FIFTY-THIRD YEAR ESTABLISHED 1872

PAPER TRADE JOURNAL

THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY

1925 CONVENTION AND PAPER TRADE ANNUAL NUMBER

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

FIFTY-THIRD YEAR

Published Every Thursday by the

LOCKWOOD TRADE JOURNAL CO., INC.

LESLIE R. PALMER, PRESIDENT — GEO. S. MACDONALD, VICE-PRESIDENT & TREAS. — F. K. HOPPIE, SECRETARY

10 EAST 39TH ST. N. Y. U. S. A

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PAPER TRADE JOURNAL

Vol. LXXX. No. 6 NEW YORK AND CHICAGO Thursday, February 5, 1925

PAPER INDUSTRY HAS ANNOYING YEAR

Four Months of Exceptionally Good Business Followed by Four Months of Depression Due in a Large Measure to Misgivings Centering About the Presidential Election—News Print Again Led the Field and the Mills of North America Made a New Production Record—Fine Papers Encountered Many Cross Currents But Have Promising Outlook for 1925.

Written Especially for the Annual Number of the Paper Trade Journal by L. E. Thayer

The story of the paper industry in 1924 proves the fallacy of prophecy if it proves nothing else. The shrewdest forecasters erred in their predictions and periodical upsets occurred to force frequent revision of their reasoning. It was rather the rule than the exception that the things which they figured on did not happen and that the things they did not figure on did happen.

One cannot honestly enshroud the record of the year, however, in a pall for the year had its good points as well as its bad. The viewing of it as a whole does not produce gloom but concentration on the bad spots has a tendency to do exactly that. The year might well be compared to the litle girl who, "when she was good she was very, very good, but when she was bad she was horrid."

The saving grace of the year was seen at its best during the first quarter. Business was not only good but it was exceptionally good. The depression of the summer months, however, was unusually protracted and it had a disheartening effect on the entire industry. Business continued good throughout April, making four months which were preeminently satisfactory. The depression period which followed lasted about four months, offsetting the fine start the year had made.

After the Summer Slump

September brought a slight betterment but it was not until October that the industry really got back into shape and improvement was fairly consistent from that time until the close of the year.

There is little question but that politics was the outstanding factor of disturbance for the year. Someone has attempted to show by means of statistics that the idea of poor business being inevitably associated with presidential years is erroneous. However valid that contention may be, there are few who would care to argue that the fine start made by 1924 was interrupted by anything except misgivings incidental to a presidential year.

The past year was a presidential year in a class by itself. It had been preceded by a long period of political dissension and by political scandals at the seat of the national government. It was a period of investigations and probes, of suspicion and rumor, of charges and denials.

As candidates for the presidency were being discussed there came the threat of a great third party—a party of more radical ideas than either of the old parties and a party which boasted of the support it would be able to obtain from a veritable army of disgruntled and dissatisfied Democrats and Republicans.

In due time the new party materialized and for many weeks the third party with Senator LaFollette as its standard bearer was a great unknown quantity. It seems inconceivable at this writing that the advent of the third party could have produced the doubts and misgivings that it actually did but it is certain that the situation then appeared complex to the average man who could conceive the possibility of almost anything or everything happening.

Big business grew timid and business men everywhere became unusually conservative. Big business plans were held up for the time being to await the outcome of the election in November. The generous buying which had marked the first months of the year was replaced by a policy of conservative buying. Few thought of possible future needs and all confined themselves to satisfying the needs of the day. Under these conditions the paper industry struggled through the months of depression. Its lot was not a solitary one for business in every field walked the same path.

In October the situation became clarified considerably. Wall street was betting unusual odds on the reelection of President Coolidge and Wall street seldom goes wrong. Several publications were conducting nation-wide straw votes and the results of these all pointed to the reelection of President Coolidge by an overwhelming plurality. And so, a month before the election, business became fairly satisfied that the Republican party would be restored to power and that there need be no fear of radical changes in government for another four years.

Business Regains Confidence

The moral effect of this conclusion was immediately seen in the general business pick-up. The result of the election in November made a certainty of what had already been accepted as a foregone conclusion and business confidence which had been racked in every nerve center was restored.

But, as said before, the year taken as a whole cannot be classified as actually bad. It would have been better but for the presidential year influence and whatever failure the paper industry may have made in not living up to expectations can be traced primarily to that cause. There was nothing wrong with the industry and, in fact, the industry proved its stability by weathering a trying year as satisfactorily as it did.

There has been a great improvement in foreign affairs and the launching of the Dawes plan in Europe has had a vital influence which is helping American business today.

The Import Committee of the Paper Industry has made gratifying progress during the year. It is putting a firm foot down on foreign abuses which have long been the bane of American manufacturers.

The Year's Achievements

The year has seen some notable achievements by the industry, one of the most notable being that accomplished by the box board men, leading to the elimination of Sunday work and to the substitution of the three-tour system for that of the two tour system formerly in vogue.

But, perhaps, the greatest achievement of all lies in the fact that even during the mid-summer depression the paper industry reached forward hopefully, that its optimism has carried it along until today it faces the future without misgiving and with confidence that 1925 will prove a banner year that will atone for all the defects of 1924.

Good Year for News Print

The figures of news print production and consumption during 1924 show some interesting and astounding facts. Once more news print led the field in demand and the statistics show a growth of newspaper reading which guarantees the future of news print under any and all conditions.

The fact that so many newspaper mergers have taken place has caused an erroneous impression with many who have not taken pains to ascertain the real facts. As a matter of fact there are approximately 22,000 newspapers in North America at this time, the number being 200 in excess of that of a year ago. About ten per cent of these are daily papers. That more papers are being read is shown by the fact that the circulation of the dailies has increased 25 per cent during the past five years and of the Sunday newspapers 42 per cent.

Five years ago the newspapers in the United States which had in excess of 100,000 circulation averaged 23 pages for the daily editions and 79 for the Sunday. Today the average pages of the dailies number 28 and of the Sunday issues 103. This shows that the press of the country is a giant octopus which is constantly calling for more news print to devour. Production is taxed to satisfy the avaricious appetite and thus is explained the glowing record of news print.

North America in 1924 made a new record for news print production with 2,900,000 tons as the amazing figure. The mills of the United States made 1,471,000 tons during the year or 14,000 tons less than in 1923 and 40,000 tons less than the high mark made in 1920. The Canadian production was 1,353,000 tons, or an increase of 87,000 tons over 1923 and a production 54 per cent larger than in 1920.

In 1924 the publishers in the United States used nine-tenths of the Canadian production and 156,000 tons imported from Europe. The consumption was 50,000 tons greater than the record consumption of 1923 and 28 per cent more than in 1920.

The Year in Board

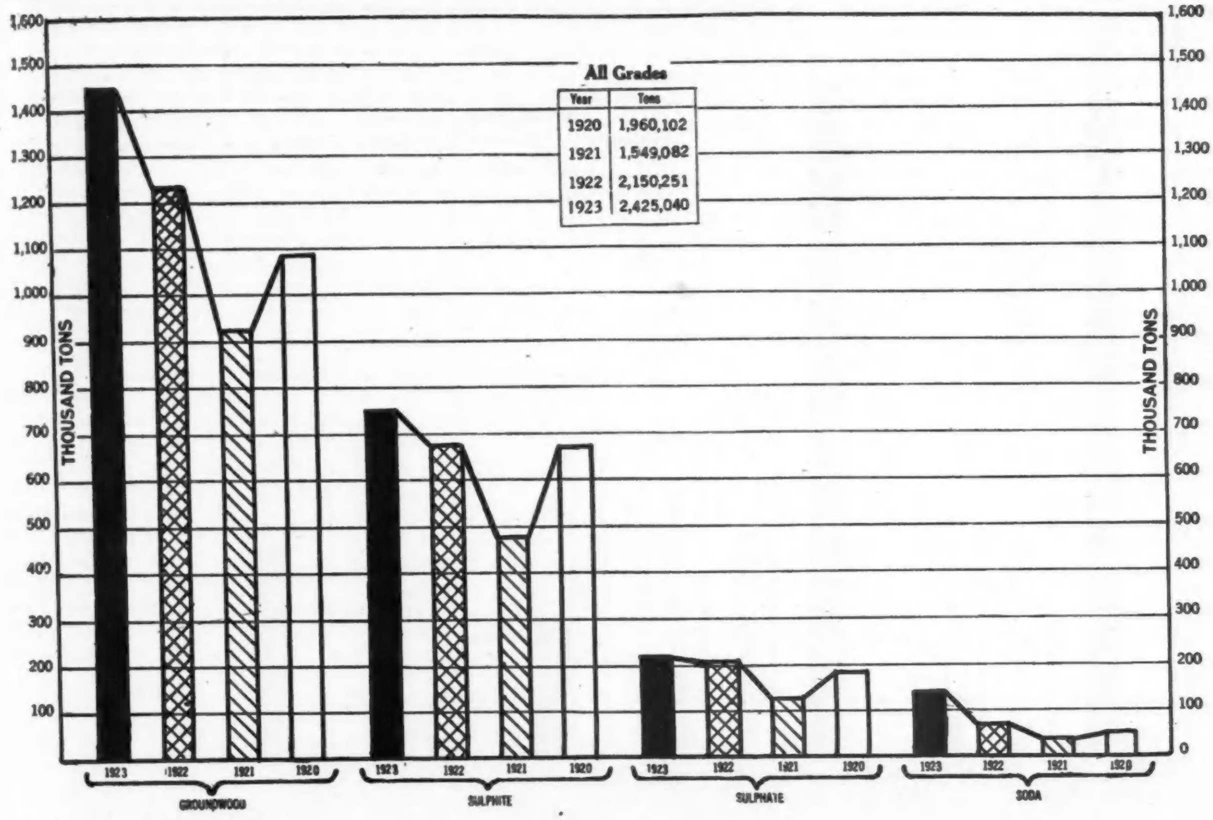
The past year has been an important one for the Box Board industry, not so much because of actual business as of because of the great advance made by the Box Board men along the lines of cooperative effort. During the year the recently formed Box Board Association has annexed more members so that now its membership represents 80 per cent of the combined tonnage of the industry. The Association is now functioning in a helpful, practical way and is putting the industry on a more satisfactory basis than it has ever occupied before.

Fine Papers Doing Well

Fine papers experienced during 1924 the various irregularities

Courtesy News Print Service Bureau

WOOD PULP PRODUCTION 1920-1923, UNITED STATES



Courtesy News Print Service Bureau

WOOD PULP PRODUCTION 1920-1923, CANADA

felt throughout the paper industry. The first five months of the year, however, were superior months and while depression followed until Fall, the total gross sales amounted to $137,500,000, which was only 0.5 per cent less than in 1923 and 6.3 per cent greater than in 1922.

The writing paper industry continues to enjoy its phenomenal growth and today the mills are producing and the country is consuming 5,000 tons of paper every 48 hours.

Paramount among the difficulties the mills have to contend with at the present time is the increase of cost of rags. The figures show that six leading grades showed an average increase last month of 22 per cent over January 1924 and 97 per cent over January 1922. Dealers and consumers seem to agree in the opinion that the peak has been reached.

Business since January 1 has been good and promises to equal and, perhaps, may exceed the business at the start of 1924 which was exceptionally good. The outlook is more than promising and there is every indication that the business for the first quarter of 1925 may exceed that for the first quarter of 1924. If it does it will start fine papers well toward a new year's record.

Book Mills Kept Fairly Busy

The book paper mills had a fair year although not operating to capacity. The average operation was in the neighborhood of 80 to 90 per cent. While the magazines and trade papers appeared to use their normal tonnage, the demand of lithographers, label printers, envelope and tablet manufacturers fell considerably below normal.

November saw a noticeable increase in the demand for all grades made by the book mills. In making 1925 contracts, some of the leading mills have changed their price policy, changing f. o. b. mill prices to prices delivered, which means a lowering of prices from $2 to $3 a ton. Prices have remained firm throughout the year and contracts for the first three months of 1925 have been taken at a firm price, prices beginning with the second quarter to be regulated by market conditions. It is predicted that cost of manufacture will not be reduced because of the present high price of labor and the growing scarcity and increasing cost of all material used in the manufacture of book paper.

Year in Tissue Mills

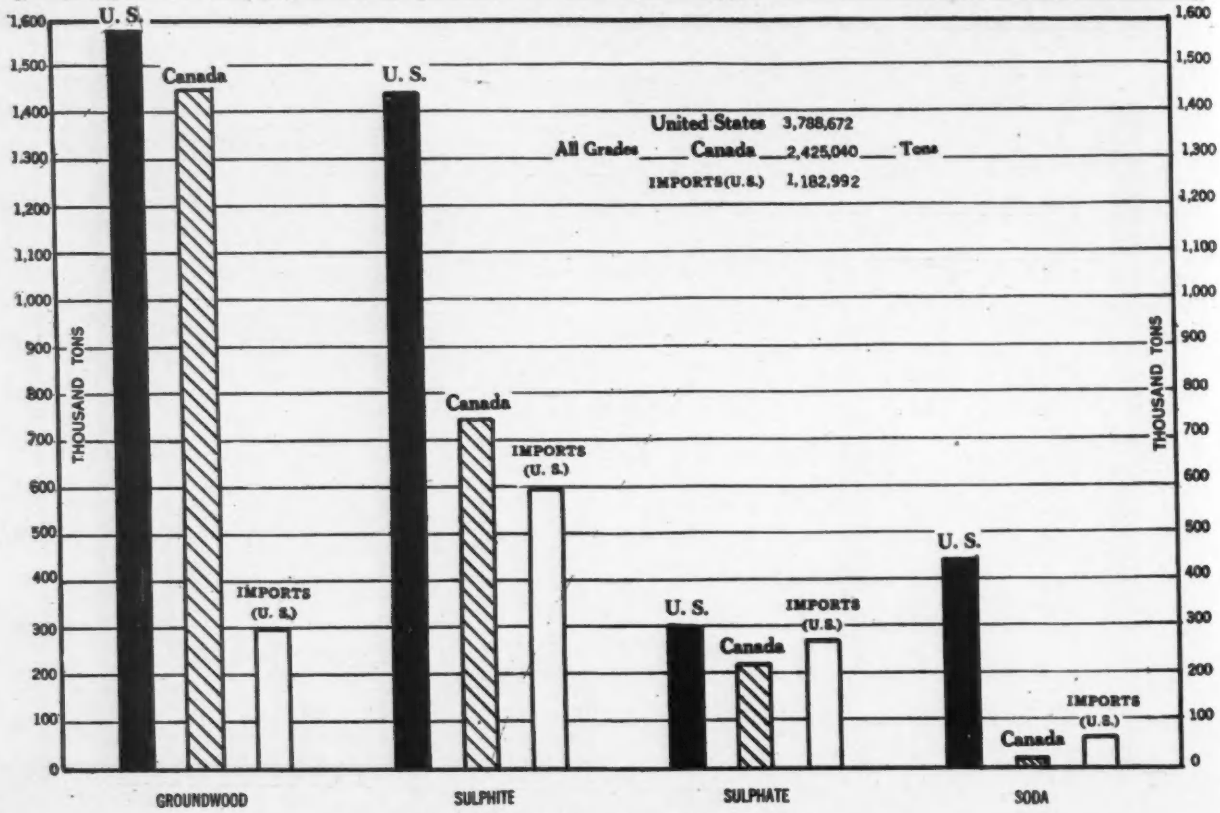
Fair conditions have prevailed at the tissue mills and most of them have been able to keep their machines moderately busy. The margin of profit has been small but things have been righting themselves and the year closed with a tendency to higher prices.

The mills which produce a line of specialties have been most favored. They have avoided too keen competition and have not been forced to take unprofitable business. Converting prices have been low and many of the mills found it difficult to keep their machines running. Some of them resorted to making sheets or stock and some of them were compelled to shut down for a time.

Most of the time production has exceeded consumption. The year's experiences have shown the need of some sort of regulation of competition. There is today an optimistic feeling regarding the future, although some of the mills are not booked very far ahead at the present moment.

Coarse Papers Have Struggle

The career of coarse papers during 1924 was somewhat parallel to its progress in 1923. While the ravages of competition may not as a whole have been as general, there were times when the same bad effects were experienced as in 1923. The market was fairly steady during the first month of the year as far as manila and fiber were



WOOD PULP PRODUCTION AND IMPORTS 1923

concerned, but Kraft suffered from competition. A certain amount of relief was experienced the latter part of February, the foreign mills becoming a competitive factor to a less extent than they had been. The depression of the summer months was marked and protracted. Everywhere there was an eagerness to obtain business which almost approached to the point of avarice. The result was that there was the keenest sort of competition with much slashing of prices. There were several occasions when some of the Western manufacturers were quoting prices so low that they did not permit of any profit. A general upset of the market resulted on these occasions.

Thus handicapped, coarse papers struggled through the summer months, getting the worst of a period that was none too good for any department of the paper industry. Fall brought an improvement but the come-back was slow and there were frequent reports of price cutting and concession giving.

The opening of the present year found coarse papers looking forward, conditions having materially improved and showing promise. Coarse papers of all grades began finding better demand. The orders from the textile industry, hardware and knitted good trades as well as others became more generous. These sources began buying Krafts, manilas, fibers and coarse specialties in considerable volume. Coarse papers have continued up to the present time to enjoy more favorable conditions and the number of inquiries being received now indicate that there will be an expansion of business as the days go by.

Interesting Year for Pulp

The year in pulp had its ups and downs and for many reasons the year may be looked upon as an exceptional one. As far as imported pulp is concerned, never had there been such a volume of business transacted. This may be attributed to general low prices and to the more general use of woodpulp.

The pulp men entered the year with some trepidation. The placing of the board mills on a curtailed schedule was not encouraging and there were other conditions to add to the doubts. A general realization that prices on all grades of pulp were most favorable, however, caused a favorable change. Large contracts were placed and some really heavy buying was done in the early part of the year. There was an advance of prices and soon afterward the market settled down, conditions becoming more normal, and only a small volume of business being transacted for several months.

Prices were maintained, however, and in some cases advanced. Buying on a more generous scale began in July and lasted practically the remainder of the year. As the year closed the pulp manufacturers had less unsold pulp on hand than at any time since the end of the World War.

An unprecedented amount of pulp was sold for delivery over 1925, most of this business being placed during the latter part of 1924. The close of the year found the market in a much more advantageous position than that it occupied at the end of 1923. The present year is already giving indication of being launched on a sea of good, substantial business prosperity.

Rags and Waste Paper

The beginning of the year saw rags and waste paper apparently started on a period of unusual activity. This market found itself in the most settled condition it had been in since the war, with plentiful demand and with mills buying ahead for six months or more, a thing they had not been doing since 1920.

National unrest brought an upset and a period of hand-to-mouth buying was entered upon which lasted until the November election. The market then began to recover, finishing the year in a fairly favorable manner and starting 1925 with reasonable expectancy of achieving the things which had been hoped for in 1924.

It was essentially a rag year. Roofing rags started to soar early and in February reached the peak, bringing 3¼ cents per pound. The demand fell off toward Spring and values struck rock bottom in the late Summer, selling at $1.60. It was not until Fall that interest revived and in December the price went up to the former high level of 3¼ cents. Roofing as a basis of all grades drove the other grades to high values.

The year in waste paper was not up to that of 1923. There was no time when the mills seemed disposed to buy far ahead. There was some advance in old papers and this was for the most part orderly. No very high level was reached but the price did not fall so low as to discourage collections.

The present year is starting off auspiciously for this market and a banner year is the expection of the rag and waste paper men.

Paper Makers' Chemicals

The record of paper makers' chemicals during 1924 is one that the manufacturers can turn their backs on with rather more cheerfulness than they could assume if they were required to face it. The condition of the chemical consuming industries at the beginning of the year was very favorable and chemicals got away to a good start with every promise of enjoying a normal year.

Before the first quarter closed there was a lessening of demand and unmistakable signs of impending disaster. The immediate future justified these signs for conditions gradually grew worse until in June the demand had become hopelessly slack and what buying was done was on a most niggardly hand-to-mouth basis. There were various contributing causes but the outstanding one was curtailment of production in some of the leading industries. The textile mills, tanners and steel and iron manufacturers were among those who had cut down production and who had adopted a policy of buying only for their most immediate needs. Over a considerable period the paper and pulp manufacturers were following a similar course.

This condition was further complicated by the political uncertainties. A very general reduction of price schedules resulted and chemicals were purchased at a lower figure than for some years.

July brought the first relief. It was only slight and in October and November business of excellent volume was recorded. Prices had meanwhile become firmer on many items. There is every promise of good business during the present year. There has been a marked improvement in the activities of the textile and steel mills and the tanners and glass makers as well as many other manufacturing lines are showing marked improvement. Chemicals are already reflecting greater prosperity due to this general improvement.

SCHREIER BROS. INCORPORATE

Schreier Brothers, who for more than thirty years have conducted a large paper jobbing business at the Wallabout Market, Brooklyn, N. Y., have incorporated the partnership and will hereafter be known as Schreier Brothers, Inc. The directors of the corporation are J. Schreier, 1447 President Street, H. Schreier, 379 Crown Street, and I. Schreier, 1486 President Street, all of Brooklyn. The nominal officers of the new organization have not been chosen.

(Photo by Fairchild Aerial Surveys Company, Ltd.; Courtesy News Print Service Bureau)

INTERNATIONAL PAPER COMPANY MILL AT THREE RIVERS, QUEBEC.

Two more high speed machines will be added to this plant during 1925, making a six-machine 480-ton mill.

New Production Record For News Print

Mills of North America Produced 2,000,000 Tons in 1924 Transcending the High Water Mark of 1923 —The United States Mills Produced 1,471,000 Tons, a Decrease of 14,000 Tons from 1923—The United States Still Holds Place as Greatest Paper Consuming Nation—With Canadian Production Only 9 Per Cent Behind that of United States, the Dominion Anticipates Early Supremacy in News Print Field.

Abstract of Report Made by R. S. Kellogg, Secretary, at Meeting of News Print Service Bureau, Montreal, Jan. 30, 1925.

A new Continental record of 2,900,000 tons of news print paper production was made in North America in 1924 with Canada as the determining factor in the increase over the previous year.

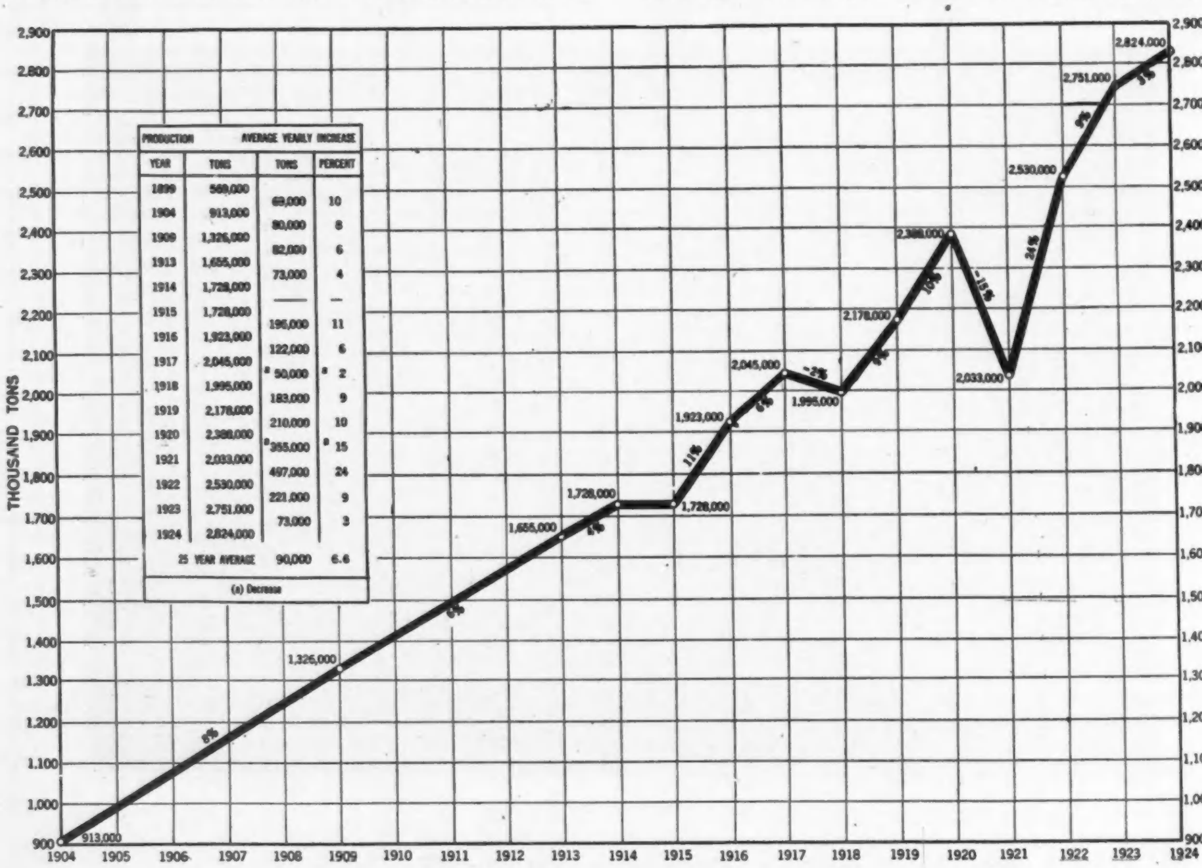
The United States mills made 1,471,000 tons of news print in 1924, a decrease of 14,000 tons from 1923 and of 40,000 tons from the high mark of 1920. Canadian news print production amounted to 1,353,000 tons, an increase of 87,000 tons from 1923 and 54 per cent more than in 1920.

The one modern news print mill in Mexico made a little over 11,000 tons, and a similar mill in Newfoundland contributed 65,000 tons to the continental total, which exceeded 60 per cent of the world's production of this essential commodity.

With the production of news print paper in Canada only 9 per cent behind that in the United States in 1924, admirers of the Dominion anticipate that the rapidly rising curve of Canadian tonnage will soon cross the stationary line of United States news print manufacture.

The United States still holds its place as by far the greatest paper consuming nation the world has ever seen. With only a few thousand tons of domestic news print exported in 1924, the publishers in the United States used nearly nine-tenths of the Canadian production, in addition to 156,000 tons imported from Europe. The consumption was 50,000 tons in excess of the record-making total of 1923 and 28 per cent more than in 1920, the latter in its turn being a record to that date. On a per capita basis, news print consumption in the United States has grown from 4 pounds in 1860 to 16 pounds in 1900 and to 50 pounds in 1923 and 1924.

