Later his son, Henry E. Dickinson and one-time Springfield mayor directed its destinies.

Dancer Roll Control

This machine was exhibited at the National Power Show in New York to demonstrate the simplicity and effectiveness with which constant tension may be maintained in winding operations by the application of the New Departure Transitorq controlled by the dancer roll.

A dancer roll is inherently a tension control by means of weight applied to a continuously running material. The



TRANSITORQ CONTROLLED BY THE DANCER ROLL.

pressure roll is driven by a motor which also drives the winding drum, but with a Transitorq interposed, the speed of the Transitorq being controlled by the dancer roll.

As an example, assume that it is desired to process material at a given speed. It can readily be seen that, given a constant winding drum speed, as the roll of material being wound increases in diameter, its surface speed increases. With no compensation for this, the tension on the material builds up to the damaging point of the material itself. To correct this condition, the speed control of the interposed Transitorq is connected to the dancer roll which (in the demonstrator) rests upon the material. As the coil diameter increases, the material tightens and causes the dancer roll to move upward. This movement actuates the Transitorq speed control mechanism and adjusts the speed of the winding drum.

In addition to the control of tension, in order to run through the machine materials of different type and quality requiring a wide variance in processing speeds, it is recommended that the power source of the main drive be a Transitorq, which may be mounted with any make of standard electric motor.

Now District of Columbia Paper Mills

The District of Columbia Paper Manufacturing Company, Washington, D. C., announces that it has changed its corporate name to the District of Columbia Paper Mills, Inc. The new name for all the papers of the company from now on will be Disco Papers. A new trade mark has been thoughtfully and simply designed in an effective manner and it will appear conspicuously throughout the firm's literature and in all its new packaging. The officers of the company are: George L. Nicolson, president; Daniel A. Smith, vice-president; Wilbur W. Langtry, vice-president and Herman R. Harrigan, general manager.

A Dard Hunter Book at New Low Price

The books compiled by Dr. Dard Hunter on papermaking are usually considered too expensive for the average person interested in this subject. The demand for Mr. Hunter's first book, "Old Papermaking," published in an edition of only 200 copies in 1923, has caused this volume to be sold at more than one hundred dollars a copy.

Owing to the interest shown in "Old Papermaking," the late Mr. William Edwin Rudge prevailed upon the author to enlarge upon the text and illustrative material of this book so that another edition might be printed that could be sold at a price within the reach of a much larger audience than was possible with the limited, handmade paper edition. The more comprehensive book was issued in an edition of 2500 copies in 1930 under the title "Papermaking Through Eighteen Centuries." The expense of producing this book was so great that Mr. Rudge insisted upon the price being set at seventeen dollars and fifty cents a copy—more than 1000 books were sold in twenty-six countries of the world at this seemingly-high price. It was the author's original desire, however, that the price of the book be seven dollars and fifty cents, but the cost of making the books was so high that this low figure was impossible.

In 1936, after the death of the esteemed founder, the famous Rudge printing plant at Mount Vernon, N. Y., was sold. Mr. Hunter was fortunate in being able to purchase the several hundred remaining copies of "Papermaking Through Eighteen Centuries" and these books are now offered to readers of THE PAPER TRADE JOURNAL at a price even below the figure at which Mr. Hunter wished the books to be sold when published.

The book is printed on paper that was made especially for this edition and all text and illustrations are printed in the aquatone process, a method of printing that was introduced in America by Mr. Rudge. The book has 356 pages, 214 illustrations and folding plates and a complete index—all devoted to papermaking and watermarking from the early centuries of the craft to the present day.

The remaining books can be had at the new low price of $4.75, express prepaid, by addressing: Dard Hunter, Chillicothe, Ohio., U. S. A. A prospectus giving reproductions of four interesting pages from "Papermaking Through Eighteen Centuries" may be had gratis.

Guaranteed Employed Plan Abandoned

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, Mass., December 8, 1936—The plan of guaranteed employment that was adopted by the Crocker-McElwain Company in 1921 has been abandoned on account of the Federal Government's Social Security Plan which it is figured will take its place. By the Crocker-McElwain plan each worker was guaranteed so many days' work whether the mill was operating or not. The company, however, maintained the right to use the employees on other than their regular work in times of shutdown.

Herb Larkin Returns To Bryant

E. H. (Herb) Larkin returns to the Bryant Paper Company as vice-president after an absence of about a year during which time he was vice-president and sales manager of Wausau Paper Mills Company. He will again be in charge of the Chicago sales district of the Bryant Paper Company, making his headquarters, as of old, at the Company's Chicago office in the Daily News Building, Chicago, Ill.

Builds Specialty Mill at Rochester

W. O. Stronach has started construction of a specialty paper mill in Rochester, Mich. The capacity will be ten tons per day and paper making operations are expected to start next April. A modern steel and concrete mill type construction building has already been started. The plant will manufacture a patented sheet of paper used as a substitute for corrugated board.

E. L. Perry, formerly of Troy, N. Y., will be the superintendent.

After January 1 a corporation to be known as the

W. O. STRONACH

Colonial Paper Company will be incorporated and meanwhile Mr. Stronach is operating as an individual until the mill is constructed.

Mr. Stronach was one of the co-founders of the Rochester Paper Company of Rochester, Mich., and served as secretary and treasurer of this company for the past ten years.

Lawrence Pumps for Orient

The Lawrence Machine and Pump Corporation, 371 Market street, Lawrence, Mass., has recently furnished four pumps for a bagasse mill in the Orient.

One is a 6 inch suction, 4 inch discharge, non-clogging sludge pump for handling bagasse pulp at 4 per cent consistency. On account of the highly abrasive character of this pulp and to eliminate the tendency to plug the sludge pump similar to that used for pumping sewage and slurries was selected.

The pump is of the horizontal type, direct connected to motor. The parts coming in contact with the pulp are made of 3 per cent nickel iron.

The second pump is a 3 inch open impeller, non-clogging type. This pump handles 2 per cent nitric acid solution at 212 degs. F. All parts of this pump coming in contact with the pulp are made of stainless steel.

The third pump is also an open impeller, non-clogging pump for handling 2 per cent to 5 per cent caustic soda solution at 212 degs. F. All parts of this pump coming in contact with the pulp are made of Monel metal.

The fourth pump is a 1½ inch open impeller, non-clogging pump for handling washed pulp at 1 per cent consistency.

Paper Industry Bowling League

The Paper Industry Bowling League is now organized and is going strong in the 1936-37 season. C. Ivan Hill of the Riegel Paper Corporation has been elected president and D. Benzoni, of the Union Bag and Paper Corporation, treasurer. Charles E. Schaehrer, also of Riegel Paper Corporation, has been elected secretary.

The Riegel Paper Corporation has donated a cup to be known as the "Riegel Trophy" and C. I. Hill will present this to the winners of the 1936-37 season. This trophy may be held by the winners for one year, after which it will pass into the possession of the next year's winning team. The first team to win the cup for three years, not necessarily consecutive, may then claim ownership to the cup.

Every Monday night at the Grand Central Bowling Alleys, 40th street and Park avenue, New York City, is a scene of friendly poshing and mighty efforts to bowl a 'perfect 300' score. Ed Corrent, of the Union Bag and Paper Corporation team is high individual scorer with 247. Arthur Ohman of International Paper Company team is leading the high individual avearges with 193.

Standings of each team at present are:

	Games Won	Games Lost
Bulkley-Dunton & Co.	16	5
International Paper Co.	13	8
Union Bag & Paper Corp.	12	9
Riegel Paper Corp.	10	11
Walker-Goulard-Plehn	7	14
Salesmen's Association	5	16

PAPER INDUSTRY BOWLING LEAGUE

No.	Team	Captain	Telephone
1.	Union Bag & Paper Co.	E. Corrent	COurtlandt 7-5304
2.	International Paper Co.	P. J. Ward	VAnderbilt 3-6600
3.	Walker-Goualrd-Plehm Co.	J. Burke	WOrth 2-0050
4.	Riegel Paper Corp.	C. E. Schaehrer	MUrrayhill 2-4900
5.	Bulkley-Dunton & Co.	P. R. Brandt	CAledonia 5-5260
6.	Salesman's Association	Wm. Raymond	GRamercy 5-1017

SCHEDULE

Date	Alleys 7—8	9—10	11—12
Oct. 19	1—2	3—4	5—6
26	4—5	6—1	3—2
Nov. 2	3—1	2—5	6—4
9	2—6	5—3	4—1
16	6—3	4—2	1—5
23	3—4	2—1	5—6
30	6—1	5—4	3—2
Dec. 7	2—5	1—3	6—4
14	5—3	6—2	4—1
21	4—2	3—6	1—5
28	6—5	1—2	3—4
Jan. 4	2—3	4—5	6—1
11	4—6	3—1	2—5
18	1—4	2—6	5—3
25	5—1	6—3	4—2
Feb. 1	6—5	3—4	2—1
8	2—3	6—1	5—4
15	4—6	2—5	1—3
Mar. 1	1—4	5—3	6—2
8	5—1	4—2	3—6
15	3—4	6—5	2—1
22	6—1	2—3	5—4
29	2—5	4—6	1—3
Apr. 5	5—3	1—4	6—2
12	4—2	5—1	3—6

Allis-Chalmers Steam Turbine Bulletin

Allis-Chalmers Manufacturing Company, Milwaukee, Wis., now is releasing another attractive steam turbine bulletin, number 1181, covering its standard line of high pressure, non-condensing steam turbine units of the three valve reaction type suitable for top turbine service, or furnishing steam for high pressure process work. All the turbine frames covered by this bulletin have been in service for at least a year. The construction of these turbines is given in considerable detail including both photographs and drawings. One section of the bulletin is devoted to the detail construction of alternating current generators suitable for this type of steam turbine.

Paper Demand Brisk In Boston

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., December 7, 1936—Paper jobbers in and around the Hub were generally busy last week with the volume of orders on the whole well sustained. From the office of one firm handling fine paper came the comment that business was "very good, a very marked improvement over a year ago." Favorable statements were made at other offices. Box coverings were exceedingly active. The demand for papers by printers for advertising purposes improved. There was a considerable rush for wrapping paper, as usual on a rising market. Kraft specialties moved well. In box board, orders came in in fair volume, although new business was not quite so brisk as it has been.

Paper stock is in an exceedingly strong situation, as a whole, with prices firm. The longshoremen's strike is helping the price situation a great deal. It is stated that there are no men to handle the merchandise on the West Coast, where there are very heavy shippers of books and magazines. It is reported that workers refused to unload boats arriving at Eastern ports from France, so shippers from that country are not sending any more paper stock at present. Old papers were in demand in practically all grades. No. 1 books heavy advanced to .80 @ .90 from .70 @ .80 f. o. b. Boston and mixed papers to .42½ @ .47½ from .40 @ .45, f. o. b. Boston. All other grades remained steady. Bagging was strong in all grades. Foreign manila rope rose to 3.00 from 2.85, jute carpet threads to 1.75 @ 2.00 from 1.65 @ 1.75, paper mill. Bagging to 1.75 @ 1.80 from 165 @ 1.75, and bagging No. 2 to 1.30 @ 1.35 from 1.10 @ 1.35, all f. o. b. Boston. New and old domestic rags were strong, but unquotably changed. Foreign rags were likewise strong, with dark cottons advancing to 1.95 @ 2.10 from 1.90 @ 2.05, f. o. b. Boston.

Business in twine increased. It is intimated that practically all mills have now advanced prices two cents a pound.

Manufacture of Paper From Bamboo Proposed in Indian State of Hyderabad

[FROM OUR REGULAR CORRESPONDENT]

Washington, D. C., December 9, 1936—The government of Hyderabad, India, is endeavoring to convince local capitalists of the possibilities of establishing a paper industry within that State according to a report from Consul C. C. Jordan, Madras, made public by the Commerce Department.

The Commerce and Industries Department has recently issued a report which calls attention to the fact that Hyderabad contains inexhaustible supplies of bamboo from which paper could be made, sufficient water power, and labor and good transportation facilities. It is being pointed out that a 5,000-ton capacity plant would find a ready outlet for its production in India whose annual consumption of paper approximates 20,000 tons, the report states.

The establishment of a paper industry in Hyderabad, Consul Jordan states, would benefit the local Government in two ways since the State is the owner of the largest bamboo forests and is also the chief purchaser of paper. The Government would further benefit in that the railway earnings will be substantially increased as 40,000 tons of raw material and manufactured paper would be transported annually to and from the local paper plant, according to the report.

CONSTRUCTION NEWS

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

Construction News

Los Angeles, Cal.—The Pioneer-Flintkote Company, 5500 South Alameda street, Vernon, Los Angeles, manufacturer of roofing and building papers and allied products, a subsidiary of the Flintkote Company, 50 West 50th street, New York, N. Y., has engaged Edward C. and Ellis W. Taylor, 803 West Third street, Los Angeles, architects, to prepare plans for proposed new additions to local mill, recently noted in these columns. The first unit will comprise a large one-story building, to be equipped as a corrugated box board mill. This will be followed by several other one-story structures to be used for other mill departments, including storage and distribution. It is expected to ask bids on general contract in near future. Entire project is reported to cost close to $1,000,000, with machinery.

Fulton, N. Y.—The Armstrong Cork Company, Lancaster, Pa., manufacturer of sheet cork products, insulation specialties, etc., has asked bids on a general contract for new one-story factory branch, storage and distributing plant at Fulton, to be about 85x200 feet. Cost over $60,000, including equipment. Work on superstructure is scheduled to begin soon.

Charlotte, N. C.—The Virginia Paper Company, South Cedar street, has awarded general contract to the Southeastern Construction Company, 218 West Second street, Charlotte, for new two-story building on local site at Main and Graham streets, recently referred to in these columns, and will proceed with erection at once. It will approximate about 30,000 square feet of floor space and is estimated to cost close to $60,000, with equipment. Walter D. Blair, 154 East Sixty-first street, New York, N. Y., is architect. Main offices of company are at Richmond, Va. D. M. Blair is president.

Monroe, Mich.—The River Raisin Paper Company, manufacturer of corrugated board, box board and allied products, will carry out erection of proposed new addition to mill by company forces, for which plans are now being completed, as recently noted in these columns. It will be one-story, about 200x200 feet, brick and reinforced-concrete type, and will be equipped for large increased capacity. It is estimated to cost approximately $200,000, including machinery.

Chicago, Ill.—The Desplaines Waste Paper Company, 736 Tilden street, is planning early rebuilding of portion of plant recently destroyed by fire. Loss estimated close to $25,000, including equipment.

Hadfield, England—The Waterside Board Mills, Ltd., Glossop, England, manufacturer of paper board products, has preliminary plans under way for large mill at Hadfield, where tract of land has been selected. It will consist of group of one and multi-story units, equipped for large capacity, with power house, machine shop and other mechanical structures. Proposed to begin work on project early in 1937. It is estimated to cost approximately $1,000,000, including machinery.

Taku, Japan—The Toyo Paper Company, Tokyo, Japan, has approved plans for new pulp and paper mill on large tract of land recently acquired at Taku, and will proceed with erection at once. It will comprise several large units for pulp and finished paper production, and is estimated to cost over $600,000, including equipment. Completion is scheduled during 1937.

New Companies, Etc.

Holyoke, Mass.—New England Paper Service Association, Inc., has been incorporated with capital of $20,000 and 4000 shares common stock, no par value, to deal in paper products. George B. Fowler is president; and Bruce Crane, Dalton, Mass., treasurer.

Lafayette, Ind.—The Warren Paper Products Company has filed notice of increase in capital to $30,000.

Philadelphia, Pa.—The Penn Fibre and Specialty Company, 912 South 12th street, has filed notice of organization to manufacture and deal in fibre products. Charles C. and William K. Davis, 7271 Guilford road, Upper Darby, Pa., are heads.

Brooklyn, N. Y.—The Triangle Paper and Woodenware Company, Inc., has been formed with capital of $20,000, to deal in paper goods of various kinds. New company is represented by Rathkopf & Rathkopf, 225 West Thirty-fourth street, New York, N. Y.

Connecticut Superintendents Meet

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, Mass., December 8, 1936—The December meeting of the Connecticut Valley Division of the American Pulp and Paper Mill Superintendents' Association was held Saturday afternoon at the Hotel Nonotuck. W. Gordon Booth of New London, Conn., presided and about 100 attended the business meeting with 150 or so at the dinner dance that followed.

Plans were advanced for the annual meeting of the association to be held in Springfield June 23-25. G. Clifton Walton of the Downington Manufacturing Company of Downington, Pa., described one of the latest machines, a tissue "Yankee" Fourdrinier installed for the Pond's Extract Company at Seymour, Conn. His talk was illustrated by moving pictures bringing out the important points of this machine.

F. K. Becker, vice-president and manager of the Bird Machine Company of South Walpole, read a paper on "Keeping the Dirt Out of Paper," outlining the modern equipment used for this purpose. Cornelius Stapley of this city had charge of the arrangements.

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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.

LAKE 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.

LOCKWOOD'S DIRECTORY

The sixty-second annual edition of Lockwood's Directory of the Paper and Allied Trades has just been issued. After a long period of comparative quiet, due to the severe depression, the pulp and paper industry has during the past year shown a surprising revival. Old mills are again being modernized and expanded and new mills are being built and projected. This is true especially of the South, where at least nine great kraft mills are either in process of erection or being planned. As a result of this revival more new mills and more changes in going mills have been entered in the Mill Section of the Directory than has been the case since the boom period of the late 20's. Owing also to many reorganizations, the changes in the officers of the various pulp and paper concerns have been more than usually numerous.

Appearing in the Directory for the first time this year is an alphabetical list of concerns having two or more pulp and paper mills, together with the location of such mills and the general offices of the companies. This list makes easily available information that is frequently needed by users of the Directory.

The section of Equipment, Supplies and Technical Service for Paper and Pulp Mills continues to prove its value and usefulness by the manner in which this department is expanding. Thousands of items constantly required in pulp and paper mills are listed in this section, making convenient for ready reference a source of such supplies and equipment. Listings in this section are free of any expense. While it is endeavored to make this section as complete as possible, it is realized that the field is rapidly and constantly expanding and under these circumstances that some concerns who are eligible for listing may have been left out. If, therefore, any individuals or concerns who should be included but are not, will inform the publishers to this effect, the omissions will be gladly corrected.

Because of the revival in business, it has been necessary to make many more additions and changes in all the other sections of the Directory, including the Classified List of Pulp and Paper Mill Products, Glazed, Coated Paper and Board Manufacturers, Rag and Paper Stock Dealers, Rags and Paper Stock Consumed by the Mills, General Paper Merchants, Paper Box Manufacturers, Paper Bag Manufacturers, Envelope Manufacturers, Papeterie Manufacturers, Pulp Testing Chemists, Office Addresses of Mills and Mill Supply Houses and the Watermarks and Brands.

It should be remembered, especially by new subscribers, that the Table of Contents on page 4 will make it easy for them to find any section of the book in which they are interested. They should remember also to read carefully the explanatory matter at the head of each section. By doing this points that otherwise might be confusing will be clear.