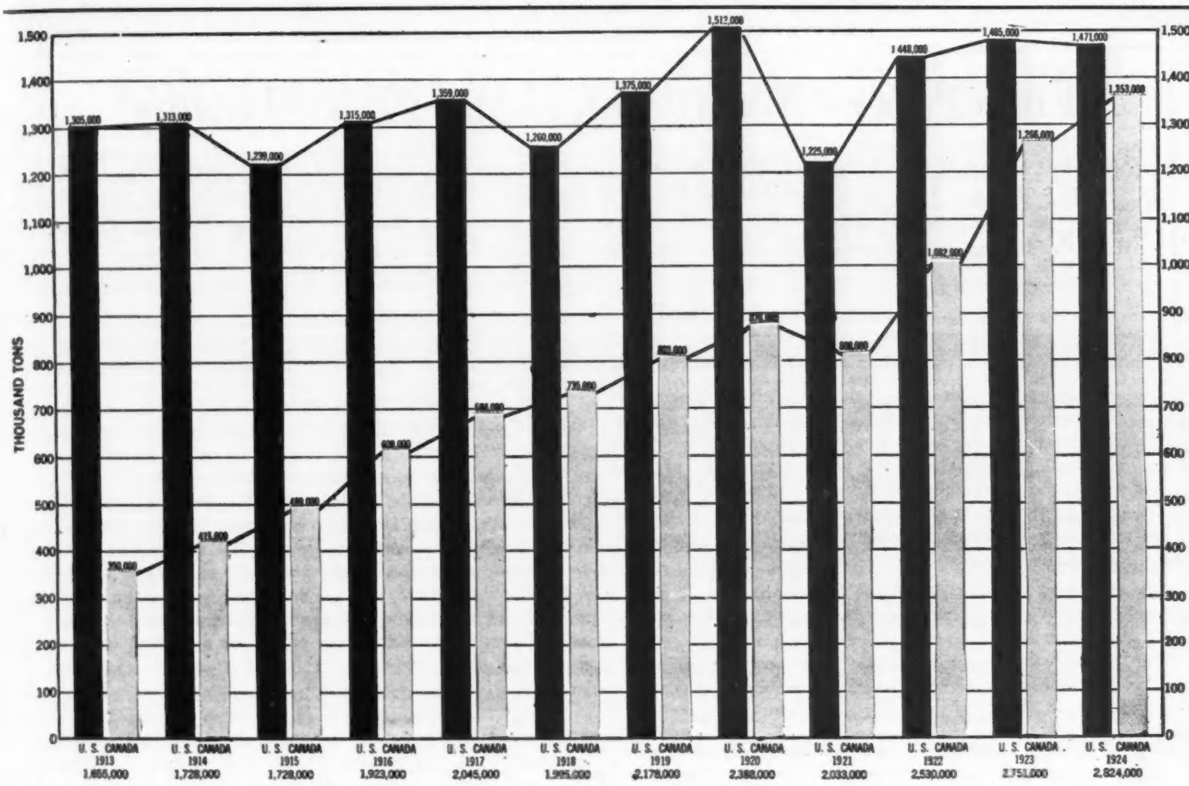
The recognized directory of the trade lists more than 22,000 news-



PRODUCTION		AVERAGE YEARLY INCREASE	
YEAR	TONS	TONS	PERCENT
1899	569,000		
1904	913,000	69,000	10
1909	1,326,000	80,000	8
1913	1,655,000	82,000	6
1914	1,728,000	73,000	4
1915	1,728,000	—	—
1916	1,923,000	196,000	11
1917	2,045,000	122,000	6
1918	1,995,000	(a) 50,000	(a) 2
1919	2,178,000	183,000	9
1920	2,388,000	210,000	10
1921	2,033,000	(a) 355,000	(a) 15
1922	2,530,000	497,000	24
1923	2,751,000	221,000	9
1924	2,824,000	73,000	3
25 YEAR AVERAGE		90,000	6.6

(a) Decrease

NEWS PRINT PRODUCTION UNITED STATES AND CANADA



News Print Production 1913-1924 United States and Canada

papers in North America at this time, with an increase of nearly 200 in number during the past year. About 10 per cent of the total listings are daily newspapers, and the English language dailies in the United States have circulations amounting to 33,000,000 copies of the daily issues and of more than 22,000,000 copies of the Sunday issues. During the past five years the dailies have increased 25 per cent in circulation and the Sunday newspapers 42 per cent. Upon examination of the United States newspapers which have circulations in excess of 100,000 copies each, we find that the daily issues averaged 28 pages in 1924 and the Sunday issues 103 pages, contrasted with 23 and 79 pages respectively in 1920. The most marked characteristic of the metropolitan newspaper to date has been its steady increase in size and circulation. There is now a copy of a daily newspaper published for every 3½ inhabitants in the United States, or more than one for every family, which shows the far-reaching daily newspaper habit.

Advertising Holds Up Well

The total volume of newspaper advertising in 1924 was practically the same as in 1923 and in 1920. Periodical advertising, while 3 per cent more in space filled in 1924 than in 1923 was still 15 per cent below the high mark of 1920.

News print paper production in North America has increased at an average rate of nearly 7 per cent compounded annually for the past twenty-five years. The new mills and additions to existing mills now under construction or planned for will bring the capacity of the North American industry up to 12,000 tons daily in 1926, unless some mills should find it more profitable to change to other types of operation.

PROSPECTS BRIGHTER IN GLENS FALLS DISTRICT

One of the best years since 1918 is forecast for the paper trade of Warren and Washington counties, New York, by members of the industry. Already conditions have improved sufficiently to warrant this optimism, it is said. Most of the paper mills lost considerable time during 1924, but reports indicate that the industry as a whole finished the year in fairly good condition.

Finch, Pruyn & Co. have been operating at capacity, and the outlook for a continuation of this schedule is considered bright. The International Paper Company plant at Glens Falls has done practically nothing since last June and is still idle, but it is believed here that operations will be resumed in the not distant future.

In Hudson Falls, the county seat of Washington county, reports indicate that that village has suffered as little from unemployment and general business depression as any village of its size during the past year. The Union Bag & Paper Corporation, although not operating its mills to capacity, has not closed down its plant entirely. In the paper mill departments short time schedules have been the rule for a number of months, while the bag department reports good business and full time operations. The Union Bag & Paper Corporation, according to an official of the company, expects an increase in the demand for its products during the coming year but does not anticipate a big rush before April or May. Late in the Spring or early in the Summer it is believed that the Union Bag Corporation will find it necessary to increase the number of workers. A six day working schedule is anticipated within the next few weeks.

The Standard Wall Paper Company during the last year has been operated near capacity, and capacity schedules are now in force at the Hudson Falls mills. The Standard Wall Paper Company, with the Schulerville mill burned, now finds it necessary to operate the Hudson Falls plant six days a week and overtime of three hours a night for four nights a week.

At the plant of the Sandy Hill Iron and Brass Works, Hudson Falls, there is much activity. An order for a large paper machine will keep the plant in full operation until June. Other orders are being constantly received, which assures the workers at this plant steady employment.

Fine Papers Nearly Duplicate 1923 Showing

Although 1924 was a Year of Irregularities the Gross Sales Amounted to $137,500,000 and Were Only 0.5 Per Cent Less Than in 1923—Demand Kept Up Excellent Pace for First Five Months But Several Months of Depression Followed—Mills Disturbed by the Increase in the Cost of Rags—Writing Paper Mills Producing and Country Consuming 5,000 Tons of Paper Every 48 Hours—Pulp Still Cheap.

Written Especially for the Annual Number of the Paper Trade Journal by Emmett Hay Naylor, Secretary of Writing, Cover and Tissue Paper Manufacturers Association.

The year 1924 was not one of well defined business movements, but rather of cross currents with very good business at the beginning of the year, depression in the summer months, and increasingly good business in the fall. 1924 started with a fairly large volume of business which kept the paper mills active the first five months of the year; then followed four months of severe depression. Early in October there were evidences of improvement and the volume of business has continued to improve progressively until the present time.

Gross Sales

The comparative gross sales for fine papers exclusive of book are as follows:

1922	$129,300,000.
1923	138,200,000.
1924	137,500,000.

The sales for 1924 were 0.5 per cent less than 1923, and 6.3 per cent higher than 1922.

Business since the first of this year has had a good start and promises to equal, if not exceed the first quarter of 1924, which was an exceedingly good one. January business was generally satisfactory in all grades. The rag grades particularly have picked up, and very satisfactory orders for merchants' stocks were reported.

Growth of the Industry

At this time, it might be well to take note of the growth in the writing paper industry.

In 1850 total production in the country was 17 tons per day, in 1900 total production in the country was 375 tons per day, in 1925 total production in the country was 1,250 tons per day.

Now to express this a little differently, and give you the annual consumption per capita in these years:

In 1850 the annual consumption per capita was ½ pound, in 1900 the annual consumption per capita was 3 pounds, in 1925 the annual consumption per capita was 6¾ pounds.

In other words, at the present time, the writing paper mills are producing, and the country is consuming, 5,000 tons of paper every 48 hours—which was the total annual production in 1850.

An interesting fact in comparison with writing paper, is that the consumption of cover paper, despite the growth of direct-by-mail advertising, has not increased perceptibly in the last fifty years, whereas the growth of tissue paper has been about twice as great in tonnage as that of writing paper in the last seventy-five years.

Experience Rag Difficulty

The greatest single difficulty with which the mills have had to contend in the last year has been the increase in the cost of rags—not only during the last year, but up to the present time. Here are some of the increases which the mills had to absorb:

The six leading grades—three new cuttings and three old rags—show an average increase in January, 1925:

22 per cent over January, 1924
37 per cent over January, 1923
87 per cent over January, 1922

There is a growing feeling among dealers, as well as consumers, that the peak has been reached. Fundamentals certainly point in that direction:

1. Cotton in the bale is down to 23½ c. a pound.
2. The consumption of cotton in December was 532,047 bales, which is the largest December consumption in the last five years.
3. Recent cuts in wages in New England cotton mills have tended to increase progressively the volume of cotton goods produced.
4. The cutting up trades are much more active than they were in the fall and dealers, therefore, must be accumulating cotton cuttings as purchases by the mills at the present time are less than they were in the fall.

Rag prices have advanced so tremendously in the last two years that even if there should be a decline of 20 per cent—which seems rather large at the moment—it would only bring rag costs back to where they were a year ago. Rags would still be 10 per cent higher than they were in January, 1923, and 50 per cent higher than they were in January, 1922.

Pulp Still Cheap

Although pulp prices are now slightly higher than they were during the summer, pulp is still relatively a cheap commodity. This has been made possible because imports have continued to expand year after year. These imports are apparently being absorbed by our larger paper production, and to some extent, to the disadvantage of the domestic pulp mills.

The total volume of chemical pulp imports from Canada and abroad have practically tripled in the last six years. The imports for the last six years are as follows:

1919	433,763
1920	673,149
1921	506,356
1922	1,043,150
1923	1,082,818
1924	1,250,000

Outlook Exceedingly Rosy

The outlook for the fine paper industry is exceedinly rosy. Printers' stocks are not large, merchants' stocks are only normal and the business demand is good. Contracts for advertising and general plans for sales promotion will call for a large consumption of paper throughout the year, and as the fine paper industry generally reflects the general condition of the business market, good business for 1925 is certain and already indicated in many lines.

N. E. BARTLETT MADE GENERAL SALES AGENT

After thirty-two years of service with the Pennsylvania Salt Manufacturing Company, of Philadelphia, N. E. Bartlett has been appointed General Sales Agent for this concern. Mr. Bartlett has devoted 21 years of this period exclusively to the interests of paper manufacturers.

Pulp Trade Had Its Ups and Downs During 1924

Volume of Business in Imported Pulp was Greatest Ever Known—Year Started Under Gloomy Conditions But a Quick Change Came and Paper Manufacturers Began Placing Large Contracts for Forward Delivery—A Normal Period Followed When Only Small Volume of Business was Placed—Year's Close Found Manufacturers with Less Pulp on Hand Than at Any Time Since End of World War.

Written Especially for the Annual Number of the Paper Trade Journal by Nils R. Johaneson, President of Johaneson, Wales & Sparre, Inc.

The past year stands out as a very exceptional year, as far as imported pulp is concerned. Never before has there been such a volume of business transacted as during the last year. This is undoubtedly explained, to a great extent, by the fact that prices for all grades of chemical pulp, bleached, easy-bleaching and unbleached sulphite and kraft pulp during the greater part of the year ruled so low that in many cases where in the past other materials have been used, when prices of woodpulp were comparatively higher, last year woodpulp was used in a larger percentage than ever before.

However, it was not without a certain amount of uneasiness and fear about the outcome of business for the year, both in regard to the volume and the prices that they would obtain, that the pulp manufacturers entered the year, because when you bear in mind that even with the help of the lengthy strikes in Sweden and Norway during 1923, when the available supply of sulphite and kraft pulp was reduced by about 160,000 and 50,000 tons, respectively, prices broke severely during the latter part of the year. Therefore, with the board manufacturers having agreed upon running their mills only five days a week, at least during the first part of the year and in many instances, finding great difficulty to operate at full capacity even with a five day week running schedule, and other branches of the paper industry only operating part time, the pulp manufacturers had reason to be concerned about where to turn to find buyers for their products, particularly as there was no likelihood of any reduction of production, on account of strikes, at least in Sweden during the year.

It did not take long, however, before the paper manufacturers realized that prices on all grades of pulp had become so low that it was a fairly safe speculation to place orders for forward delivery. As a result, large contracts were placed, and from the beginning of the year, when it looked very doubtful, conditions soon changed to a more hopeful situation for the manufacturers both here and abroad.

Prices, that in the beginning of the year had been so low that even the most skeptic buyers had to admit that they could not reasonably be expected to be maintained at such low levels and certainly could go any lower, as a result of the heavy buying of, particularly, unbleached sulphite and kraft pulp, began to advance, and the sellers became more and more firm in their idea of prices.

During the heavy buying that took place the early part of the year, prices were about as follows:

IMPORTED PULP

	Depending on Grades
Prime bleached sulphite	$3.50-$4.50
Prime easybleaching sulphite	2.75- 3.00
Prime Mitscherlich sulphite	2.50- 2.70
Prime strong unbleached sulphite	2.50- 2.90
Prime kraft pulp	2.50- 2.75

DOMESTIC AND CANADIAN PULPS

	Depending on Grades
Prime bleached sulphite	$3.50-$4.75
Prime easybleaching sulphite	2.60- 3.00
Prime strong unbleached sulphite	2.40- 3.10
Prime kraft pulp	2.30- 3.00

After this unexpected volume of business, the market began to settle down to normal, and only a comparatively small volume of business was transacted during the months following. Even though comparatively small orders were placed, prices, however, were maintained, and in some instances slight advances took place. And, when the buyers more generally became interested in protecting themselves for their requirements over the latter part of the year, as well as for the months during the closed navigation period, the sellers had the market well in hand and had very little difficulty in obtaining the prices asked. As a result of this renewed buying activity, which began in July and lasted more or less throughout the remainder of the year, the pulp manufacturers found themselves at the end of the year with less pulp on hand unsold than at any time previous, at least, since the end of the World War, in 1918.

Prices at the end of the year were as follows:

IMPORTED PULP

	Depending on Grades
Prime bleached sulphite	$3.75-$4.75
Prime easybleaching sulphite	2.90- 3.20
Prime Mitscherlich sulphite	2.75- 3.00
Prime strong unbleached sulphite	2.70- 3.10
Prime kraft pulp	2.80- 3.20

DOMESTIC AND CANADIAN PULPS

	Depending on Grades
Prime bleached sulphite	$3.75-$4.75
Prime easybleaching sulphite	2.70- 3.00
Prime, unbleached sulphite	2.45- 3.25
Prime kraft pulp	2.50- 3.25

Buying for 1925

Another outstanding feature of the pulp market and business in 1924 is the unprecedented amount sold for delivery over 1925. These orders were, in most cases, placed during the latter part of 1924, at prices approximately the same as I have just quoted above, and they are further evidence that the buyers feel confident that not only is the outlook for good business in 1925 fairly certain, but also that the present pulp prices offer them good opportunities to protect themselves at prices that are still so low, that many mills in this country, which previously manufactured their own pulp, have discontinued doing so, and are instead obtaining their requirements either from abroad or from other domestic pulp manufacturers with lower cost of production, or from Canada.

The statistics of the pulp mills in Sweden, Norway and Finland, which countries supply most of the imported pulp that is shipped from Europe to this market, show that at the end of 1923, Sweden had sold for delivery in 1924 about ten per cent of the total production of sulphite for 1924, and about fourteen per cent of the kraft pulp production; Norway, about forty-four per cent of the sulphite production, and about sixteen per cent of the kraft production; Finland had at the end of 1923, out of her production of sulphite and kraft pulp for 1924, sold about twenty-five per cent of the sulphite production and twenty-five per cent of the kraft production.

At the end of 1924, these same statistics were: Sweden, about 30 per cent of the sulphite production and about 56.6 per cent kraft, Norway about 44 per cent of the sulphite production and about 53 per cent kraft, Finland about 75 per cent of the sulphite production and about 75 per cent kraft.

Keen Competition in Tissue Market

Overeagerness to Procure Business Resulted in the Taking of Many Orders at a Narrow Margin of Profit—Mills Making Wrapping Grades Were Able to Keep Machines Running Practically Full Time While Those Making Specialties Found the Situation Most Favorable—Converting Mills in Many Cases Were Forced to Turn to Makeshift Production or to Shut Down for the Time Being.

Written Especially for the Annual Number of the Paper Trade Journal by S. W. Dunning.

During the past year the tissue mills, making wrapping grades, have found conditions fair and most of them were favored with sufficient tonnage to keep their machines running practically full time, although the margin of profit has been small and some mills, at times, have run considerable tonnage at practically nothing over cost. But the year closed with a decided tendency to higher prices and better demand.

Those mills making a line of specialties, naturally, have found the situation better, as they are always in position to pick the cream of the trade and are not subject to such keen competition, and can sidestep much business that would be unprofitable. Also, the mills more favorably situated, that is, having abundant water power, and those manufacturing their own ground wood, and those with more modern high speed machines, found conditions more favorable than the older and smaller mills with a more limited production and higher conversion costs.

Converting Prices Low

The same general condition has prevailed among the mills making sheets or converting rolls for either toilet or waxing. Prices on converting have been low and many mills have found it difficult to obtain tonnage sufficient to keep their machines running; some of them have been forced at times to make sheets or stock, or shut down for a time, except those who developed some special grade and because of which, for the time being, they were favored with good tonnage.

As shown by the Mill Reports issued from time to time by the Association, production has exceeded consumption a greater part of the time, and while this is generally acknowledged, still, plans are always under way for increasing production of machines already installed, or adding new machines or installing larger and faster ones; all of which increases tonnage and adds to the competition, for although there is a normal increase from year to year in consumption, production always seems to be well in advance of the demand.

Unlooked-for Competition

It is, of course, impossible to regulate prices, but it ought not to be impossible to regulate competition to a certain extent, and so govern prices to a considerable degree. During the year there developed considerable unlooked for competition in the lower grades, such as are made by what are nominally known as the ground wood mills, because some of the high grade mills entered the market with low grade papers, in an effort to obtain additional tonnage. This resulted, naturally, in keener competition and lowering of prices.

A similar condition developed in the higher grades of No. 1 White, where some of the mills, in order to obtain, if possible, a larger tonnage, developed lower grades of No. 1 at reduced prices, which naturally forced other mills to develop similar grades, with a result that all were obtaining less price and no more tonnage; the only ultimate gainer being the consumer, the mills being the losers. It is most unfortunate for the trade in general that there is not a more general tendency to improve the grades and in that way obtain higher prices, rather than in an effort to temporarily increase sales by lowering the grades, which acts as a "boomerang" and demoralizes the general market.

How to Create Demand

As stated, the year closed with a decided tendency to higher prices and good feeling for the future, and while some of the mills are not booked very far ahead, there is a general feeling of optimism. Naturally, the mills can not control the general demand, but they can create a demand for their particular grades by so improving them and maintaining standards that their papers will be called for and not allow their grades, whatever they may be, to run down to such an extent as to throw the nominal trade for their papers into the hands of their competitors; so that the conditions, to a great extent, depend on what each individual mill makes it, as, while price counts to a great extent, quality and more particularly uniformity, even in the lower grades, rules with a large percentage of buyers, and the mills that give the closest attention to satisfying their customers on whatever grades they require, are the ones who generally have their order books well filled.

HOWARD PAPER MILL EMPLOYEES BANQUETED

Heads of departments and expert paper makers of the Howard Paper Company, Urbana, Ohio, were the guests of Ward Howard, vice-president of the company, at the fifth annual banquet given by Mr. Howard at the Douglas Inn, Sunday night, January 11, 1925.

Thirty-eight men were seated around the banquet table which was presided over by Mr. Howard.

Following the banquet Superintendent of Schools C. W. Cookson gave a short address on "Cooperation" with reference to team work between employees and employers, factories and the public and among the public in general. He was introduced by Attorney H. W. Houston, counsel for the Howard Paper Company. Short addresses were also given by John Yordy, mill superintendent; Harry Legge, assistant manager, and Mr. Howard. Paul Dye led a short song fest and favored the assembly with a solo.

Following this program Mr. Howard awarded prizes to five employees who made the best records for production and efficiency during the last year. Truman Mathers, Walter Mulligan, Raymond Colbert and Claud Bishop, expert paper makers, were each presented with a solid gold Howard Watch. Dave Modena, of the beater department, was awarded a chest of Community silver.

As each guest entered the banquet room he was given two tickets which entitled him to a drawing for prizes to be given away later in the evening by Mr. Howard and Mr. Yordy. These consisted of a chest of Community silver and a handsome wicker chair.

Guests at the banquet were loud in their praise and appreciation of the courtesy and attention shown them by Mr. Howard.

Board Industry Made Real Progress in 1924

Better Operating Conditions Have Been Adopted and Industry is Eliminating Sunday Work and Discarding the Two Tour System for the Three Tour—1924 Demand for Box Board Required but Four and One-Half Days' Operation for All Mills—Mills in General Are Now Tuned Up to Meet All Demands and Expect During 1925 to Enjoy Fair Share of Prosperity Which Seems Impending.

Written Especially for the Annual Number of the Paper Trade Journal by George W. Gair, Vice President Robert Gair Co.

A year ago I wrote an article on the outlook for the box board industry in 1924, which dealt largely with the attempts that were being made to improve our condition through cooperative effort. We had tried successively the Armstrong Bureau and the Paper Industries Exchange and had just launched the Box Board Association, so that this article should deal largely with the year's experience and what has been accomplished by this new association.

Our first annual report, just issued, shows that we have gained fifteen members, bringing our total membership up to fifty-three companies, with a total daily tonnage of over six thousand tons. The tonnage output of present membership is well over eighty per cent of the combined tonnage of the Industry and includes most of the representative mills in the country, which speaks well for a year old organization and gives promise of further additions this year toward the goal of one hundred per cent.

Better Operating Conditions

On May second last, a meeting was called in Washington by Secretary Davis, of the Department of Labor, to which every box board mill in the country was invited, and a program for betterment in operating conditions was agreed to by a large majority of the mills that attended. This program was virtually the same as the plan adopted, with the approval of President Harding and the Department of Labor, the previous year, which went on the rocks with the abandonment of the Armstrong Bureau and the Paper Industries Exchange. But the benefits to both the mill owners and the employees was so great that Secretary Davis determined to take the lead in reviving it and hopes to make it the standard for the entire Paper Industry.

The standard of labor in the United States is too far advanced to permit a continuance of eleven and thirteen hour operation seven days a week, and when that operating time means an over-production of twenty to twenty-five per cent, it results in inhumane treatment of labor and unprofitable results for the employer, which combined is unsatisfactory to everyone concerned.

Eliminating Sunday Work

A second seeting was called by Secretary Davis in Washington on January 15 to check up what had been accomplished in the eight months since the May meeting, and report showed that a very splendid response had been made on both the elimination of Sunday work and the changing over from two to three tours. At the dinner given that evening, at which the Box Board Association acted as host to all mills attending the conference and the Government officials who were interested in this movement, we were told that the work we are doing has full Government support and will have their further support to round up all the mills in the country, regardless of association membership or other affiliations. It was made clear that the men could not have good working conditions and good wages, nor owners and stockholders fair returns on their investment, nor the Government collect taxes from the Industry unless mills are operated on a humane and profitable basis.

I was much impressed with the remarks of an old-timer when the session ended, that for the first time in many years he was getting to have some respect for the business and felt that we were at last getting on a decent basis, and all of this can only be done through cooperation along the lines we are working on in the Box Board Association.

1925 Outlook Brighter

The best proof of the justification of this program is that the demand last year for box board required but four and one-half days' operation for all the mills in the country, and while the outlook for 1925 is much improved, it is not expected that over the full period the demand will be greater than five days a week production, which would be more than ten per cent increase over 1924 consumption.

The regulation of an industry to balance production with the demand is recognized as the only equitable way to conduct it in the best interests of employer, employee and the public, but a knowledge of how to do this can only be had through dependable information such as is furnished by statistics gathered by an association or Government agency.

I hear complaints on all sides from folding box manufacturers and corrugated and solid fibre manufacturers that their business is over-produced and unprofitable, and the answer is that this condition cannot be avoided—if the main industry, box board, is demoralized, all manufactures resulting from the conversion of box board would necessarily be in the same condition, so that to make the Paper Industry as a whole profitable and satisfactory, we must begin by correcting the abuses in the box board industry as fundamental.

The Greatest Danger

Secretary Davis told us in Washington that the Act creating his department antidates the Sherman Law, and as his department was created and his whole endeavor is to improve the conditions of labor in the United States, he will not permit some old law to stand in the way of bettering working conditions. This same point was emphasized that evening by Judge Van Fleet, Chairman of the Federal Trade Commission, given as his personal views on this subject, but whether personal or otherwise, the gentleman certainly indicated the commonsense application of laws to an honest effort on the part of business men to improve the conditions of their business.

The one great danger ahead of the box board industry is that improved conditions and better business during the coming year may lead to further expansion and erection of new mills, which has usually been undertaken at the wrong time. They are not ready to serve while the demand exists and when completed add to the burden of an already over-produced market. But there, again, our statistics prove of value, for today the banker will inquire before investing money whether the new plant is justified and will have satisfactory earning power.

Influence of Year On Rags and Waste Paper

Year Started Off Well and Proved Decidedly a Rag Year While Waste Paper Was Less Active but More Healthy—Mills Were Buying Far Ahead When Several Incidents Occurred to Disturb Public Confidence and Hand-to-Mouth Buying Resulted—Result of November Election Restored Faith and Brought Great Optimism for the Future—Exploits of Roofing Stock One of Year's Features—Some of the Prices.

Written Especially for the Annual Number of the Paper Trade Journal by Walter R. Hicks of Daniel M. Hicks, Inc., New York

The traveler reaches the journey's end. In the gathering twilight his mood becomes that of reflection, undisurbed except for the bleating of sheep, the lowing of the herd and the bird-song. His meditation carries him back over his pilgrimage. We, too, have reached a journey's end and in the gathering twilight of the closing year, we lend ourselves to reflection, undisturbed except for the bleating of the bears and bulls, the lowing of prices and the popular refrains "from buying." Our meditation carries us back over the journey.