Two editions of the Directory are issued. The regular edition includes about 1,200 pages and the Travelers' edition includes about 250 pages and contains only the pulp and paper mill section, making a convenient volume for travelers to carry about. The cost of each edition is $7.50 or $7.00 cash with order. Orders should be sent to the Lockwood Trade Journal Company, 15 West 47th street, New York.

WHAT THEY DO

Each year from Thanksgiving to Christmas, Americans from Maine to Hawaii and from Alaska to Florida unite with the people of 41 other countries in one of the most powerful mass movements against a common foe that the world has ever known—Tuberculosis.

Voluntarily they participate in the annual sale of Christmas seals, those gay holiday stickers on which appears that international symbol of health and hope—the double-barred cross. This year the United States seals also bear the picture of jovial good health personified, Santa Claus.

Christmas seals, since 1907 when the first one was sold in Wilmington, Del., have raised funds—penny by penny and dollar by dollar—that have helped to build a line of defense that protects all of us.

That the defenses are effective is shown clearly by the fact that the tuberculosis death rate has been forced down from 179 deaths per 100,000 population in 1907 to 54 in 1935.

Against the unnecessary toll taken by this *communicable, preventable and curable disease,* the comparatively small sums of money raised in local communities by voluntary groups have been used in those communities with a definite

plan, under the guidance of the National Tuberculosis Association.

These funds have promoted the establishment of agencies by various kinds that have in turn been chiefly instrumental in gradually bringing tuberculosis under control. These lines of defense may be catalogued briefly thus:

1. 1,200 institutions—sanatoria for tuberculosis and hospitals having tuberculosis departments—providing 95,000 beds for the treatment and prevention of tuberculosis, chiefly for adults.

2. 10,000 public health nurses engaged in tuberculosis work.

3. 1,000 clinics for diagnosing and finding tuberculosis.

4. More than 1,200 preventoria, summer camps, open-air schools and similar institutions for the care and treatment of children with various forms of tuberculosis or for those who have been in contact with tuberculosis, or who are subnormal physically.

5. 1,981 tuberculosis associations including a state-wide organization in every state and local agencies in all of the larger population centers.

But the building of our national defense against tuberculosis is not completed. The disease still takes the lives of about 70,000 persons annually in the United States. Tuberculosis, although ranking *seventh* as a cause of death when all ages are considered, is the *leading* killer of people between 15 and 45. It remains the breaker of homes, the maker of orphans and a constant threat to the life and happiness of everyone.

Mead Corp. Pays Dividend

[FROM OUR REGULAR CORRESPONDENT]

DAYTON, Ohio, December 7, 1936—The Mead Corporation distributed approximately $168,000 in Chillicothe and vicinity Tuesday, thus adding to the holiday buying power of that section of Ohio, this being the amount of checks and common stock certificates covering payment on 14 quarterly dividends.

Three hundred persons in and near Chillicothe hold approximately 8,000 preferred shares, and received $48,000 cash and $120,000 in common stock certificates, valued for dividend purposes at $15 a share, although selling currently on the New York Exchange for $23, or thereabouts.

The cash represented four quarterly dividends and the certificates, 10 past due dividends. The action in paying off in this manner was taken at a Board meeting held in Dayton recently.

Total dividends paid by the Mead Corporation Tuesday on 33,000 shares of preferred stock were $200,000 cash and $495,000 in common stock certificates.

Crossett Paper Mills Join TAPPI

The Crossett Paper Mill of Crossett, Ark., has become a corporate member of the Technical Association of the Pulp and Paper Industry and will be represented by K. A. Forrest, manager.

The Crossett mill is now under construction and is expected to be ready in January. It will have a capacity of 150 tons of sulphate pulp daily, 100 tons of which will be converted into wrapping paper and bags and will cost about four million dollars.

Production Ratio Report

These stastics are based upon paper production reports to the American Paper and Pulp Association.

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%	56.8%
October	87.6%	75.6%	64.7%
November	.....	75.3%	61.7%
December	.....	71.2%	59.5%

COMPARATIVE WEEKLY SUMMARIES

CURRENT WEEKS, 1936		CORRESPONDING WEEKS, 1935	
*November 7	87.0%	November 9	75.5%
*November 14	87.0%	November 16	75.2%
*November 21	89.0%	November 23	76.9%
*November 28	86.1%	November 30	73.5%

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

	Number of Mills Reporting, Current Weeks			
Ratio Limits	Nov. 7, 1936	Nov. 14, 1936	Nov. 21, 1936	Nov. 28, 1936
0% to 50%	55	58	50	55
51% to 100%	272	262	267	182
Total Mills Reporting	327	320	317	237

* 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% Week ending Nov. 28, 1936—75%

H. D. Schmidt Heads Paperboard Assn.

At the annual meeting of the National Paperboard Association held at the Waldorf-Astoria Hotel in New York recently the following officers were unanimously elected:

President, Henry D. Schmidt, of Schmidt & Ault Paper Company, York, Pa.

Vice-President, S. M. Phelan, of West Virginia Pulp and Paper Company, New York, N. Y.

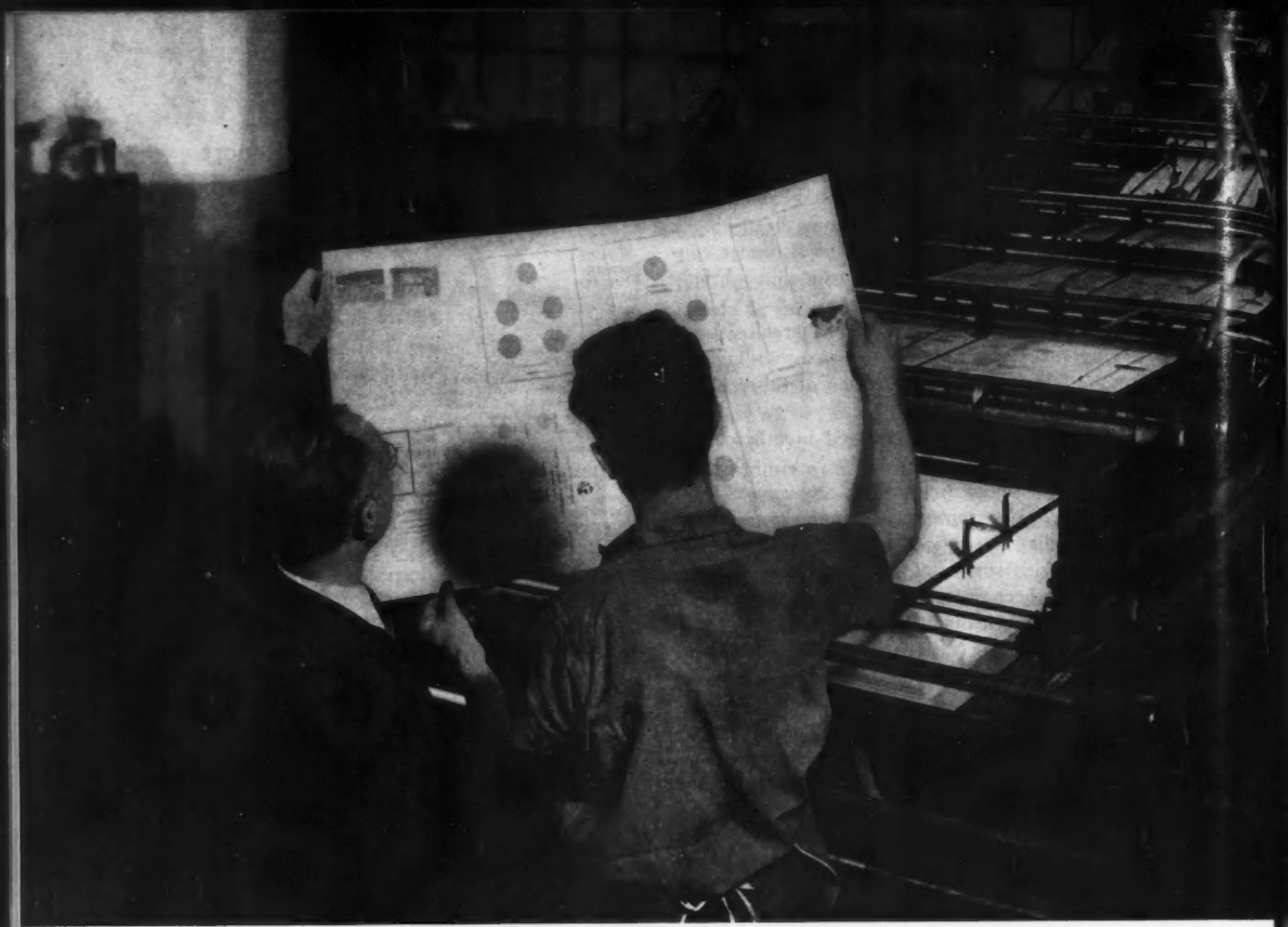
Executive Manager, Frederick G. Becker, 40 East 41st street, New York City, and 80 East Jackson boulevard, Chicago, Ill.

Secretary and Treasurer, H. S. Adler, 80 East Jackson boulevard, Chicago, Ill.

Figures reported at the meeting indicated that the production of paperboard of all kinds during the year 1936 (the figures for November and December estimated) will exceed the production of the previous year by approximately 13.4 per cent.

Expressions by those in attendance at the meeting, representing both large and small mills, were in general optimistic as to the outlook for the near future.

Throughout the sessions it was emphasized that developments affecting the industry, such as legislation, new capacity, increasing cost of raw material, and labor conditions, warrant most careful consideration by the members of the paperboard industry. A continuation of the constructive activities now well under way in the several groups of the association was strongly urged both by the retiring President, Sidney Frohman and by the new President, Henry D. Schmidt.



"Okay"!

And no wonder—for coming through this printer's press is one of those "better" printing jobs done on Zinc Sulphide Pigmented paper. Better because the reproduction of his type and delicate halftones is enhanced by the brilliant whiteness of the paper. Better, too, because the Zinc Sulphide prevents any shadowy "show through" from marring the easy reading, clean cut appearance of his work.

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Bleaching of Rag Half Stock by Calcium Hypochlorite*

By Richard C. Crain[1]

Abstract

A study has been made of the variables involved in the bleaching of rag stock with calcium hypochlorite solutions. The veriables studied include the concentration of the hypochlorite solution used, the ratio of available chlorine to cellulose, the time of treatment, variations in temperature over a range of 15-45 deg. C. and the pH of the bleach liquor. Changes were followed by determinations of viscosity, alpha-, beta-, and gamma-cellulose, copper number, and absorption of methylene blue. It appears that in the ordinary operation of bleaching as carried on in the mill, there is very little loss in weight of the stock, for recoveries ranging between 99.6 and 99.8 per cent have been obtained over a wide range of concentrations of available chlorine. The rate of degradation of the stock is dependent upon the concentration of the hypochlorite solution used, and within limits, is independent of the ratio of available chlorine to stock. The extent of degradation likewise is related to the time of treatment, although the rate of degradation falls off as the time is prolonged. The effect of temperature as followed by changes of viscosity shows that there is roughly a linear relation between the loss of viscosity and the temperature of bleaching up to a temperature of 35 deg. C. As the temperature is increased beyond that point, the viscosity decreases much more rapidly, and above 45 degrees the shape of the extended curves indicates that the modification of cellulose is very rapid. The most rapid degradation of stock within a pH range of 4.5-10 occurs at a pH somewhere in the neighborhood of 6.8. Strength tests of rag stock at consistencies of 4 per cent support the chemical data. The first constant to be modified greatly as bleaching proceeds is that of viscosity. As the viscosity decreases and until it approaches a value in the range of 30-40, only a slight drop in Mullen and tear is noted; as the viscosity falls below this point, strength values begin to decrease rather rapidly. Under the conditions resulting in appreciable loss in strength, there is also a definite decrease in alpha-cellulose content. Data obtained on strength testing of rag stock at a consistency of 4 per cent or less have only a qualitative value, especially in the range of the higher viscosities. In order to bring out strength differences of these higher viscosities, it is necessary to strength test at consistencies well above 4 per cent. A good survey of the literature on the bleaching of rag stock is presented.

Rags intended for conversion into paper receive today essentially the same treatment that they have received for centuries. Bleaching by means of chlorine agents has replaced the early bleaching in air and sunlight, and modern machinery has facilitated the handling and breaking up of the rags, but the process in the main is unchanged. It is apparent from the literature that very little is known of this process, its variables, and their control. This lack of technical knowledge is the reason for this study of the bleaching of rags for paper making purposes.

Historical Review

The literature available in regard to the bleaching of rag stock for paper making includes not only the immediate references to the specific subject, but also the large amount of data relative to the bleaching of textiles and textile fibers, since the bleaching processes of the two industries are so nearly identical, chemically speaking, and differ mainly in the manner of mechanical handling of the stock during the process. Nearly all of the investigations of the modification of cellulose during bleaching have been carried out in the textile field, but the results of the investigation can be applied, at least qualitatively, to the bleaching of rag half stock.

To facilitate the presentation of this historical review, it is convenient to divide the subject into five sections:

A. The Practical Application of Hypochlorites to the Bleaching of Rag Half-Stock.
B. The Quasi-Quantitative Description of the Bleaching Process.
C. The Quantitative Description of the Bleaching Process.
D. The Effect of the Bleaching Process on the Strength of Cellulose Fibers and Products.
E. The Bleaching of Rag Stock with Agents Other Than Hypochlorites.

The articles included under *B* are so grouped because of the failure of the authors to recognize the importance of hydrogen ion concentration in bleaching.

A. BLEACHING OF RAG HALF-STOCK BY HYPOCHLORITES

The use of calcium hypochlorite for bleaching rag half-

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stock has been frequently described in the literature (*1-14*). In general, these articles have reported the quantities of bleaching liquor, or available chlorine, and the length of time required to bleach various commercial stocks to a satisfactory color. The data are taken from mills in various countries and are so dependent on individual mill practice in sorting, cooking, and washing of the rags that they are of little specific value.

With the introduction of electrolytic processes for the commercial production of chlorine and sodium hypochlorite, considerable interest has developed in regard to the relative bleaching properties of sodium and calcium hypochlorites *(15-22)*. In general, it has been concluded from these investigations that sodium hypochlorite bleaches more rapidly and gives a better color than does calcium hypochlorite. The alkalinity of the sodium hypochlorite is more easily regulated. In view of the effect of variations in hydrogen ion concentration and the presence of salts on the bleaching activity of hypochlorites, it is possible that the observed difference between sodium and calcium hypochlorite solutions results from these uncontrolled factors. Higgins *(23)* has shown that sodium, lithium, and potassium hypochlorites all have the same bleaching activity in both alkaline and slightly acid solutions.

In place of hypochlorites, free hypochlorous acid has been used for rag bleaching *(24-26)*. The action of the free acid is very similar to that of equivalent amounts of hypochlorites.

B. Quasi-Quantitative Description of Bleaching.

That the hypochlorite bleaching of cellulose results in the formation of oxycellulose was established by Nastukoff *(27)* who, on drastic over-bleaching, obtained a yield from cotton cellulose of 45 per cent of a material soluble in 10 per cent alkali and reprecipitated by acids. Jecuse *(28)* has also called attention to the formation of oxycellulose by the action of dilute hypochlorites. Moore *(29)* treated cotton yarn at different temperatures with varying concentrations of bleaching powder solutions, to which had been added varying quantities of hydrochloric acid, acetic acid, or sodium hydroxide. He measured the amounts of oxycellulose formed in each case by testing the alkali solubility of the bleached product.

By measuring the rates of oxygen liberation and of chlorine consumption, Higgins *(30, 31)* showed that the bleaching action of hypochlorites followed the course of a unimolecular reaction. He also showed that certain neutral salts increased the bleaching activity of hypochlorite solutions and believed that this was due to the increased solubility of atmospheric carbon dioxide in the salt solutions *(32)*. Underwood and Mack *(33)* found a positive salt effect in the decomposition of sodium hypochlorite in the presence of various salts, and their velocity data showed that, in strong salt solutions, the reaction of decomposition was kinetically bimolecular. The influence of neutral salts, principally chlorides, in increasing the bleaching activity of hypochlorite solutions has also been shown by Ruis y Miró *(34)* and explained by Kauffmann *(35)* and Weiss *(36)*. They suggest that the effect of the salts is to increase the ionic concentration or activity of the hypochlorite ion. Klemm found that iron and calcium soaps, sometimes present as a result of the cooking operation, retarded the oxidizing action of hypochlorites *(37)*.

According to Trotman *(38)*, the rate of apparent bleaching is parallel to the rate of bleach consumption and is increased by the addition of acid or calcium chloride to the calcium hypochlorite solution. Knecht and Egan *(39)* found that the amount of oxygen absorbed by the cellulose was proportional to that available in solution.

The speed of bleaching has been found to be proportional to the temperature of the bleaching solution, higher temperatures resulting in faster bleaching *(30, 40-43)*. Nussbaum and Ebert *(44)* found that the speed of bleaching was approximately doubled for each seven degree rise in temperature, and their results have been confirmed by Heerman and Frederking *(45)* and by Kind *(46)*. Considerable damage to the cellulose was caused by bleaching at temperatures above 100 deg. F., though the reference does not indicate how the damage was measured *(47)*.

By the addition of acid to hypochlorite solutions, the bleaching activity was increased, as was the amount of available chlorine consumed *(30, 40-42, 44, 48, 49)*. Carbon dioxide, either absorbed from the air or added directly, acts similarly to other acids *(32, 50-53)* and forms carbonates and bicarbonates, which act as buffers *(53)*. The addition of alkali retards the rate of bleaching *(54)*.

Escourrou *(55)* exposed the bleaching bath to ultraviolet light and noted an increased rate of bleaching and of attack on the cellulose, and an increased consumption of chlorine.

Ristenpart, Wyrich and Wieland *(56)* found that the presence of an excess of formaldehyde in the hypochlorite solution accelerated the exhaustion of the available chlorine, and checked the excessive degradation of cellulose otherwise occurring in the presence of metals. Localized tendering of cotton and linen had been noted as a result of the action of bleach solutions on metallic impurities in the cloth *(57-62)*.

Taute *(63)* successfully protected the cellulose fibers from damage during hypochlorite bleaching by the addition of sodium silicate to the bleaching bath. The ash content of the fibers was greatly increased by this process.

C. Quantitative Description of the Bleaching Process

The most valuable and comprehensive work in the field of the chemical modification of cellulose by hypochlorite bleaching liquors is the work of Clibbens and Ridge *(64)*. They treated cellulose with hypochlorite and hypobromite solutions in buffered solutions covering the pH range of 1-13. The time required at different pH's for the exhaustion of one-half of the available chlorine reaches a decided minimum at a pH of 7. This minimum time of chlorine consumption corresponds to a maximum rate of consumption. By chemical analysis of the bleached cotton cellulose samples, they found that the cellulose was most degraded at a pH of 7. The chemical tests by which this degradation was indicated were the copper number, methylene blue absorption, and the viscosity in cuprammonium solution expressed logarithmically. In this investigation, the hypochlorite solutions used were in concentrations higher than one gram per liter, and a considerable fraction of the available chlorine was consumed. The work of Clibbens and Ridge was translated in summary form by Kind and Korte *(65)*, who added a little confirmatory data of their own.