From afar we hear the rustle of leaves, not the autumnals of the giant oak, nor the stately elm, nor the majestic poplar, but the leaves of this lofty journal between whose sheets is tucked away the slumbering year, to the crooning of Dame Fortune. To reach another milestone along the tempestuous highway is of itself a triumph, but to get there ahead of time is no mean achievement and that is just what the paper industry has done. Some years ago Congress took time by the ear and turned the clock back one hour. The American Pulp and Paper Association took time by the tail and yanked the calendar back two months, and we have the Convention precipitated on the unsuspecting Public in February instead of April as heretofore. There is no doubt some good economic reason for this. It may be because the nights are longer and the days shorter, or the rates lower and the gayety higher, but whatever the reason, the week of eats and meets, of razz and jazz is upon us and instead of the manufacturers flocking in on the wings of the robin, they are ushered in on the share of the snow-plow.

An Eventful Year

It has been an eventful year. The world flyers succeeded in ringing the globe, the Z-R 3 completed one of the greatest flights of the imagination. Washington emerged the victor in the pennant race, the Democrats were submerged in the political contest, cross word puzzles have supplanted Mah Jong and all these, together with considerable paper making, constitutes a glorious year regardless of our views. Citations such as these are more or less general but are worthy of comment in passing as I have yet to see the all around man who is not itching to put aside the books for the golf bag, in quest of the "Missing Links." The matter in hand, however, calls for cold facts so let's get down to brass tacks and crack the ice of the hard crusted incidents, whose influences were felt in business.

Year Started Well

The year started off with a bang. Values had reached a level that had brought things in alignment. The relationship of economic values was fairly established for the first time since the war. Demand sprang up all around and for the first time since 1920, mills were willing to buy ahead as far as six months, and in some cases, as far ahead as a year. Confidence was restored and it looked as if we would have a good steady market over the year. Then came the Washington oil episode and with it, a feeling that it might mean the ousting of the Republican party. The passing of the Soldiers' bonus was considered an act that would reflect against business and the failure of the Mellon Tax Reduction Bill presented a gloomy aspect. Immediately confidence was shaken and the hand-to-mouth policy was pursued until election. With the Republicans' re-election, faith was again restored. This, with the launching of the Dawes Plan in Europe and the general improvement in foreign affairs, brought great optimism for the future. In a resume of the market these influences will be noticed in the fluctuation of prices.

Decidedly a Rag Year

Last year was decidedly a rag year. The grand old rag had been dangling against the mast, waiting for the trade winds to stir it to action, "and the blow almost killed father." Roofing was the first to go on the rampage. Having been at half mast for the major portion of '23, Roofing gradually rose until it reached the peak in February '24, to the tune of 03¼ cents per lb. Demand eased off toward Spring and values gradually dropped to the low level of about $1.60 in the late Summer. Buyers held off and sellers held on, until the early Fall when interest sprang up over night, and under the resumption of heavy purchases, the price soared to the previous high level of 03¼ cents per lb. in early December. These prices are all f. o. b. shipping point and the market has remained firm up to the present. Roofing occupies an important position as it is the basis of all other grades. The fiber mills were therefore forced to pay substantially higher prices to cover their requirements. This buying pressure drove whites, blues and medium colored up to proportionately high values. The writing mills were not as big a factor but they were compelled to go to the limit on No. 1 Old Whites, No. 2's, thirds and blues and extra light prints, with about the same degree of fluctuation.

New rags were particularly strong. Beside the paper making demand, the breaking up trade figured largely in the buying, as staple cotton was in good demand and drove consumers into the field for substitutes. All grades of cuttings were eagerly sought and commanded top notch prices. White shirts went from about 12 cents to 16 cents per lb. Blue overalls from about 7 cents to 12¼ cents, while fancy shirts did a little better than 10 cents from a low level of 6 cents and Washables showed about the same gain, going from 5 cents to over 9 cents per lb.

Rope Prices Went Up

The market on Rope showed an increase of about 2 cents per lb., reaching 7¼ cents per lb. the demand being good on the whole over the year. Bagging at last came into its own and advanced about 100 per cent, reaching a little better than 3 cents per lb. for the best qualities. In fact, all grades of jute stocks were strong and new cuttings, jute threads, jute wastes all showed about the same gain.

Practically all consumers were in the same position as the Roofing mills and the fiber mills as regards low stocks, and were all compelled to buy to cover their requirements. While some of the mills have fair stocks on hand, it is the concensus of opinion that the demand will continue on the whole and the market on all grades remain firm until Spring.

Waste Paper Healthy

Waste paper was not as fortunate as Rags. The previous year was a better year for Old Paper than 1924. While there was some advance it was limited to about $10.00 per ton on the average and covered all grades. Book and board mills did not seem to get the volume of business that the rag consuming mills enjoyed. They had fair supplies on hand and were able to keep a better hold on the market. Mixed Papers reached about 90 cents from a low of 40 cents. Books were as high as 1¾ cents with a low of 1¼ cents. Soft White did not do better than $3.25 for the average grade and the low was about $2.90. These few grades will serve to show the trend of the market, as all qualities moved in like proportion. At no time did the mills seem inclined to buy very far ahead. On the other hand, the packers would not take orders over any great period as it seemed likely any change would be upward, and not being able to cover ahead, would not take the chance of future delivery.

While waste paper was not as active as rags, its position in the market was more healthy. It is true that pulp had a steadying influence on waste paper. It remained at levels that warranted its use and when waste paper reached certains limits, it was more profitable to run on pulp whenever the furnish would permit. This substitution checked any runaway market in waste paper. On the whole, the advance in old papers was orderly. This may further be explained by the fact that while the limits did not reach a very high level, they did not go so low that it discouraged collections.

A Question of Policy

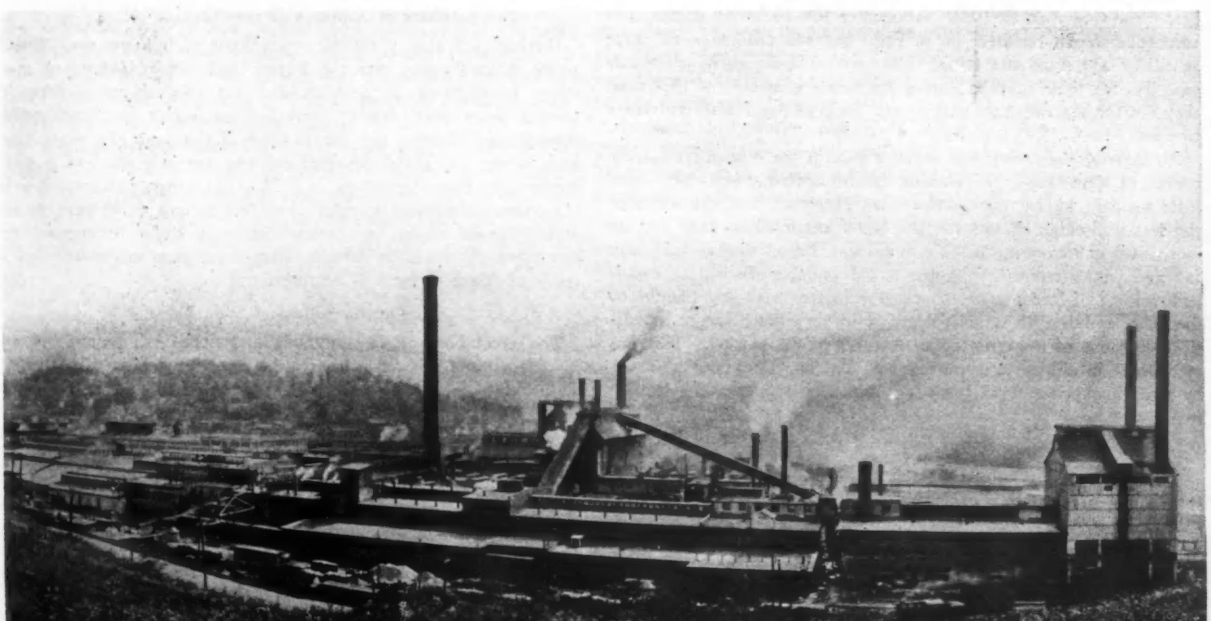
If the mills consuming paper stock would adopt the policy of paying fair prices and thereby encourage its production, it would go a long way toward balancing the market. Is it not a strange coincidence that the most successful mills are those that always pay fair prices? Is there not some economic value behind this policy? The suppliers of these mills are sure of a steady market at a workable margin. The stock is put up right, assuring good quality. Such mills have a decided advantage as they have the choice of the best packings of waste paper, which of itself must result in quicker handling at the mills and a greater yield, which in turn should mean increased production. If the manufacturers would adopt this plan of paying fair prices, thereby stimulating the collection of waste, it would go a long way toward stabilizing the market. Neither packers nor mills want to see booms but until some such policy is adopted we will ever be confronted with the problem of the runaway market.

Let us then be up and doing
With a heart for any fate,
Still achieving, still pursuing,
Learn to linger and to wait.

JOINS FOREST PRODUCTS LABORATORY

Vance P. Edwardes, in charge of sulphite investigations in the pulp and paper section of the Forest Products Laboratory, 1917-1921, at Madison, Wis., has rejoined the laboratory after three and one-half years in the employ of the Interlake Division of the Consolidated Water Power and Paper Company at Appleton, Wisconsin. When Mr. Edwardes joined the Consolidated Water Power and Paper Company forces he was placed in charge of the organization of a laboratory to develop methods of control and standardization of mill operations. For two and one-half years he was in charge of the sulphite department further developing control methods of both quality and production. In 1924 Mr. Edwardes made a trip to Norway and Sweden as a representative of his company to study methods used there in the sulphite process, particularly in the cooking and handling of pulp and in steam conservation.

Mr. Edwardes is well known to the members of the American Pulp and Paper Mill Superintendents' Association as first vice-president of the Northwestern Division of that organization. His new position with the Forest Products Laboratory involves laison work with the pulp and paper industry. He is at present occupied with the promotion of better white water utilization.



Chemical Pulp Mill of Champion Fiber Co., Canton, N. C. Only Pulp Mill in the U. S. Where Sulphite, Sulphate and Soda Pulp Are Made

1924 An Off Year For Paper Makers' Chemicals

Normal Conditions Prevailing Early in the Year Were Soon Upset, Demand Becoming Less Active Before First Quarter Ended and Business Gradually Growing Worse During the Next Quarter—Radical Curtailment of Production in Many Industries Caused General Hand-to-Mouth Buying Policy to Be Adopted but Much Lost Ground Was Recovered During Closing Period of Year—Good Outlook.

Written Especially for the Annual Number of the Paper Trade Journal by Guy A. Gardner, Mgr., Chemical Division, M. Gottesman & Co., Inc.

The story of paper makers' chemicals during 1924 has passed into history and most of it does not make any too pleasant reading for the chemical manufacturer. The past year started out well enough with many of the large chemical consuming industries operating on a fairly normal basis, but this state of things did not last long. The demand became less active before the end of the first quarter of the year and gradually became worse as mid-year approached. This condition was brought about by radical curtailment of production in many of the leading industries, such as the textile mills, steel and iron manufactures, tanners, etc. These industries normally consume large quantities of chemicals and when they adopted a hand-to-mouth buying policy, the lack of orders was seriously felt by the chemical producers. The paper and pulp manufacturers also curtailed their purchases of chemical supplies during many months of the past year.

Politics Prolonged Uncertainty

The political situation was somewhat to blame for prolonging the feeling of uncertainty among many buyers, as the old time idea that a Presidential year was bad for business unquestionably had a tendency to slow things up. Our export trade in chemicals also declined noticeably during 1924 although a few lines made a somewhat better showing than in 1923. Altogether this lessening of the consuming demand resulted in a very general reduction of price schedules and it is safe to say that buyers of industrial chemicals paid less for their supplies during the first six months of 1924 than they did for several years past or are likely to pay for several years to come.

All through the spring and summer months the consumers largely continued their policy of hand-to-mouth ordering and there was little forward buying during this time. However, a slight but none the less noticeable change for the better occurred in July and an increasing improvement in shipments was shown during the early fall and winter months. October and November showed an excellent volume of business as compared with the preceding months of the year, withdrawals against contract in very much larger quantities being one of the outstanding features of the market. This improvement in shipment continued well on into December although by that time prices were becoming firmer on many of the leading items.

Advances on Imported Chemicals

The prices of a great many imported chemicals advanced considerably during the year due to improved conditions in Europe, with the result that spot stocks were greatly reduced in volume. The price for shipment from abroad was in many cases higher than could be obtained in the spot market and together with the higher duties imposed on many chemicals by the new tariff, prevented any large volume of imports and further tended to strengthen the market for the domestic products. Most of the important paper makers' chemicals have already shown the effect of improved market conditions. Prices are higher on many items and a very firm tone prevails throughout the entire list.

Bleaching Powder

Bleaching Powder buyers who made their contracts late in 1923 for 1924 delivery were able to purchase their supplies at a very low price, saving from $10 to $15 per ton for all contract withdrawals during 1924. During the first three months of 1924 the manufacturers advanced the price of Bleaching Powder on three different occasions, increasing the price from $1.25 per 100 lbs. to $1.90 per 100 lbs., the price prevailing prior to July, 1923. These advances, however, were put into effect after the majority of the larger buyers had placed their contract business for the year. The price for 1925 delivery is now very generally held at $1.90 per 100 lbs. f. o. b. works, in carload lots. Some buyers have expressed criticism of this price advance but they should remember that when they bought Bleaching Powder at $1.25 they were buying their supplies at exactly the same price as prevailed for several years prior to 1914. They must of course consider the tremendous increase in manufacturing cost since that time, and will readily appreciate that the manufacturers could not continue to supply Bleach at such a low price. This year's price is in line with present day cost and can be considered fair both to the consumer and the manufacturer.

Sulphate of Alumina (Paper Makers' Alum)

During 1924 a very satisfactory volume of business was done in paper makers' alum and the buyers had the advantage of much lower prices both on contract and for spot shipment than for several years past, due to increased production and keen selling competition. During the last months of the year, the market became firmer and prices for 1925 delivery are in most cases slightly higher than those prevailing in 1924. The generally accepted price for contract shipment in bags over 1925 is now $1.40 per 100 lbs. f.o.b. Eastern works for carload lots. A slight differential due mainly to difference in freight charges for raw material exists in favor of shipment from Western points.

Caustic Soda and Soda Ash

The great bulk of Caustic Soda and Soda Ash tonnage is sold on contract and this tends to create a strongly stabilized market for these items. Since the reduction in price which went into effect in October, 1923, there has been no change in price and orders are now being placed for 1925 delivery, at $3.10 per 100 lbs. f. o. b. works, in carload lots, for Caustic Soda, and $1.38 per 100 lbs. for Soda Ash, in single bags, carload deliveries. During the greater part of 1924 the withdrawals against Alkali contracts went on steadily, keeping the various manufacturers well sold up. Contract business for 1925 has been placed in very satisfactory volume indicating the confidence of the buyer in the continued stability of the market.

Salt Cake

During the first six months of 1924 the demand for Salt Cake fell off considerably but this was more than counter-balanced by the greatly reduced production at most of the manufacturing plants.

Prices were to a large extent firmly maintained, although during the early summer months considerable spot tonnage was disposed of at prices somewhat lower than contract schedules. The resumption of operations by the glass manufacturers in the Fall called for deliveries of large tonnage and absorbed practically all surplus stocks. The market is now very firm and with an increasing demand from practically all Salt Cake consuming industries, prices may reasonably be expected to go higher for delivery over the coming months. Contracts are now being placed on a basis of about $17 per ton for prime quality material, and Salt Cake at this figure represents very good value inasmuch as contracts for some years past have been at a much higher level. In recent years the use of Salt Cake has greatly increased while, on the other hand, production has been materially reduced as the number of acid plants in operation have been constantly growing less. When this factor is taken into consideration, there is every reason to believe that buyers are justified in placing their orders for 1925 delivery at present prices with the assurance that they are purchasing their supplies on a sound and fair basis.

Other pulp and paper making materials such as Sulphur, China Clay, Casein, Bisulphite of Soda, Blanc Fixe, Chloride of Barium, etc., met with fairly good demand at nominal prices. During the early summer months some declines were noted but later in the year prices became firmer and now may be considered as indicative of values that will prevail over 1925.

Present Outlook Good

The outlook for this year is a decidedly favorable one and shows promise of business in considerably increased volume for all the industries that are large chemical users. The marked improvement shown by textile and steel mills, tanners, glass makers, and many other manufacturing lines together with the improvement in the agricultural situation certainly indicates progress and prosperity for the coming months.

NEWFOUNDLAND POWER & PAPER CO.'S BIG PROJECT

Written Especially for the Annual Review Number of the Paper Trade Journal

Separated from the principal ports of Eastern and Southern United States by only a short ocean voyage, the town of Corner Brook, Newfoundland, once only a fishermen's settlement, is rapidly assuming a position of importance in the paper industry of the world. It is situated on the West Coast of Newfoundland on what is called the Humber Arm, a stretch of water about twelve miles long, averaging in width about two miles. The distance from the Gulf of St. Lawrence is about twenty miles and Corner Brook Harbour is an ideal one for the loading and unloading of ships.

It is here that the great English company the Sir W. G. Armstrong Whitworth & Co., Ltd. has chosen to erect its huge newsprint mill, the Newfoundland Power & Paper Co., Ltd. Under the able direction of John Stadler, work is progressing at a high rate of speed, and it is expected that the first machine will be producing newsprint in May of this year.

The mill itself will be one of the finest in the world. It will be equipped with the most modern and up-to-date machinery all of which is being built by the Armstrong Whitworth Company or its allied firms either in England or Canada, probably the best known of which being the Walmsley organization.

The four paper machines 234 inches wide will, of course, be Walmsleys, each with a capacity of 100 tons or better a day. Eighteen Warren magazine grinders of the latest type will furnish the ground wood and the sulphite plant equipment will represent the latest ideas in the manufacture of this important factor toward high-grade news print.

Hydro electric power will be developed at Deer Lake which is roughly twenty-five miles from Corner Brook and will be brought to the mill by transmission lines. The power house will produce about 100,000 horse power and will also allow for future expansion.

The principal timber limits are situated on the water sheds of the Humber River and St. Georges Bay. Newfoundland is well equipped with streams for the log drives.

One of the most interesting features of the Newfoundland Power and Paper Company is its scheme of transportation of the finished newsprint to the markets of the world. Two huge warehouses or shipping sheds are located alongside of the finishing room and at the end of these is a large wharf of a size sufficient to load two vessels at a time. In order to be complete in every way special steamers are being constructed for the transportation of news print. Each of these will be able to carry around 5,000 tons of paper and will be of the finest type of construction. They also are being built by Armstrong Whitworth, and it is interesting here to note that during the war this great organization produced 47 war ships and 22 merchant ships, to say nothing of an enormous amount of guns, ammunition, airplanes, dirigibles and tanks, etc.

PLANT OF NEWFOUNDLAND POWER & PAPER CO.

Paper Industry Expands in Michigan

In Spite of a Not Altogether Satisfactory Year Kalamazoo Concerns Especially Have Made Numerous Improvements to Their Plants—Paper Industry Has Apparently Sailed Out of the Doldrums and Is Now Headed for Good Business—Prospects for Expansions This Year Said to Be Good—Allied Paper Mills Make Notable Improvements—Six Companies Operate Sixteen Mills With Twenty-eight Machines.

Written Especially for the Annual Number of the Paper Trade Journal by Howard G. Hall.

Despite the fact that 1924 has not been, all things considered, a satisfactory year in the paper industry, the twelve months just closed have been important in the development of the industry in the Kalamazoo valley.

Quite the most important point to be considered is the fact that despite an unstable and low market, paper concerns in the Kalamazoo valley have gone right ahead improving their respective plants, making for greater efficiency, economy and production, but more than all operating on close to 100 per cent basis, thus giving employment steadily to thousands of men and women. It is a well known fact that Kalamazoo suffered much less during 1924 than the average industrial community in the state, particularly those depending solely on the manufacture of automobiles and automobile accessories. While Kalamazoo has not been blessed with industrial growth, that condition has been largely due to the community's business stupidity in dealing with projects directly outside the realm of paper making.

Headed for Good Business

Another point well worth considering is that the paper industry has apparently sailed out of the doldrums and is now headed for good business. Every paper mill executive in the Kalamazoo valley, even makers of board, are a unit in predicting good business for 1925, expressing the belief that the year will be one of the best in the history of the industry. Along this line it is argued that expenditures for proper maintenances, upkeep and improvements have been wise investments and that the months ahead wwill demonstrate that fact. Mills in the Kalamazoo valley are making approximately 1,500 tons of paper and board daily and they are going to make more in the future.

Just what growth has occurred during 1924 and what does 1925 promise along that line?

Kalamazoo's tenth papermaking concern, the Bradford Paper Company, was organized in 1924. It is capitalized for $500,000, of which $200,000 is paid in immediately, and will engage in the manufacture of coated paper. Raw stock will be purchased outside. This plant should be in operation in 30 days time.

The Kalbfleisch Corporation, having decided to establish a plant in the west, picked Kalamazoo as the best location. An adequate site and building for the first unit have been purchased and production has begun. It is understood that before the lapse of two years important additions will be made to the plant first secured.

The Sutherland Paper Company expended over $100,000 in the erection and equipment of a new press room and office structure.

The Bryant Paper Company is now building a new machine shop and salvage plant, the final step in a $1,750,000 campaign of improvements, inaugurated in 1923.

The Western Board and Paper Company is increasing the capacity of its mill from 30 to 100 tons a day, through rebuilding its machine, installing new equipment and adding to its power capacity.

The Rex Paper Company has erected an office building and addition to finishing room.

The Allied Paper Mills spent over $116,000 in improvements to its three divisions and have authorized approximately $125,000 outlay for 1925, thereby increasing its output 25 tons a day.

The MacSimBar Paper Company started late in the fall the erection of a new engine room and pump house.

The Hawthorne Paper Company built an entirely new office facilities and technical laboratory.

The Kalamazoo Vegetable Parchment Company has placed its No. 2 mill on a profitable operating basis and erected a new water cooling tower and water distributing system that effects large savings.

Prospects for Expansions in 1925

The prospects for expansions in 1925 loom equally large.

Of first importance is the announcement of the Kalamazoo Paper Company that it will expand approximately $1,000,000 in the installation of a 168 inch Fourdrinier machine, with a daily capacity of 50 tons of the better grades of paper. This will require large extensions to the present plant and much additional machinery and equipment.

The Standard Paper Company will erect a 5,000 ton stock house, costing about $100,000.

The Saniwax Paper Company is now securing plans for a very fine plant, fully two and a half times the size of its present plant. This concern will build in the early summer.

The Kalamazoo Paper Box Company is considering the advisability of doubling its factory on East Kalamazoo avenue, thus increasing capacity and centering all activities under one roof.

Bermingham & Prosser, who increased their capital from $500,000 to $1,300,000 are considering the proposition of doubling their sales warehouse on East Frank street. No definite announcement along that line is available as yet.

Bradford Paper Co. Organized

The Bradford Paper Company, organized in September, 1924, for the manufacture and sale of coated paper, held its annual meeting the fourth Tuesday in January, re-electing at that time all temporary officers and directors. The personnel includes: Directors, C. A. Bradford, George K. Taylor, John L. Hollander, H. Clair Jackson, Harry A. Young and J. G. Fox; president and treasurer, C. A. Bradford; vice president, George K. Taylor; secretary, H. Clair Jackson.

Production in the new plant on Fulford street will be on within thirty days. The reconstruction of the building is about completed and machinery is now being installed. Four Waldron coaters, two trimming 73 inches in width and two to trim 62 inches, have been ordered. The larger ones are now in place. Considerable of the auxiliary machinery is arriving and two Norwood super calendars are now on the road. The drying system in the coating room is the product of the J. L. Ross Engineering Company and several interesting and unique features have been adopted in the installation. Clarage fans have been used. The Kalamazoo Blow

Pipe Company installed the radiation system. A traveling crane will be installed to facilitate the handling of heavy rolls. The power plant has been overhauled and is now ready for operation. All machinery will be electrically driven. The building, 120 by 260 feet in dimensions, is splendidly adapted for the needs of the industry.

Allied Paper Mills Have Big Year

The Allied Paper Mills, operating the King and Monarch divisions in Kalamazoo and the Bardeen division in Otsego, manufactured and sold 2725 carloads of paper during 1924, or to be exact 10,893,803 more pounds of paper than were made during 1923. The concern paid in wages in 1924 the immense sum of $1,566,369.85, over 70 per cent being disbursed in Kalamazoo, the balance in Otsego.

The above were among the interesting facts recited by President Alex. G. Gilman at the annual meeting of the stockholders, held Wednesday in the Chamber of Commerce rooms. Mr. Gilman was also able to add that the company faces its most prosperous year, his statement being based on the general outlook for business.

During 1924 this concern expended $116,412.39 in improvement of its various units. On the King division alone $71,211.67 was spent the past year, with improvements on the Monarch costing $24,412.07 and on the Bardeen, $20,788.65. The stockholders furthermore authorized the expenditure of $125,000 more during the first half of 1925, thus making it possible to complete the work of bringing all properties up to highest state of efficiency and productiveness.

Important recent betterments at the King division includes the complete rebuilding of the 3 and 4 machines. No. 4 was rebuilt last spring by the J. H. Horne & Sons Company, Lawrence, Mass. Beloit Iron Works is now engaged in rebuilding the No. 3 machine along similar lines. In addition this unit will be driven by a Proesser type, high speed engine, manufactured by Chandler & Taylor. This is an exact prototype of the engine installed last spring for the operation of the No. 2 paper machine and found to work so successfully. By these improvements the production capacity of the King division will be increased fully 25 per cent, or from 150,000 to 185,000 pounds every 24 hours.

During the past year both paper machines in the No. 1 mill of the Bardeen division have been equipped with new drives, increasing the capacity from 40,000 to 50,000 pounds daily. The next improvement authorized at Otsego is the erection of a new boiler plant to supply adequate power for the No. 1 mill. This building will be of reinforced concrete, steel and brick and of the most approved type in every way.

President Gilman has ordered three 300 horse power Wicks boilers and three "Type E" stokers, product of the Combustion Engineering Corporation, for installation. Provision will be made so that the exhaust steam can be used efficiently for drying purposes.

The stockholders by unanimous vote approved the plan submitted to change the present no par stock to $10 par stock. As a result 400,000 shares of $10 par stock will be issued and exchanged on the basis of one share of $10 par stock for four shares of the present no-par stock. The 400,000 shares approved will be sufficient to take care of the outstanding no-par issue. This move will not in any way effect the six per cent preferred stock now held to the extent of $2,300,000.

Death Claims Two Directors

During the past year Allied Paper Mills has lost two directors by death. They are George E. Bardeen, one of the best known papermakers in the United States and one of the greatest factors in the development of the industry in the Kalamazoo valley, and E. S. Rankin, capitalist and during his lifetime head of the Rankin Insurance agency. No attempt was made to fill the vacancies and as a result the board is automatically reduced to 17 members as follows: A. B. Connable, George S. Davis, C. A. Dewing, J. H. Dewing, George H. Gerpheide, A. G. Gilman, A. E. Kettle, W. E. Kidder, S. B. Monroe, John H. Pyl, G. W. Ritchie, H. L. Vanderhorst, George D. Cobb, Kalamazoo; J. W. Thompson, Detroit; E. G. Read, Richmond; Florence G. Bardeen, Otsego; A. L. Pratt, Paris, France.

All officers were re-elected: President, A. G. Gilman; first vice president, George H. Gerpheide; second vice president, John H. Pyl; secretary, George S. Davis, treasurer, S. B. Monroe.

Sutherland Paper Co. Improvements

Officials of the Sutherland Paper Company can now say enthusiastically: "We now have a first class plant throughout and are in position to produce high grade products."

The completion of the new office building and press room was the finishing touch on a model manufacturing institution. The new building contains 55,000 square feet of floor space. The entire main floor, high, light and airy, is devoted to the printing and cutting of cartons. There is an unusually large battery of one, two and three color presses, together with the auxiliary equipment. The old press room has been converted into a well arranged stock and storage house for maunfactured products.

L. W. Sutherland, president of the concern reports that four more two color presses are to be added to the equipment, the first one to go in within 60 days. The others will follow in order.

The Sutherland Paper Company was literally raised on a quagmire, for where five acres of heavy concrete, brick and steel buildings now stand, was less than a decade ago one of the most treacherous pieces of swamp land in the Kalamazoo valley, never safe to walk on and more than half the time under water. It was the location, not the condition of the ground that appealed to L. W. Sutherland. He has since remarked that from the standpoint of advertising the position of the plant could not be improved. On the one side runs the main line of the Michigan Central railroad, while at the front of the mill is M-17, the main automobile highway between Chicago and Detroit, literally teeming with motoring tourists a major portion of the year. Thus the plant annually comes closely to the attention of millions of travelers.

The new addition also provides unusually well arranged offices, large, light and airy, sufficient for the future needs of the concern.

Bryant Reconstruction Program

The Bryant Paper Company is winding up its first reconstruction program. Right on the heels of building the new central power plant and the entire re-construction of the Superior division, with its efficient conversion plant to supply raw stock at a minimum of cost, comes the new machine shop and salvage plant. This building of brick, reinforced concrete and steel, will be 172 by 57 feet in dimensions and 40 feet high, furnishing one of the finest paper mill machine shops in the country. The equipment is to be adequate in every way. R. D. Boyer has the building well under way and it should be ready for occupancy this spring.

Winship A. Hodge, manager of the Western Board and Paper Company, is going ahead with the improvements to that plant, which when completed will greatly increase the capacity and at the same time improve the general quality of the manufactured product. Work is progressing rapidly on the addition to the boiler house, 70 to 80 feet in dimensions. A 500 horse power Wickes boiler has been ordered for installation, together with an additional power unit, consisting of a Hamilton engine direct connected to a 300 k.w. Westinghouse generator. The Dayton Hoist and Beater Company is building one 1,500 pound and one 2,200 pound beater for the plant.

To finance this program, the Western Board and Paper Company issued $100,000 first mortgage 6½ per cent gold bonds, running 15 years. All were taken by the stockholders, being in fact three times oversubscribed. The details of the first steps in the Western Board's expansion program were recounted in the spring mill number of the PAPER TRADE JOURNAL.

Rex Paper Co. Improvements

During the summer and fall months the Rex Paper Company added to its plant, the structure not only providing new office quarters, but greatly increasing the mill's finishing department. The MacSimBar Paper Company is now engaged in the erection of a new engine house, an improvement made necessary for the building of the company's boiler plant. The pump house is finished and equipment is being installed. In the near future the company will get all its water from the Kalamazoo river. Plans are being drawn for the 5,000 ton steel stock house, which is to be erected by the Standard Paper Company during 1925. This addition with its equipment will represent an outlay of between $90,000 and $100,000.

While the Hawthorne Paper Company has not increased its capacity during the past year, it has greatly expanded its office facilities and made available space for a working technical department. This mill specializes in the manufacture of high grade bond and writing paper.

The most interesting item in mill construction outside the Kalamazoo valley during 1924 was the erection of the plant of the Dunn Sulphite Paper Company at Port Huron, an operation fully chronicled in the spring mill number o the PAPER TRADE JOURNAL.

Kellogg Box Board Co.

The trade generally is also interested in the recent organization of the Kellogg Box Board Company, an organization affiliated with the Kellogg Corn Flakes Company of Battle Creek. This concern has acquired the plant of the Chicago Paper Mill and Box Company, 2539-61 Taylor street, Chicago. The price is said to have been $375,000.

At the close of 1924 the number of operating companies had increased to 43, owning 66 mills, equipped with 113 machines and capable of producing 3,119,000 pounds of paper, 3,770,000 pounds of board, 600,000 pounds of ground wood and 1,000,000 pounds of sulphite and sulphate each 24 hours.

While the industry is pretty well scattered throughout the state, by far the greatest activity is found in the Kalamazoo river valley and in Monroe. Kalamazoo has for years been recognized as leading all other cities in the world in manufacture of book and coated papers. Monroe occupies a similar position with regards to the making of board.

Six New Concerns Start

At the close of 1924 there are six companies in Kalamazoo proper, operating 16 mills with 28 machines, capable of turning out 1,222,000 pounds of paper daily. Since the close of 1918 one book mill, operating one machine has been erected in the valley, but the gross daily capacity has increased 210,000 pounds. In the Kalamazoo valley district, but outside the city proper, are five companies engaged in the manufacture of paper, operating six mills and 11 machines and producing 312,000 pounds daily. The increase in paper during the period for Kalamazoo proper was 20.8 per cent and for the valley as a whole 16.4 per cent.

Notable strides have been made in this section in the manufacture of board. In Kalamazoo proper the number of companies has increased from 2 to 3, the number of mills from 2 to 3, the number of machines from 4 to 5 and the 24 hour tonnage from 105 to 215 tons. In the valley district the growth has been even more marked with 6 mills against 4, ten machines against six and a production of 1,150,000 pounds as compared with 340,000 for each 24 hours The advance in board production has been 104.8 per cent for Kalamazoo proper and 187.3 per cent for the valley as a whole. The combined output of paper and board in the valley is 3,114,000 pounds daily, with 1,862,000 pounds a day in 1918 or a gain of 67.3 per cent.

Monroe, making board exclusively, has shown a remarkable growth during the past six years. The daily output has advanced from 1,134,000 pounds to 1,892,000 pounds, or 66.8 per cent. While four concerns are still listed by Lockwood, the number of mills operated has increased from 8 to 14 and the number of cylinder machines from 12 to 19.

During the period indicated new mills have been erected by the following companies: Sutherland Paper Company, Kalamazoo Vegetable Parchment Company, Kalamazoo; Monroe Paper Products Company, Consolidated Paper Company, River Raisin Paper Company, Monroe; Ford Motor Company, Dearborn; Filer Fiber Company, Filer City; Escanaba Paper Company, Gross; Manistique Pulp and Paper Company, Manistique; Hoskins-Morinville Company, Monominee; Central Paper Company, Kuskegon; Dunn Sulphite Paper Company, Port Huron; Eddy Paper Company, Three Rivers and the Ontonagon Fiber Company.

Increases in Capacity

Substantial increases in capacity of their respective plants through installation of new equipment have been effected by the Western Board and Paper Company, Standard Paper Company, Kalamazoo; McSimBar Paper Company, Otsego; Watervleit Paper Company, Watervleit; Michigan Carton Company, Battle Creek and the Detroit Sulphite Pulp and Paper Company, Detroit. The Monroe Paper Company, Monroe and the American Can Company, Constantine, have rebuilt their mills, destroyed by fire.

PAPER HOUSE SOLVES OVERSTOCKING PROBLEMS

Problems arising out of the small lot, broken ream and particularly the odd size questions in the paper distributing field, long a source of vexation alike to paper seller and paper buyer, have been largely solved by a new development of the activities of the Paper House of Pennsylvania in Philadelphia. During the past year it has established in the great Federal warehouse, Front street and Washington avenue, a converting plant which may be briefly described as a complete finishing plant of a modern paper mill. In these quarters, which, on a recent visit N. A. Schenoenbucher, of the National Paper Trade Association, characterized as being ideal and as offering the best opportunities for a converting plant he had ever seen, the Paper House has installed a complete equipment which enables it to transform the large rolls it takes from the mill into the almost infinite variety of sizes required by the rather complex market to which it caters.

During the comparatively brief history of the Paper House of Pennsylvania, now nearing a decade, the firm has worked up a large patronage from railroads, financial and insurance corporations and other large consumers using sizes of paper not ordinarily carried in the warehouses. In order to give immediate service to these patrons the company found that either it would have to carry a tremendous stock of these sizes not usually to be found or else develop a finishing plant where they could be made to order, and this it has done and very successfully. The requirements of even a limited number of its customers were so varied as in themselves to involve the necessity of carrying a tremendous stock unless an equipment for producing the goods on order was made and, therefore, the venture of the Paper House of Pennsylvania was immediately successful from the points of view of both consumer and distributor. Throughout the United States a number of distributors have heard of the Paper House's enterprise and it is constantly in receipt of letters asking for practical suggestions.

In this converting department the firm carries on all varieties of cutting, sorting and testing service, using as its raw material either wide rolls or sheets. The complete machinery installation was developed from the company's own experiences in attempting to promptly meet various requirements. The result is that the firm is not only able to take care immediately of rush orders for deliveries of odd sizes but also has very much speeded up its turn-over. It realized that in these days of great rush, quick deliveries were of outstanding importance. With the operation of the converting department there is avoided the over-stocking of any grade and there is no hang over such as usually happens when an odd size market is catered to.

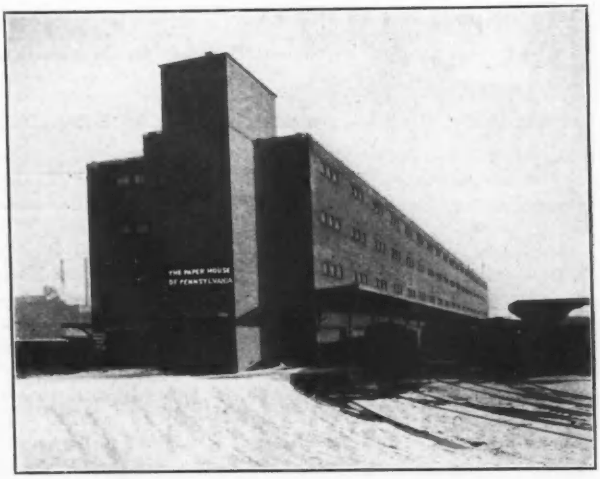
In the plant in the Federal warehouses there are customarily carried as much as one thousand tons of stock and from the company's supplies the meeting of every requirement can be very quickly made. On the sheeting machine there has been cut as high as 12 tons per day. In addition a rewinder is in operation for the conversion of big rolls into smaller lots at the rate of ten tons per day. This provides one of the largest converting departments in the city and during the November and December rush days the winder was run on a 24-hour schedule with orders extending to as far as Gulf ports taking care of the needs of the paper trade. The plant efficiency has established as its goal a 24-hour service.

In addition to the converting department the Federal warehouse also accommodates the import news print division of the Paper House of Pennsylvania. This is a most important feature of the firm's business. In connection with it are two items of widespread interest. Only a few months ago it came about that on a certain month every newspaper in Philadelphia and in Camden, Chester, Allentown and Coatesville was printed on paper imported by the Paper House of Pennsylvania from the Scandinavian countries. The statistics of the United States Department of Commerce show that

MAIN OFFICE, 28-30 NORTH 6TH STREET, PHILADELPHIA.

in September of last year there came into the port of Philadelphia 2,833,056 pounds of news print paper and that the imports of the Paper House of Pennsylvania for that period were 2,777,985 pounds leaving but 55,071 pounds as the imports of all other dealers.

Although the history of the Paper House of Pennsylvania dates back but a decade it is one of interest and as well of continued success. Its founders were the Considine brothers, Norbert A. and Raymond J., sons of J. P. Considine, who is prominently identified with the North American as its general manager. Norbert A. Considine, president of the company, is a graduate from St. Joseph's College in Philadelphia. During his vacation days he secured practical experience by working in the paper mills of the P. H. Glatfelter Paper Company at Spring Grove, Pa., and also in the International Company's Mills at Glen Falls, N. Y., and Piercefield. Subsequently he joined the sales organization of the Glatfelter Company and in 1914 established himself in business with an office in the North American building. The venture was successful and five years later upon the incorporation of the Paper House of Pennsylvania it purchased the six-story warehouse at 28 North Sixth street,



EXTERIOR OF WAREHOUSE, FRONT AND FEDERAL STREETS, SHOWING RAILROAD FACILITIES

FINISHING DEPARTMENT AT FRONT AND FEDERAL STREETS. PAPER STOCKS SHOWN HAVE BEEN SHEETED FROM ROLLS

stocking all grades of fine and coarse papers. The capacity of this building subsequently was outgrown and in 1923 the firm took over a large area in the warehouse at Front and Federal streets.

His brother Raymond J. Considine, vice-president of the company, served with the U. S. flag on the battlefields of Europe with the Fifth Division of the Regular Army. He was injured by a machine gun in the Argonne which resulted in the amputation of a finger of the left arm and won for himself a citation for valor. Upon the closing of the war he joined the newly formed Paper House of Pennsylvania as an associate of his brother.

Saranac Pulp & Paper Co. Starts New Mill

Construction Started in October, 1923 and Operations Begun in June, 1924—Plant Consists of Ground Wood Mill With Four Sandy Hill Iron and Brass Works Grinders and Paper Mill With Eight Beaters, One Cylinder and 132 inch Yankee Fourdrinier—Initial Production Was of Marketable Quality and Shipped Out an Order for Commercial Usage—Engineering Work by F. L. Smith of New York City.

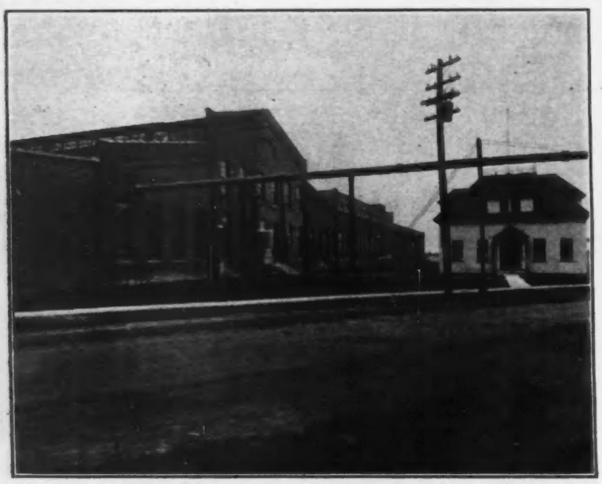
Written Especially for the Annual Review Number of the Paper Trade Journal

Among the new mills that have been put into successful operation during the past year of 1924 is that of the Saranac Pulp and Paper Company, Inc., on the shore of Lake Champlain, Plattsburgh, New York.

The plant is supplied with electric current by a 3,000 kilowatt hydro-electric station on the Saranac River, about five miles above the City of Plattsburgh. This hydro station was built on the site of the old ground wood pulp mill owned by the Saranac Company. This station is equipped kith one 1,000 K. W. O.8 P. F. 2,300 volt, 60 cycle, 3 phase, vertical water-whell driven generator and one 1,400 K. W. 0.8 P. F. 2,300 volt, 60 cycle, 3 phase, vertical water-wheel driven generator with direct connected exciters.

From this hydro station the current is transmitted to the ground wood and paper mills at Plattsburgh, N. Y., over the Company's own lines.

This station is constructed entirely of reinforced concrete, the superstructure walls being filled in between the reinforced concrete columns with brick panels. It has ample provision for natural lighting. Quite a definite idea of the character of this hydro



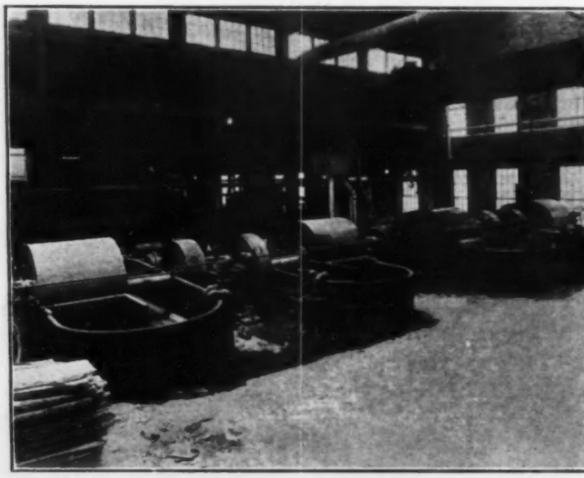
MAIN PAPER MILL BUILDING AND OFFICE OF THE SARANAC PULP & PAPER CO., AT PLATTSBURGH, N. Y.

development and its equipment can be obtained from the exterior and interior photographic views.

The Groundwood Pulp Mill

The ground wood pulp mill is located adjacent to the paper mill in a building that had previously been used for the construction of motor boats, and because of the very unusual story height of this building, due to the purpose for which it was originally built, it made an ideal building for a ground wood mill; it is approximately 240 feet long by 75 feet in width and 40 feet in the clear, underneath the lower cord of the roof truss; about 200 feet from the shore of the lake, at the lake and adjacent to this end of the building, was built a new one-story wood room—113 feet in length and 32 feet in width.

At one end of the wood room, at right angles to the length of



BEATER ROOM SHOWING 4-1000 LB. BEATERS OPERATED IN PAIRS BY DOUBLE ENDED MOTORS AND LENIX DRIVES

it, a log conveyor extends out into the lake about 200 feet, and handles the water shipments of logs to the wood room. This conveyor is equipped with a steel cable and cast iron button flights, and is driven by an independent electric motor.

The equipment of the wood room itself consists of one 72-inch slasher saw, six 4 feet barkers, arranged three on one side and three on the other side of the receiving and discharging of the rough and rossed wood conveyors. These conveyors discharge into a concrete tank located at the extreme end of the building, opposite to that at which the wood is delivered and from this tank the wood is handled by a concrete water conveyor to the grinders. These grinders are four in number and are of the latest type manufactured by the Sandy Hill Iron & Brass Works. Three have 27" pockets and 54" stones, and one has a 32" pocket and 54" stone. They are driven by direct connected, 400 K. W., 3 phase, 60 cycle, 550 volt, General Electric motors, each motor being protected from the grinder to which it is connected, by an angle frame, asbestos covered screen or partition.

The pulp from the grinders flows through a Bull sliver screen into a concrete sump or pump pit, to which is connected a 6-inch centrifugal stock pump, and this pump handles the stock to an elevated chest. From this chest it runs through three centrifugal screens to six Bagley & Sewall 72-inch wet machines, where it is taken off in laps and stored at the extreme end of the ground wood pulp mill, nearest to the paper mill, for ultimate use in the Beater Room of the paper mill.

The wet machines are driven by one main countershaft, mounted behind and above the cylinders of the machines, which countershaft is, in turn, driven by a belted motor.

All stock pumps, pressure pumps, and other auxiliaries of the ground wood mill are driven by direct connected electric motors.

The maximum output of the ground wood mill is 30 tons per day.

Paper Mill

The paper mill, located approximately 300 feet from the extreme in-shore end of the ground wood pulp mill, consists of a beater and jordan room, two-machine paper mill building, a finishing and stock storage building.

The beater room is equipped with six beaters—four 62 feet by 40 feet wood tub Hollander beater built by Noble & Wood of Hoosick Falls, N. Y., each pair driven by two 125 H. P. motors through a Lenix drive, and two 66 feet by 60 feet cast iron tub Dilts Machine Works beaters, each individually belted to a 75 H. P. motor.

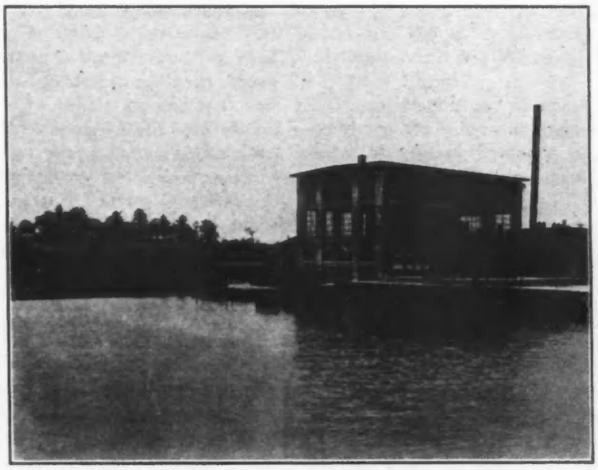
The Jordan Equipment consists of two Noble and Wood Monarch Jordans, direct connected to 75 H. P. General Electric induction motors, and one Noble and Wood Mammoth Jr. Jordan, driven by belt from a 150 H. P. General Electric motor.

All six beaters dump into horizontal concrete stuff chests in the basement of the beater room. The agitators of these chests are driven by direct connected motors through a train of gears.

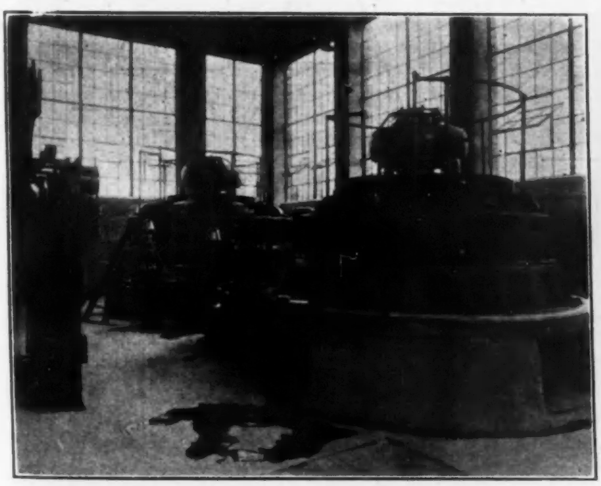
The beater stuff pumps are Beloit Iron Works 8"x18" Duplex, direct connected to 7½ H. P. motors mounted on the frame of the pumps, entirely self contained, and located directly under the beaters in the basement of the beater room, thus reducing the runs of stock piping to a minimum.

In the construction of the beater room, rather an unusual condition was encountered in the finding of quicksand at the elevation of the floor level of the basement of this building, and in order to overcome this condition without the expense of piling the entire foundation and basement floor of the building, a reinforced concrete mattress was designed, on which floats the entire beater room foundation and superstructure.

The paper mill machine equipment consists of one Sandy Hill Iron and Brass Works single cylinder tissue machine with one main press, eighteen 36x91 inch face dryers, one 18x91 inch face lead dryer, two 28x91 inch face felt dryers, one 8-roll stack of calenders, one 3-drum revolving reel, and one double drum Sandy Hill winder. A 12-plate packer diaphragm screen is part of the auxiliary equipment of the cylinder machine. This machine is driven by means of a direct connected General Electric variable speed full sectional drive, and planned to operate at 500 feet per minute maximum speed. The average output per day of 24 hours, in 10 pound paper, is 6 tons, The widest trimmed sheet is 82 inches.

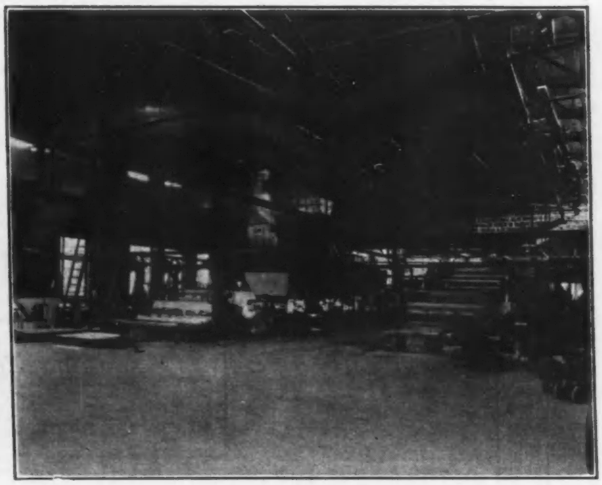


General View of Hydro-Electric Station of the Saranac Pulp & Paper Co., at Plattsburg, N. Y.



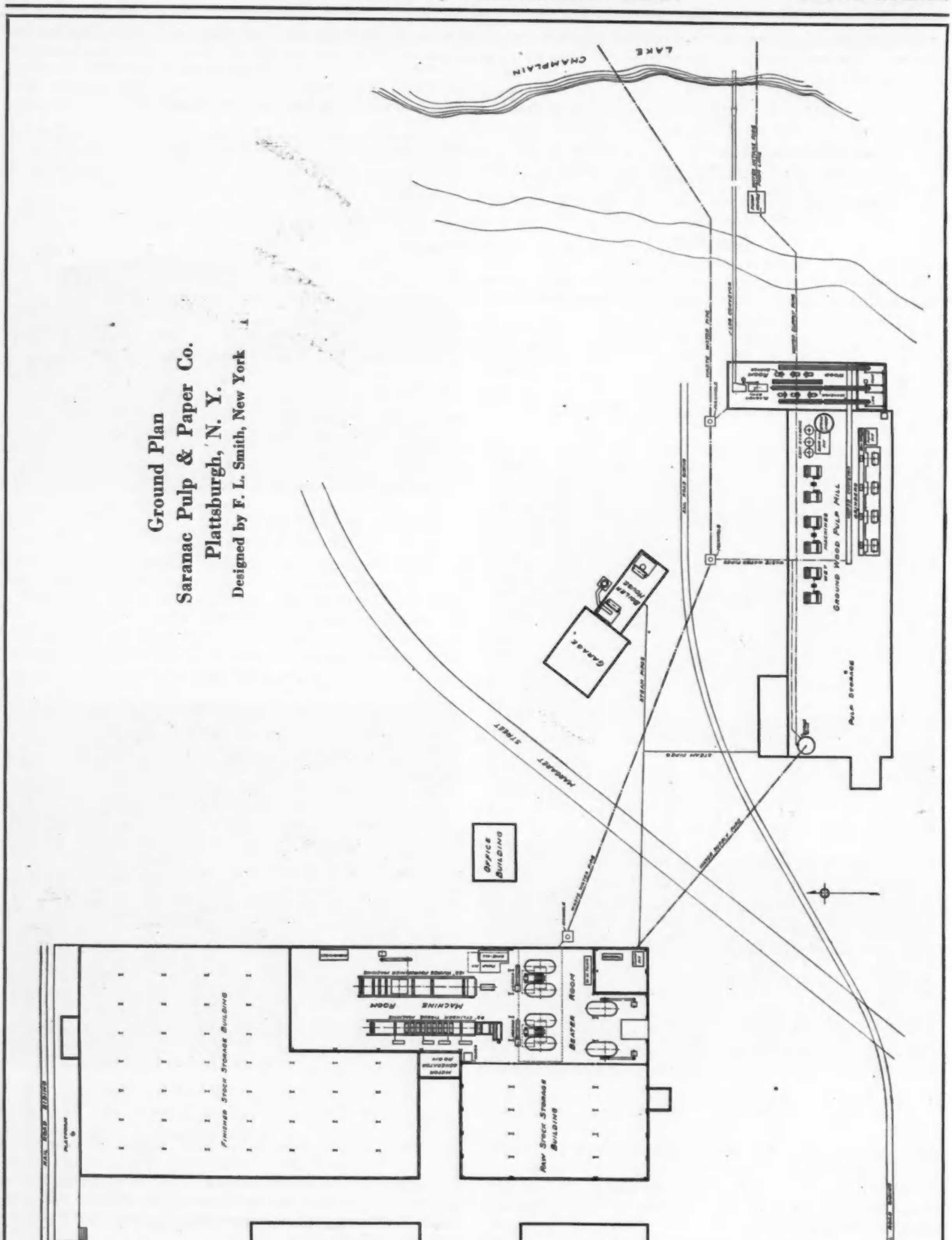
Interior View of Power Station Showing Generators, 1-2100 H.P. and 1-1500 H.P. With All-Electric Driven Governors

The second machine is a Beloit Iron Works 132-inch Yankee machine with a 50x132 feet face wire, one 6-roll stack of calenders, one 2-drum revolving reel, one 2-drum winder. This machine is driven by a belted, variable speed electric motor, capable of being varied in a 4 to 1 speed ratio. A No. 2 Bird screen is part of the auxiliary equipment of this machine. The widest trimmed sheet is 126 inches, the maximum speed 600 feet per minute. The average daily 24-hour output of the machine is 20 tons of M. G. finished light weight papers.