In an effort to explain the increased action of neutral hypochlorites on cellulose, Kauffmann *(35)* assumed that the active bleaching agent was a hypochlorous acid-hypochlorite ion complex, and calculated that such a complex exists in maximum concentration at or near the neutral point. His calculation depends on the ionization constant of hypochlorus acid, which is variously reported in the literature *(66-68)*. Weiss *(36)* thought that Kauffmann's assumption was unnecessary and unjustified and instead considered that hypochlorous acid or its anhydride was the active bleaching agent. By a complex mathematical treatment, he showed that the greatest concentration of hypochlorous acid occurs at the neutral point.

Ruis y Miró *(69)* measured the potentials of a platinum electrode in hypochlorite solutions and compared them to the velocity of the reactions and the strengths of the bleached cotton yarns. They found that the addition of neutral salts to the hypochlorite solutions, dilution of the solutions, and partial acidification of the solutions all increased the platinum electrode potential and the extent of damage to the cotton yarn. The most acid conditions employed were obtained by the addition of sodium bicarbonate and so were somewhere near the neutral point. Ruis and Arnal *(70)* applied the platinum electrode to the titration of bleach liquors. Remington and Trimble *(71)*, using a platinum electrode in buffered solutions of sodium hypochlorite, found that the electrode potential was practically a linear function of the pH through range of 5 to 12.

Davidson *(72)* has studied the drop in pH, as determined by the use of a glass electrode, during the course of the bleaching of cotton cloth. He found that the drop in pH was due to the decomposition of the hypochlorite and to the formation of carbon dioxide and oxalic acid from the cellulose by oxidation. Exhausted bleach liquors have a pH of from 6.5-6.6, which is practically the pH of solutions of oxalic acid.

Hofmann and Ritter *(73)* studied the stability of hypochlorites in relation to the oxidation potential of the solutions as determined by platinum or magnetite electrodes.

D. Strength of Bleached Cellulose Fibers.

Greenwood found that bleaching (including the cooking operation with the hypochlorite bleaching) strengthened cotton yarn, although the individual cotton hairs lost as much as 20 per cent of their tensile strength *(74)*. This indicates that bleaching greatly increased the cohesion of the fibers in the yarn. According to Arrington *(75)*, bleaching does not excessively decrease the breaking load strength of cotton cloth. Mackinnon *(76)* traced the loss of strength in processing cotton cloth to the scouring operation, and concluded that hypochlorite bleaching did not necessarily produce a loss in strength.

Cunliffe and Farrow *(77)* showed that the strength of cotton cloth falls off slightly for each step in the bleaching process, and that, on exposure to ultra violet light, the bleached cloth loses strength more rapidly than does the unbleached. The effect due to the light was the same on both bleached and unbleached cloth when long exposures were made.

Williams *(78)* over-bleached cotton yarn with neutral sodium hypochlorite solutions and found that yarn lost from 3-80 per cent of its tensile strength. It is unfortunate that he reports none of the other conditions of bleaching and none of the chemical constants of the cellulose in the yarn.

Ristenpart *(50)* found that the strength of cotton fibers bleached in mildly acid hypochlorite was some 20 per cent lower than the strength when the bleaching bath was alkaline or distinctly acid.

Heerman and Frederking *(45)* investigated the influence of time, temperature, and concentration of the hypochlorite solution on the strength of cotton cloth. They repeated the bleaching treatment as many as fifty times on the same cloth sample, drying the cloth between each treatment. The bleaching was carried out with 0.5 gram of available chlorine per liter at 20 deg. C., and for periods of treatments of 0.25, 1.25, and 6.25 hours. The strength of the cloth after bleaching showed noticeable losses only after repeated bleaching. Increasing the concentration increased the loss in strength, but again this loss was apparent only after repeated bleaching. The effect was similar for increased temperatures of bleaching. Farrow and Neale *(79)* found that, upon oxidation of cotton with hypobromite solutions, the loss of strength of the individual cotton hairs was a function of their viscosity in cuprammonium solution. By an oxidation which reduced in viscosity to one one-hundredth of its original value, the hair strength of the cotton was reduced by half.

Clibbens and Ridge *(80)* continued the work of Farrow and Neale, and, by expressing viscosity as fluidity, obtained a nearly linear relation of the hair strength of the cotton. Their data show that strength changes were most pronounced when the viscosity was less than five and that, for a viscosity of ten, there was approximately a loss of 10 per cent in strength. They also found that subjecting the cotton to an alkaline treatment after the bleaching caused a greater loss in strength for the case of neutral bleaching than for the case of alkaline bleaching.

Bialkowsky, bleaching beaten muslin rag stock and making the bleached fibers up into sheets, found that the folding endurance of the paper decreased as the viscosity decreased. Most of the loss of fold occurred after the viscosity had been lowered from an original 250 to viscosities of less than 15 *(81)*. Knösel has discussed the effect on paper strength of weakening the fibers by acid treatment *(82)*.

E. The Use of Bleaching Agents Other Than Hypochlorites

The use of oxygenated bleaching agents has been reviewed by Trotman *(83)* and by Higgins *(84)*. The more important bleaching agents of this type discussed in the literature are perborates *(85, 86)*, permanganates *(87-89)*, ozone *(90-92)*, peroxides *(93-96)*, and oxygen in hot alkaline solutions *(97- 98)*. No special advantages were found in the use of any of these bleaching agents, and, as they are more expensive than the chlorine bleaching agents, they have found little actual application.

Gaseous chlorine has been used for bleaching, either in rag washers or in high density systems *(99-101)*. The De Vains process, using chlorine hydrate, has also been applied to rag half stock bleaching *(102, 103)*. Thorne *(104)* has described a process for aeration of hypochlorite solutions during bleaching and was able by this means to reduce the chlorine consumption about 30 per cent. The Mathieson Alkali Company *(105)* has recently acquired a French patent for bleaching with sodium chlorite. These processes are economically inferior to, and in practice more difficult of application than hypochlorite bleaching, except in very special instances.

The characterization and identification of oxycellulose prepared by various oxidation processes have been studied in particular by Heuser and Stöckigt *(106)* and by Birtwell, Clibbens, and Ridge *(107)*. Clifford and Fargher have recently reviewed the literature relative to the formation and reactions of oxycellulose *(108)*.

The field of the oxidation of cellulose with oxidizing agents other than hypochlorites has been reviewed and discussed by Hibbert and Parsons *(109)*. Parsons has published a good review of the comparatively recent work on the oxidation of cellulose *(110)*.

Scope of the Experimental Investigation

The purpose of this investigation is to study the changes taking place in rag half stock as a result of the bleaching action of calcium hypochlorite solutions. To accomplish this purpose, it is necessary to employ the hypochlorite at the low concentrations comparable to the concentrations generally used.

The practical bleaching of rag half-stock is carried out in washers of the hollander type after the rags have been washed sufficiently free from the residues entrained in the rags after the cooking operation. The hypochlorite

bleaching agent, most frequently calcium hypochlorite, is added in solution to the washer and allowed to act on the half stock for a period of half an hour to two hours or more in accordance with the grade of rag and the individual mill practice. It is common practice on the lower grades of rags to add to the washer a small amount of acid to accelerate the bleaching action. If the final color is not obtained in the washer and the excess bleach washed out, the stock is dropped into drainers where most of the excess bleach drains away, and the remaining fraction produces the final color of the stock.

The strength of the hypochlorite solution in the washer very rarely exceeds one gram of available chlorine per liter, and is usually less than half of that concentration. The temperature of the stock suspension and the hypochlorite solution is normally less than 25 deg. C. and rarely exceeds 40 deg. C. The hydrogen ion concentration of the hypochlorite solution during bleaching is an unknown factor in most mills, for the ordinary colorimetric methd of determining pH breaks down in the presence of oxidizing agents.

The ranges of variables chosen in this work are approximately those which embrace the extreme conditions that may obtain in rag paper mills throughout the country. The period of bleaching extends from half an hour to four hours and, in the second part of this work, to forty-eight hours. The temperature at which the bleaching was carried out was varied from 15 deg. to 45 deg. C. The concentration of the calcium hypochlorite ranges from 0.1 to 1.0 gram of available chlorine per liter. The limits of the pH range selected were 4.5 and 10 which are, respectively, the pH values of normal paper machine white water and of a calcium hypochlorite solution of the concentration employed.

It is evident that in so selecting the limits of variables, the work accomplishes its purpose of investigating the action of bleaching liquor in cellulose under the conditions which are employed in mill practice. At the same time, the work is confined to a small fraction of the possible range of variables, which happens to be the fraction over which no previous quantitative work has been done.

Chemical Modification of Cellulose by the Action of Dilute Calcium Hypochlorite Solutions

Description of Experimental Procedures

In the discussion of the experimental work, only enough of the experimental conditions are given to indicate the nature of the work. In the following paragraphs, the conditions under which the samples of stock were treated and the methods of testing and analysis are fully described.

For the investigation of the chemical modification of cellulose by the action of dilute calcium hypochlorite solutions, an unbleached muslin stock was selected as being the commercial stock most nearly approaching pure cellulose. The alkaline cleansing of the rags, and the washing, defibering, and shredding are described below. After shredding, the stock was kept in the air-dry condition in air-tight cans.

The samples of stock were treated with hypochlorite in a glass container of 3 liters capacity; they were maintained at 25 ± 0.1 deg. C., except in the investigation of the effect of temperature, by means of a constant temperature bath. During treatment, the stock was agitated by means of an electrically-driven glass stirrer.

A glass electrode was set up outside the constant temperature bath in such a way that the glass bulb and the salt bridge connecting to the reference calomel cell could be lowered into the bleaching bath at any desired time by stopping the agitator and moving the bleaching bath to the edge of the temperature bath. The glass electrode was calibrated daily against buffers of known pH at 25 deg. C. The electrical circuit and manner of operation of the glass electrode are described by Voigtman and Rowland (Paper Trade J. 95, no. 9:36-38 (Sept. 1, 1932)).

The hypochlorite solution was a commercial bleaching liquor containing 30 grams per liter of available chlorine, with only traces of chlorates. The solution was kept in an ice box and the content of available chlorine did not change over a period of three months. The calculated amount of this concentrated solution was added to water from a pipette to secure the desired concentration for the bleaching bath.

In each experiment 2,500 cc. of water were placed in the glass container in the temperature bath, brought to the correct temperature, and the measured amount of hypochlorite added. An amount of air-dry stock equivalent to 25 grams of oven-dry stock was then added, the time of addition being taken as the zero time. The pH of the solution and its concentration were checked before the addition of the stock and at intervals during the reaction.

In investigating the effect of the pH of the solution, a quantity of acetic acid, calculated on the basis of past experience to give the desired pH, was added to the hypochlorite solution and the pH determined. In every case it was possible to predict the pH within two or three tenths of a pH unit.

After the stock had been treated for the desired length of time, the suspension was filtered in a 10 inch Buechner funnel having a 60-mesh wire screen covering the bottom above the perforated porcelain plate. This wire screen greatly facilitated filtering and washing the stock. The treated stock was thoroughly washed with water, removed from the screen, and broken up in a dilute solution of sodium thiosulfate to destroy the last traces of hypochlorite, and again filtered and thoroughly washed, this time with hot water. The washed stock was air-dried, and the yield of stock determined prior to the chemical analysis.

Analytical Methods

The viscosities of the stock sample were determined in cuprammonium solution by the method outlined by Bialkowsky *(81)*.

The copper number of the samples was determined by the modified Schwalbe-Braidy method (Technical Association Papers, May, 1930).

The alpha-cellulose content was determined by the TAPPI standard method (Ind. Eng. Chem., Anal. Ed. I: 54 (1929)). The beta- and gamma-cellulose contents were determined by the method of the Forest Products Laboratory. Minor modifications in the dilutions of the alpha filtrate were necessary to permit its use in conjunction with the alpha-cellulose method used.

The methylene blue absorptions were determined by a modification of the method of the Textile Institute. In this method 1.5 grams of air-dry stock are shaken intermittently for two hours with 50 cc. of methylene blue solution and the mixture is filtered with suction on a No. 3 Jena glass crucible. The methylene blue solution contains 0.128 gram of du Pont Methylene Blue ZX in one liter. The methylene blue solution filtered off from the stock was tested for dye content by colorimetric measurement against a solution containing 0.064 gram per liter. From the concentration determined, the initial concentration, the volume of solution used, and the weight of stock, the milligrams absorbed per hundred grams of oven-dry stock were calculated.

Discussion of Experimental Work

The action of calcium hypochlorite solutions on cellu-

lose is primarily one of oxidation, and only secondarily one of hydrolysis, the cellulose being ultimately oxidized to carbon dioxide and water. In the course of the reaction various products may be formed, some of which have been isolated and others determined qualitatively. These intermediate products range from very slightly modified cellulose through oxycelluloses and cello-dextrins, to lactic, uronic, oxalic, acetic, and formic acids. As intermediary steps in the formation of these acids from cellulose, a whole series of aldehydes may be assumed. Laughlin *(111)* has discussed the possible formation of these products in the alkaline oxidation of cellulose, and it is a justifiable assumption that oxidation by means of hypochlorites would take much the same course.

In accord with the purpose of this work, it is possible to divide the oxidation products of cellulose into two groups, those which are soluble and those which are insoluble in water, and to dismiss the first class from further consideration. The water-soluble products are useless to the paper maker and represent only a loss in raw material which is comparatively negligible. The yields obtained after bleaching samples of muslin stock for four hours with calcium hypochlorite solutions are tabulated in Table I.

The water-insoluble products, together with the associated unchanged cellulose, are termed modified cellulose, in order to avoid controversial definitions and distinctions.

Modified cellulose is differentiated from the original cellulose material (which is usually already somewhat modified) by its lower viscosity in cuprammonium solution, its lower content of alpha-cellulose and its higher copper number, beta- and gamma-cellulose content, and absorptive properties. The extent of change in these—the so-called chemical constants of cellulose—may be taken as a measure of the extent of modification of the cellulose, regardless of the nature of the modifying agent.

TABLE I.—YIELDS OF BLEACHED RAG STOCKS

Relation between the Concentration of Available Chlorine and Yield of Bleached Rag Stock. Time—One Hour. Temperature—25 deg. C.

Concentration—Gram Available Chlorine per Liter	pH of Solution	Yield in Grams	Yield in Per Cent
0.1	8.00	24.95	99.80
0.2	8.25	24.95	99.80
0.4	8.15	24.93	99.70
0.8	8.00	24.90	99.60
0.4	7.30	24.95	99.80
0.4	7.05	24.95	99.80
0.4	7.75	24.90	99.60
0.4	6.65	24.90	99.60
0.4	8.30	24.93	99.70
0.4	5.20	24.95	99.80
0.4	6.15	24.94	99.75
0.4	6.85	24.90	99.60

By every known reaction to which highly purified cellulose may be subjected, the viscosity and alpha-cellulose content of the cellulose are lowered and the copper number is raised. It sometimes happens that, by a carefully controlled reaction designed to remove undesirable non-cellulosic constituents, or cellulosic fragments formed in processing, the chemical constants of a sample of crude cellulose may appear to have been improved. The lowering of the copper number of a pulp by an alkaline treatment, which dissolves the reducing fraction of the cellulose, is an example of such a reaction, but even here the chemical constants of the actual cellulose are lowered.

The base stock for this work was prepared by treating unbleached muslin rags for three hours at 40 pound steam pressure with 1.5 per cent of their weight of sodium hydroxide. The cooked rags were washed thoroughly and reduced to half-stock in a laboratory hollander washer. It was found necessary to disintegrate the stock in a Gösta Hall disintegrator prior to the treatment with hypochlorite in order to make satisfactory check runs. The prepared base stock had a viscosity of 275 and a copper number of 0.15 and contained 95.5 per cent of alpha-cellulose, 4.0 per cent of beta-cellulose, and 0.5 per cent of gamma-cellulose. In referring to this stock later, or to its modifications, the word "cellulose" will be used.

The extent of the modification of the cellulose by the action of hypochlorite depends on the concentration of the hypochlorite solution and, within rather wide limits, is independent of the ratio of available chlorine to cellulose. This was established by treating different quantities of the cellulose with a constant volume (2,500 cc.) of hypochlorite solution at each of two different concentrations for one hour at 25 deg. C. Consideration of the data presented in Table II shows that, by the action of two hypochlorite solutions of different strength, different degrees of modification were produced, but that altering the quantity of cellulose present, and thereby the ratio of chlorine to cellulose, expressed in per cent, had no effect on the degrading action of these solutions.

TABLE II.—RELATION BETWEEN CONCENTRATION AND RATIO OF AVAILABLE CHLORINE TO CELLULOSE AND THE CHEMICAL CONSTANTS OF THE STOCK

Concentration Available Cl gm./l.	Weight of Sample	Chlorine Per Cent on Sample	Copper Number	Per Cent Alpha-Cellulose	Viscosity in Cuprammonium Solution
0.2	12.5	4.0	0.22	95.0	155
0.2	25.0	2.0	0.23	94.6	153
0.2	50.0	1.0	0.28	94.3	154
0.4	12.5	8.0	0.40	94.3	93
0.4	25.0	4.0	0.41	93.5	96
0.4	50.0	2.0	0.48	93.4	98

In this connection, it will be noticed that the quantity of available chlorine present is considerably in excess of that consumed (Table III). Where this is not the case and a considerable fraction of the available chlorine is consumed, the extent of modification depends on the quantity of chlorine present, or more properly on the quantity of chlorine consumed. Under the conditions used in this work, it was impossible to determine chlorine consumptions accurately enough to tell whether the modi-

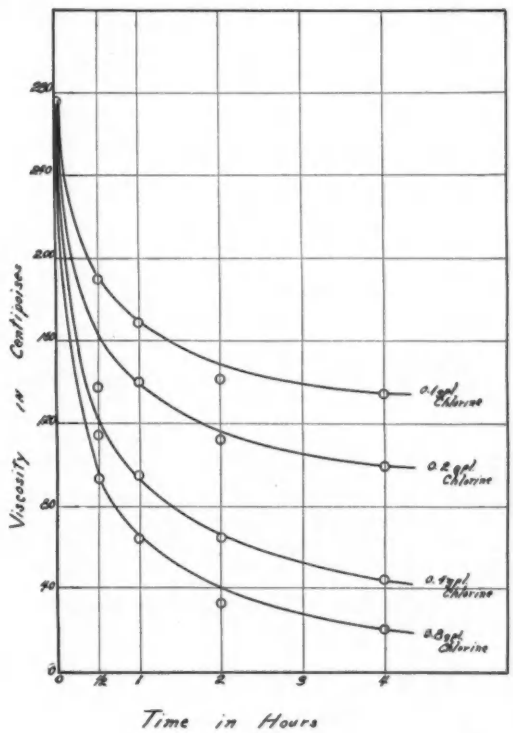

FIG. 1.

The relation of the viscosity of the cellulose to the time of bleaching. Curves at different concentrations.

fication produced was proportional to the chlorine consumed, although the indications were that such was the case. The inaccuracy of this determination is due to escape of the chlorine from the dilute solutions used and to the absorption of carbon dioxide from the air.

TABLE III.—RELATION BETWEEN THE AMOUNT OF CHLORINE CONSUMED AND THE CONCENTRATION OF THE CHLORINE IN GRAMS PER LITER

Concentration Available Cl in gram per liter	Initial Weight of Chlorine Present	Weight of Cl Consumed in One Hour
0.1	0.25 gram	0.015 gram
0.2	0.50 gram	0.020 gram
0.4	1.00 grams	0.025 gram
0.8	2.00 grams	0.033 gram

In the practical bleaching of rag stock, the chlorine present is considerably in excess of that consumed, and the modification of the stock depends not on the quantity of chlorine present but on its concentration in the washer.

The extent of modification of the cellulose depends directly on the concentration of the hypochlorite solution and the time of treatment. Samples of the cellulose were treated for varying lengths of time with varying concentrations of hypochlorite, and their chemical constants determined. The treatments were carried out at 25 deg. C., and the pH values of the hypochlorite solution were kept within the range of 8.0 to 8.3. These results are presented in Table IV.

In Fig. 1 the viscosities of the samples are plotted against the time of treatment, the four curves corresponding to four concentrations of hypochlorite employed. In Fig. 2 the alpha-cellulose contents and copper numbers are similarly plotted. Fig. 3, obtained by using the same data but making the abscissa the concentration of hypochlorite, illustrates viscosity changes with increased concentration.

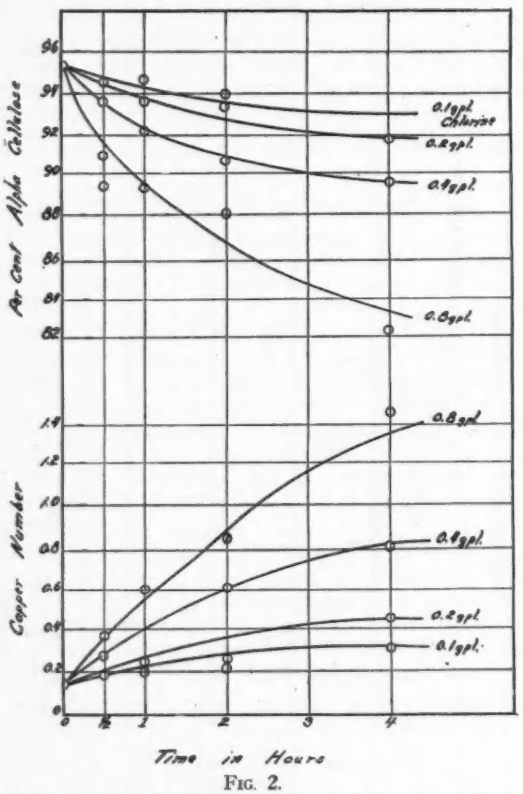

FIG. 2.

The relation of the alpha-cellulose content and the copper number of the cellulose to the time of bleaching. Curves at different concentrations.

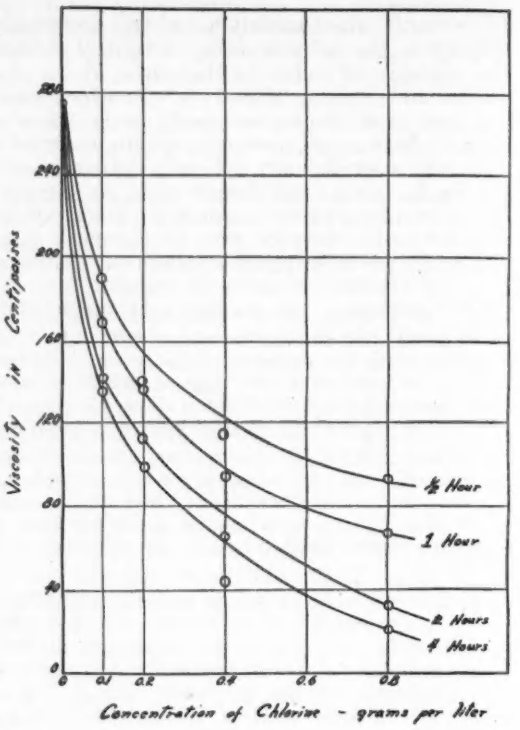

FIG. 3.

The relation of the viscosity of the cellulose to the concentration of chlorine. Curves at different times of bleaching.

TABLE IV.—EFFECT OF THE TIME OF BLEACHING AND THE CONCENTRATION OF THE HYPOCHLORITE SOLUTION

Concentration Available Cl gram per liter	Time of Bleaching Hours	Copper Number	Alpha-Cellulose Per Cent	Viscosity Centipoises
0.1	0.5	0.17	94.5	190
0.2	"	0.19	93.6	137
0.4	"	0.28	90.9	115
0.8	"	0.37	89.4	94
0.1	1.0	0.20	94.6	174
0.2	"	0.20	93.6	140
0.4	"	0.23	92.2	96
0.8	"	0.60	90.0	64
0.1	2.0	0.22	93.9	142
0.2	"	0.26	93.3	113
0.4	"	0.61	90.6	65
0.8	"	0.85	88.0	33
0.1	4.0	0.30	91.7	135
0.2	"	0.45	93.5	100
0.4	"	0.81	89.4	44
0.8	"	1.46	81.3	21

From a study of these curves it is evident that the greater part of the modification of the cellulose as measured by viscosity change occurs in the initial stages of the bleaching action. Referring to the lower curve of Fig. 1, illustrating the action of a hypochlorite solution containing 0.8 gram of available chlorine per liter, approximately 80 per cent of the loss of viscosity occurring in the four hour treatment takes place in the first hour. The results are similar with lower chlorine concentrations. Increasing the concentration of the hypochlorite solutions has the same diminishing effect as increasing the time of treatment. Since this last is true, the apparent slowing up as the bleaching reaction proceeds cannot be due to any loss of activity of the bleaching solution.

The general shape of these curves is very similar to like curves obtained by the degradation of cellulose by other means, such as acid treatments, oven aging, and oxidation by agents other than hypochlorites. Numerous investigations of these types of degradation appear in the literature, notably in the recent publications from The Institute of Paper Chemistry in connection with studies on the stability of cellulose.

The effect of temperature, for the range of 15 to 45 deg. C., upon the action of hypochlorites on cellulose is shown in Table V. The data on the viscosity of the stocks oxidized at the different temperatures shows that, for temperatures up to 35 deg. C., the relation of viscosity to temperature is nearly linear, but that, between 35 and 45 degrees, the viscosity decreases more rapidly. Above 45 degrees, where any near approach to a controlled oxidation is impossible, the shape of the extended curves indicates that the modification of the cellulose is very rapid. This confirms the more or less qualitative observations in the literature relating to the pronounced damage of rag stocks bleached in this range of temperature.

The remaining variable in the action of hypochlorites on cellulose is the hydrogen ion concentration of the hypochlorite solution. Practically the only investigation reported in the literature on the effect of pH is that described by Clibbens and Ridge *(80)*. In contrast to their work, this investigation has been carried out with solutions in which the desired pH is obtained by acidification with acetic acid and is measured by means of a glass electrode.

TABLE V.—EFFECT OF TEMPERATURE DURING BLEACHING ON THE CHEMICAL CONSTANTS OF THE CELLULOSE. TIME—ONE HOUR

Temperature	Concentration Available Cl gram per liter	Copper Number	Alpha-Cellulose Per Cent	Viscosity Centipoises
15° C.	0.2	0.15	95.50	174
15° C.	0.4	0.19	94.60	174
25° C.	0.2	0.16	95.50	175
25° C.	0.4	0.19	94.40	130
35° C.	0.2	0.25	94.95	130
35° C.	0.4	0.28	95.60	104
45° C.	0.2	0.35	94.80	82
45° C.	0.4	0.38	94.70	55

It was found that, for any period of bleaching up to four hours, at least, the pH of solutions obtained by adding acetic acid to diluted calcium hypochlorite liquors did not change more than 0.3 pH units during the course of the reaction with cellulose. While this variation is sufficient to make exact duplication of results impossible, it is small enough so that the effect of the pH of the solution can be determined with some accuracy over the range from pH 4.5 to 10. The pH values listed in the tables are the mean of the initial and final pH of the solutions.

This same change of hydrogen ion concentration occurred in the preceding work in determining the effect of concentration, time, and temperature of bleaching on the cellulose. Since all the dilutions were made in the same manner, these values are very nearly identical as is shown in the tables. The slight variations noted are not of sufficient magnitude to invalidate either the trend or the conclusions.

It was noted that the change of pH during the reaction was invariably to a pH nearer 7 than that of the original, whether it had been above or below 7. Some initial and final pH measurements are given in Table VI to illustrate this point. As mentioned in the historical review, this shift has been explained as due to the presence of acids, notably carbonic and oxalic, produced by the oxidation of the cellulose.

In investigating the effect of pH on the activity of hypochlorite solutions, series of treatments were made at different hydrogen ion concentrations for each of three different concentrations of hypochlorite. The chemical constants of the treated stocks and the conditions under which they were prepared are listed in Table VII.

TABLE VI.—THE SHIFT OF pH DURING A ONE HOUR BLEACH AT 25 DEG. C.

Initial pH	Final pH	Concentration Available Cl gram per liter
8.15	8.00	0.8
7.05	7.03	0.8
6.75	6.75	0.8
4.80	4.90	0.8
8.40	8.15	0.4
7.35	7.28	0.4
7.05	7.05	0.4
6.85	6.85	0.4
5.20	5.25	0.4
8.50	8.23	0.2
8.50	8.25	0.1
6.12	6.19	0.4
8.50	8.23	0.2
8.50	8.25	0.1

TABLE VII.—THE RELATION BETWEEN THE pH OF THE BLEACH LIQUOR AND THE EFFECT OF THE pH DURING BLEACHING ON THE CHEMICAL CONSTANTS OF THE CELLULOSE

Concentration Available Cl gram. per liter	pH of Solution	Copper Number	Alpha-Cellulose Per Cent	Viscosity in Centipoises
0.2	9.49	0.19	95.50	175
0.2	8.36	0.21	94.30	157
0.2	7.74	0.40	95.40	145
0.2	7.09	0.43	93.40	126
0.2	6.80	0.39	93.85	112
0.2	6.27	0.31	93.85	147
0.2	5.56	0.29	93.85	150
0.4	9.65	0.16	94.40	157
0.4	8.30	0.23	93.50	127
0.4	7.75	0.39	92.10	102
0.4	7.31	0.53	91.40	78
0.4	7.05	0.63	89.90	74
0.4	6.85	0.65	88.70	75
0.4	6.67	0.61	89.50	84
0.4	6.16	0.45	90.90	93
0.4	5.22	0.22	94.75	144
0.8	10.00	0.21	93.70	95
0.8	7.95	0.60	90.00	64
0.8	7.75	0.74	90.20	35
0.8	7.30	1.11	87.20	36
0.8	7.05	1.22	87.00	37
0.8	6.75	1.12	87.50	37
0.8	6.22	1.04	90.10	42
0.8	4.85	0.36	93.50	111

The viscosities of the stocks are plotted against pH in Fig. 4.

It is quite evident from a consideration of these results that a point of maximum modification of the cellulose occurs at or near a pH of 7; the exact point at which this maximum occurs is 6.85, as shown by the data. The evidence, however, is insufficient, in view of the shift that occurs during the reaction, to establish this with any certainty as the point of maximum.

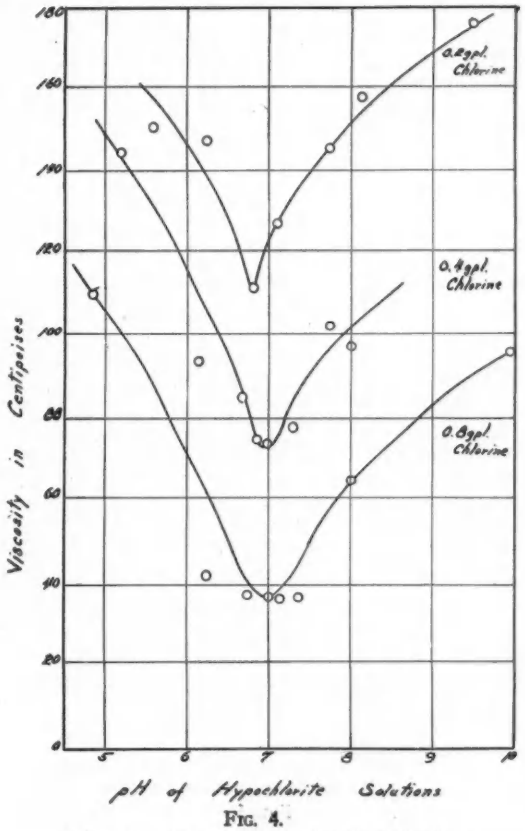

FIG. 4.

The relation of the viscosity to the pH of bleaching.

The increased modification of the cellulose at pH 7 over that occurring at pH 8 is approximately the same as was obtained by doubling the concentration of the hypochlorite solution or the period of treatment.

There is some evidence reported in the literature that cellulose exhibts an iso-electric point in the neighborhood of pH 7, and the maximum modification observed at that point may in part be due to this supposed iso-electric point and the increased surface activity of the cellulose. The majority of the evidence, however, demonstrates that hypochlorite solutions possess their greatest activity at pH 7, both toward cellulose and toward other substances, including dyestuffs. This evidence has been presented by Kauffmann *(35)* and by Weiss *(36)*, and has been discussed in the literature survey.

Under the action of dilute calcium hypochlorite solutions, the change taking place in the cellulose is almost entirely from alpha-cellulose to beta-cellulose, while the gamma-cellulose content remains practically unchanged. Alpha-, beta-, and gamma-cellulose contents and methylene blue absorptions were determined for a set of samples which form one concentration and one pH series; the results are presented in Table VIII.

TABLE VIII.—COMPLETE CHEMICAL ANALYSIS OF CERTAIN SAMPLES

Concentration Available Cl gram per liter	pH of Solution	Copper Number	Per Cent Cellulose			Viscosity in Centipoises	Methylene Blue Absorption Mgs. dye/100 gm. Cellulose
			Alpha-	Beta-	Gamma-		
0.1	8.30	0.17	94.7	4.2	0.66	195	
0.2	8.30	0.17	94.3	4.2	0.66	160	
0.4	8.30	0.23	92.2	5.2	0.60	128	235
0.8	8.30	0.52	92.1	7.5	0.50	62	243
0.4	7.75	0.39	92.0	7.5	0.60	102	247
0.4	7.30	0.53	91.4	7.8	0.60	78	259
0.4	7.05	0.63	90.1	8.4	0.70	74	267
0.4	6.85	0.65	88.7	10.5	0.56	75	271
0.4	6.65	0.61	89.5	9.9	0.60	84	258
0.4	6.15	0.45	90.9	8.2	0.70	93	248
0.4	5.20	0.22	94.7	4.9	0.56	144	231

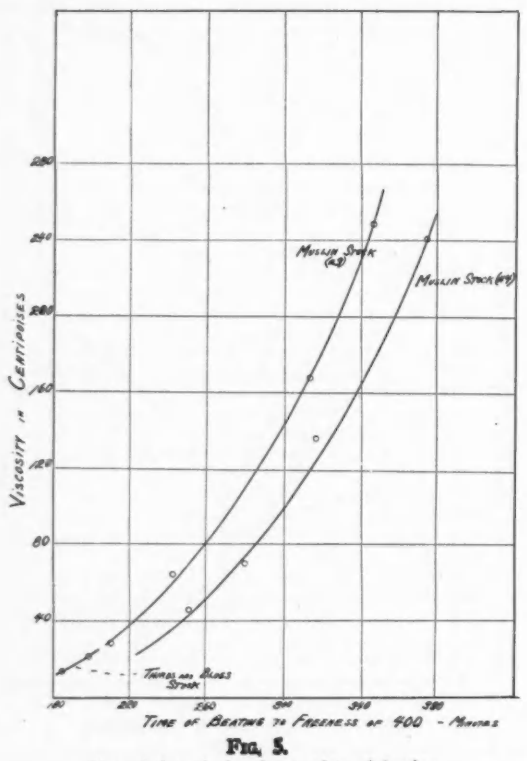

Fig. 5.

The relation of viscosity to time of beating.

The methylene blue absorption increased almost in direct proportion to the copper number. The absorption is so dependent on traces of impurities in the cellulose, particularly acids and alkalies, that considerable disagreement of results is found in the literature. The results obtained, however, are in accord with the general trend of the results of the Textile Institute.

Paper Making Properties of Bleached Rag Half Stock

Practical experience indicates that over bleaching of rag half stock results in a lowering of the strength of the paper, and it was the purpose of this section of the work to see whether a quantitative relationship might be established between the constants of the stock and the physical tests of handsheets made from that stock after beating in laboratory beaters. The viscosity of the stock, previously shown to be the most sensitive of the chemical tests, was taken as the index of the chemical degradation of the stock.

Two laboratory beaters of the adjustable roll type were available which would beat stock at maximum consistencies of 2.7 and 4.0 per cent, respectively. These consistencies are much lower than those obtaining commercially and would tend to promote cutting of the stock during beating at the expense of "hydration." Cutting was also promoted by the narrowness of the tackle in the beaters. As a result, the data obtained cannot be transferred to commercial operation, except in a qualitative way; the work indicates the need of a testing beater for rag stock, capable of handling the stock at consistencies of 6 per cent or better. (Incidentally, such a unit has recently been developed at the Institute and a report will be forthcoming shortly.)

A large number of runs were made in these two beaters and it was found that, in the cases where the beating was carried out at 4.0 per cent consistency, the correlation between the chemical constants of the bleached stock and the strength of the paper was much better than in the runs made at the lower consistency.

In carrying out this work the rag stock was bleached under controlled conditions so that the desired viscosities were obtained. This required much longer periods of bleaching, other conditions remaining the same, than were required in the previous work for which the stock had been shredded. After thorough washing the bleached stock was transferred to the beater and beaten until a freeness of 350 (Schopper-Riegler) was reached. The beating was controlled in most cases by following a predetermined course of roll settings. In some cases control was attempted by means of power consumption, as shown by a recording wattmeter, but this was not wholly satisfactory because of power changes resulting from variations in stock friction as the beating progressed. Hand sheets were made from the stock at regular intervals in the beating and were later tested for Mullen and tear, according to standard TAPPI methods. It was found best, for comparing one run to another, to use the strength data corresponding to a freeness of 400 in each run.

As rag stock is progressively degraded by bleaching, the time required to beat the stock to a freeness of 400 is decreased. Fig. 5 shows the relation of the beating time to the viscosity of the stock. The shortening of the beating time is greatest in the lower viscosity ranges but is well defined throughout the viscosity range studied. This shows that the stock has been definitely softened physically as it has been degraded chemically.