View from the Dry End of the Machine Looking Toward Beater Room

The hot air for the Yankee machine is furnished by a J. O.



Ground Plan
Saranac Pulp & Paper Co.
Plattsburgh, N. Y.
Designed by F. L. Smith, New York

Ross Engineering Corporation system of fans, heaters, and economizers, so designed and arranged that air entering the fan coils for use on the machine may be re-circulated from the room or taken directly from the outside and the air exhausted from the hood on the machine in its passage through the economizer discharges through the roof of the building.

A very clear idea of the machine room installation and the hot air and economizer equipment for the Yankee machine may be had from the photograph taken facing the dry ends of the two machines.

A partial view of the beater room showing the four Noble & Wood beaters and the electric motor drives can be had from the photograph of this equipment taken looking toward the machine room. This photograph, it will also be noted, shows the inclined save-all, located against the wall of the machine room at the extreme end of the wet part of the machine, over which save-all all of the white water from the Yankee machine is handled, and then pumped to a storage tank, from which it is drawn for furnishing the beaters.

Water Supply

The water for the operation of both the ground work mill and the paper mill is secured directly from Lake Champlain. For this purpose, and in order to secure clean water, free from the waste water discharged from the mill, an intake 1,600 feet in length, constructed of 30" wood stave pipe, was sunk on the bottom of the lake and connected at its out-shore end with a crib intake, the water flowing from this intake through the pipe into a concrete caisson sunk in-shore sufficiently below the elevation of the out-shore intake to insure a gravity flow to the sump. From the sump the water is handled by a 10" Worthington centrifugal jump, driven by a 50 H. P. direct-connected motor. The water is pumped to a surge tank, and from here, distributed through the entire plant.

A very interesting feature in connection with the construction of this intake was the laying of the wood stave pipe. The pipe, of necessity, had to be put together in short sections, and, likewise, before being submerged to the bed of the lake. This was accomplished by building the pipe out on the ice covered like, banding and tying the joints; then cutting a channel through the ice, rolling the pipe into the water thus exposed by the channel, and sinking it gradually from the in-shore and toward the out-shore, by the use of pre-cast concrete anchors. The work was completed in a single operation, without mishap, and reflects much credit on the local contractors to whom its completion was entrusted.

Power Plant

The steam power plant is housed in an independent building about equally distant from the paper mill and the ground wood mill. A railroad siding makes possible the delivery of coal at the door of the boiler house, from which point it is delivered by gravity on the floor in front of the boilers, the floor being depressed some six or eight feet below the ground elevation, and from the floor, hand-fed to the boilers.

The boiler house equipment consists of two marine type 250 H. P. Cross Drum Water Tube Boilers, one 800 H. P. Harrison Safety Boiler Works Open Feed Water Heater and two Worthington outside packed steam driven Boiler Feed Pumps.

The boilers are equipped with independent stacks, one of brick, which formed part of the original boiler house before the new equipment was installed. This stack handles the gasses from one of the boilers; and one of steel, mounted over the second boiler, takes care of the gasses from that boiler.

Inasmuch as the mill is entirely electrically driven, the steam requirements are only those necessitated for drying, heating, and process water heating. This demand is secured from the exhaust of a General Electric Company non-condensing turbine, driving a 200 K. W. 3 phase, 60 cycle, 600 volt generator, the current developed from the generator being synchronized with, and floating on the buss bars of the hydro-electric station current, the output load of the generator fluctuating with the demand on the turbine for steam for the process work.

Building Construction

The buildings, housing the beater room, paper machines, finishing and stock storage departments are of brick with steel roof construction and 3" plank roofing; are edequately lighted through the side walls and, in the case of the Stock Storage Building, through skylights in the saw-tooth construction.

The groundwood pulp mill and wood room are of timber construction and the boiler house is of stone.

Engineering Work by F. L. Smith

Construction was started in October of 1923 and operation begun in June, 1924. H. P. G. Norstrand, president of the Company, and formerly associated with Stevens and Thompson Paper Company at Greenwich, New York, has been the responsible managing director in the planning and construction of the mill. The engineering work was performed by Frederick L. Smith, pulp and paper mill engineer, of 21 East 40th Street, New York City.

The operation of each of the many units of the plant, resulting in initial production on the machines, was accomplished without hitch or delay, and the first paper that came off of each of the machines was of marketable quality and shipped out on orders for commercial usage.

Conditions in the Book Paper Industry in 1924

Written Especially for the Annual Number of the Paper Trade Journal.

During the calendar year of 1924 the book paper mills enjoyed a fairly good business, although unable to operate to full capacity. The average operation was in the neighborhood of 80 to 90 per cent.

Contract prices remained firm throughout the year, but, in some cases, lower prices were made for spot delivery of desirable tonnage.

Magazines and trade papers seemed to be taking their normal contract tonnage, but lithographers, label printers, envelope and tablet manufacturers, etc., were operating in some instances not more than 60 or 70 per cent, which decreased their consumption materially. This naturally affected the tonnage of the paper manufacturers.

Eearly in November there was a noticeable increase in the demand for all grades made by the book mills. This was not sufficient to cause any material disturbance in the prices—although it no doubt had the effect of preventing ridiculously low prices being made for spot delivery.

In closing contracts for 1925, a number of the prominent mills changed their policy for making prices f. o. b. mill, to prices delivered, which meant lowering prices from $2 to $3 a ton, and at present, the demand for book paper is practically 100 per cent of capacity, which has a tendency to hold prices firm.

Contracts for 1925 have been taken at a firm price for the first three months of the year—after that time to be subject to change according to market conditions. Should the demand in 1925 exceed the supply, naturally, there will be prive advances—on the other hand, there is no indication that the cost of manufacture will be reduced, because of the continued high price of labor, the growing scarcity and increasing cost of pulpwood and all materials used in making book paper.

Story of McDowell Mills Starts Back 100 Years

For More Than a Century They Have Remained in Continuous Control of One Family of Paper Makers and Have During That Time Been Intimately Associated With the Progress of the Paper Making Industry in America—How the Mills Came Into Being and Progressed on a Career Which Has Been Marked by a Triumphant Victory Over Many Perplexing Vicissitudes and Complicated Problems.

Written Especially for the Annual Number of the Paper Trade Journal by Gene Carr.

The McDowell Paper Mills, on the Schuykill Canal in Manayunk section of Philadelphia, rise to distinction because of circumstances which intimately tie them into the history of paper making in the United States. Furthermore, they stand in the forefront of paper making enterprises from the fact that they have been in existence for over one hundred years, and during all that time have been continuously in the control and under the direction of one family of paper makers, whose present day representative, Charles McDowell, enjoys an acquaintanceship in the craft that is nationwide.

Finally the history of the McDowell Mills is most intimately interwoven with the annals of the paper making industry in America. Time and again when certain phases of the industry were affected by reason of changing import conditions, due to tariff and other causes, McDowell Mills were most directly involved—to such an extent indeed that fields of operation were absolutely closed. But, though the traditions of a Century hung about the mills, the adaptability of their management to change their business conduct most radically to meet the new conditions, was so great that crisis after crisis was successfully passed and the mills today survive and are active and prosperous after vicissitudes which have closed the career of many larger enterprises in the industry.

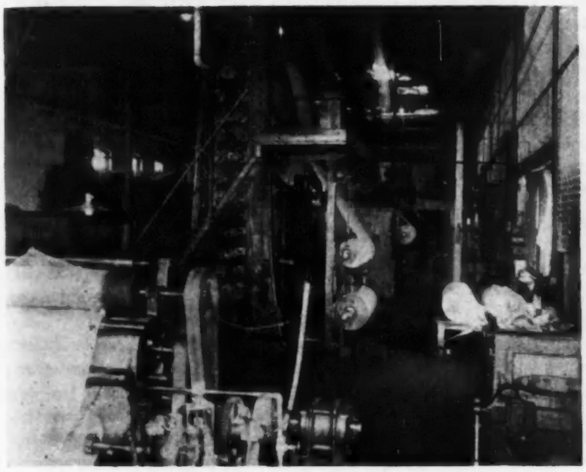
History of the McDowells

Now, a little review of the history of the McDowell Mills is in one sense an epitomized history of paper manufacturing in the United States. Because these mills are so closely associated with the history of the McDowells who have always conducted them, the story of the mills and of the three outstanding members of the family who served to guide their policies, is necessarily one of a biographical character. And so the story of the McDowell Mills becomes the life story of Joseph McDowell, active from 1850 to 1870; F. W. McDowell, who carried on until 1907, and Charles McDowell, who began his active association with the paper industry in 1886, who is the present survivor of the three generations and who is the owner of the McDowell Mills which, during the past year, entered into new fields and assumed a new activity.

Although a portion of the McDowell family was of Scotch-Irish parentage, Joseph McDowell, pioneer of the family, was apprenticed to a paper maker at New London Crossroads, Chester County, Pa. His wife, Rebekah Warren English, was a member of an old family of Orthodox Friends, so that the family early was identified

McDowell Paper Mills, Philadelphia, Pa.

with the Friends. He was born June 30, 1791, and died January 8, 1870. He was the son of Thomas McDowell, who was a soldier during the Colonial War; enlisted from Chester County, in the First Maryland Regiment, served through the war and returned to Chester County. He married Rebekah Warren English, of Burlington, N. J., daughter of John and Priscilla English, whose ancestors came

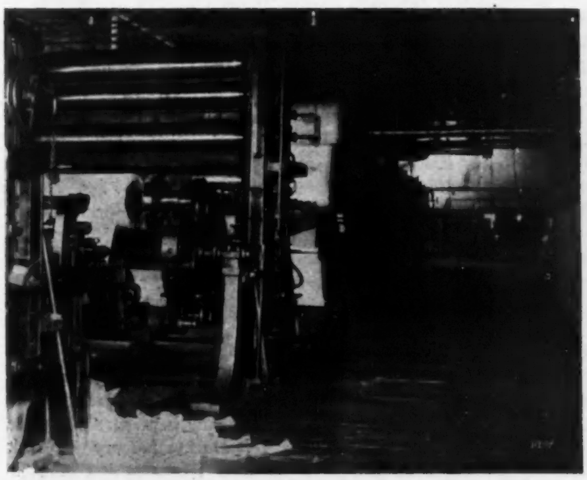


SHOWING SECTION THROUGH CALENDER DEPARTMENT

over shortly after William Penn settled at Mansfield, N. J., where the records of the English family are preserved.

Started Hand Paper Mill

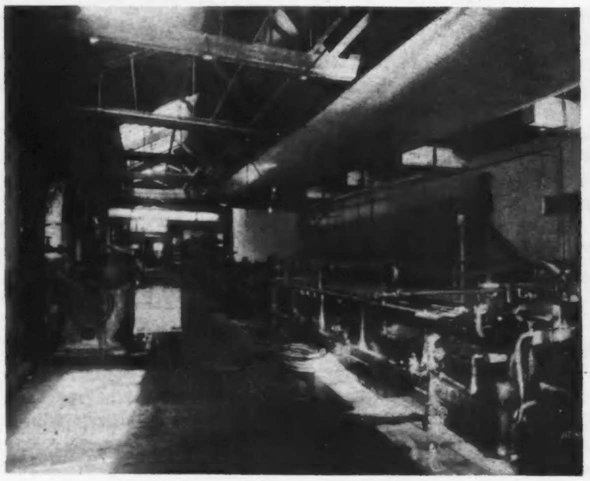
Joseph McDowell started a hand paper mill on the Pennypack Creek about fifteen miles from Philadelphia, Montgomery County, noted for its fine class of paper, making fine Ledgers, Bonds, etc. All paper at that time was labeled with a heavy trade mark, and



114" MOORE & WHITE FOURDRINIER PAPER MACHINE MAKING GLASSINE, GREASEPROOF AND PARCHMENT. TRIM 96 TO 100"

the trade mark was placed on every package. There accompanies this article a cut showing the manufacture of paper by hand, also the wonderful engraving and paper that were used. This picture shows the early mode of producing hand made paper. There is preserved by Charles McDowell a business card showing that in 1825 Joseph McDowell also operated a store selling blank books, rags, paper, etc.

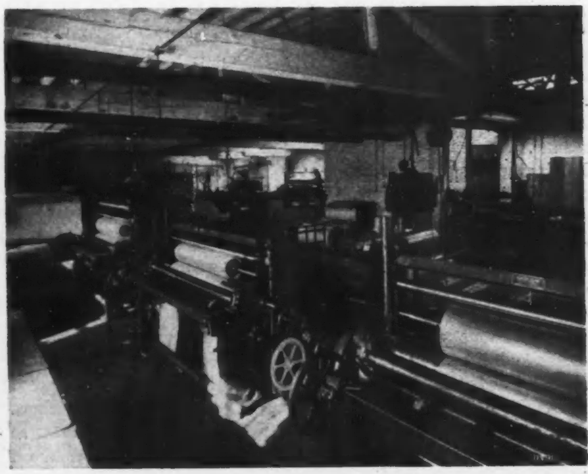
In order to keep abreast of the times, he decided to install a paper machine, and he purchased a mill at Manayunk. This property was deeded April 19, 1683, by the Governor of Pennsylvania, and was acquired by Joseph McDowell, July 5, 1827. He operated this mill in connection with the hand-made mill at Pennypack. It was about one mile and a quarter from the site of the old Rittenhouse



86" MOORE & WHITE FOURDRINIER PAPER MACHINE MAKING SPECIALTIES. TRIM 76"

Mills, which were run in 1690 by David Rittenhouse, one of the first American paper mills in the United States. It was also just below the old mill owned by Samuel Eckstein.

Just after he had put in the new Fourdrinier Machine at Manayunk, the Pennypack hand mill burned to the ground and was never rebuilt, so his efforts were concentrated on the mill at Manayunk on account of the advantages of the Schuykill River, as



SHOWING SECTION OF WINDING, SHEETING, CUTTING, TRIMMING, EXPANSION REEL BALING PRESSES, ETC. DEPARTMENTS

it was situated on the old Manayunk Canal, from which there is drawn power of about 2,500 H. P. for the different mills. The Canal was instrumental in bringing down coal from the coal regions by canal boat, and was a very busy place during earlier years. The Philadelphia and Reading Railroad ran to Reading and it soon saw the possibilities and advantages of the Canal and so it acquired the property in order to get the railroad tracks into the mines, after which, of course, it commenced hauling the coal down, and canal boats greatly decreased until at the present time there are only a few remaining. The original canal is maintained by the company; it must be kept up indefinitely for water power.

Learned Trade with Father

F. W. McDowell, son of Joseph McDowell, learned his trade with his father at Pennypack Creek, after which he became connected with the Megargee and Jessup and Moore and had charge of their mills in connection with his own mill at Manayunk. He continued in the paper business until his death in 1907.

His son, Charles McDowell, took hold of the McDowell Paper Mills at Manayunk in 1886 after his return from the Rensselaer Polytechnic Institute at Troy, New York, and a number of years of service with the Jessup and Moore Paper Company at their Pulp Mills at Wilmington, Del.

At the start book papers were made, then news, supplying all the Philadelphia newspapers. This mill was able to take care of them all and a good many others. Then Manila papers were made from jute for bag purposes, then rope for clasp envelopes and strong heavy wrappers, and wonderful sheets of this paper are still in the McDowell files and have not deteriorated in all these years. The high class papers were substituted for cheaper made papers when ground wood came into the market and drove out the rope and jute. Then water finish sulphite papers were made with a high glazed finish. There was some demand for this until samples were sent over from the other side showing "Kraft," so McDowell imported the pulp and machinery to make this paper which they were very successful with, building up quite a large business in this line, comparing very favorably with foreign krafts. But as the duty was changed, it was impossible to compete with foreign manufacturers, and it was not long before the firm was forced to give this up. After this it produced kraft and sulphite specialties in different designs and figures with a high and low finish, also special colored textile papers. These two in time were also killed by the imported papers.

Try Greaseproof Line

Then the greaseproof line was tried, and with it the mills were fairly successful. It was used by the biscuit and cracker manufacturers, and also for cooking bags. But imported glassines came into this market and this again shut down mills making these grades.

In the meantime, in 1910, the mills added another Fourdrinier machine, 114-inch, and increased equipment, which with the old 72-inch machine gave an output of 25 to 40 tons per day, depending on the grade. There were bleached specialties for bonds, wrapping and drinking cups which were new. Finally in 1912 it was decided to start glassine paper manufacture but again foreign papers came in below the cost of domestic manufacture, and the mills were forced to stop this and continue on specialties. During later years, however, the mills have been able to increase the manufacture of greaseproof and glassines, and are running about 10 to 12 tons of glassine and probably 6 to 8 tons of greaseproof and other specialties per day. Today this mill is noted for its glassine and greaseproof papers, also parchments, plain and embossed with different designs.

The plant is now run by water power and auxiliary steam, so there is no interruption in power. The mills are fully equipped with all up-to-date appliances, having a large filter plant with 1,200,000 gallons of pure water, 24 hours per day, and 85,000 square feet of floor surface. There is a rewinding department, to take care of small rolls, cutters, sheeters, slitters and cutting presses, baling presses, and its own railroad sidings where cars can be loaded and unloaded in the plant. The mills are provided with ample railroad facilities for shipping and export all over the world, and are but 5½ miles from the Port of Philadelphia.

Last Year's Improvements

The improvements in the last year have been the installation of a 750 K. V. A. Curtiss Turbine with direct connected generator and a Westinghouse condenser, with large switchboard capable of taking care of a 750 Curtiss turbine. This gives ample power to run through high and low water and to operate continuously 24 hours daily. Facilities for handling the product are unsurpassed.

The boiler plant is fully equipped with Babcock and Wilcox and return tubular boilers, steam turbines, boiler feeds and all necessary pumps and regulators. Steam is supplied at 150 pounds all over the mill and returned back to the boilers through a series of heaters and hot wells with steam turbine boiler feed pumps at about 210 degrees.

The machine shop is complete with all the necessary lathes, planers, etc., to take care of all mechanical units with carpenter shop, blacksmith and grinding rooms for the care of knives and rolls.

NEWS OF THE BALTIMORE TRADE

Capt. Jorgen Snedker, master of the Danish steamer *Arkansas*, one of the recent arrivals in Baltimore with a cargo of wood pulp, entertained a number of members of the B. F. Bond Paper Company, of Baltimore at a dinner on board his ship last week. Later, Captain Snedker was entertained by officials of the paper company at a theatre party.

Captain Snedker is well known to Baltimore pulp men as well as many paper dealers and manufacturers. He has been going to sea for 48 years, and recounts some harrowing experiences during the World War, having had four vessels torpedoed under him by German submarines. The last was the steamer Adolf Anderson, with a cargo of coal. The Anderson sank in three minutes, and Capt. Snedker was cast adrift in an open boat until picked up by a French patrol vessel.

Frank Pierce, formerly with the Whiting and Patterson Paper Company, of Philadelphia, has joined the sales force of the B. F. Bond Paper Company of Baltimore. Mr. Frank Marshall, a newcomer in the paper trade, also has joined the sales force of the B. F. Bond Paper Company.

J. Evan Reese, manager of the Whitaker Paper Company, of Baltimore, returned recently from an extended trip through the South. Later, Mr. Reese made a business trip to New York and Norfolk.

At the beginning of their 1925 advertising campaign, J. Francis Hock & Co., Inc., of Baltimore, have mailed out descriptive circulars of Active Bond. This medium priced bond paper is carried in stock in ten sizes, in white, blue, canary, pink, primrose, green, gray, russet, buff, salmon, cafe, goldenrod, amber and cherry. Double sizes are listed to provide sizes that often are preferable in figuring on forms, as many of them used today do not cut to advantage out of single paper size.

Active Bond is carried in four different weights, ranging from 26 to 61 pounds.

The Whitaker Paper Company, of Baltimore, has just mailed out a new price list to the trade.

J. Francis Hock & Co., Inc., of Baltimore, paper dealers, have recently completed renovations to their offices at 30 South Charles street. As is their annual custom, this company is preparing to close their books for the year on February 28. During January the Hock Company will take an inventory to show the condition of their stock as of March 1st.

KALAMAZOO PAPER BOX CO. ELECTION

Paul O. Staebler was elected a director of the Kalamazoo Paper Box Company at the last annual meeting. He succeeds Mrs. A. H. Huelster, Oak Park, Ill. The other members of the board are R. E. Staebler, E. H. Distin, Kalamazoo; W. W. Huelster, and S. E. Giffert, Grand Rapids. All officers were re-elected as follows: S. E. Giffert, president; E. H. Distin, vice president; R. E. Staebler, treasurer and general manager; Miss Zola Whiting, secretary.

Ontario Paper Industry Had a Trying Year

Poor Business Was Partially Overcome, However, by Exceptional Sales Efforts so That Pulp and Paper Men Came Through Unfavorable Period in Better Shape Than at Times Seemed Possible—Reforestation Problem Grows in Importance and Much Vital Legislation is Acted On—Hydroplane Patrol of Forest Areas Proves Successful—Several Leading Concerns Carry Out Elaborate Expansion Plans.

Written Especially for the Annual Number of the Paper Trade Journal by G. W. Brock

The year 1924 was a trying one with the pulp and paper industry of the province of Ontario the same as it was with many other businesses but, on the whole, the pulp and paper men came out fairly well and a great deal better than many expected. Collections were slow for many months or until the fall crop was harvested and more money was put in circulation and, during the whole season, credits had to be closely watched. Orders for the most part were small and placed only as required but, in the aggregate, they made up a very respectable total. Some months were very dull with the wholesale paper trade but against this there were periods of considerable activity which helped to create a volume larger than anticipated.

There were few changes in prices during the past twelve months and this materially aided in stabilizing matters. Book and writing mills were employed on the average to about eighty per cent of capacity but economies were effected and production costs cut down to the lowest notch. Business was harder to secure than in 1923 but this served to put wholesalers and their salesmen on their mettle to plug for all the orders that were going.

Coated Mills Suffered

Coated paper mills probably suffered the most as there was a tendency all around to retrench on catalogues and other literature of an expensive character, with the result that supercalendered stock and art papers, to a large extent, took the place of coated while the number of printed pages in all advertising matter was reduced, thus effecting a considerable saving in paper. The printing trade for the greater part of 1924 was quiet and shops in the smaller cities and towns appeared to be busier than the concerns in the larger centres of population. Manufacturing stationers and envelope makers were running only to three quarters of their usual output, although numerous specialties were put on the market in order to stimulate trade. Box manfacturers also had a perplexing period but backed up their selling organizations and campaigns with much mail order publicity, as did also the jobbers and several mills.

An attempt was made to substitute the net price list for the long price list which had been in effect two years but the proposed change was strenuously opposed by the Toronto Typothetæ. The final outcome was that a new long price list was issued at the close of the year with the general trend of quotations upwards, especially on the resale values. The jobbers announced that sales were confined to the trade except in the case of private plants to which sales would be made for use in their own equipment only.

News Print Was Active

Wrapping paper lines were quite dull until the fall months when orders picked up considerably. News print producers enjoyed a pretty active year as that market is steady under all circumstances and mills are well sold up ahead. About eighty-five per cent of the news print turned out in Ontario and the other provinces is shipped to the United States.

Board mills were only moderately employed owing to the comparative quietness in the paper box trade. One thing, which may be said in praise of the paper people in general, is that there was very little price cutting except on some special ranges and few firms suffered any financial reverses, although profits, which were reasonably satisfactory in 1923, were not nearly as large in 1924. Most concerns are happy to have come through the last twelve months by breaking even. A few companies in the distributing line made money and believe that the coming year will show much better results. No changes in prices are anticipated for several months and the road appears clear for steadily increasing business with no detours or obstructions. No one expects that 1925 will be a banner or boom year but conditions should be nearer normal than they have been.

Toilet and tissue plants enjoyed quite a satisfactory business but kraft paper was only in fair requisition. Pulp plants were kept moderately busy but the profits were small and ground wood establishments suffered more than those turning out sulphite pulps. Several ground wood units were shut down for part of the season owing to slow market conditions, while others operated under a receivership and found it difficult to sell their product at a satisfactory profit.

Important Legislation

During the year the Ontario Legislature passed legislation compelling all saw mill, lumber, pulp and paper concerns to take out a license and this regulation has been complied with readily, the license fee being very small. Ontario has always been a pioneer in the matter of advanced forest products legislation and adopting measures calculated to provide for the protection of the natural resources and their perpetuation. Ontario was the first province to place an embargo on the export of pulp wood from Crown lands. This came into force in 1900. An embargo on the export of pine sawlogs, which had formerly gone over to Michigan and other western states to be turned into lumber, became operative in 1897. Last year an act was passed that no hardwood logs could be exported from Crown lands without first being turned into boards, deals, joists or lath. The measure was to be operative on a date to be named by the Lieutenant-Governor by his proclamation, and this proclamation was recently issued, becoming effective with the opening of 1925. Every provision has been made for the carrying out of the act and, as a result, it is believed that several new hardwood lumber plants will be erected in the Northern and Northwestern portions of the province.

The pulp and paper mills of Ontario now have a pulping capacity of 850,000 tons annually and a paper capacity of 700,000 tons annually. In the news print line the Abitibi Power and Paper Company at Iroquois Falls, Ont., turn out 500 tons daily, being the largest mill under one roof in the world; J. R. Booth, of Ottawa, produces daily 145 tons; the Fort William Paper Company at Fort William, 160 tons; the Backus-Brooks Company at Kenora, 100 tons; the Ontario Paper Company at Thorold, 300 tons; the Spanish River Pulp and Paper Mills at Espanola, Sturgeon Falls and Sault Ste. Marie, 700 tons and the Fort Frances Pulp and Paper Company at Fort Frances, 150 tons. The total daily capacity of all the news print mills in Canada is now 4,850 tons and Ontario turns out 2,055 tons, so that the province produces between thirty-five and forty per cent of the entire Canadian output, being exceeded only by the province of Quebec.

Forest Land Figures

Some other figures may prove of interest and in an official statement recently issued by the province of Ontario, it was stated that this great industry was rapidly forging to the front as one of the premier activities. Up to the present only some 40,000 square miles of an available 260,000 square miles have been under the axe and the provincial government is adopting a progressive policy of reforestation that will assure this great natural asset for many years. The total area of Ontario's forest lands, exclusive of Patricia, is 125,000 square miles and the extent of the district of Patricia, the pulp wood resources of which are unexplored, is 146,000 square miles. The area of pulp wood concessions granted is 33,325 square miles.

The capital invested in the pulp and paper mills of Ontario is more than $140,000,000, and the average production of pulp wood is one million cords. The value of the pulp wood produced in Ontario is about $17,000,000 while the value of the pulp and paper industry at place of preparation, including raw wood, pulp exported and paper made, is $70,000,000.

The question of an embargo on the export of pulp wood from private lands has come in for considerable attention and the proposed measure has been strongly advocated and opposed with equal vigor. The Ontario Associated Boards of Trade and Chambers of Commerce have discussed the whole proposition and, at the last annual meeting, a resolution was passed to the effect that joint negotiations be opened up between the various governments in Canada therein interested and the United States, with a viewpoint of having certain restrictions removed, these being a thirty per cent duty on all manufactured book and writing paper entering the United States and a twenty-five per cent duty on manufactured kraft and wrapping paper going into that country.

Market Too Restricted

One of the leading manufacturers of wrapping papers, on this point lately said the main trouble was that the Canadian market was too restricted and, provided that Ontario manufacturers of wrapping papers had the opportunity of marketing their output in the United States in competition with paper manufacturers in that country, who are using Canadian wood and Canadian pulp, the future of the industry in the province would be much brighter. The present federal government does not, however, appear to be doing anything in regard to restricting the shipment of pulp wood from private lands across the border; and he concluded, "we have felt for some time that if some sort of restriction were placed on the export, it might have some effect on the authorities at Washington toward lowering the tariff barriers on our product."

The Ontario Associated Boards of Trade, in a resolution passed lately, pointed out that there was not a sufficiently remunerative market in certain parts of Canada for settlers' wood, especially poplar, from which book and writing papers are manufactured. It was declared by the business and commercial interests of the province represented at the gathering, that the best purpose could be served, not by a total embargo or, on the other hand, by no embargo at all, but by a method of a graded export tax, collected at the port of entry on the bill of landing or ship's manifest, so that the settlers from Northern Ontario and Northern Quebec—by having a much lesser tax would be able to compete with the cheap boat transportation now employed in bringing wood from points where settlement and agriculture do not exist to the same extent as along the railway lines.

Revenue from Export Tax

It was recommended that the revenue from the export tax, which would amount to between three and five million dollars a year, be ear-marked to be distributed among the different provinces pro rata to the amount of wood exported from each province; and that the fund be used principally for the better protection of the remaining forest area of the country and to some extent toward reforestation. It was declared that this method would be not only beneficial to the settlers and the railways, but would also act similar to a protective tariff in so far as the paper mills are concerned and insure a partial wood supply for the American mills, and by using the revenues they would provide for fire protection. Canada would prevent the burning up of a number of cords of wood to every one that the Dominion is now exporting.

A resolution to this effect will be presented to the federal government at Ottawa by the Ontario Associated Boards of Trade during the present session. In the House the whole matter of an export duty on pulp wood is likely to be discussed within the next few weeks, and there the matter rests at present.

General conditions in Ontario during 1924 disclose the fact that the market during 1924 was spotty and there was at times a lack of confidence. Readjustments have now taken place and matters, fundamentally and economically, are on a sound basis. A better feeling pervades all branches of the business; hesitancy to a certain extent has been removed and the house set in order for bigger and better results during 1925. A number of large consumers of paper have already placed contracts for their requirements for the coming months with jobbers, few variations in prices, if any, are anticipated, and demand should steadily grow.

Patrol of Forest Areas

During the past year the Ontario government employed fourteen hydroplanes to patrol the forset areas of the province in the North and they did effective work. The loss of timber by fires was very low in comparison with the awful havoc wrought by conflagrations in previous periods. Now when bids are invited for timber berths an "upset price" is placed on the different woods. In sales which have taken place within the last few months, the highest figures ever realized have been paid.

The cut in the bush during the present winter will not be as heavy as last, owing to 1924 seeing a restricted demand and distribution of forest products, especially in lumber and pulp wood, but a very fair log harvest will come down the streams in the spring. Reforestation is being undertaken on a larger scale than ever. The hope of the future lies in an awakened public interest in the matter of conservation and in protecting the natural resources of Ontario so as to ensure a dependable supply of raw material.

During the past year there were a number of improvements to plants and additional installations while in 1925 there will be some further expansions and developments. Several projects are under consideration, but will not take definite shape until all doubt is removed regarding financial conditions and the commercial and industrial outlook strengthened.

During the year just closed the pulpwood situation was not as active as in some previous years and prices toward the fall declined on both spruce and balsam owing to the pulp and paper companies not being in the market for large quantities and the mills only operating to about 70 to 80 per cent of capacity.

Big Pulpwood Business

One of the largest contractors in pulpwood is the Thompson and Heyland Company, Toronto, who handled and shipped between 60,000 and 70,000 cords. This company, which cut 20,000 cords of poplar off their own holdings, found a ready market for the latter wood in Pennsylvania and other States. This amount was more than double that of 1923.

Peeled pulpwood was last season from 50 cents to $1 a cord less than in the summer of 1923. Peeled poplar sold at $5 to $9 a cord in Ontario, according to location and freight rates, while peeled spruce and balsam brought from $8 to $12, the same conditions governing. For rough spruce and balsam from $5 to $8 a cord was paid in Ontario, according to location, availability, carrying charges, etc.

Two important legislative matters were enacted, as already stated, by the Ontario government during 1924. One was that prohibiting the export of hardwood logs from Crown lands unless turned into lumber, etc., which restriction went into effect on January 1 last. The other was an act providing for the licenses of all sawmills and pulp and paper mills. The latter step was taken for various purposes. The regulation states that returns shall be made by licensees of the sources of supply of material for use in the mills, the quantity of material used, the output, etc.

The Thunder Bay Pulp Mill, in which United States interests of Appleton, Wis., are interested, increased the output of its ground wood plant from 65 tons to 120 tons a day, at an expenditure of about $250,000.

Expansion Developments

The new ground wood pulp plant of the Great Lakes Pulp Company, started operations early in the summer at Fort William, Ont., and is today turning out about 160 to 180 tons of mechanical pulp. The company recently increased its authorized capital stock and will erect a 100-ton news print mill in the spring which will be ready for operation in 1926.

The new plant of the International Fibreboard Company, at Midland, was put in operation during the past year and is now turning out fifty thousand square feet daily of Ten Test solid fiberboard. The process of manufacturing this board first reduces wood waste to fibrous pulp. After-treating this through several machines to separate and distribute each fiber these are pressed with over a thousand tons pressure back into one solid board again over half an inch thick. Each board is made separately with special gauges and the closest observation to ensure its quality and uniformity. The moisture is then taken out by steam heated kilns, in which there are over ten miles of piping and through which is circulated superheated air. H. J. Wiser is at the head of the company, which has a well equipped and modern plant.

Another new company started business in Thorold, Ont., known as Wood and Pulp Process, Limited. Jack pine has been so treated that all the resin, pitch and gummy substance are taken out and the pulp from the wood used in making news print. The print paper so produced was made from seventy-eight per cent jack pine ground wood and twenty-two per cent sulphite pulp. If jack pine can be used in the future in turning out news print it will mean that a great impetus has been given to the industry in Ontario. There are about fifteen million cords of jack pine in Northern Ontario, according to the most conservative estimates and the Niagara district is the first paper manufacturing centre to exploit the new process, the outcome of which will be awaited with much interest during 1925. Expert paper men have given their opinion that the new process will become a predominating factor in production, that costs will eventually be lowered and vast resources of this wood will by the treatment be made suitable for the manufacture of news print of good quality, texture and strength.

Large Pulpwood Purchase

The Hammermill Paper Company, of Erie, Pa., which for the last twenty years has been buying pulpwood in the Thunder Bay district, purchased 62,000 cords from large and small contractors in and around Fort William and Port Arthur during the past year. The total expenditure of the company in that district was about a million dollars. Owing to the company having a good supply of wood on hand at their big plant in Erie, Pa., they will expend only about $600,000 on wood during the coming season. M. Cochrane, chief of the interests of the corporation at the head of the Great Lakes, states that they consider the quality of Thunder Bay pulp wood much better than they can purchase elsewhere. Previous to the establishment of the district headquarters in Port Arthur the company bought its wood through jubbers. It was paid for when delivered at the plant at Erie. Four years ago when the industry was in the stages of rapid expansion, office headquarters were made in Port Arthur; purchasing the supply of wood direct from the contractors, farmers and settlers and taking delivery either on the banks of rivers and streams or by rail. Driving and loading operations are now conducted by the company themselves.

Important Mill Changes

The Lennox Paper Mills, Camden East, Ont., were taken over by the Daverin Paper Company and put in operation, turning out book and other lines of paper under the management of Dan Daverin, who for many years was superintendent of the Montrose division of the Provincial Paper Mills at Thorold, Ont.

The Davy Pulp and Paper Company took over the Davy section of the old Foley-Rieger Company's ground wood plant at Thorold, Ont., and under the management of F. A. Fish, put the plant in operation in the turning out of ground wood pulp.

The Dominion Envelope and Carton Company, Toronto, of which E. Newell is manager, purchased an adjoining portion of property, had the buildings thereon torn down and are now erecting a large addition wihch will be used chiefly for centralizing their warehouse accommodation.

Canada Waxed Papers started manufacturing at 615 Yonge street, Toronto, and the members of the company are James MacArthur, for many years with the British America Waxed Paper Company, and George Courtenay. The concern has built up a good business.

The Continental Wood Products Company, of Elsas, Ont., which during recent years put up several cottages, is making extensive preparations to erect a kraft pulp plant, the construction of which will be proceeded with this year. All the preliminary arrangements have been made and the mill will have an output of 75 to 100 tons a day, while the equipment will be of the very latest character. The company, which is a subsidiary of the International Paper Company, is a concern which is doing things by leaps and bounds.

Mattagami's Big Year

The Mattagami Pulp and Paper Company, of Smooth Rock Falls, had a very busy year turning out 52,000 tons of unbleached sulphite. The company has contracted for 125,000 cords of pulp wood for 1925 delivery.

The Porcupine Pulp and Lumber Company, of Hoyle, Ont., during the past season took out about 12,000 cords of spruce pulpwood which was rossed at their mill at Hoyle. This season they are taking out 5,000 cords of pulpwood and have purchased cutting rights on 1,500 additional acres. They are not putting in any camps of their own but are securing their wood from their own lands through jobbers.

The Dryden Paper Company, of Dryden, Ont., which has been under a receivership since the fall of 1923 and was shut down for several months during the summer, resumed operations in September last and has since been operating to about 60 per cent capacity. The company turns out kraft pulp, sheathing paper, wrapping papers, etc.

Gummed Papers, Brampton, erected a new addition to their plant and considerably increased their output.

The Provincial Paper Mills, Toronto, carried out rather extensive improvements to their plant at Mille Roches. The beater room was remodeled and heavier types of beaters and new Jordans installed, considerably increasing the capacity. A new stone building was erected, 100 x 80 feet, three stories high, for storing materials. The beater room was rewired and new electric equipment put in. At Port Arthur, the ground wood pulp plant of the company was doubled in capacity and the output is now forty tons daily.

The Interlake Tissue Mills Company, Merritton, erected a new gypsum roof on the machine room and carried out several other improvements.

Big Expansion in Canada's News Print Industry

At End of Year Just Closed New Mills and Additional Machines in Existing Plants Have Brought Total Production of News Print in the Dominion Up to 1,516,000 Tons Per Annum—Markets During the Years Have Not Been Up to Expectations and Competition in the Future Is Expected to Be Keener—Auction Sale of the Riordon Properties One of the Outstanding Features of the Year.

Written Especially for the Annual Review Number of the Paper Trade Journal by C. L. Sibley

Before proceeding to a review of outstanding developments in the pulp and paper industry in Quebec and the Maritime Provinces in 1924, it will be interesting to glance at the remarkable expansion of the news print industry in Canada generally during the past year. During the year 1923, Canada produced 1,250,000 tons of news print. By the end of the year just closed new mills and additional machines in existing plants have brought the total producing capacity of the news print mills of the Dominion up to 1,516,000 tons per annum, which is a larger amount than has ever been produced in the news print mills of the United States in one year. The following table shows the news print capacity of Canadian mills as rated at the end of 1924:

Name of Mill	Tons daily	Capacity yearly
Abitibi	500	150,000
Bathurst	60	18,000
Belgo	385	115,000
Booth	145	43,500
Brompton	120	36,000
Canada	45	13,500
Donnacona	210	63,000
Eddy	160	48,000
Fort William	160	48,000
Laurentide	375	112,500
Keewatin Lumber Co.	100	30,000
News Pulp & Paper	30	9,000
Ontario	300	90,000
Pacific Mills	220	66,000
Powell River	225	67,500
Price Bros.	500	150,000
St. Maurice Paper	250	75,000
Spanish River	700	210,000
St. Lawrence	160	48,000
Fort Frances	150	45,000
International (St. Maurice Lumber)	260	78,000
Total	5,055	1,516,000

Demand Not Equal to Capacity

As regards the market for news print, this has not been quite up to expectation and the result has been that Canada's news print mills have not all been running to capacity. Early in the year the demand for news print was good but the advent of the summer season, and the disturbance in the United States due to the presidential election, adversely affected the demand for news print. But on the other hand, there was a falling off in the shipments of news print from the European countries to the United States and this in some measure compensated the Canadian mills. The fact remains, however, that demand is not at present equal to the capacity, and the fact that several large extensions are under way and several mills are under construction, is expected still further to increase the competition. There are some who believe that the demand for news print will soon balance production and take up new production as it comes along, but there can be no doubt that the mills will all have to meet keener competition in the future.

Notable Additions to Mills

Among the notable additions to the news print mills during the year are the installation of a new machine by the Donnacona Company, Donnacona Que.; one by the Belgo Paper Company, Shawinigan Falls, Que.; two by Price Bros. & Co. at Kenagami, Que.; one by the Keewatin Lumber Company, at Kenora, Ont., and two by the St. Maurice Paper Company at Three Rivers, Que.

There are a number of important new mills and extensions under way. For instance, the E. B. Eddy Company of Hull, Que., has constructed a new sulphite and news print mill. The news print machines are now being erected and will start operation early this year. Price Bros. & Company have started work on the erection of a news print mill at St. Joseph d'Alma, Que. It is expected that this mill will be ready to produce 200 tons of news print per day by the end of the present year. The company will follow this by the erection next year of another mill of 200-tons per day capacity. The Great Lakes Pulp and Paper Company is building a 100-ton news print mill at Fort William, Ont., and production is expected to commence in the present year. The St. Regis Paper Company of Watertown, N. Y., is planning a 200-ton news print mill at Quebec City and the International Paper Company is planning to increase the capacity of the St. Maurice Lumber Company's news print mill at Three Rivers by another 100 tons per day. The Fraser Company's plant of Edmunston, N. B., are said to be planning the erection of a new mill, and another news print mill is stated to be planned by the Gulf Pulp and Paper Company of Quebec. One of the most notable of the developments planned for the present year is the erection of a 200-ton news print mill by the Wayagamack Pulp and Paper Company at Three Rivers, which company has formerly devoted itself largely to the production of kraft paper. There is some talk also of the Abitibi Power and Paper Company erecting a 300-ton mill in northern Ontario. Altogether, therefore, there are active plans underway for the addition of some 1,000 tons capacity per day or some 300,000 tons per year, which by the end of 1925 or some time in 1926 will, if all are carried out, bring the total yearly capacity of Canadian news print mills to about 1,800,000 tons per annum.

Overseas Markets

An important feature of the year has been the export of a quantity of news print to Great Britain, and in this connection it is interesting to note that Price Bros. & Co., of Quebec, have entered into a contract with the *London Daily Express* for the shipment of a large quantity of news print regularly to England. The contract was made during the visit of Lord Beaverbrook, proprietor of the *Express,* and is understood to call for about 15,000 tons per annum, or something like 50 tons per day. The negotiations for a preferential tariff with Australia are also expected to re-open the Australian market to Canadian news print. At present, the largest overseas customers of Canadian news print mills are New Zealand and South Africa. During the past year some 88 per cent of the total production of Canadian news print found a market in the United States. The total shipments overseas amounted to rather over 25,000 tons, New Zealand taking about 10,000 and South Africa about 8,000.

Pulp and the Finer Papers

As regards the mills for the production of pulp and the finer grades of paper, the following statement of A. E. Cadman, Assistant Secretary of the Canadian Pulp and Paper Association, summarizes the situation:—"The pulp mills have not fared so well this year so far as export markets are concerned, although there has been an increased production of pulp commensurate with the larger output of news print. There was a falling off in demand for pulp in the United States and the heavy imports of European pulp at low prices resulted in severe competition in that market. Some of the pulp mills were closed down temporarily pending re-organization following financial difficulties. Among the re-organizations which have taken place may be mentioned the Port Alfred Pulp and Paper Corporation, the Chicoutimi Company, and the sale of the Riordon properties. With the exception of the Chicoutimi, these mills have not ceased operations, but the overcoming of their difficulties will have a good effect on the situation and be of advantage to the industry in general. The exports of wood pulp have been somewhat smaller this year than they were last year, particularly in the case of mechanical pulp and unbleached sulphite; in respect to bleached sulphite and sulphate pulp the totals were about the same as in the previous year. In the finer grades of paper, for which the principal market is found in Canada, the situation was affected by the general business depression throughout the country. Exports also showed a decline from last year's figures, due largely to competition from European countries; considerable shipments, however, were sent to New Zealand, Australia, South Africa and other parts of the British Empire, and Canadian papers are expected to become still better known in those countries as a result of the Empire Exhibition held at Wembley."

Exports of Pulp and Paper

Exports of pulp and paper from Canada during the first twelve months of the year (ending December 31) were valued at $139,491,469, the total being made up of pulp $40,242,972 and paper $99,248,497. The total was below that for the corresponding months of 1923 by $1,306,884, the decline being mainly due to smaller exports of wood-pulp, while the value of the paper exported was greater by $5,477,640. Details for the principal grades of pulp and paper are as follows:—

	Year 1924		Year 1923	
	Tons	Value	Tons	Value
Paper:				
News print	1,219,384	$90,990,717	1,137,963	$85,611,258
Wrapping	21,586	3,222,520	20,364	3,087,957
Book (cwts.)	22,874	189,113	49,315	345,956
Writing (cwts.)	19,939	209,364	23,222	240,535
All other	....	4,636,783	....	4,485,251
Total paper	....	$99,248,497	....	$93,770,957
Pulp:				
Mechanical	253,699	$7,916,029	341,108	$11,599,323
Sulphite, bleached	165,869	12,383,645	159,873	13,568,320
Sulphite, unbleached	222,227	11,611,367	228,033	12,405,995
Sulphate	140,183	8,331,931	146,345	9,453,758
Total pulp	781,978	$40,242,972	875,349	$47,027,396

Investment in Mills

The Dominion Bureau of Statistics published during the year a preliminary census report on the pulp and paper industry for 1923, and, as an index to the growth of the industry, this report makes interesting reading. There were 110 mills in operation that year, representing a capital investment of $417,612,000, an increase of six mills and $37,000,000 of capital investment over 1922. In 1923, the industry provided employment for 29,000 persons, whose annual payroll amounted to $38,305,000, and the total value of the pulp and paper produced was $226,491,000. The first report of this kind, that for 1917, showed in that year a capital investment of $187,000,000 and a total production valued at $96,340,000, which indicates the development carried on in the industry during the past six years. The province of Quebec ranked first in the number of mills and the value of the production, although Ontario was the leading province in respect to capital investment, due to its possessing a larger number of mills manufacturing paper, there being a greater number of pulp mills in Quebec.

The Death of Sir William Price

No review of the pulp and paper industry in Canada during the past year would be complete without reference to the tragic and untimely death of Sir William Price, which occurred at Price Brothers' mill at Kenogami in September last when Sir William was carried away in a landslide and drowned in the river, his body not being recovered until some days after. His position in the industry is summed up by James Carruthers, President of the Pulp and Paper Association, who in a tribute to him said: "Sir William Price's position as the head of the firm of Price Bros. & Co., with its family traditions extending back over a hundred years, and his intimate connection with the industrial and financial life of the Dominion, and particularly of the province of Quebec, made him an outstanding figure. The tremendous developments for which he was responsible in the Lake St. John District are an eloquent testimony to his energy and force of character, and it is nothing short of a tragedy that he should have been cut off thus suddenly without being privileged to witness the completion of his life's work."

A Huge Power Development

The development above referred to is the largest hydro-electric development now under way in Canada. It is being carried out by the Duke-Price Power Company, Limited, which recently floated a portion of a $12,000,000 issue of bonds in order to finance the work. The plan is to develop the falls known as the Grand Discharge, just below the point where the Saguenay River flows out of Lake St. John. The scheme, it is declared, will have three times the capacity of the Muscle Shoals plant during low water conditions, and will cost less than half the cost of the development of the Muscle Shoals, besides taking only one quarter of the time to complete. Construction in connection with this scheme is already well advanced and the first unit will be in operation this year.

According to Hugh L. Cooper, the engineer in charge of design and supervision, the minimum discharge of the Tennessee River at the site of the Muscle Shoals development is 7,350 cu. ft. per second. A. S. Crane, vice-president of J. G. White Engineering Corporation, states that the unregulated flow of the Saguenay River varies between 8,000 and 200,000 cu. ft. a second, with an average of 49,000 second feet. The initial development at Muscle Shoals will be 100,000 h. p., which it is planned shortly thereafter to increase to 260,000 h. p., but such a capacity is held here not to be warranted when it is understood that the primary power output, taking into consideration regulation but without the use of steam standbys, will probably not exceed 100,000 h. p.

The initial capacity of the Duke-Price station will be 360,000 h. p., which can be increased at small cost to 540,000 h. p. The cost of installing the initial development at Muscle Shoals will probably be over $60,000,000, not taking into consideration any value of water-power rights and the like. The Duke-Price Power Company shows a plant account, together with the amount of proceeds to be deposited with the trustees for the completion of the dam, of $29,700,000. The work of constructing the Muscle Shoals Station was started in 1918, and the development will probably not be in operation until 1926. The Duke-Price Power Station was started early in 1923 and will be in operation early in 1925.

The Duke-Price Power Company has a contract with Price Bros. & Co., Limited, which contemplates the sale of 160,000 h. p. at $7.50 a h. p. year, which is but little over one mill per kilowatt-hour, and 40,000 h. p. at $12 a h. p. year, or about two mills a kilowatt-hour. The power sold at the lower rate will be used by Price Bros. & Co., Limited, for the purpose of heating processes in the operations in place of coal, and the contract contemplates that when the Duke-Price Power Company, Limited, obtains customers for the sale of such power at higher rates, that it can divert such power (ultimately up to 160,000 h. p.) from Price Bros. & Co., Ltd. The net earnings from Price Bros. & Co., Limited, will alone approximate 1¾ times the interest charges on the present issue of $12,000,000 First Mortgage 6's and, of course, these earnings will be increased with the sale of additional power.

The Sale of the Riordon Properties

Another outstanding feature of the year has been the sale of the Riordon properties. This took place in September last. The properties were put up at auction at the company's offices in Montreal. The respective properties were bid in by the two groups of bondholders, 8 per cent and 6 per cent, for a total of $7,302,500, subject to liens against them of $1,500,000, and the meaning of these figures can be gathered when it is stated that, while the Riordon Company was still a going concern in July of 1921, the properties were placed in the balance sheet at a total of aproximately $70,000,000. The real significance of this sale rests in the final notice that has thereby been indicated to the preferred and common shareholders that their stock is of absolutely no value, and that no matter what happens now in connection with the enterprise, no value can accrue to these securities.

The sale did not settle the question as to what is finally to become of the Riordon properties. The bondholders who now hold it are bankers rather than pulp manufacturers and it generally taken for granted here that the International Paper Company will take over the properties. It has been rumored that the company contemplates erecting a large pulp and paper mill at Chelsey, Que., which is in the Gatineau Valley, where there are large timber limits belonging to the Riordon Company. The area of timber lands involved is 9,638 square miles, as compared with the International Company's present holdings of 6,969 square miles of timber lands in Canada and the United States. This will make a total of 16,607 square miles of timber limits. In addition the International Paper Company will acquire valuable water power sites. President Graustein, of the International Paper Company, has admitted that the company is considering the possibility of acquiring the properties.

PLANT FIBER PAPER

The Mathers-Lamm Paper Company of Washington, D. C., which submitted a bid to the Joint Congressional Committee on Printing on plant fiber paper has sent a very interesting communication on this subject to the committee. The letter follows:—

White cotton linters remain durable and do not change their beautiful white color. While their cost is higher than wood at the present time, the possibilities in the reduction of the present cost are almost limitless. When the cost can be figured on a commercial economical production basis, the proposed award will be a great step towards this, and the saving in this direction by the use of permanent paper in the production of books and records can hardly be reckoned in value by dollars and cents, (as you may well understand some valuable records are priceless).

1,000 Tons Daily Available

A thousand tons a day of this fiber is now available for paper making, and if the demand could be created for this valuable grade of paper and the Joint Committee on Printing can and should be the means of starting this demand—which only needs a start to give it impetus, and thus and thereby help to reduce its cost to the Government and interested public, not only giving to posterity what it needs (permanent records) but giving to the growers of cotton, that vast and vital interest of the great South, a source of revenue, instead of a dead loss as now, by the burning of this material in many instances, simply to destroy it.

The only act of your honorable body necessary to further this great cause is simply to award this contract to us. We have avoided the use of any technical terms herein, so that the subject may be made as clear as possible to you, and while we regret the length of this communication, the subject is of such vital importance to this Country, that we believe the time you devote to this important matter will be a small expenditure in comparison with its results.