The Mullen and tear strengths of paper made from the degraded stocks fall away only slowly over the viscosity range from 250 to 40. At this viscosity (40) both the

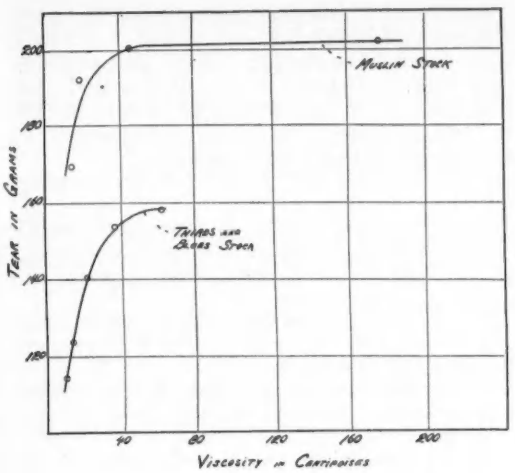

FIG. 6.

The relation of tearing strength to viscosity of the stock.

Mullen and tear begin to decrease more rapidly until, at a viscosity of about 10, the strength loss is enormous for a small change in viscosity. This is illustrated by the tear curve of Fig. 6. In more recent work with the new rag testing unit mentioned above, this break in the Mullen and tear curves occurs at a somewhat higher viscosity.

These results show that in the normal ranges of commercial bleaching of rag stock, the strength of such stock tested in a laboratory beater at low consistency is not affected greatly, although as the result of extended bleaching the stock is rendered softer and is easier to beat. Losses in Mullen and tear of these handsheets are relatively small for decrease in cuprammonium viscosity until a viscosity in the range of forty is reached. Beyond this point the losses are much greater over much smaller viscosity ranges. It should be noted that in commercial operations where beating is carried out at high consistencies, the significant point in viscosity appears to be somewhat higher.

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New TAPPI Members

The executive committee of the Technical Association of the Pulp and Paper Industry has announced that the following have been elected to membership:

John M. Behnke, chief chemist, Riverside Paper Corporation, Appleton, Wis., is a 1923 graduate of the Institute of Paper Chemistry and Technology, Kothen, Germany, and has been employed by Papierfabrik Hohenkrug, Oker Papierfabrik, Natronag and the Kimberly-Clark Corporation, Kimberly, Wis.

Harry L. Bode, in charge of laboratory, Robert Gaylord Inc., St. Louis, Mo., attended Washington University (St. Louis).

Glenn Davidson, Aurora, Ill., broker, attended the University of Nebraska and was formerly chemist in charge of research for I. F. Laucks Inc., Seattle, Wash.

Vincent G. Lava, chemist, Bureau of Science, Manila, P. I. is a graduate of the University of the Philippines and the University of California, and received his doctorate from Columbia University.

William Bond Wheelwright, editor and publisher of *Paper and Printing Digest,* Chicago, Ill., is a 1901 graduate of Harvard University and was formerly with the Merrymount Press, Boston, George W. Wheelwright Paper Company and the Bryant Paper Company.

Irving Feldman, student, New York State College of Forestry.

William J. Foote Jr., student, Institute of Paper Chemistry, has worked for the Riverside Paper Company, Appleton, Wis. and the Michigan Carton Company, Battle Creek, Mich.

David D. Reeve, draftsman, British Columbia Pulp and Paper Company, Port Alice, B. C. is a 1936 graduate of the University of British Columbia.

John P. Weidner, student, Institute of Paper Chemistry has worked for the Michigan Carton Company and the Mosinee Paper Mills, Mosinee, Wis.

Karl Wille, demonstrator, Calco Chemical Company, Bound Brook, N. J. attended Gottingen, Marburg and Hall Universities in Germany and was formerly with the Badishe Company, the National Aniline and Chemical Company, New York, and the A. M. Collins Company, Philadelphia, Pa.

John C. Wollwage, student, Institute of Paper Chemistry is a graduate of Northwestern University and Lawrence College, and has worked for the Hammermill Paper Company, Erie, Pa.

Gosta A. Hall, technical advisor to the European Sales Organization of the Swedish Pulp Company and manager of the Container Testing Laboratory, Paris, France, is a 1921 graduate of the Royal Institute of Technology, Stockholm, (Reinstatement).

Maurice D. Fisher, supervisor of testing laboratory, Agfa Ansco Corporation, Binghamton, N. Y. attended Rensselaer Polytechnic Institute.

Herman N. Simpson, engineer, Crown-Zellerbach Corporation, Port Townsend, Wash. is a 1916 graduate of Armour Institute of Technology and was formerly in charge of construction for V. D. Simons of Chicago.

Thomas E. Moffitt, research chemist, I. F. Laucks Inc., Seattle, Wash. is a 1922 graduate of Cornell University and was formerly with the Hooker Electrochemical Company, Tacoma, Wash and the Guy C. Howard Company, Seattle.

Laurence E. Russell, student, New York State College of Forestry, Syracuse, N. Y.

Norval F. Wilson, technical director, Alton Box Board and Paper Company, Alton, Ill. is a 1930 graduate of Shurtliff College and was formerly with the Western Cartridge Company of E. Alton, Ill.

Kennedy Valve Bulletin

A bulletin describing a new line of fully bronze-bushed standard iron-body wedge gate valves has just been published by the Kennedy Valve Manufacturing Company. This folder contains large sectional views of these valves, with references to 33 outstanding features of design, and describes the valves in detail. A fracture through the valve metal is illustrated to show the exceptionally dense structure, which is 50 per cent stronger than ordinary cast-iron. Other views illustrate the ease of connecting up, operating, repacking, lubricating, and disassembling the valves.

Copies of the bulletin may be obtained by addressing the Kennedy Valve Manufacturing Company, Elmira, N. Y., and asking for Bulletin 47.

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 obtanned from the United States Patent Office, Washington, D. C., for 10 cents each. Send currency, not stamps.

Sulphite Process

Rate of Pulping of Douglas Fir Sawdust. H. English, H. Green, C. R. Mitchell and F. H. Yorston. Quart Rev. Forest Products Lab. Can. 20:15-21 (1934).—The rate of sulphonation is proportional to the amount of unsulphonated lignin present at any instant, and the rate of removal of sulphur (and hence, presumably, of sulphonated lignin) is proportional to the amount of the latter present. Sulphonation is slow enough to limit somewhat the overall rate of pulping. The relation governing the rate of removal of the unsulphonated lignin is not yet clear.—A.P.-C.

Burning Sulphur to Produce Sulphur Dioxide. Isaac Bencowitz, assignor to Texas Gulf Sulphur Co. U. S. pat. 2,031,403 (Feb. 18, 1936).—Molten sulphur and oxygen are introduced, in independently regulatable quantities, into a heated combustion chamber, simultaneously agitated to effect intimate admixture, and the mixture is passed along a tortuous path in the heated combustion chamber to oxidize the sulphur, and the mixture of gases is subsequently passed through heated checkerwork.—A.P.-C.

Burning Pyrites. Daniel Tyrer, assignor to Imperial Chemical Industries, Ltd. U. S. pat. 2,031,801 (Feb. 25, 1936).—Pyrites in a roasting furnace is passed through a distillation zone and a combustion zone countercurrent to a gas stream formed by introducing into the furnace a restricted quantity of a gas containing free oxygen and a proportion of a pre-heated sulphur dioxide-containing gas so adjusted that the gases around the top of the combustion zone are substantially free from oxygen and have a sulphur dioxide concentration of at least 20 per cent.—A.P.-C.

The Liming of Digesters. C. F. B. Stevens and W. H. Birchard. Paper Trade J. 103, No. 7:78-79 (Aug. 13, 1936).—Analysis of the deposit responsible for the liming of sulphite digesters showed it to consist principally of calcium sulphite.—A.P.-C.

The Welded Digester and Other Innovations. A Danninger. Papier-Fabr. 34, no. 9:65-69 (March 1, 1936).—The article describes the manufacture of an electrically welded sulphite digester, gross volumes 250 cubic meters, operating at a pressure of 8 atmospheres. The welded digester is much cheaper than the riveted construction, and its smooth inner surface does not offer any difficulties in the application of acid-resistant lining. Excellent results have been obtained with Brobeck's forced liquor circulation system. Reference is also made to a new type of basket chip screen, and vibrating pulp screens, also of the basket type.—C.J.W.

Liquor Volume Circulated During Sulphite Cooking. T. Samson. Papir-J. 24, no. 10:104-106; no. 12:126-129 (May 31, June 30, 1936).—Formulas have been developed for calculating the quantities of liquor to be circulated within a certain time unit in order to obtain a satisfactory product. The uniformity of pulp is affected by such variables as the rate of temperature increase, local irregularities in the composition of the liquor, the size and shape of the chips, the nature of the wood, etc. The temperature in a digester filled with liquor and chips rises much faster than in the case of liquor alone; the tighter the packing of the chips, the more uniform the distribution of the chemicals in the liquor. Chip paclong devices should therefore be employed in connection with forced liquor circulation. The cooking procedure depends upon a large number of variables, the operation of the boiler house and other machinery in the mill playing for instance an important part, so that hardly two digesters are run in exactly the same manner. Circulation equipment should therefore be flexible and adaptable to various cooking conditions within very wide limits. Reference is made to the advantages of a preheater constructed by the Nordiska Armaturfabrikerna in Sweden and used in connection with a circulating pump and indirect heating. The liquor is not diluted by steam and its composition will be more uniform throughout the digester. Correct dimensions of the circulation equipment are of utmost importance. It is then possible to cook just as fast in a large as in a small digester and the same pulp quality will be obtained.—C.J.W.

Monosulphite Pulping of Straw. G. E. Shnuiparkov and I. Yu Markiv. Bumazhnaya Prom. 14, no. 12:25-30 (1935); C. A. 30:5033.—The effect of the addition of causticized melt to the sulphite liquor in the mono-sulphite pulping of rye straw was studied in the laboratory by varying the proportions of sodium carbonate, sodium hydroxide, sodium sulphite and sodium silicate, respectively. Shredded straw was cooked with seven parts of the liquor at six atmospheres for three hours. The mono-sulphite pulping gives the best results. The presence of sodium sulphite in the causticized liquor gives better cooking as compared with pulping with sodium hydroxide alone. The substitution of sodium carbonate for sodium hydroxide in the sulphite liquor (use of a clarified green liquor) results in a lower degree of cooking; sodium silicate decomposes the incrustation more effectively than sodium carbonate.—C.J.W.

Technical Control of Sulphite Pulping. O. K. Giller. Bumazhnaya Prom. 15, no. 1:32-141 (1936); C. A. 30:5033.—A critical discussion of the control work of all important phases of pulping, bleaching and papermaking in U. S. S. R. mills.—C.J.W.

New Control Method for the Sulphite Cooking Process. C. Haider. Papier-Fabr. 33, No. 39:321-326; No. 40:332-335; no. 41:341-344; no. 42:347-352 (Sept. 29, Oct. 6-20, 1935).—The method is based on the quantitative determination of the lignosulphonic acid and the total sugars in the cooking liquor. The sulphurous acid is removed with calcium carbonate and the lignosulphonate and the total sugars are isolated by fractional precipitation with alcohol. With standard solutions of calcium lignosulphonate and of total sugars of various concentrations, the density and refractive index were determined and the density-refraction diagram was developed. On account of the parallel course of these curves no definite results could be obtained. The author, therefore, worked out a quanti-

tative method for separating the calcium lignosulphonate and the total sugars and determined the concentrations of the components refractometrically. He believes that this method can be used for control of operations in the sulphite cooking process and gives some examples of mill experiments.—C.J.W.

Acid-base Dissociation Constants in Mixtures and Their Relation to the Activities of the Individual Ions. Carl Du Rietz. Svensk Kem. Tid. 48, no. 7:165-175 (July, 1936).—This is a theoretical discussion of the subject and may find practical application in the cooking of strong sulphite pulp.—C.J.W.

Sulphite Pulp Yield From Siberian Fir. N. A. Rozenberger and A. G. Laube. Tzentral. Nauch.-Issledovatel. Inst. Bumazhnoi Prom. Materialui 1935, no. 2:3-15; C. A. 30:5033.—The results of comparative laboratory pulping of fir and spruce by Plechev (*Ibid.* 1934, no. 4:211-236) were confirmed by commercial pulping tests.—C.J.W.

Electric Wet Purification in the Sulphite Industry. W. Hoss. Papier-Fabr. 33, No. 29:241-245 (July 21, 1935).—The system is used for removing gaseous or liquid impurities from the sulphur dioxide gas obtained by roasting pyrites. No sulphur trioxide is claimed to reach the acid towers after passing through this installation, and calcium sulphate formation upon the limestones in the tower is greatly reduced, thus increasing the efficiency of the acid plant and the uniformity of the product. —C.J.W.

Recovery in the Cooking of Sulphite Pulp. Zellstoff u. Papier, 16, No. 6:215-16 (June, 1936).—Twenty-five cooks are made under different conditions from which it was ascertained that the sulphur dioxide recovered is directly proportional to the content of free sulphur dioxide in the cooking liquor and this recovery can be calculated from a formula. The recovered liquor depends on the degree of filling of the digestor with acid, the moisture content of the chips and the method of relief. The sulphur consumption can also be calculated by formula.—J.F.O.

Continuous Sulphite Pulping Process. Peter A. Paulson. U. S. pat. 2,047,488 (July 14, 1936).—Chips and a base-containing liquor are introduced continuously at the top of a vertical digester, and steam and a gas containing sulphur dioxide are introduced continuously at the bottom. The material is discharged continuously through a level controlling tank.—A.P.-C.

Manufacture of Paper Pulp. Louis L. Larson and Lewis Schwartz, assignors to E. I. du Pont de Nemours & Co. U. S. pat. 2,049,567 (Aug. 4, 1936).—Wetting out agents are added to acid or alkaline pulping liquors to assist penetration of the liquor into the wood or other raw material to be pulped.—A.P.-C.

Manufacture of Cellulosic Products From Wood, Straw, Grass, and the Like. Henry Dreyfus. U. S. pat. 2,041,745 (May 26, 1936).—The raw material is treated to remove resins (suitably with dilute caustic soda solution) before cooking by the sulphite process.—A.P.-C.

Critical Consideration of Forced Circulation in Sulphite Digesters. Wurz. Papierfabr. 33, No. 22:187-190; No. 23:197-199 (June 2, 9, 1935)—The technical literature of recent years has published exclusively favorable reports concerning forced liquor circulation. The author, however, is of the opinion that satisfactory circulation inside a digester can also be obtained without pumps, when certain construction factors and operating principles receive consideration. Some of these factors are size and shape of digester and discharge flange, steam circulation inside the digester, methods of charging chips and operating the digester during the cooking process with special reference to gas relief, etc. This holds particularly true in the case of indirect cooking, whereas direct cooking with very large digesters may require forced circulation. The author, however, does not consider very large digester volumes (200-300 cubic meters) a desirable feature. —C.J.W.

The Waste Water From the Pulp and Paper Industry. F. Meinck. Papier-Fabr. 33, No. 49:416-20 (Dec. 8, 1935). —The numerous and valuable products in sulphite waste liquor are discussed and especially methods for their utilization, such as for the production of alcohol, for combustion and for binders. Treatments of white water to recover the valuable constituents are discussed.—J.F.O.

The Hydrolysis of Sulphite Waste Liquor. H. Lauber and O. Merlau. Papier-Fabr. 33, No. 49:420-23 (Dec. 8, 1935).—An acid hydrolysis by means of sulphuric acid is described. The sulphuric acid makes possible the hydrolysis of certain sugars in the waste liquor otherwise lost in the production of alcohol, and it also destroys the action of the sulphur dioxide which is detrimental to the fermentation process. The economic possibilities of the process are given with figures.—J.F.O.

Process for the Recovery of Sulphurous Acid From Gases Containing Such. Metallgesellschaft A. G. Frankfurt a.M. Finn. pat. 16,720 (July 5, 1934).—The gases are treated with a mixture of organic bases, as for example aromatic amines, and water, and then heating the reaction products.—J.F.O.

Correlating Recovery in Pulp Mills Operating With Different Kinds of Liquors. G. A. Richter, assignor to Brown Co. U. S. pat. 2,047,032 (July 7, 1936).—Spent cooking liquor containing an ammonium-sulphur salt is mixed with spent alkaline sodium base liquor, to cause liberation of the ammonia, which is recovered. The sodium salts in the mixed spent liquors are recovered in known manner.—A.P.-C.

Process for the Manufacture of New Tanning Materials From Sulphite Waste Liquor. Hermann Noerr and Gustav Mauthe, assignors to I. G. Farbenindustrie Aktiengesellschaft. U. S. pat. 2,045,049 (June 23, 1936).—Tanning agents, which can be substituted entirely for the vegetable tannins, can be produced by treating sulphite waste liquors or the lignin-sulphonic acid obtainable therefrom with a dihydroxy-diaryl sulphone and an aldehyde. These two ingredients may be condensed in an alkaline solution before adding to the waste liquor, but in such a case a subsequent treatment of the condensation product of waste liquor with a further quantity of formaldehyde may be advisable.—A.P.-C.

Sulphite Waste Liquor. Guy Howard. Paper Trade J. 103, No. 1:84, 86 (July 2, 1936).—A brief description is given of the mill application of the previously described process (*Ind. Eng. Chem.* 26:614-617 (1934)), of it benefits and the probable savings which it will effect.—A.P.-C.

Sulphite Turpentine. Charles A. Mann, R. E. Montonna and M. G. Larian. Ind. Eng. Chem. 28: 598-601 (May, 1936).—Sulphite turpentine, as obtained, is saturated with sulphur dioxide. It contains in addition to 75 to 85 per cent of para-cymene, fat acids, resins, borneol, terpenes and sesquiterpenes, etc. The sulphur dioxide is rapidly removed by treatment with 30 per cent caustic soda solution. Fractional distillation and (or) refluxing over sodium must be supplemented by treatment with concentrated sulphuric acid to obtain a satisfactory pure para-cymene. By treating the impurities contained in sulphite turpentine with sodium or caustic soda borneol

is produced. Atmospheric oxidation seems to involved in the process. Nitration of pure para-cymene according to published methods yielded 55 to 60 per cent nitrocymene, and appreciable amounts of para-tolylmethyl ketone (15 per cent), para-nitrotoluene (1 to 2 per cent) and 16 per cent of tar containing small amounts of para-toluic acid and 2-nitro, 5-nitro and 2.6-dinitrocymene. It was not possible to make a sharp separation of para-nitrotoluene and nitrocymene by slow fractional distillation. Reduction of the nitro compounds to the amines permitted a separation both by fractional distillation and by fractional crystallization of the sulphates.—A.P.-C.