We beg leave to direct your careful attention to our bid on plant *fiber* paper. While this item has been scheduled for years past, the Government has never heretofore received a bid until our proposal at the opening of bids yesterday, specified on lots 17 and 18, meeting every specification therein and it is our intention to make the paper even better than specified.

Wood Now Predominates Fiber

You are aware, of course, that wood is now the predominant fiber used in paper making—and there seems no possibility of any fiber taking its place from the standpoint of economy. In tonnage and price, such a fiber has its rightful use and place in many papers, but its use is incurred in certain papers where it should be used to a small percentage.

The fiber we will use in the manufacture of this paper is cotton linters, which when properly treated, produces a beautiful fine white fiber, eminently suited for the manufacture of paper. When a thorough knowledge of this treatment becomes understood, our mill that will make this paper, is the one mill in the United States making the pulp and paper from cotton linters.

We have spent a great deal of time, energy and money to bring into use this (formerly waste) fiber, and have succeeded in getting a few mills (other than our mill) to use this very valuable fiber in their paper making. You are probably aware of the lethargy on the part of paper makers to adopt or even try to use a new fiber, only because they are unfamiliar with its value and use—and in short because they have never used it before.

We might add—this attitude on the part of paper superintendents is just human nature. Apathy on their part—to go along the lines of least resistance. Now then if the Joint Committee on Printing will carry out and complete its part of the contract as per the "Notes" on lots 17 and 18, its action thereby will at once create a tremendous influence in minds of paper manufacturers (and superintendents of paper mills) by drawing their attention to valuable formerly waste fiber for paper making—thereby filling a long felt want for paper permanency.

This fiber has exclusive quality for permanency (a highly desirable quality for paper for the use of printed books for *permanency*), and in this all important respect directly opposite to the widespread use of wood fiber (such as sulphite, sulphate, soda and ground wood.) Some of the latter fibers disintegrate and discolor in a few months after use in printing.

K. V. P. CO. EXPECTS BIG YEAR

Jacob Kindelberger, president of the Kalamazoo Vegetable Parchment Company, predicts that 1925 will be the best year in the histoyr of that concern from a business standpoint. That is based on prospects of a generally fine business in all lines, orders booked at this time and the physical condition of the plant. At the annual meeting of the company, held Tuesday afternoon, he was able to report to the stockholders that the No. 2 mill is now operating at near capacity. All difficulties originally confronted in adjusting and operating the big 164 inch fast running fourdrinier have been overcome and the machine is showing a profit.

The annual election of officers and directors resulted in present incumbents being retained. Those re-named are: Directors, Jacob Kindleberger, Frank Mosteller, C. S. Campbell, W. M. Loveland, W. O. Jones, Austin B. Read, C. H. Stearns, A. B. Connable and W. J. Lawrence; president, Jacob Kindleberger; general manager, R. H. Hayward; first vice president, Frank Mosteller; second vice president, James A. Greenlee, Chicago; secretary, S. Ward Kennedy; treasurer, C. S. Campbell.

Powdered Coal, the Modern Industrial Fuel

Problem of Fuel Costs, Smaller Payrolls and Decreased Maintenance Charge Solved Through the Use of Powdered Coal With a Substantial Saving in the Most Important Item, Fuel Cost and a Corresponding Saving in Other Items — Many Improvements in Boiler Room Practice Since 1900 Have Greatly Lowered Cost of Generating Steam—The Storage and the Unit Systems of Installation.

Written Especially for the Annual Number of the Paper Trade Journal by Roderick D. Donaldson, Consulting Engineer, 37 West 39th Street, New York.

Lower fuel costs, smaller labor payrolls and decreased maintenance charges constitute an ever present problem in the industrial world. This article deals with a solution of the problem through the use of powdered coal—with a substantial saving in the most important item—fuel cost—and a corresponding saving in the other items.

Pronounced Step in Advance

Powdered coal burned under boilers, is a pronounced step in the advance which has occurred in boiler room practice since 1900. In that year, relatively large plants were hand fired. Since then great strides have been made in the development of mechanical stokers. The past twenty-five years have given us a tremendous development in coal and ash handling apparatus. During this same period the use of fuel oil in the boiler plant has been developed to a marked extent. All these improvements have been made in order that we may generate steam at a lower cost.

In the stoker fired plants having coal handling auxiliaries, we have reduced the labor item very materially. We have also increased the burning efficiency to a marked extent. This reduction in the fuel bill has come about in the stoker plant through better control of the amount of fuel burned in proportion to the air required to burn it. We have, however, largely increased the maintenance charge by introducing moving metallic parts into the hot firebed.

In oil fired plants, we have gone still further in the reduction of the labor charge. Through the comparative ease of control of the fuel burned in proportion to the air required to burn it, we have still further increased the burning efficiency. By the elimination of metal parts in the fire-bed, we have materially reduced the maintenance charge experienced in the stoker fired plant. With oil as a fuel, we have secured a material saving over stoker fired plants, for the reason that we can control instantaneously the amount of fuel introduced into the furnace. With oil firing there is no fuel left in the furnace when the demand for steam ceases, as is the case with stoker plants.

From an operating standpoint, the oil fired plant is unquestionably superior to the stoker fired plant. It was this unquestioned superiority together with relative costs of oil and coal which led many plants in 1919 and 1920 to abandon coal and substitute fuel oil. At that time fuel oil was being sold for approximately $1.00 per barrel in the northeastern harbors. Pool-1 coal, on the other hand, was selling for $10.00 or more a ton when it was procurable. The industrial plants which substituted oil for coal in the years 1919-1920, were able to secure oil contracts covering three to five years, at a price which permitted them to more than depreciate the investment required for the change-over during the first contract period. Those who so changed, have had undoubted proof of the superiority of oil fired over stoker fired plants. In the last ananlysis, the satisfaction resulting from this change was due to the low labor charge, the low maintenance charge and the great ease of control of the fire.

The condition which existed in the coal and oil markets in 1919-1920, has been reversed. We enter the year of 1925 with oil selling in the New York harbor for $1.80 a barrel, with a quoted price at private docks of $2.00 or $2.05 a barrel. While the cost of fuel oil has increased approximately 100 per cent, the supply of Pool-1 coal has become stabilized and is selling in eastern harbors at about one-half the price quoted five years ago. The differential which formerly existed in favor of fuel oil has entirely disappeared, and we now find a tremendous differential in favor of coal. Those who have experienced the undoubted advantages of fuel oil, are hesitant to take the step backwards to stoker fired coal with its increased labor charge, its increased maintenance, its comparative lack of control, its confusion and its lack of cleanliness. The existing differential between oil and coal, however, compels a substitution of coal for oil. Fortunately the manufacturer who has experienced the benefits of oil can secure these benefits with coal by pulverizing the coal and burning it with the same degree of control as was possible with oil.

The application of powdered coal to boiler plants is a comparatively recent development. The evolution of powdered coal, however, stretches over a number of years. Pulverized fuel has been used for a number of years in the cement industry and to some extent has been used as a means of burning coal mine refuse under boilers adjacent to the mines.

During 1918, pulverized coal was used to a large extent in the Pittsburgh district. Many heating furnaces in this steel center had been using natural gas. The tremendous demands put on the natural gas sources during 1918, resulted in their partial depletion, necessitating an immediate change in the fuel used by a large number of iron and steel industries. The scarcity of petroleum products did not permit the use of fuel oil as a substitute for natural gas. The result was that pulverized fuel was used and rapid strides were made in perfecting its use. It was widely predicted in 1918 that pulverized fuel would shortly be the recognized heating agent for nearly all industrial purposes.

In 1919, fuel oil was made available to this country in great quantities from Mexico. The rapid development in the petroleum industry in this country, further augmented the sources of fuel oil. At the same time the coal fields were experiencing their worst period of labor troubles. These two simultaneous causes resulted in low priced fuel oil and extremely high prices for coal of all descriptions.

Check in Pulverized Coal Development

The unstable high priced coal market of 1919-1920, together with a stable low priced market on fuel oil, acted as a serious check in the development of pulverized coal and was responsible for many large and small industrial plants and large central station electric plants changing over from coal to fuel oil.

By the end of 1921, the coal market had become stabilized and the price of fuel oil had reached a point where it was no longer attractive to many boiler plants. The development of powdered fuel for boiler room purposes, once again became prominent. During the past three years, a considerable number of stoker fired coal burning plants have changed to pulverized fuel in both industrial and central station power plants. There also have been several large plants designed and built to use powdered coal. Several important central station plants in New England have changed over from fuel oil to powdered coal, and others are now in process of making this change. Some large and important paper mills and steel mills have converted their boiler rooms over to pulverized fuel, and there is a great interest in this subject among many other such mills. From all of these developments, it is quite apparent that pulverized fuel has long since passed the experimental stage and now represents the most modern and economical method for the generation of steam.

The burning of powedered coal in general, consists of pulverizing the fuel to a fineness ranging from 100 to 200 mesh and blowing a mixture of this finely divided coal and air into a combustion chamber under the boiler. The finely divided particles of coal burn with a long, lazy, gaseous flame. The control of the fire is made quite simple by controlling the amount of pulverized coal being blown into the furnace, and by controlling the amount of air which is blown in with the coal and the amount of air admitted into the furnace through air ducts in the furnace walls. There are two systems of powdered coal installations, one known as the Storage System, and the other known as the Unit System. Both of these systems are the same in all essentials as regards the method of burning the fuel. The difference in the systems consists of the method of preparing and handling the fuel before it is introduced into the furnace under the boiler.

The Storage System

The storage system pulverizes the coal in machines, the operation of which has no relation to the operation of the boilers. In this system the pulverizers are generally set up in a building separate from the boiler room. The coal as received from the mine, is conveyed in the usual manner to an overhead bunker. When, and as desired, the coal is conveyed from this overhead bunker to the pulverizers, and is thence conveyed to a secondary bunker adjacent to and at a higher elevation than the boilers. Here the pulverized fuel is stored for use as required by the boilers. It is quite apparent that any large amount of moisture in the coal in this finely divided state, will cause the fuel to pack and be difficult to handle between the secondary bunker and the furnace. For this reason it is quite usual in this Storage System, to have a drying plant where the coal as it comes from the mine can be dried before entering the pulverizer. In some applications, the coal is dried after being pulverized rather than drying the coal as received from the mine, but this is not the usual practice for the reason that it takes less power to pulverize dry coal than wet coal.

In the Storage System, the powdered coal is conveyed by gravity from the secondary overhead bunker to an enclosed screw conveyor at the end of which, air from a blowing fan is introduced in sufficient quantity and at the proper pressure to convey the coal into the furnace. As stated in the previous paragraph, the method of burning the coal in the furnace and the construction of the furnace in this system, are essentially the same as in the Unit System. The apparent advantage of this system is that pulverized coal may be accumulated at any time during the day that may best fit boiler room operation; this system also makes pulverizing of the coal an independent operation, so that a failure of any one of the pulverizing units does not affect the operation of any boiler. Another advantage of this system, is that a somewhat better control can be secured in the relative amounts of air and fuel admitted into the furnace. The disadvantage in general of the storage system, particularly for the smaller or moderate size plants, is in the duplication of equipment, as for example, two bunkers and two coal conveying systems being required for these. Another disadvantage is the requirement of drying the coal when its moisture content exceeds approximately 4 per cent.

In the Unit System

In the Unit System, the coal is fed from the overhead bunker to a pulverizer, there being in general one pulverizer for each boiler. On one end of this pulverizer there is a fan which pulls through the machine the finely divided particles of coal and delivers the mixture of coal and air into the furnace through the proper ducts. The advantage of this system is the simplicity of the machinery involved. The burning efficiency which can be secured on this system cery closely approaches the best which can be secured on the Storage System. Due to keeping the pulverized fuel continuously in motion, there is no chance of packing and clogging. For this reason, there is no necessity for drying the coal.

Pulverized fuel in the average boiler room with modern boilers, equipped with superheaters but not equipped with economizers, will give an efficiency of 77 per cent to 80 per cent on monthly operation. In larger plants with economizers, pulverized fuel installations are being operated at monthly efficiencies approaching 90 per cent. The labor charge with pulverized fuel is only slightly greater than in an oil burning plant and is considerably less than is usual in stoker fired plants. The total maintenance charges in a pulverized fuel installation are somewhat gerater than in a fuel oil burning plant on account of the coal handling and pulverizing machinery required. The maintenance cost of pulverizing the coal is found to approximate seven cents per ton of coal fired. The furnace maintenance cost should not exceed that experienced in a fuel oil burning plant, and is less than in a stoker fired plant. The total maintenance cost of a pulverized fuel installation is considerably less than in a stoker fired plant and is not materially greater than in a plant using fuel oil.

The power required to pulverize the coal and blow it into the furnace, approximates 18 kilowatt hours per ton of coal fired. This is somewhat less than the power required on either a forced draft stoker fired plant, or in a steam atomizing oil plant.

Resultant Ash Easily Cared For

In a properly designed pulverized fuel installation, the resultant ash is easily cared for. The fineness to which the coal is pulverized, results in about 40 per cent of the ash passing through the boiler; most of this in turn, goes up the stack, some remaining in the dust chamber or in the bottom of the stack. The extreme fineness of the material which passes up the stack, causes it to float in the air for a considerable length of time. As the initial coal is pulverized to pass 100 or 200 mesh, and as all of the combustible material is burned out of the coal, it will be seen that a particle of 200 mesh having a 10 per cent ash content, results in a particle of ash so fine as to be imperceptible. Analysis of the ash shows that there is only a trace of carbon in the ash. Therefore, the ash which goes up the stack is no detriment to the mill in which the plant is located, nor to the surrounding territory. In fact, the ash emitted from a pulverized fuel stack is considerably less objectionable than the smoke from a stoker fired plant, or the unburned carbon emitted from the oil fired plant. It is true that during the period of normal operation, there is a very small residue from an oil burning plant going up the stack. In such plants, however, in which proper combustion is maintained, there is a certain amount of unburned carbon which collects on the boiler tubes, and when the boiler tubes are blown, this unburned carbon passes up the stack.

The ash which settles at the bottom of the furnace, is extremely fine and flows like very fine dry sand. On account of the small amount of ash left in the furnace and boiler, the removal of this ash constitutes a much lighter task than is the case in stoker fired plants. Care must be taken in the design of the furnace to prevent this ash from slagging through contact with the pulverized fuel flame. There have been cases where this ash has slagged in the bottom of the furnace, making it difficult to remove. Slagging is easily avoided, however, if the furnace is properly designed.

Principal Investment in Furnace

Of the total investment required to install pulverized fuel, 50 per cent or more is represented in the furnace. The construction of the furnace is the most important factor in the success of a pulverized fuel installation. We must prevent the slagging of the ash, and we must care for high furnace temperatures. The furnace must be designed to withstand these high temperatures and must also be designed to make possible complete combustion in the furnace without admitting more air than is required for the proper combustion of the fuel.

The savings which can be secured from pulverized fuel over other methods of operation, are shown in the following table. This table gives the yearly fuel cost in a boiler plant of 1,000 h. p. nominal rating, operating 5,000 hours in the year. This table also shows four different ratings of operating this 1,000 h.p. boiler plant. In computing the cost of fuel per year in a coal burning plant, it has been assumed that Pool-1 coal, having a heating value of 14,250 B.t.u., will be used. The oil is taken as having a heating value of 18,250 B.t.u. The oil is taken as having a heating value of 18,250 B.t.u. The efficiency of operation has been taken at 75 per cent in pulverized coal and oil plants, and 65 per cent in stoker fired plants. It is well known that stoker fired plants can secure and maintain efficiencies higher than 65 per cent, but experience indicates that very few such plants are operating throughout the year at 65 per cent or better. It should be noted that these efficiencies do not take into consideration any extraction of heat from the flue gases by economizers. In assuming a 75 per cent efficiency for pulverized fuel, experience indicates that this efficiency can be secured with greater ease than can 65 per cent efficiency on stoker fired plants, and with somewhat gerater east than can be secured in oil burning plants. This relatively high operating efficiency with pulverized coal is made possible through the high degree of control of the fuel and the air, and the nearly perfect combustion which can be secured in the furnace.

FUEL COST PER YEAR OF 1,000 H. P. BOILER PLANT GENERATING STEAM 5,000 HOURS AT DIFFERENT AVERAGE RATINGS AND AT DIFFERENT COST OF FUEL

	Per cent of Nominal Boiler Rating			
OIL FIRING—Cost per Barrel	150%	175%	200%	225%
$1.70	$92,820	$108,290	$123,760	$139,230
1.80	98,280	114,660	131,040	147,420
1.90	103,740	121,030	138,320	155,610
2.00	109,200	127,400	145,600	163,800
2.10	114,660	133,770	152,880	171,990
STOCKER FIRING—Cost per Gross Ton				
$5.50	$66,600	$77,700	$88,800	$99,900
6.00	72,657	84,766	96,876	108,985
6.50	78,712	91,830	104,949	118,068
7.00	84,767	98,895	113,022	127,151
7.50	90,822	105,960	121,095	136,234
POWDERED COAL—Cost per Gross Ton				
$5.50	$57,750	$67,375	$77,000	$86,625
6.00	63,000	73,500	84,000	94,500
6.50	68,250	79,625	91,000	102,375
7.00	73,500	85,750	98,000	110,250
7.50	78,750	91,875	105,000	118,125

Coal Costs

The existing market conditions in New England and vicinity, indicate that high grade coal can be purchased at $6 per gross ton with oil costing $2.10 a barrel. Assuming a 1,000 h.p. boiler plant operating at 175 per cent of nominal rating, it will be seen that the yearly fuel cost for oil is $133,770, while with pulverized coal the cost is $73,500, resulting in a saving of $60,270. In some plants there will be a slight increase in the labor and maintenance charges through the installation of powdered coal, but this saving of $60,270 will not be decreased to any great extent. Under the same assumed costs of fuel, it will be seen that a stoker-fired plant will have a fuel cost of $84,766 as against $73,500 for pulverized fuel, making a saving in favor of pulverized fuel of $11,266. Under normal conditions, this saving in favor of pulverized coal of $11,266 will be increased substantially by the saving in labor and maintenance charges. Together with a lower steam cost on pulverized coal as opposed to stoker firing, there will go the advantage of higher available capacity from the same boilers, greater control of the steaming rate on the boilers, and a cleaner boiler room.

Changing Plant from Oil to Pulverized Coal

In connection with changing a boiler plant from oil to pulverized coal, it is interesting to note that the oil burning apparatus can be retained so that should the unforeseen occur and fuel oil once again sell at attractive prices with a simultaneous sharp advance in the price of coal, that oil can be burned in the same furnace on a few hours' notice and without any interference with the pulverized fuel equipment. From this it is obvious that the owner of a pulverized fuel installation has the marked advantage of being able to burn either pulverized coal or oil in the same furnace, thereby taking advantage of the best that the coal or oil market may offer.

NEWS OF THE NORTHWESTERN TRADE

The Lewis River Pulp and Paper Company which is planning a new pulp mill has established offices in Seattle in the Dexter Horton Building with M. C. Winters in charge. Work has already begun on the new plant which will be located at the new townsite of Alderwood on the Columbia River between Kalama and Martins Bluff, Washington.

This company also will build an 18-ton capacity tissue paper mill at the same location, which it is expected will be completed by August this year. Capital stock has recently been increased $700,000. A. D. Bowen of Portland is president, and J. H. Stilp, recently of the Oregon Pulp and Paper Company, and formerly of the Kimberly Clark Company is vice-president and general manager.

The Leadbetter Lumber and Paper Mill Company has filed articles of incorporation at Vancouver, Washington. The headquarters of the new business will be at Camas, Washington. The capital of the new company is listed at $4,000,000 of which $3,000,000 will be common stock and the remainder preferred.

Incorporators are B. T. McBain of the Columbia River Paper Mills Company, Henry Crass, attorney of Vancouver, and F. W. Leadbetter.

Ralph L. Brackett, former owner and founder of the Crescent Paper Company of Portland, has become associated with the Crown-Willamette Pulp and Paper Company as sales manager with headquarters in San Francisco.

HINDE & DAUCH PAPER CO. HAS GOOD YEAR

Directors were elected at the annual meeting of stockholders of the Hinde & Dauch Paper Company, Sandusky, Ohio, and reports for the past year were submitted, showing what was declared to have been a satisfactory business for the twelve-months' period. The directors later re-elected the officers.

But one change was made on the board, William Dauch, of Westminster, Ohio, succeeding Miss Leola Dauch. Other directors are Sidney Froham, R. K. Ramsey, W. L. Allendorf, Sandusky; George Little, Xenia, Ohio; Maynard H. Murch and H. C. Robinson, Cleveland.

Officers named are: President and general manager, Sidney Frohman; vice president, George Little; vice president and treasurer, R. K. Ramsey; secretary, W. F. Pheiffer; assistant secretary, Louis R. Wendt.

Authorization was given for an increased building program at Fort Madison, Ia. No changes or extensions are contemplated here, and nothing was done about a new office building.

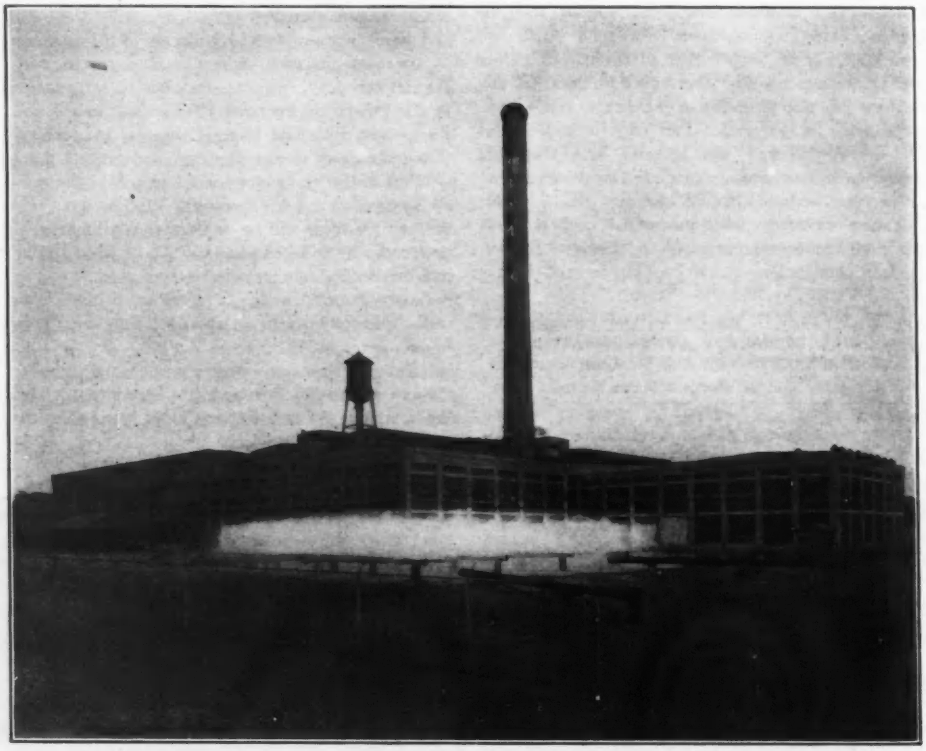
The annual meeting of the Hinde & Dauch Paper Company, Ltd., of Canada, will be held in Toronto on Friday. Messrs. Frohman, Ramsey, Allendorf and Little, all directors in the Canadian company, will go to Toronto for the meeting.

The Southern Kraft Industry

Started Only About a Quarter of a Century Ago the South Now Has Twelve Mills Operating On This Variety of Pulp and Paper and An Additional One Building—The Industry in Dixie Represents An Investment of Approximately $22,000,000 and Is Capable of Producing 800 Tons of Pulp and 600 Tons of Paper Every Twenty-four Hours—Activity of Southern Kraft Manufacturing Association.

Written by C. E. Dobson, Sec. Southern Kraft Manufacturers' Association in the "Southern Lumberman"

About the year 1901, there stood almost on the beach of Pensacola Bay, alongside the steam "dummy" line which then connected the city of Pensacola, Fla., with the government reservation seven miles away, a rough frame building, unpainted, and of no great size, which was the nursery of a great industry. It was here that first was made from Southern pine pulp the paper which was the inspiration of the efforts that culminated in the successful manufacture of kraft paper in the South. Now there are twelve operating mills, and one additional under construction, representing an investment of approximately twenty-two million dollars, and capable of producing eight hundred tons of pulp and six hundred tons of paper every twenty-four hours. The greater part of the excess pulp is combined with waste paper to produce board that is used for making shipping containers, traveling bags, suit cases and trunks, and for electrical refrigerating insulation.



ONE OF THE MODEL NEW MILLS OF THE SOUTH. PLANT OF THE BROWN PAPER MILL CO., WEST MONROE, LA.

The paper made at Pensacola was seen by officials of a lumber company of Orange, Texas, and they sent a representative to Pensacola, who purchased the machinery and shipped it to Orange, where it was set up in 1903. Attempts were made to manufacture pulp from pine by the sulphite process; however, they were not able to make a commercial success of this, so they turned to the soda process. This was used with rather poor success until 1911, when they changed to the sulphate process and began to make kraft paper, with which they were successful after many experiments, much discouragement, and a large expenditure of money. This kraft paper is said to have been the first ever made from yellow pine pulp; the mill which made it, the Yellow Pine Paper Mill Company, still operates steadily, and has a present capacity of thirty-five tons of kraft wrapping per day. It is, in fact, a Texas institution, and the story of it is carried in the Texas school histories.

In the meantime, in 1908, the Halifax Paper Corporation built a sulphate mill at Roanoke Rapids, N. C., and began to make sulphate pulp from the North Carolina pine. The Southern Paper

Company, at the edge of the pine woods, near Moss Point, Miss., was also a pioneer in the making of kraft in the South. It is an enterprise of the Dantzlers, the well-known Gulf Coast lumbermen.

Early Efforts

Successful paper making commercially, from wood of any sort, is comparatively modern, although the idea is as old as Confucius. It was done first in England in 1851, then in the United States, in Pennsylvania in 1854. However, Weeks says that very good paper was made in Alabama in 1834 from corn husks and from birch and poplar wood and bark. He also quotes the New Orleans *Bulletin* of 1860 as stating that it had been shown specimens of fibre made from eleven different kinds of material growing in Louisiana, among them, bagasse, cotton stalks, wild indigo and banana. However, out of all the experiment and talk emerges the fact that there are only four great staple materials for paper making—rags, straw, wood and jute; and wood is king of these. But up until 1850, rags alone were the dependence of the paper maker for quantity production of usable paper.