Ammoniation of Sulphite Waste Liquor. Kenneth A. Kobe, Jack H. Layman and Frederick R. Armbruster. Ind. Eng. Chem. 28: 571-572 (May, 1936).—When sulphite waste liquor is made alkaline with lime to a pH of 9.6, the free sulphur dioxide and part of the combined sulphur dioxide are precipitated as calcium sulphite. The resulting liquor can be directly ammoniated to give a solid and liquid portion, both which contain combined nitrogen. The solid material is physically suitable for fertilizer.—A.P.-C.

Anaerobic Fermentation of Sulphite Waste Liquor by Bacteria of Fresh-Water Muds. A. M. Partansky and H. K. Benson. Proc. Natl. Acad. Sci., 22:153-158 (1936). —Fermentation of the sulphite waste liquor, carried out in 30 per cent dilution seeded with 12 different muds and incubated at 36°C., resulted in complete gasification of all constituents of the waste liquor other than lignin to carbon dioxide, methane and hydrogen. The heating value of evolved gases was equivalent to 4,767,500 B.t.u., per ton of pulp. A partial loss of methoxyl was the only effect of the fermentation on the lignisulphonic acids. For complete gasification of the liquor by anaerobic fermentation, an initial removal of lignin appears necessary, for it cannot be gasified except aerobically in very high dilution (hence its pollution effect is relatively small) and its presence retards gasification of the other constituents of sulphite waste liquor. Stabilization of the waste liquor is mainly concerned with the decomposition of the sugars is contains. Seventy-three per cent of the total gas evolved was attained in 40 days; 92 per cent in 42 days. —A.P.-C.

Sulphite Waste Liquor. Laboratory Study of Its Anaerobic Decomposition When Discharged Into Water Bodies. H. K. Benson and A. M. Partansky. Ind. Eng. Chem. 28:738-740 (June, 1936).—The pollution effect of sulphite waste liquor is due chiefly to the sugars. The latter, together with the minor constituents of sulphite waste liquor, can be destroyed by gasification in anaerobic methane-type fermentation, which is, however, relatively slow and as yet cannot be controlled. The sugars can also be changed into butyric acid by a pure-culture fermentation and the acid recovered. In both cases the residue contains only lignin, and its 10-day biological oxygen demand is only about one-fifth that of the original liquor. Therefore, when lignin is first removed from sulphite waste liquor, the methods of disposal are greatly simplified and similar to those used in the disposal of sugar wastes. All organic matter of sulphite waste liquor, including lignin, when sufficiently diluted, is oxidized biochemically to carbon dioxide and water in both fresh and sea water. This oxidation should be complete in about 5 months. Evidence shows that the fear of pollution by sulphite waste liquor has been greatly exaggerated, and that the problem of its disposal is similar to that of sewage disposal. Sufficient dilution accomplished by discharging into large bodies of water, where the liquor is destroyed biochemically, should solve the problem.—A.P.-C.

Nitric Acid Method

Preparation of Pulp by the Nitric Acid Cooking Method. I. Isao Shimoda. Cellulose Ind. (Tokyo) 12: 13-16 (1936).—Dried samples of *Pinus sylvestris* were cooked for 90 to 240 min. at 60° to 97°C, on supplying with 0.1049 to 0.1444 g. nitric oxide per min. and subjected to after treatment with 0.2 to 0.5 per cent caustic soda solution, the yield of pulp being 38 to 50.5 per cent. The pulp thus obtained contains 81 to 92 per cent alpha-cellulose as compared with 89.43 per cent by the sulphite process, and 0.11 to 0.12 per cent of ash as compared with 0.37 per cent. The higher pentosan content, 4.45 to 13.54 per cent as compared with 2.84 per cent by the sulphite process, is due to the formation of furfural by distillation with hydrochloric acid of oxycellulose resulting from the oxidation of cellulose with nitric acid. The copper number is 1.2 to 5.91. This method gives the same quality and yield as the sulphite process; it has the advantage that the heating can be carried out within a shorter time under ordinary pressure in continuous operation.—A.P.-C.

Preparation of Pulp by the Nitric Acid Cooking Method. II. Isao Shimoda. Cellulose Ind. (Tokyo) 12: 39-47 (1936).—Routala reported that dilute nitric acid begins to react with lignin at about 70° C. Therefore rice straw was cooked at 70° to 100° C., with 1 to 4 per cent nitric acid and after-treated with 0.5 to 1 per cent caustic soda. The reaction of lignin with 4 per cent nitric acid is accelerated with increasing temperature, and is complete in 1 hr. at 100°C; nearly the same is true for 2 per cent nitric acid. The consumption of nitric acid is decreased, however, with decreasing nitric acid concentration, and with 1 per cent nitric acid lignin is not completely nitrated, while the consumption of caustic soda increases with decreasing and concentration, the caustic soda reacting with the lignin in the case of incomplete nitration. Consequently instead of 1, 2 per cent or more concentrated nitric acid should be used for cooking rice straw; 2 per cent nitric acid is strong enough for ordinary paper pulp, and 4 per cent acid is required for chemical pulp. The yield of nitro straw is limited to 63 to 68 per cent, larger or smalled yields being ascribed to incomplete or over-digestion.—A.P.-C.

Preparation of Cellulose by the Nitric Acid Decomposition Process. III. Decomposition of Rice Straw With Dilute Nitric Acid (2). Schimoda. J. Cellulose Inst. Tokyo 12: 71-75 (1936). — A suitable after-treatment for rice straw which has been decomposed by boiling for 1 hr. with 2 per cent nitric acid in digestion at 100° with 10 times its weight of 1 per cent aqueous caustic soda solution; the yield of cellulose is 32 per cent of the straw. The gas evolved during the nitric acid treatment consists of hydrocyanic acid, carbon monoxide, nitrous oxide and carbon dioxide.—A.P.-C.

Bagasse. VIII. Action of Dilute Nitric Acid on Bagasse. Y. Hachihama, M. Onishi and W. Takemura. J. Soc. Chem. Ind. Japan 38: 690-691 B (1935).—The maximum quantity of lignin and pentosan is extracted from bagasse (without affecting the cellulose) when this is digested with from 3 to 5 per cent of nitric acid at 100°C. during 1 hr. and subsequently treated with 2 per cent caustic soda at 100°C. during 1 hr. The lignin dissolves as nitrolignin and the pentosan is hydrolyzed to xylose.—A.P.-C.

Production of Cellulose. H. Dreyfus. Brit. pat. 442,020, (July 30, 1934).—Wood chips are treated with nitric acid (2 to 10 per cent) at less than the boiling point (65° to 90°C) and under pressure (above 10 atmospheres), washed, heated with 1 to 5 per cent of aqueous caustic

soda at 100° to 130°C. under pressure, and finally, if desired, further treated with cold 15 per cent caustic soda.—A.P.-C.

Mechanical Process

Variations in the Quality of Groundwood Pulp. H. V. Nordström. Finnish Paper and Timber J. 18, No. 11: 598-600, 602 (June 15, 1936).—The author found a relationship between the cold and warm seasons of the year and the quality and output of groundwood pulp under otherwise identical conditions. The output in winter is higher and the pulp quality slower than during the summer months and vice-versa. The changes from one season to the other are quite pronounced, chiefly due to variations in the temperature of the fresh water (which may amount to 10-20°C.) in the system. Drainage experiments with different pulps and temperatures illustrate the influence of this factor upon groundwood pulp and mixtures of groundwood and chemical pulps, while pure chemical pulp is not affected. Hence, temperature will also influence the water removal from the paper web upon the wire and explains the demands of the newsprint mill for a slower pulp during summer. In order to maintain a uniform product throughout the year, special attention must be paid to slowness control, and in the author's opinion the Green freeness tester is the most suitable instrument for this purpose.—C.J.W.

Groundwood Studies. E. Edwards, W. Holland and H. W. Johnston. Quart. Rev. Forest Products Lab. Can. 22: 11-19 (1935).—A model pulp grinder with floating pocket is described.—A.P.-C.

Effect of Electrolytes on Freeness of Groundwork Pulp. G. Skaperdas. Quart. Rev. Forest Products Lab. Can. 20: 11-12 (1934).—Water of electric conductively equal to that of a seven hundredth normal potassium chloride solution and with a hardness of 80 p.p.m. is without effect on the freeness of groundwood, by comparison with distilled water—A.P.-C.

Characteristics of Groundwood Pulp for High Speed News Print Machines. L. E. Kendall. Paper Trade J. 103, No. 7: 80-82 (Aug. 13, 1936); Pulp Paper Mag. Can. 37: 511-5-4 (Aug., 1936).—Data from units running at various speeds indicate that higher speed machines will require groundwood having higher freeness and strength tests, and it is suggested that the groundwood fibres should also be longer and more slender than for low speed machines.—A.P.-C.

Experimental Wood Grinder Studies at Darmstadt. W. Brecht. Paper Industry 18: 291-296 (July, 1936) fl—A systematic report describing the equipment and the cold- and hot-grinding of spruce wood, under carefully regulated conditions. The influence of pressure peripheral speed of the stone, the length of the zone of contact between pulpstone and wood, stuff density, smoothness, number and porosity of the pulp produced were carefully studied and are shown in a series of graphs. Temperature of the stock in the grinder pit are important, and control of the temperature of water used in pulping is more essential than changes in stuff density in the pit.—A.P.-C.

Effect of High Pit Temperature and of Preheating of the Wood on the Grinding of Loblolly Pine. E. R. Schafer, J. C. Pew and R. G. Knechtges. Tech. Asso. Paper 19: 279-282 (June, 1936); Paper Trade J. 103, No. 2: 29-32 (July 9, 1936).—Elevation of grinder pit temperatures, with other variables constant results in longer fibered and stronger pulps in relation to the power consumer. Preheating of the wood in water has relatively little effect as compared with the pit temperature.—A.P.-C. moved, suitably by a flotation process.—A.P.-C.

Grinding Pulp With Laboratory Assistance. George K. Walker. Paper Trade J. 103, No. 1: 107-109 (July 2, 1936).—Numerous curves are given showing the improvement in groundwood quality effected at the Glens Falls mill of Finch, Pruyn Co., as a result of laboratory control by means of a sheet making mold and motor-driven Mullen tester.—A.P.-C.

Mill Performaance of Artificial Pulp Stones. R. I. Wynne-Roberts. Paper Trade J. 103, No. 1: 101-102 (July 2, 1936).—A discussion of the performance of Norton artificial pulp stones.—A.P.-C.

Concerning the Fungus Growth of Moist Ground Wood. W. Schmid. Papier-Fabr. 33, No. 46: 380-82; No. 47: 387-89 (Nov. 17, 24, 1935).—A study of the literature in the past years shows that there are various kinds of sources of infection of primary and secondary nature and methods for preventing this growth of fungus are described. The conditions in open and closed white water system are discussed in their relation to the fungus growth. When the temperature of the white water is over 48° C. there is much more chance for fungus to grow than when the temperature is lower than 48°.—J.F.O.

Electric Drives in Groundwork Mills. K. J. Wilkman. Finnish Paper and Timber J. 18, Special issue: 383-384, 386-388, 390-391 (April, 1936).—The article describes in detail the electrical installations of the Voikka groundwood mill with an annual output of 90,000 tons of absolute dry groundwood pulp. The unit forms part of a newsprint mill, several illustrations of which are given on pages 326-328 of this issue.—C. J. W.

Miscellaneous Digesting Methods

Manufacture of Cellulose From Lignocellulosic Products. Henry Dreyfus. U. S. pat. 2,042,705 (June 2, 1936).—Lignocellulosic materials extracted at high temperature with a substantially neutral solvent mixture of non- phenolic purely organic liquids of substantially different dipole moments due to the presence in the molecule of groups of different types.—A.P.-C.

Treatment of Fibrous Material. Thomas L. Dunbar assignor to Chemipulp Process, Inc. Can. pat. 358,259 (June 2, 1936).—Fibrous material, such as wood chips, to liberate acid-forming constituents and increase porosity, is heated to about 100°C. with steam and cooking liquor at above 110°C. is added. The mixture is then raised to 110°C. to initiate reaction of the liquor with the material. —A.P.-C.

Production of Cellulose, Zellingnon-Gesellschaft m.b.H. Fr. pat. 794,604 (Feb. 21, 1936).—The incrustations are separated from cellulose by treating wood with organic nitrogen compounds, concentrated or diluted, e.g., triethanolamine, ethyl amine, dimethyl amine, trimethyl amine, benzyl amine, beta-naphthylamine, pyridine, quinoline and their compounds. The treatment is carried out in the presence of a catalyst, preferably zinc oxide or sulphuric acid.—A.P.-C.

Drinking Paper Printed With Oxidizable Inks. Pierre R. Hines. U. S. pat. 2,042,465 (June 2, 1936).—Paper printed with oxidizable inks is treated to remove size (suitably with 40 to 60 lbs. of caustic soda per to of air-dry paper). The liquor is removed, and the shr s are maintained in loose condition and moist with weak alkali solution and exposed to the air until brown spots appear on the shreds. The latter are then again covered with a weak alkaline solution so as to exclude further direct contact with air till the ink particles are readily detachable by slight brushing. The shreds are then subjected to defiberizing action and the ink particles re-

IMPORTS OF PAPER AND PAPER STOCK

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING DECEMBER 5, 1936

CIGARETTE PAPER

De Mauduit Paper Corp., *Champlain,* Havre, 1 cs.

WALL PAPER

F. J. Emmerich, *Lancastria,* Liverpool, 3 bls.; Rohner Gehrig & Co., *Stavangerfjord,* Oslo, 6 bxs.

PAPER HANGINGS

W. H. S. Lloyd & Co., *American Merchant,* London, 13 bls., 1 cs.

WALL BOARD

Treetex Corp., *Schwanheim,* Kopmanholmen, 5,765 bdls.

NEWSPRINT

Jay Madden Corp., *Cliffwood,* Kotka, 297 rolls; N. Y. Times Co., *Markland,* Liverpool, N. S., 169 rolls; N. Y. Tribune, Inc., *Markland,* Liverpool, N. S., 2,186 rolls; World Telegram, *Markland,* Liverpool, N. S., 608 rolls; Brooklyn Daily Eagle, *Markland,* Liverpool, N. S., 462 rolls; Westchester Newspapers, Inc., *Markland,* Liverpool, N. S., 46 rolls; Parsons & Whittemore, Inc., *Markland,* Liverpool, N. S., 585 rolls; Jay Madden Corp., *Sagoporack,* Kotka, 733 rolls; Jay Madden Corp., *Korsholm,* Kotka, 285 rolls; Walker Goulard Plehn Co., *Korsholm,* Kotka, 77 bls.; Lunham & Reeve, Inc., *Korsholm,* Kotka, 307 rolls; Jay Madden Corp., *Scanpenn,* Wiborg, 735 rolls; Lunham & Reeve, Inc., *Scanpenn,* Wiborg, 289 rolls; Perkins Goodwin & Co., *New York,* Hamburg 482 rolls; ———, *Stavangerfjord,* Skien, 262 rolls.

PRINTING PAPER

———, *Queen Mary,* Southampton, 5 cs.; Oxford University Press, *Lancastria,* Liverpool, 5 cs.; ———, *Ascania,* London, 3 cs.; ———, *Europa,* Bremen, 8 cs.; E. Dietzgen & Co., *New York,* Hamburg, 30 cs.

WRAPPING PAPER

———, *Scanpenn,* Wiborg, 107 bls.; J. F. Kilroy, *New York,* Hamburg, 2 pkgs.; E. Dietzgen & Co., *New York,* Hamburg, 7 cs.

FILTER PAPER

H. Reeve Angel & Co. Inc., *Ascania,* London, 7 cs.; C. Schleicher & Schull Co. Inc., *New York,* Hamburg, 13 cs.

SURFACE COATED PAPER

Gevaert Co. of America, *Black Falcon,* Antwerp, 18 cs.; Hensel Bruckman & Lorbacher, *New York,* Hamburg, 14 cs.

BARYTA COATED PAPER

Globe Shipping Co., *Europa,* Bremen, 6 cs., 42 crates.

METAL COATED PAPER

K. Pauli Co., *New York,* Hamburg, 31 cs.

TRANSFER PICTURES

Rohner Gehrig & Co., *Europa,* Bremen, 10 cs.

TRANSFER PAPER

Phoenix Shipping Co., *New York,* Hamburg, 7 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., *Lancastria,* Liverpool, 36 cs. (duplex).

DECALCOMANIAS

Sellers Transportation Co., *Europa,* Bremen, 23 cs.; Sellers Transportation Co., *New York,* Hamburg, 11 cs.

COLORED PAPER

D. C. Andrews & Co., *Europa,* Bremen, 6 cs.; International F'd'g. Co., *New York,* Hamburg, 1 cs.

STENCIL PAPER

C. Happel, *Black Falcon,* Antwerp, 1 cs.

GUMMED PAPER

Heemsoth Kerner Corp., *Europa,* Bremen, 11 cs.

WAX COATED PAPER

Lansen Naeve Corp., *New York,* Hamburg, 2 cs.

PAPER TUBES

———, *New York,* Hamburg, 68 pkgs.; Almo Trading & Importing Co., *Champlain,* Havre, 25 cs.

CARD BOARD

American Express Co., *New York,* Hamburg, 50 cs.

MISCELLANEOUS PAPER

Jay Madden Corp., *Sagoporack,* Kotka, 82 rolls; Moller Products Corp., *Wales Maru,* Yokohama, 25 cs.; H. Reeve Angel & Co. Inc., *Wales Maru,* Yokohama, 6 cs.; F. C. Strype, *Black Falcon,* Rotterdam, 1 cs.; Japan Paper Co., *Bilderdyk,* Rotterdam, 4 cs.; Keuffel & Esser Co., *New York,* Hamburg, 33 cs.

RAGS, BAGGINGS, ETC.

S. Shapiro & Son, *Cliffwood,* Gdynia, 68 bls. rags; Royal Manufacturing Co., *Wales Maru,* Shanghai, 400 bls. cotton waste; Royal Manufacturing Co., *Wales Maru,* Shanghai, 50 bls. cotton fly waste; E. P. Gus, *Wales Maru,* Shanghai, 100 bls. cotton waste; Brandwein Mazur Co., *Wales Maru,* Shanghai, 125 bls. cotton waste; Manufacturers Trust Co., *Wales Maru,* Shanghai, 200 bls. cotton waste; Michigan Felt Co., *Wales Maru,* Shanghai, 100 bls. cotton waste; Guaranty Trust Co., *Wales Maru,* Kobe, 250 bls. cotton waste; J. J. Ryan & Sons, Inc., *Wales Maru,* Kobe, 650 bls. cotton waste; O'Brien Padawer Co., *Wales Maru,* Kobe, 100 bls. cotton waste; Chase National Bank, *Wales Maru,* Kobe, 84 bls. cotton waste; Loumar Textile By Products Co., *Wales Maru,* Kobe, 22 bls. thread waste; E. J. Keller Co. Inc., *Wales Maru,* ———, 450 bls. cotton waste, 133 bls. paper stock; ———, *Lancastria,* Liverpool, 19 bls. rags; ———, *Ascania,* London, 58 bls. rags; J. Cohen Son & Co. Inc., *Ascania,* London, 56 bls. rags; Castle & Overton, Inc., *Independence Hall,* Havre, 264 bls. rags, 263 bls. bagging; R. Blank, *Independence Hall,* Havre, 138 bls. rags; J. T. Flanney Co., *Independence Hall,*

Havre, 95 bls. rags; National City Bank, *Independence Hall,* Havre, 277 bls. rags; Loumar Textile By Products Co., *Independence Hall,* Dunkirk, 74 bls. bagging; Irving Trust Co., *American Merchant,* London, 6 bls. rags; A. W. Fenton, Inc., *American Merchant,* London, 9 bls. rags; Chase National Bank, *American Merchant,* London, 32 bls. rags; Banco Coml. Italiane Trust Co., *American Merchant,* London, 67 bls. paper stock; ———, *Boniface,* Bahia, 190 bls. cotton waste; J. J. Ryan & Sons, Inc., *Tai Shan,* Kobe, 400 bls. cotton waste; ———, *Tai Shan,* Kobe, 150 bls. cotton waste; ———, *Schwanheim,* Gefle, 69 bls. rags; Banco Coml. Italiane Trust Co., *Scanpenn,* Gdynia, 122 bls. rags; Hicks Costarino & Co., *Exchester,* Naples, 77 bls. rags; J. Eisenberg Co., *Bilderdyk,* Rotterdam, 6 bls. rags; R. & V. Miller, *Bilderdyk,* Rotterdam, 9 bls. rags; ———, *Bilderdyk,* Rotterdam, 232 bls. rags; Brown Bros. Harriman & Co., *Hoegh Transporter,* Trieste, 87 bls. rags; Banco Coml. Italiane Trust Co., *Hoegh Transporter,* Trieste, 41 bls. rags; Manufacturers Trust Co., *Hoegh Transporter,* Naples, 80 bls. rags; E. J. Keller Co. Inc., *Estrella,* ———, 42 bls. paper stock.

BONE GLUE

———, *Vulcania,* Trieste, 450 bags.

OLD ROPE

Banco Coml. Italiane Trust Co., *Ascania,* London, 64 coils; Banco Coml. Italiane Trust Co., *American Merchant,* London, 67 coils; G. W. Millar & Co. Inc., *Black Falcon,* Rotterdam, 54 coils.

CHINA CLAY

English China Clays Sales Corp., *Lancastria,* Liverpool, 56 bags.

WOOD PULP

Perkins Goodwin & Co., *Cliffwood,* Gdynia, 2,200 bls. wood pulp, 338 tons; Johaneson Wales & Sparre, Inc., *Cliffwood,* Gdynia, 1,500 bls. wood pulp, 150 tons; Lagerloef Trading Co., *Cliffwood,* Wiborg, 878 bls. wood pulp; J. Andersen & Co., *Sagoporack,* Stockholm, 600 bls. sulphite, 100 tons; Gottesman & Co. Inc., *Sagoporack,* Stockholm, 450 bls. sulphite, 76 tons; Lagerloef Trading Co., *Sagoporack,* Helsingfors, 520 bls. mechanical pulp, 104 tons; Lagerloef Trading Co., *Korsholm,* Rauma, 1,180 bls. sulphite; Lagerloef Trading Co., *Korsholm,* Rauma, 1,400 bls. sulphate; Castle & Overton, Inc., *Korsholm,* Viipuri, 2,757 bls. wood pulp; Lagerloef Trading Co., *Korsholm,* Viipuri, 514 bls. sulphite, 500 bls. sulphate; ———, *Schwanheim,* Gefle, 125 bls. sulphite; Gottesman & Co. Inc., *Schwanheim,* Gefle, 2,920 bls. sulphite; Tradesman's National Bank Trust Co., *Schwanheim,* Norrsundet, 2,135 bls. sulphate; Brown Bros. Harriman & Co., *Schwanheim,* Hernosand, 750 bls. kraft pulp, 125 tons; Central Hanover Bank Trust Co., *Schwanheim,* Hernosand, 750 bls. sulphite, 125 tons; Bank of Manhattan Trust Co., *Schwanheim,* Hernosand, 600 bls. sulphite, 100 tons; Price & Pierce, Ltd., *Schwanheim,* Hernosand, 600 bls. mechanical pulp, 100 tons; Price & Pierce, Ltd., *Schwanheim,* Orviken, 750 bls. unbleached sulphite; Pagel Horton & Co. Inc., *Schwanheim,* Sikea, 150 bls. sulphite; ———, *Schwanheim,* Kopmanholmen, 612 bls. chemical pulp; Lagerloef Trading Co., *Scanpenn,* Wiborg, 1,274 lbs. sulphite, 247 tons; Jay Madden Corp., *Scanpenn,* Wiborg, 35 bls. wood pulp, 6 tons; M. Sone, *Stavangerfjord,* Oslo, 1,755 bls. wood pulp; Perkins Goodwin & Co., *Stavangerfjord,* Drammen, 625 bls. sulphite; The Borregaard Co. Inc., *Stavangerfjord,* Sarpsborg, 704 bls. sulphate; M. Sone, *Hoegh Transporter,* Trieste, 4,383 bls. wood pulp; Johaneson Wales & Sparre, Inc., *Hoegh Transporter,* Trieste, 2,000 bls. wood pulp; Guaranty Trust Co., *Hoegh Transporter,* Trieste, 822 bls. wood pulp.

WOOD PULP BOARDS

Jay Madden Corp., *Cliffwood,* Wiborg, 41 bls.; Jay Madden Corp., *Sagoporack,* Kotka, 74 rolls, 88 bls.; Jay Madden Corp., *Korsholm,* Kotka, 124 rolls, 246 pkgs.; Jay Madden Corp., *Korsholm,* Viipuri, 15 bls.; ———, *Korsholm,* Viipuri, 315 rolls; ———, *New York,* Hamburg, 127 bls.

ALBANY IMPORTS

WEEK ENDING DECEMBER 5, 1936

Pagel Horton & Co. Inc., *Schwanheim,* Gefle, 2,500 bls. sulphate, 2,500 bls. sulphite; ———, *Schwanheim,* Gefle, 1,875 bls. sulphite; Price & Pierce, Ltd., *Schwanheim,* Gefle, 600 bls. sulphite; Price & Pierce, Ltd., *Schwanheim,* Orviken, 6,600 bls. chemical pulp; Price & Pierce, Ltd., *Schwanheim,* Hernosand, 3,000 bls. sulphite, 500 tons; Bank of N. Y. Trust Co., *Schwanheim,* Hernosand, 3,000 bls. kraft pulp, 500 tons; Central Hanover Bank Trust Co., *Schwanheim,* Hernosand, 1,800 bls. sulphite, 300 tons; Pagel Horton & Co. Inc., *Schwanheim,* Hornefors, 4,500 bls. sulphite, 762 tons; Pagel Horton & Co. Inc., *Schwanheim,* Sikea, 6,150 bls. sulphite; ———, *Schwanheim,* Kopmanholmen, 5,202 bls. chemical pulp.

PORTLAND IMPORTS

WEEK ENDING DECEMBER 5, 1936

Price & Pierce, Ltd., *Etna,* ———, 6,000 lbs. unbleached kraft, 1,950 bls. unbleached sulphite; Gottesman & Co. Inc., *Hammaren,* Sweden, 2,000 bls. wood pulp.

BOSTON IMPORTS

WEEK ENDING DECEMBER 5, 1936

E. J. Keller Co. Inc., *Wales Maru,* ———, 600 bls. rags; Smith Paper Co., *Liberty,* Manchester, 65 bls. bagging; Atkinson Haserick & Co., *Pr. Polk,* Genoa, 16 cs. paper; Parsons & Whittemore, Inc., *City of Flint,* ———, 2,075 bls. wood pulp; Gottesman & Co. Inc., *Hammaren,* Sweden, 940 bls. wood pulp; M. Sone, *Hoegh Transporter,* Trieste, 670 bls. wood pulp.

PHILADELPHIA IMPORTS

WEEK ENDING DECEMBER 5, 1936

Enterprise Paper Co., *Awobasan Maru,* Yokohama, 2 cs. paper; Jay Madden Corp., *Sagoporack,* Helsingfors, 336 bls., 3 cs. paper; J. W. Hampton Jr. Co., *Sagoporack,* Kotka, 418 rolls newsprint; H. Reeve Angel & Co. Inc., *Sagoporack,* Kotka, 51 rolls newsprint; Royal Manufacturing Co., *Wales Maru,* Shanghai, 100 bls. cotton waste; American Cotton Products Co., *Wales Maru,* Shanghai, 100 bls. cotton waste; ———, *Wales Maru,* Kobe, 170 bls. cotton waste, 434 bls. rags; Union Waste Co., *Wales Maru,* Kobe, 100 bls. rags; J. M. Hagy Waste Works, *Wales Maru,* Kobe, 50 bls. rags; Chase National Bank, *Wales Maru,* Kobe, 334 bls. rags; ———, *Korsholm,* Norrkoping, 497 rolls newsprint; Guaranty Trust Co., *Korsholm,* Norrkoping, 71 bdls., 313 rolls kraft paper; Lagerloef Trading Co., *Korsholm,* Rauma, 3,372 bls. sulphite; Lagerloef Trading Co., *Korsholm,* Kotka, 125 bls. sulphate; Jay Madden Corp., *Korsholm,* Kotka, 200 rolls newsprint; Castle & Overton, Inc., *Korsholm,* Viipuri, 1,043 bls. wood pulp; ———, *Liberty,* Liverpool, 80 coils old rope; ———, *Liberty,* Liverpool, 65 bls. bagging; Loumar Textile By Products Co., *Independence Hall,* Havre, 520 bls. rags; R. J. Ross & Co. Inc., *Independence Hall,* Havre, 72 bls. rags; Castle & Overton, Inc., *Independence Hall,* Havre, 1,142 bls. rags; National Vulcanized Fibre Co., *Independence Hall,* Havre, 44 bls. rags; ———, *Independence Hall,* Havre, 43 bls. cotton waste; Ore & Chemical Corp., *Independence Hall,* Havre, 47 bls. rags; D. Galloway, *Independence Hall,* Dunkirk, 66 bls. thread

(Continued on page 53)

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, December 9, 1936.

Trading in the local paper market continues brisk. The various standard grades of paper are moving into consumption in heavy volume. Sales forces of the leading paper organizations are decidedly optimistic over the future trend of the industry. Quotations are generally steady to firm.

The newsprint paper market is in a stronger position. Demand from the newspaper publishers is exceptionally active and production in Canada, Newfoundland and the United States is being maintained at near capacity to meet current requirements. Newspaper advertising lineage is running well ahead of last year's record.

Sentiment in the fine paper market is improving. Demand for book, cover, bond and ledger papers is persistent. Prices are firmer. Tissues are moving in good volume. The coarse paper market is exhibiting a strong undertone. Demand for the various grades of paper board is well sustained. Prices are steady.

Mechanical Pulp

The ground wood pulp market is firmer. Demand for both domestic and imported mechanical pulp is better. Manufacturing operations in North America and abroad have been speeded up to take care of the increased consumption. Imported ground wood pulp is now quoted at from $29 to $30 per ton, on dock, Atlantic ports.

Chemical Pulp

Steadiness prevails in the chemical pulp market. Bleached sulphite, easy bleaching and kraft pulps continue to display strength. Light and strong kraft is now quoted at from $2.30 to $2.45 and kraft No. 1 at from $2.15 to $2.40 per 100 pounds, on dock, Atlantic ports.

Old Rope and Bagging

The old rope market is showing signs of improvement. Demand for domestic and foreign old manila rope is fairly active. Prices are firmer. Domestic old manila rope is now quoted at $3 to $3.25 per 100 pounds, f. o. b. New York. The bagging market is strong. All grades are in excellent request.

Rags

Conditions in the domestic rag market are improving. Demand for new and old cotton rags is holding up well. No. 1 shirt cuttings, in particular, are attracting much interest both here and abroad. Roofing grades are displaying strength. The position of the imported rag market is practically unchanged.

Waste Paper

The local paper stock market is sharing the general improvement. Board mill demand for the lower grades is insistent and, with offerings limited, prices are firmer. No. 1 mixed paper is now quoted at from .45 to .50, f. o. b. New York. The higher grades of waste paper are firmer, including book stock.

Twine

Demand for the various varieties of twine continues lively and this situation should continue until after the Yuletide holidays, at least. The price situation is considered bullish, in most quarters, and another advance has been announced on practically all grades of soft fiber twines.

New England TAPPI To Meet

There will be a meeting of the New England Section of the Technical Association on December 18 at the Nonotuck Hotel in Holyoke, Mass. A du Pont motion picture film entitled "The Wonder World of Chemistry" will be shown, and there will be a talk on cellulose lacquers.

IMPORTS OF PAPER AND PAPER STOCK

(Continued from page 52)

waste; J. Andersen & Co., *Scanpenn,* Helsingfors, 600 bls. mechanical pulp, 101 tons; Lagerloef Trading Co., *Scannpenn,* Wiborg, 2,548 bls. sulphate, 425 tons; Jay Madden Corp., *Scanpenn,* Wiborg, 28 bls. wood pulp boards; Wilkinson Bros. Co., *Scannpenn,* Wiborg, 123 rolls newsprint; J. W. Hampton Jr. Co., *Scannpenn,* Wiborg, 454 rolls newsprint; E. J. Keller Co. Inc., *Black Falcon,* 53 bls. rags; Gottesman & Co., Inc., *Stureholm,* Sweden, 4,495 bls. wood pulp; M. Sone, *Hagen,* Hamburg, 316 bls. wood pulp; Parsons & Whittemore, Inc., *Chr. Krohg,* ———, 3,500 bls. wood pulp.

WILMINGTON IMPORTS

WEEK ENDING DECEMBER 5, 1936

Lagerloef Trading Co., *Sagoporack,* Kotka, 1,879 bls. sulphite, 351 tons; Price & Pierce, Ltd., *Kelkheim,* ———, 6,500 bls. unbleached sulphite.

CAMDEN IMPORTS

WEEK ENDING DECEMBER 5, 1936

Lagerloef Trading Co., *Cliffwood,* Wiborg, 3,189 bls. wood pulp; Lagerloef Trading Co., *Sagoporack,* Wiborg, 7,548 bls. sulphate, 1,508 tons; Lagerloef Trading Co., *Scanpenn,* Wiborg, 3,046 bls. sulphate, 609 tons.

BALTIMORE IMPORTS

WEEK ENDING DECEMBER 5, 1936

Washington Post, *Markland,* Liverpool, N. S., 1,342 rolls newsprint; Atterbury Bros. Inc., *Sagoporack,* Helsingfors, 150 bls. mechanical pulp, 25 tons; ———, *Sagoporack,* Kotka, 1,060 bls. sulphite, 178 tons; Johaneson Wales & Sparre, Inc., *Sagoporack,* Gdynia, 1,650 bls. wood pulp, 165 tons; J. Andersen & Co., *Sagoporack,* Gdynia, 280 bls. wood pulp, 56 tons; ———, *Sagoporack,* Gdynia, 200 bls. wood pulp, 35 tons; Price & Pierce, Ltd., *Sagoporack,* Gdynia, 600 bls. wood pulp, 101 tons; Scherman Bros., *Wales Maru,* Kobe, 130 bls. rags; Irving Trust Co., *Liberty,* Liverpool, 89 coils old rope; Congoleum Nairn Co., *Black Falcon,* Antwerp, 198 bls. rags; Castle & Overton, Inc., *Black Falcon,* Rotterdam, 400 bls. wood pulp, 80 tons; ———, *Black Falcon,* Rotterdam, 1,213 bls. wood pulp, 258 tons; Congoleum Nairn Co., *Exchester,* Marseilles, 1,257 bls. rags; M. Sone, *City of Baltimore,* Hamburg, 1,680 bls. wood pulp.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, December 9, 1936.

BLANC FIXE.—The position of the blanc fixe market is practically unchanged. Prices are holding to schedule. The pulp is quoted at from $42.50 to $45 per ton, in bulk; while the powder is selling at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER.—Conditions in the bleaching powder market are satisfactory. Shipments against contract are going forward in good volume. Prices remain unchanged. 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 17½ cents; while French and Argentine standard ground are selling at 17 and finely ground at 17½ cents per pound, all in bags, car lot quantities.

CAUSTIC SODA.—Steadiness prevails in the caustic soda market. The contract movement is well up to average. Solid caustic soda is 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 exhibiting a strong undertone. Contract shipments are moving freely. 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 brisk. The contract movement is normal. Contracts for the forthcoming year are being booked in good volume. Prices are firm. Chlorine is quoted at from $2.15 to $2.25 per 100 pounds, in car lots, at works.

ROSIN.—The rosin market is stronger. Paper making gum rosin is now quoted at $8.37½ and wood rosin at $8.25 per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent rosin size is selling at $3.75 per 100 pounds, in tank cars, at works.

SALT CAKE.—Business in the salt cake market is active. Prices continue steady. 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 fairly active. Shipments against contract are moving in good volume. Quotations on soda ash, in car lots, at works, per 100 pounds, are still as follows: in bulk, $1.05; in bags, $1.20; and in barrels, $1.50.

STARCH.—Supplies of starch are moving into consumption in normal manner for the time of year. Prices are holding to schedule. 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 displaying strength. Prices are holding to schedule. 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 nearby car loads, the quotation is $21 per ton. All quotations are in car lot, at works.

TALC.—Demand for talc is fairly persistent. The contract movement is normal. Prices are steady and unchanged. 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

Rag Content Bond & Ledgers—Delivered Zone 1

	Bonds		Ledgers
100% Rag Ext. No. 1	—		—
100% Rag	.29	@	.30
75% Rag	.22	@	.23
65% Rag	.19	@	.20
50% Rag	.15½	@	.16½
25% Rag	.13	@	.14

Sulphite Bond & Ledgers—Delivered Zone 1

	Bonds		Ledgers
No. 1 Sulphite	7.50	@	8.50
No. 2 Sulphite	6.50	@	7.50
No. 3 Sulphite	6.00		7.00
No. 4 Sulphite	5.50		6.50
Book, B Grade, Cased			
S. & S. C.	6.10	@	6.85
S. & S. C. Litho.	6.35	@	7.10
M. F.	5.95	@	6.60
Coated and Enamel	7.15	@	8.00
Coated Litho.	7.15	@	8.00
Tissues—Per Ream—			
White No. 1	.82½	@	—
White No. 1 M. G.	.77½	@	—
White No. 1½	.62½	@	—
White No. 2	.60	@	—
Anti-Tarnish M. G.	.67½	@	—
Colored	.80	@	—
Kraft	.67½	@	—
Manila	.60	@	—
Unbleached Toilet	2.60	@	3.30
Bleached Toilet	3.94	@	5.26
Paper Towels—			
Unbleached	2.10	@	3.35
Bleached	3.30	@	3.70
Manila—			
No. 1 Jute	9.00	@	9.25
No. 2 Jute	7.75	@	8.50
No. 1 Wood	4.00	@	5.25
No. 2 Wood	3.50	@	4.00
Fibre Papers—			
No. 1 Fibre	4.25	@	5.50
No. 2 Fibre	4.00	@	4.75

(Delivered New York)

News, per ton—			
Roll, contract	41.00	@	—
Sheets	46.00	@	—
Kraft—			
No. 1 Northern	4.25	@	4.75
Standard	4.12½	@	4.25
Southern	4.00	@	—
Glazed	4.50	@	—
Striped	4.75	@	—
Boards, per ton—			
News	37.50	@	40.00
Chip	35.00	@	37.50
Sgl. Mla. Ll. Chip	50.00	@	52.50
Jute Lined Chip	50.00	@	52.50
Kraft Liners	65.00	@	67.50
White Pat. Coated	60.00	@	62.50
Binders Boards	67.00	@	75.00

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported		
Moist	29.00	@30.00
Dry	29.00	@30.00
(Delivered)		
No. 1 Domestic and Canadian	29.00	@31.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Prime Bleached Sulphite	2.70	@	3.30
Prime Qualities—			
Class 1 All Prime Easy Bleaching	2.40	@	2.60
Other Than Easy Bleaching—			
Class 2 Higher than Standard	2.40	@	2.50
Class 3 Standard	2.35	@	2.40
Class 4 Lower than Standard	2.30	@	2.35

(On Dock, Atlantic Ports)

Kraft Bleached	3.00	@	3.25
Kraft Light & Strong	2.30	@	2.45
Kraft No. 1	2.15	@	2.40
Kraft No. 2	2.10	@	2.15
(F.o.b. Pulp Mill)			
Kraft Domestic	1.95	@	2.30
(Delivered)			
Soda Bleached	2.70	@	—

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.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	7.75	@	8.00
Silesias No. 1	6.25	@	6.50
New Unbleached	8.25	@	8.50
New Soft Blacks	3.75	@	4.00
Blue Overall	6.75	@	7.00
Fancy	3.00	@	3.25
Washables	2.25	@	2.50
Mixed Khaki Cuttings	3.50	@	3.75
O. D. Khaki Cuttings	4.25	@	4.50

Old Rags

White, No. 1—			
Repacked	3.25	@	3.50
Miscellaneous	2.75	@	3.00
White, No. 2—			
Repacked	2.25	@	2.50
Miscellaneous	1.75	@	2.00
Thirds and Blues—			
Repacked	2.00	@	2.25
Miscellaneous	1.90	@	2.00
Roofing Rags—			
No. 1	Nominal		
No. 2	1.65	@	1.70
No. 3 (bagging)	1.50	@	1.55
No. 4	1.50	@	1.60
No. 5A	1.40	@	1.50

Foreign Rags

New Rags

New Dark Cuttings	2.25	@	2.50
New Mixed Cuttings	2.00	@	2.25
New Light Silesias	5.50	@	5.75
Light Flannelettes	5.50	@	5.75
New White Cuttings	7.00	@	7.50
New Light Oxfords	4.00	@	4.50
New Light Prints	3.00	@	3.25

Old Rags

No. 1 White Linens	7.50	@	8.00
No. 2 White Linens	6.50	@	7.00
No. 3 White Linens	4.50	@	5.00
No. 4 White Linens	2.25	@	2.50
No. 1 White Cotton	4.25	@	4.75
No. 2 White Cotton	3.25	@	3.75
No. 3 White Cotton	2.50	@	2.75
No. 4 White Cotton	1.90	@	2.15
Extra Light Prints	2.00	@	2.25
Ord. Light Prints	1.75	@	1.85
Med. Light Prints	1.55	@	1.65
Dutch Blue Cottons	2.25	@	2.50
French Blue Linens	3.50	@	4.00
German Blue Linens	2.50	@	2.75
German Blue Cottons	2.00	@	2.25
Checks and Blues	2.00	@	2.25
Linsey Garments	2.15	@	2.25
Dark Cottons	1.90	@	2.10
Old Shopperies	1.75	@	2.00
New Shopperies	1.75	@	2.00
French Blues	2.25	@	2.50

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—			
Foreign	2.10	@	2.15
Domestic	1.90	@	2.00
Wool Tares, light	1.50	@	1.75
Wool Tares, heavy	1.85	@	2.05
Bright Bagging	1.70	@	1.75
Manila Rope—			
Foreign	2.75	@	3.00
Domestic	3.00	@	3.25
Jute Strings	2.00	@	2.20
Sisal Strings	2.00	@	2.10
Mixed Strings	Nominal		

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	2.60	@	2.70
Ordinary Hard White No. 1	2.25	@	2.35
Hard White No. 2	2.10	@	2.20
Soft White No. 1	2.00	@	2.10
Flat Stock—			
Stitchless	.80	@	.95
Over issue Mag.	.85	@	.95
Solid Flat Book	.75	@	.80
Crumpled No. 1	.50	@	.55
Ledger Stock	.95	@	1.00
New B. B. Chips	.30	@	.35
Manilas—			
New Env. Cut	1.75	@	1.85
New Cuttings	1.35	@	1.45
Old Kraft Machine—			
Compressed bales	1.15	@	1.30
News—			
No. 1 White News	1.25	@	1.35
Strictly Overissue	.60	@	.70
Strictly Folded	.50	@	.55
No. 1 Mixed Paper	.45	@	.50

Twines

(F. o. b. Mill)

(Soft Fibre)

Coarse Polished—			
India	.14¾	@	.17¾
Belg. White Hemp	.15¾	@	.19¾
India Compress	.15¾	@	.15¾
Fine Polished—			
Fine India	.21	@	.23
Unpolished—			
Box	.10¾	@	.11¾
Paper Makers	.10½	@	.12¾
Tube Rope	.11½	@	.14
Wall Paper	.12½	@	.13¾
Wrapping	.16	@	.20
Soft Fiber Rope	.13¾	@	.14¾

(Hard Fibre)

Bond	.12	@	.20½
Anchor	.11½	@	.13
Manila	.21	@	.28

CHICAGO

Paper

(F. o. b. Mill)

Rag Bond	.12	@	.40
Water Marked Sulphite Bond	.06¾	@	.11
Sulphite Bond	.05½	@	.07¼
Superfine Writing	.18	@	.24
No. 1 M. F. Book	.06½	@	.07¼
No. 2 M. F. Book	.05¼	@	.06¼
No. 1 S.&S.C. Book	.06¾	@	.07¾
No. 2 S.&S.C. Book	.05¾	@	.06½
Coated Book	.07	@	.12
Coated Label	.07	@	.08½
No. 1 Manila	.04¼	@	.05¾
No. 1 Fibre	.04¾	@	.05¼
No. 2 Manila	.04¼	@	.04¾
Butcher's Manila	.03¾	@	.03¾
No. 1 Kraft	4.75	@	5.00
Southern Kraft	3.88	@	4.25
No. 2 Kraft	3.88	@	4.25
Wood Tag Boards	.04¼	@	.06¼
Sulphite Screenings	.03	@	.03¾
Manila Tissue	.05¾	@	.07
White Tissue	.07	@	.09

(Delivered Central Territory)

News, per ton—			
Rolls, contract	42.00	@	—
Sheets, open	47.00	@	—
Boards, per ton—			
Plain Chip	46.50	@	—
Solid News	50.00	@	—
Manila Lined Chip	55.00	@	—
Patent Coated	65.00	@	—
Container Lined—			
85 Test, per 1000 sq. ft.			1.70
100 Test, per 1000 sq. ft.			1.85

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope Cuttings	1.70	@	2.00
No. 1 Hard White	1.40	@	1.65
No. 1 Soft White	1.25	@	1.50
Ledger & Writings	.60	@	.70
Solid Books	.50	@	.60
Blanks	1.00	@	1.05
Krafts	.80	@	.90
New Kraft Cuts	1.20	@	1.30
Manila Env. Cuts	1.25	@	1.30
Ex. No. 1 Manila	.90	@	1.00
Print Manila	.40	@	.50
Overissue News	.40	@	.45
Old Newspapers—			
No. 1 Folded News	.42½	@	.45
No. 1 Mixed Paper	.25	@	.30
Roofing Stocks—			
No. 1	30.00	@	—
No. 2	28.00	@	—

PHILADELPHIA

Paper

Rag Content Bond & Ledgers— Delivered Zone 1	Bonds	Ledgers
100% Rag Ext. No. 1	.36	.37
100% Rag	.28	.29
75% Rag	.21	.22
65% Rag	.18	.19
50% Rag	.15	.16
25% Rag	.12½	.13½

Sulphite Bond & Ledgers— Delivered Zone 1	Bonds	Ledgers
No. 1 Sulphite	7.75	8.75
No. 2 Sulphite	6.75	7.75
No. 3 Sulphite	6.00	7.00
No. 4 Sulphite	5.50	6.50

F.o.b. Mill

Book, M. F	5.00	@	—
Book, S. S. & C	5.25	@	—
Book, Coated	6.15	@	—
Coated Lithograph	6.15	@	—
No. 1 Jute Manila	10.50	@	—
Manila Sul., No. 1	6.75	@	—
Manila No. 2	4.25	@	—
No. 1 Kraft	6.00	@	—
Southern Kraft	5.00	@	—
News Print Rolls	40.00	@	—
Straw Board	40.00	@	45.00
News Board	40.00	@	—
Chip Board	37.50	@	—
Wood Pulp Board	70.00	@	85.00
Binder Boards—			
No. 1, per ton	75.00	@	80.00
No. 2, per ton	70.00	@	75.00
Carload lots	65.00	@	70.00
Tarred Felts—			
Regular	52.25	@	54.25
Slaters (per roll)	.84	@	.94

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1.	.08	@	.08½
New White, No. 2.	.04½	@	.05
Light Silesias	.05½		—
Silesias, No. 1	.04½	@	.05
Black Silesias, soft.	.03½	@	.04
New Unbleached	.06	@	—
Washable, No. 1	.02	@	.02½
Blue Overall	.07	@	.07½
Cottons—According to grades—			
Washable, No. 2	.02½	@	.04½
New Blue	.02	@	.02½
Fancy	.03	@	—
New Black Soft	.04	@	.04½
New Light Seconds	.03½	@	.04
New Dark Seconds	2.00	@	2.25
Khaki Cuttings—			
No. 1 O. D.	.04	@	.04½
No. 2 Mixed	.03½	@	.04
Corduroy	.02	@	.02¼
New Canvas	.04	@	.04½
New Black Mixed.	.02	@	.02¼

Domestic Rags (Old)

White No. 1—			
Repacked	4.00	@	4.50
Miscellaneous	3.00	@	3.50
Thirds and Blues—			
Miscellaneous	2.00	@	2.25
Repacked	2.50	@	2.75
Black Stockings (Export)	4.50	@	5.00
Roofing Stock—			
Foreign No. 1	2.20	@	2.25
Domestic No. 1	1.50	@	1.60
Domestic No. 2	1.40	@	1.50
Roofing bagging	1.10	@	1.20

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	2.00	@	—
Domestic	2.25	@	—
Manila Rope	2.75	@	—
Sisal Rope	2.25	@	2.35
Mixed Rope	1.00	@	1.10
Scrap Burlaps—			
No. 1	2.25	@	2.50
No. 2	1.00	@	1.10
Wool Tares, heavy	3.25	@	3.50
Mixed Strings	1.00	@	1.10
No. 1 New Light Burlap	3.00	@	3.50
New Brrlap Cuttings	2.50	@	2.75

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.30	@	2.40
No. 2 Hard White	2.10	@	2.20
No. 1 Soft White	1.90	@	2.00
No. 2 Soft White	1.40	@	1.45
No. 1 Mixed	—	@	.85
Solid Ledger Stock	1.50	@	1.60
Ledger Stock, white	1.15	@	1.20
Ledger Stock, colored	.85	@	.90
No. 1 Books, heavy	.70	@	.75
Manila Cuttings	1.80	@	1.90
Print Manila	.55	@	.60
Container Manila	.55	@	.60
Kraft Paper	1.10	@	1.20
No. 1 Mixed Paper	.45	@	.50
Straw Board Chip	.40	@	—
Binders Board Chip	.40	@	—
Corrugated Board	.60	@	.65
Overissue News	.70	@	.75
Old Newspapers	.50	@	.55

BOSTON

Paper

Rag Content Bond & Ledgers— Delivered Zone 1	Bonds	Ledgers
100% Rag Ext. No. 1	.36	.37
100% Rag	.28	.29
75% Rag	.21	.22
65% Rag	.18	.19
50% Rag	.15	.16
25% Rag	.12½	.13½

Sulphite Bond & Ledgers— Delivered Zone 1	Bonds	Ledgers
No. 1 Sulphite	7.50	8.50
No. 2 Sulphite	6.50	7.50
No. 3 Sulphite	6.00	7.00
No. 4 Sulphite	5.50	6.50

F.o.b. Mill

Book, Super	.06	@	.09
Book, M. F	.05½	@	.08½
Book, Coated	.08½	@	.18
Coated Litho	.09	@	.12
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¾	@	.06¾
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.04¾	@	—
No. 2 Kraft	.04½	@	—

(Delivered New England points)

Southern Kraft	.04	@	—
News Print Rolls	39.50	@	—
Straw Board, rolls	.009	—	@35.00
Filled News Board	42.50	@	45.00
Chip Board	40.00	@	42.50
Single Manila Lined Chip	50.00	@	55.00
Single White, Patent Coated News Board (Bender)	60.00	@	65.00
Wood Pulp Board	70.00	@	75.00
Binder Boards (Standard Grade)	67.00	@	75.00

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.20	@	2.35
No. 1 Soft White	1.85	@	2.15
No. 2 Mixed	.75	@	.80
Solid Ledger Books	1.50	@	1.75
Overissue Ledger Stock	1.15	@	1.30
Mixed Ledgers	.85	@	.90
No. 1 Books, heavy	.80	@	.90
No. 1 Books, light	.50	@	.60
Crumpled Stitchless Book Stock	.50	@	.60
Manila Env. Cuttings	1.50	@	1.60
Manila Env. Cuttings, extra quality	1.75	@	1.85
No. 1 Old Manila	.60	@	.65
White Blank News	1.10	@	1.15
No. 1 Kraft	1.25	@	—
Mixed Papers	.42½	@	.47½
Print Manila	.60	@	.70
Container Manilas	.27½	@	—
Old Newspapers	.50	@	.55
Overissue News	.50	@	.65
Box Board Chips	.40	@	.45
Corrugated Boxes	.50	@	.60
Kraft corrugated boxes	.95	@	1.00
Screening Wrappers	40	@	.45

Bagging

(F. o. b. Boston)

Manila Rope—			
Foreign	3.00	@	—
Domestic	2.87½	@	—
Transmission Rope	1.25	@	1.35
Jute Rope	2.12½	@	2.25
Jute Carpet Threads	1.75	@	2.00
Gunny No. 1—			
Foreign	2.05	@	2.15
Domestic	1.90	@	2.00
Bleachery Burlap	4.25	@	4.50
Scrap Burlap—			
Foreign	2.00	@	2.05
Domestic	1.80	@	1.90
Scrap Sisal	2.00	@	2.10
Scrap Sisal for Shredding	2.10	@	2.35
Wool Tares, heavy	1.90	@	2.00
New Burlap Cuttings	2.25	@	2.50
Australian Wool Pouches	2.75	@	3.00
Heavy Baling Bagging	2.00	@	2.50
Paper Mill Bagging	1.75	@	1.80
Bagging No. 2	1.30	@	1.35

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.03½	@	.03¾
New White No. 1	.07½	@	.08
New White No. 2	.04½	@	.05
Silesias No. 1	.06½	@	.06¾
New Black Silesias	.03½	@	.04
Soft Unbleached	.08	@	.08½
Blue Chevoit	.06½	@	.07
Fancy	.03	@	.03¼
Washable	.02	@	.02½
Cottons—According to grades—			
Blue Overalls	6.25	@	6.75
New Black, soft	—	@	—
Khaki Cuttings	.03¾	@	.04
O. D. Khaki	.03¾	@	.04¼
Corduroy	.02¾	@	.03
New Canvas	—	@	—
B.V.D. Cuttings	.07¾	@	.08

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues	1.75	@	2.00
Thirds and Blues—			
Repacked	1.37½	@	1.75
Miscellaneous	1.25	@	1.62½
Black Stockings	3.90	@	4.00
Roofing Stock—			
No. 1	1.75	@	1.80
No. 2	1.65	@	1.70
No. 3	1.30	@	1.35

Foreign Rags

(F. o. b. Boston)

Dark Cottons	1.95	@	2.10
New White Shirt Cuttings	6.50	@	6.75
Dutch Blues	2.25	@	2.50
New Checks & Blues	2.50	@	3.00
Old Fustians	2.05	@	2.25
Old Linsey Garments	2.25	@	2.50
New Silesias	5.75	@	6.00

TORONTO

Paper

Bond—Delivered—			
No. 5 White	.10¾	@	—
No. 6 White	.10	@	—
No. 5 Tints	.11¾	@	—
No. 6 Tints	.10½	@	—
No. 5 Golden Rod.	.12¾	@	—
No. 6 Golden Rod.	.12	@	—
Ledgers—			
Ledgers, No. 1	.34½	@	—
Ledgers, No. 2	.25½	@	—
Writing	.09	@	.09½
Book—			
No. 1 M. F	6.50	@	6.75
No. 2 M. F	6.25	@	6.50
No. 3 M. F	5.00	@	5.35
No. 1 S. C	7.00	@	7.50
No. 2 S. C	6.50	@	7.00
No. 3 S. C	5.50	@	6.00
No. 1 Coated and Litho	12.00	@	—
No. 2 Coated and Litho	10.50	@	—
No. 3 Coated and Litho	9.50	@	—
Coated tinted	13.00	@	—
Wrapping—delivered—			
Rag Brown	4.75	@	—
White Wrap	3.50	@	—
"B" Manila	4.80	@	—
No. 1 Manila	5.40	@	—
Fiber	5.40	@	—
Kraft. M. F	5.90	@	—
Kraft. No. 2	5.40	@	—

(F. o. b. Cars Toronto)

News, per ton—			
Rolls (contract)	Nominal		
Sheets	Nominal		

Pulp

Ground wood	27.00	@	—
Unbleached Sulphite	42.00	@	—
Book (Class 1)	58.00	@	—
Writing (Class 2)	59.00	@	—
Select (Class 3)	60.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.00	@	2.25
Soft White	1.60	@	1.90
White Blk. News	1.25	@	1.40
Book and Ledger—			
Flat Magazine and Book Stock (old)	.80	@	.90
Light and Crumpled Book Stock	.70	@	.80
Ledgers and Writings	.90	@	1.00
Manilas—			
New Manila Cut	1.20	@	1.40
Printed Manilas	.55	@	—
Kraft	1.00	@	1.60
News and Scrap—			
Strictly Overissue	.55	@	.60
Strictly Folded	.50	@	.55
No. 1 Mixed Paper	.40	@	.45

Domestic Rags

(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.07	@	.08¼
Fancy Shirt Cuttings	.03	@	.03½

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