There are four processes used to break down wood so as to obtain fibre in a state which will allow it to be made to cohere so as to form paper—mechanical, grinding or shredding it with the addition of water; soda, cooking the chipped wood under pressure in a solution of caustic soda; sulphite, cooking the chipped wood in a solution of bisulphite of lime; sulphate, cooking the chipped wood in a solution of sodium hydroxide and sulphide. The last is the process used on pine, and it produces a tough, strong fibre which contains no acid to weaken it, the process being entirely alkaline. The kraft paper made from this fibre is of such strength and toughness that elaborate tests made in the fall of 1924 by the Forest Products Laboratory of the United States Department of Agriculture on samples over seven years old showed the paper to be generally stronger than when it was first made. These qualities make kraft the best paper to use for wrapping and bags, for lining bales and cases in shipping, for lining freight cars, and for every use where a strong, tough paper is required. It is replacing many heavier papers that have not its strength, as generally a kraft of one-half or two-thirds the weight will give better service than heavier paper of another kind, and will cost less, area for area; for while the heavier paper may be cheaper per pound, it will weigh more in equal covering area, and therefore, cost more for the quantity necessary to do the work.

As the manufacture of Southern kraft is being perfected, it is gaining the necessary smoothness and eveness for finer uses, such as pay and other heavy duty envelopes, stickers and gummed tape, and is being used to some extent for letterheads. It may be had in various colors, and even self-striped, so that it is now available for use by some businesses which have required a showier paper than its natural brown color furnishes.

Plants in the South

Mention has already been made of the Yellow Pine Paper Mill Company, W. H. Stark, president, which continues its regular operation under the same ownership by which it was organized and developed, in the port of Orange, Tex., on the Sabine river, at the edge of the oil fields, with a rated production of thirty-five tons of pulp and thirty-five tons of paper every twenty-four hours. The E. Z. Opener Bag Company has a bag factory immediately connected with the mill, and uses a part of its production for the making of kraft paper bags. The same interests which own the paper mill, own also, under the corporate name of Lutcher & Moore Lumber Company, a large sawmill at Orange, and have extensive holdings of yellow pine timber in Texas and western Louisiana.

Mills in Louisiana

H. L. Brown, who is the active vice-president of the Yellow Pine Paper Mill Company, is the president, and George S. Holmes, former general manager of the Yellow Pine Paper Mill Company, is the vice-president and general manager of the new Brown Paper Mill Company at Monroe, La., on the Ouachita river, in the gas fields of North Louisiana. The new mill recently completed, which uses gas fuel and is electrically driven, is a magnificent structure with the very latest and most efficient equipment, and is capable of turning out sixty-five tons of pulp and sixty-five tons of paper every twenty-four hours. The supply of raw material is taken care of by their own forests of 40,000 acres of pine, near the mill, reached by their own railroad and hauled by their own engines. Their reforestation policy promises a continuous and perpetual supply of wood. A feature of this mill is the separate building that houses the general offices, which is a reproduction of an Elizabethan cottage, done with elaborate exactness and artistic skill.

At Bastrop, north of Monroe, is the plant of the Bastrop Pulp and Paper Company, and the new mill which is under construction by the Louisiana Pulp and Paper Company. R. J. Cullen, who organized both these companies, is vice-president of both. The Bastrop Pulp and Paper Company has a capacity of seventy tons of pulp and sixty-five tons of paper every twenty-four hours. The Louisiana Pulp and Paper Company is not yet in operation, but its indicated capacity is 160 tons of pulp and 150 tons of paper every twenty-four hours.

At Bogalusa, La., is located the extensive plant of the Bogalusa Paper Company, a sister plant to the tremendous sawmill of the Great Southern Lumber Company, which is under the same management and ownership. From this joint management come economies of fuel and raw material, the waste of the sawmill being used for these purposes at the paper mill; there comes also a joint interest in forests, and reforestation is being extensively practiced, with a prevision and thoroughness that promise continuing supplies of raw material. This mill uses part of its pulp, mixing it with waste paper, for the making of container liner (board), and the remainder for paper making, occasionally selling pulp to those in need; in turn, part of the paper supply is used by a bag mill which immediately adjoins the paper mill, and is operated by the Union Bag Company—the remainder of the paper being sold. The mill has a capacity of one hundred tons of pulp, one hundred and twenty tons of container liner and fifty tons of paper every twenty-four hours. The whole is under the active and personal supervision of W. H. Sullivan, vice-president and general manager of both the Great Southern Lumber Company and of the Bogalusa Paper Company, also mayor of Bogalusa, and with sundry other interests to occupy his spare time. A. C. Goodyear of Buffalo, N. Y., and Bogalusa, the president of the two companies, is vice-president of the Southern Kraft Manufacturers' Association.

Mississippi

Eighteen miles below New Orleans, on the Mississippi, almost in the shadow of the levee, is the paper mill of the E. Z. Opener Bag Company, which provides the paper for its New Orleans bag factory. Here, on the historic highway which connects New Orleans with the lower coast, these far-seeing Illinois manufacturers have built up a highly efficient plant under the management of R. E. Hartman, who is also treasurer of the Southern Kraft Manufacturers' Association. So successful has this plant been that plans are under way to enlarge its capacity. None of the paper made here is sold as paper, but is converted into bags at the company's New Orleans factory. In making paper for its own use, the E. Z. Opener Bag Company is enabled to determine by experiment, the methods of producing paper best suited for bag making, and to set a standard both of value and quality by which it may judge the paper it must buy from other mills. The mill operates steadily at a rated production of twenty-seven tons of pulp and twenty-seven tons of paper every twenty-four hours.

At Elizabeth, La., the Calcasieu Manufacturing Company has a pulp and paper mill with a rated capacity of twenty tons of pulp and twenty tons of paper every twenty-four hours. This mill is closed at present, awaiting a better condition of the kraft market, but is utilizing the time in an investigation of methods for improving and perfecting the manufacture of its product. R. M. Hallowell, the president, and S. M. Lee, the vice-president, are well-known lumbermen.

Down in Georgia

Down in Georgia, in a village about thirty miles from Macon, on the Central of Georgia railroad, is the mill of the Pynetree Paper Company, which produces pulp and makes container liner therefrom by mixing it with waste paper. It also sells some of its surplus pulp, and has considered installing a paper machine to round out its plant and take care of the surplus plup which its equipment and location enable it to produce at a low cost. Vice-president M. T. Nichols, the active manager of the company, has had many years' experience in pulp making, and his plant is so situated in a rural community among the pine woods as to keep his costs down to a minimum. The rated production is forty tons of pulp and sixty tons of container board every twenty-four hours.

North Carolina

At Roanoke Rapids, N. C., an industrial community built at the rapids of the Roanoke river, almost on the Virginia-North Carolina line, is the plant of the Halifax Paper Corporation which has been previously mentioned. It has a rated capacity of twenty-five tons of pulp and twenty-five tons of paper every twenty-four hours. This is said to have been the first mill to make sulphate pulp in the South, President Job Taylor having obtained his training in Canada; and it maintains its tradition of steady, conservative operation and unhurried production. Roanoke Rapids is one of three towns which blend into one another to make an industrial community of several miles' length, extending from the Seaboard Air Line station at Roanoke Junction through Rosemary to the river at Roanoke Rapids. This community has the finest public school building in a town of anything like equal size that the writer has seen.

Virginia

About seventy-five miles from Roanoke Rapids, on the James river, near Petersburg, in the war-built city of Hopewell, Va., is the mill of the Hummell-Ross Fibre Corporation, with a rated production of forty tons of paper and one hundred tons of pulp every twenty-four hours.

The Albemarle Paper Manufacturing Company, Richmond, Va., manufactures not only kraft but blotting papers of world-wide reputation and sale; they also make matrix and other absorbent paper specialties. This corporation was established in 1887, but it was not until soon after the purchase of their Brown's Island mill in 1921 that Albemarle kraft was placed on the market. This mill is situated on the James river very near the blotting mill. The kraft pulp is supplied from an allied company, the Chesapeake Corporation, West Point, Va. At Brown's Island is made not only regular brown kraft but kraft of various colors in wide variety, both plain and striped. It is planned to add a line of creped kraft and perhaps waxed kraft at a later date. The president of the company, H. W. Ellerson, is also president of the Southern Kraft Manufacturers' Association, and is interested in many other businesses and civic enterprises in Richmond. An interesting feature of this company is the daily luncheon (filling all the traditions of Virginia's plenty and skilled cookery) which it provides for its office force, when they, from the president to the office boy, sit around one big long table and enjoy themselves in a free exchange of anecdotes and banter, which is delightful to a visitor and an excellent index to the good feeling and loyalty that makes the business and its products the success they are.

The plant of the Chesapeake Corporation is located on the Pamunkey river at West Point, Va., in an advantageous position for securing its wood supplies by water. It was built in 1913 and has been enlarged until it has a present capacity of about seventy-five tons of pulp and forty-five tons of board and heavy wrapping specialties daily. Vice-president and General Manager Elis Olsson is an experienced pulp and paper maker, and his plant furnishes all the pulp for the Albemarle Paper Manufacturing Company's kraft mill, as well as for the board and heavy paper which he manufactures in his own plant. Mr. Olsson's knowledge of and personal contact with the Swedish pulp manufacturers has been of continued value to the Southern Kraft Manufacturers' Association.

Kraft Manufacturers' Association

The Southern Kraft Manufacturers' Association was formed in January, 1924, for the purpose of stabilizing and strengthening the Southern kraft industry, extending the market for its products, perfecting the processes and decreasing the costs of manufacture. It exists as a clearing house for the industry, and as a united force for its development sanely, rationally, and in a businesslike manner. It acts for the welfare of the industry and of the section, and its mills deserve particularly the support of those who believe in such concerted effort and action and who know that they represent a progressive and enlightened spirit on the part of those participating, which is reflected in the liberality of their policies and the superiority of their products. The members of the association are:

Albemarle Paper Mfg. Co., Richmond, Va.; Bogalusa Paper Company, Bogalusa, La.; Brown Paper Mill Co., Monroe, La.; Calcasieu Mfg. Co., Elizabeth, La.; Chesapeake Corporation West Point, Va.; E. Z. Opener Bag Co., Braithwaite, La.; Halifax Paper Corporation, Roanoke Rapids, N. C.; Pynetree Paper Company, Gordon, Ga.; Yellow Pine Paper Mill Co., Orange, Tex.

The officers are as follows: H. W. Ellerson, president; A. C. Goodyear, vice-president; R. E. Hartman, treasurer; C. E. Dobson, secretary.

The office of the association is at 417 Carondelet Building, New Orleans, La., and it solicits inquiry and suggestion, and is prepared to give information and service both to the trade and the general public regarding kraft products and the kraft industry in the South.

The present opportunity for paper making in the South is for the poduction of varieties other than kraft, the manufacture of which has been developed to an extent that threatens to overcrowd the market, and to make serious sales difficulties for new mills. There are processes which have been worked out at the Forest Products Laboratory at Madison, Wis., which, adapted to commercial use will start a new and very profitable era in the paper making history of the South. One is the manufacture of book paper (used for the weekly and monthly magazines and for booklet and pamphlet printing) from a mixture of pine pulp (sulphate) and the pulp of almost any of the various kinds of the plentiful Southern gums, though book paper may be made from the unmixed bleached sulphate pulp of the Southern pine alone. I have a beautiful sample of this bleached pulp before me as I write. There is another promising process which the Laboratory has been working on recently that produces a good pulp from the various pine species, and from gum, also, by a combined chemical and mechanical process, for about twenty-five dollars per ton. This offers very attractive possibilities in its unbleached state for the manufacture of various sorts of low priced papers, and, with a cheap bleaching process worked out, for the production of news print.

This business of paper making is not simple and easy, nor can it be done on small capital. It requires expert knowledge, long experience and excellent business capacity, combined with a large investment. Consequently, it is not to be entered into lightly without inviting disaster to those who invest money. But there are possibilities along the lines I have indicated, and they offer a tempting field for investigation and experiment and an inviting prospect of reputation and profit to those who succeed in working out a successful solution.

Trade Banquets Held During Paper Week

Judge Charles F. Moore, Who Has Long Been Ill, Pleasantly Surprises Diners at Banquet of American Paper and Pulp Association at Waldorf-Astoria, Thursday Evening With Brief Address—Senator Moses, of New Hampshire, Delivers Stirring Address Against Proposed Embargo on Pulpwood from Freehold Lands of Canada—Numerous Affiliated Associations Hold Banquets Which Are Pleasant Affairs.

In an impassioned address last night at the forty-eighth annual banquet of the American Paper and Pulp Association held at the Waldorf-Astoria, United States Senator George H. Moses of New Hampshire, spoke on the steps contemplated by Canada looking to an embargo on the export of pulpwood, declaring that if Canada persisted in her aggressive policy she would not find the United States weaponless and that if "the menace of tonight becomes the reality of tomorrow," our statesmen at Washington will be found neither dumb nor silent.

Henry W. Stokes Presides

President Henry W. Stokes presided as toastmaster and started the program with a surprise. "We have with us tonight," he said, "one who for many years has graced our banquets, one who has always been deeply interested in our industry although not directly associated with it; one who has always been ready to give the hand of fellowship and to do a kindly act. A few years ago he was stricken but by the grace of God and by his indomitable will and splendid constitution, he is able to be with us tonight. I take pleasure in introducing an old friend—Judge Charles F. Moore."

Judge Moore Speaks

Judge Moore had come to the banquet in his wheel chair and he was obliged to retain his seat as he briefly responded to the ovation the gathering gave him. He said:

"I would be ungrateful indeed if I did not recognize the fact that it is by the grace of God that I am permitted to be here but I also know that my being here is partly due to your unfailing friendship and good fellowship. I regret that I cannot stand up to say what is in my heart but I am no longer on any standing committees and am obliged to spend most of my time posing as Poe's Raven—'sitting, ever sitting and quothing nevermore.' I am glad of this opportunity, however, to thank you for all your personal kindnesses for it would be absolutely impossible for me to thank you each in person. I can only express the hope that you will each secure some of the happiness which you have been instrumental in bestowing upon me."

Resolution Against Embargo

President Stokes launched the Canadian embargo matter by stating that the American Paper Industry had been dealt a blow from an unexpected source and one which came to it as a stab in the back. He referred, he said, to what was undeniably a step on the part of Canada toward the prohibition of the export of pulpwood from that country to this. The idea had been combatted by a committee of the American Paper and Pulp Association with what had been thought success, but last week the Canadian Pulp and Paper Association had gone on record as favoring an export tax on pulpwood, well knowing the effect it would have on the industry in this country—not only on the manufacturer of paper but also on the ultimate consumer whether he was a consumer of news print, writing paper, wrapping paper or any other kind of paper.

Mr. Stokes then read the resolution adopted at the annual meeting that morning which is published elsewhere. He said he thought that in as much as this gathering not only included manufacturers but merchants and consumers, it would be well to go on record again expressing disapproval of the Canadian action. "Canada has gone on record as being for Canada solely. Let us tell them that we stand for an American paper industry for America."

A rising vote was taken and if anyone failed to endorse the resolution he escaped the writer's attention.

President Stokes in introducing Senator Moses, referred to him as a Representative of the Government at Washington who had been a loyal ally of the paper industry, aiding it on several occasions in supporting its desires in legislation and tariff matters.

Senator Moses Speaks

"My father was a pastor," began Senator Moses, "one of the fifty-seven varieties of Baptists and if I was searching for a text tonight I think I could do no better than take this resolution which you have just unanimously endorsed."

After a few flashes of wit, Senator Moses plunged headlong into the subject of the embargo and did not deviate from it again during his talk.

"It seems to me," he said, "that synchronous with the movement to which your President has already referred is a matter which chances to be on the calendar of the Senate at Washington—a matter which is in fact a proposal to establish a model form of commercial relations between the United States and all the other nations of the world."

The speaker said that it was the desire of the people's representatives to guard against anything in this proposal which might react against the interests of the country and which might place the American people in a position where it might be difficult for them to protect their own markets. He spoke of the report made by the Foreign Relations committee which leaves Congress absolutely untrammelled in the enactment of such legislation as the United States might require to enable it to assert itself in the markets of the world. "It seems to me," he commented, "that your problem falls in line with this."

He outlined the purpose of Congress to denounce all commercial treaties which do not contain the same spirit of liberalization that is to be found in the treaty which is about to be ratified with Germany. "Then," he said, "the Colony of British Columbia would not be beyond the parveau of that treaty. It came to be my duty two years ago to visit the Dominion of Canada and investigate the scope of the commission appointed on the pulpwood situation. It took me only a few days to satisfy myself that the whole question had risen through skillful propaganda started by an extensive land owner who desired to get more money and who succeeded in making it a national problem. Yet that could not have been at any stage other than a narrow and selfish effort to obtain a dominating position in the American market.

PICTURE TAKEN AT THE FORTY-EIGHTH ANNUAL BANQUET OF THE AMERICAN PAPER AND PULP ASS

ASSOCIATION AT THE WALDORF-ASTORIA HOTEL, NEW YORK, THURSDAY EVENING, FEBRUARY 5, 1925

"It may be that there are those of our neighbors who are forgetful of the peaceful and amicable relations this country has maintained toward Canada but we can hardly be expected to forget that only a few years ago this country dared to take a stand that looked to the establishment of peace forever throughout the world.

"We regret that the first step has been taken in what may prove a dangerous situation, but we cannot regret that that first step was not taken by Columbia but by Our Lady of The Snows. We should speak to her as a friend. We should try to point out to her that she is embarking on an unfriendly course and perhaps our neighbors will give heed to such a cry and refrain from doing injury to a great hearted friend who wishes only good to her and all her enterprises.

"We cannot forget that into Canada has flowed a great stream of American gold that has added more than anything else to her growth. Yet now comes an unwarranted blow. Our friendship now seems to be revolted so let us tell all men that while we are not the ones who have been aggressive if aggressiveness comes to us we are not without weapons. Canada has several thousand miles of railroads in this country on which we might lay a hand. An embargo on coal and sulphur would be but a matter of a stroke of the pen by the President of the United States, I believe I am not going beyond by province when I say to you tonight that those who speak for you at Washington will neither be dumb nor silent if this menace of tonight should become the reality of tomorrow."

The other speakers were Judge Harold B. Wells of New Jersey and Rev. Dr. Nehemiah Boynton of New York.

TECHNICAL ASSOCIATION DINES

The Technical Association of the Pulp and Paper Industry celebrated its tenth anniversary at its annual banquet held at the Hotel Commodore on Tuesday evening. After the serving of dinner, President, Howard S. Taylor, acting as toastmaster, reviewed the growth of the association during its ten years of existence and dwelt on the future prospects of the organization with an optimistic viewpoint.

An interesting talk was given by Rev. Canon Almond of Montreal who saw service as chaplain of the Canadian forces in the World War and the Boer War. He interspersed his serious narration with the relating of many amusing incidents which took place at the fronts. He emphazised that the problems of United States and Canada as a result of the last war were correlated and both countries therefore should work together with harmonious relations. Truth and Faith he implored his hearers to practice in the daily life.

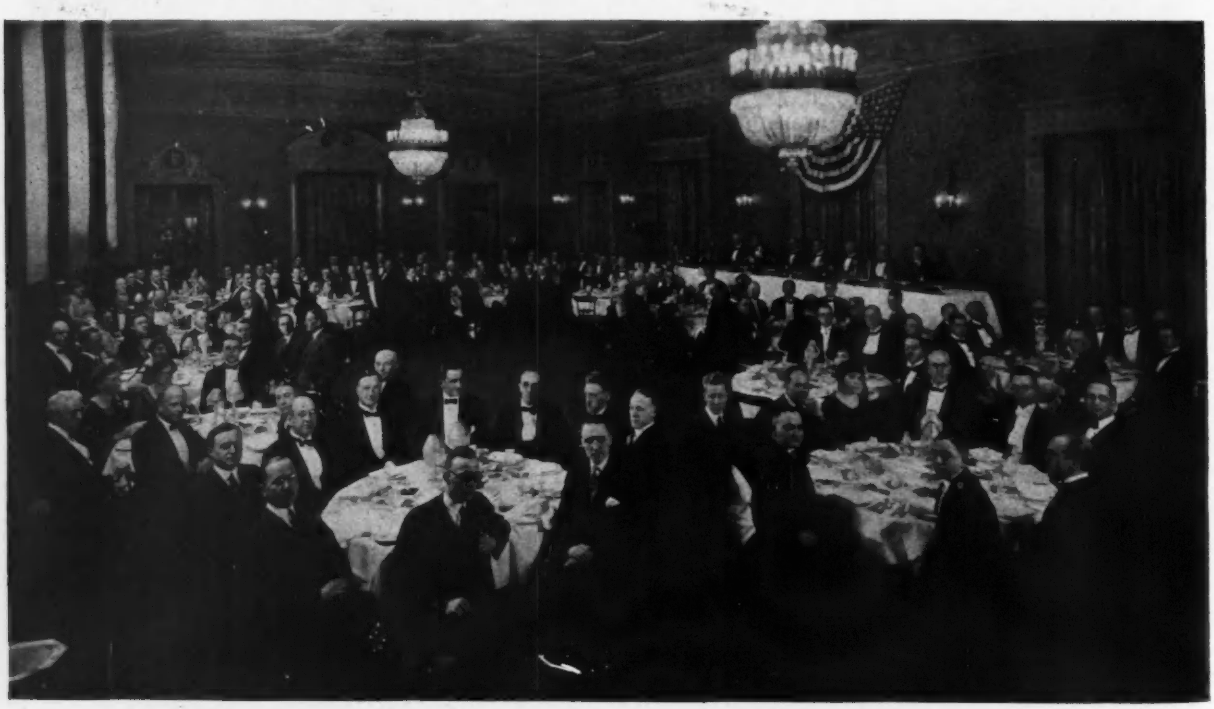
Mr. Elwood Hendrick curator of the Museum of Chemistry of Columbia University spoke on the subject of "Taste" and in a semi-serious vein suggested a revolution in the domestic lives of business men, stating the man should reverse position with his wife and assume the household duties while the wife could devote more time to pleasure and dress. The ladies present were strong for his views but representing about two per cent of the audience their comfort rested in the seed of thought which the speaker had planted. After a remark in the vocational education committee by President Taylor and R. S. Hatch, R. S. Kellogg secretary of the news print Service Bureau was presented with five bound volumes of educational committees reports and papers in recognition of his services and cooperation in the work of the Committee, covering a period of over five years. A similar set is to be presented to J. N. Stephenson of the Canadian Technical Association, who was not present to receive the gift.

SALESMEN'S BANQUET

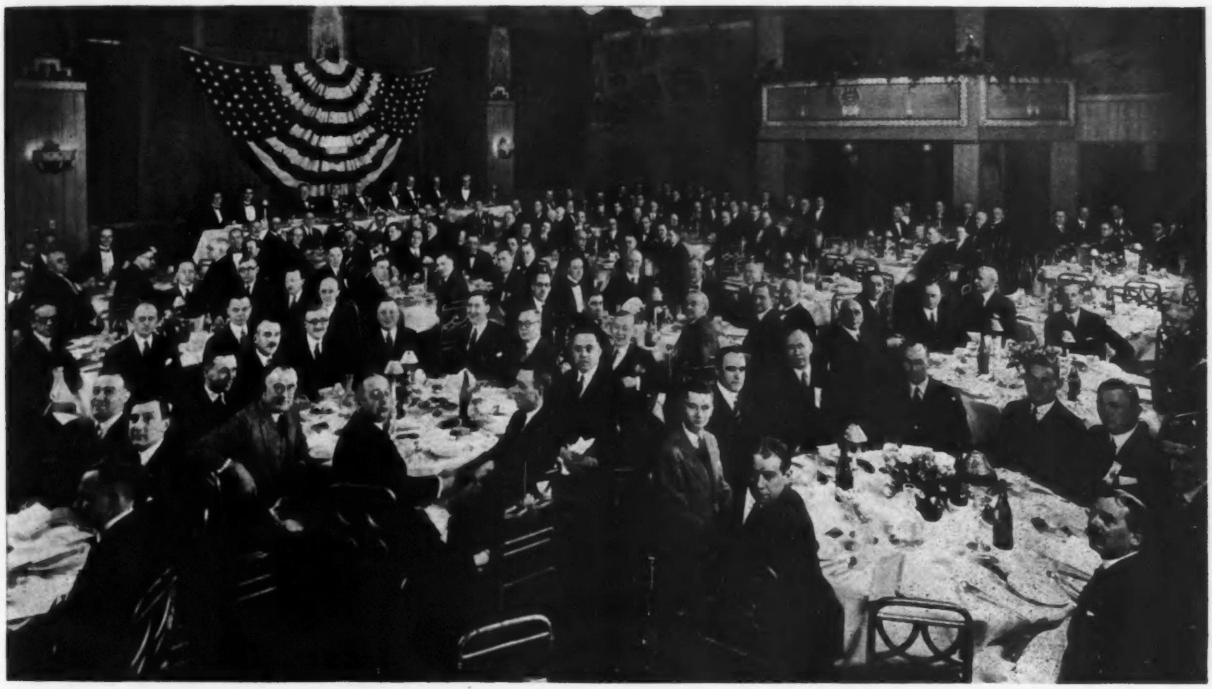
In point of attendance and in quality of program the banquet of the Salesmen's Association held Tuesday night on the Roof Garden of the Waldorf-Astoria, was the most successful affair ever held by this association. During the serving of the dinner vocal numbers were furnished the "The Right Quintette" and the diners on occasion joined with spirit in the singing.

J. L. Fearing, president of the Association, presided and, after a few words of greeting, introduced as the first speaker of the evening, Rev. Dr. Henry H. Crane of Malden, Mass., who spoke on "Business at the Bat."

Dr. Crane remarked that in baseball the man at the plate was the



BANQUET OF THE TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, HOTEL COMMODORE



BANQUET OF THE SALESMEN'S ASSOCIATION OF THE PAPER INDUSTRY, WALDORF-ASTORIA HOTEL

central figure and what the rest of the players did largely depended on what he did. The game of life was largely like the game of baseball and the man at the plate was the one in authority. Life up to now had been pretty generally a game of the professionals against the amateurs. The professionals had about had their own way but they were about through.

The world had first been in the hands of the professional soldier, who had said: "I will rule everybody because I have the power." The world was ruled by the solider for centuries but his efforts always ended in failure.

The second type to come to the plate was the professional religionist who played on the superstition of the people but his temporal power eventually fell to the ground.

The third type was the professional politician who was still with us. "But," went on the speaker, "business is on deck. The professional politician has had two decisive strikes called on him and I predict that he is going to strike out."

Dr. Crane then declared that the rise of the business man was the most amazing phenomenon of the century. Today he is taking the position of supreme importance—the world was turning to him and asking him to bring order out of the chaos. The reforms already accomplished by business were as follows:—

1—Business discovered the absolute necessity of placing faith in people.

2—Business changed the old belief that the only way to do business was by competition to the theory that cooperation is the essence of business.

3—Business discovered the necessity of adopting a code of ethics.

4—Business brought about a realization of the solemn significance of service.

In closing Dr. Crane said:—"These are the rounds of the ladder which have brought you where you are today. It is the following of these principles which will redeem business and enable business to redeem the world. It is the hope of the world today that you will not strike out—but that you will at least knock out a single and, perhaps, a home run."

Edgar A. Guest, the poet, was the next speaker, "Home Folks" being the title of his informal talk. He began by making some happy applications to Dr. Crane's talk. He said he was not a business man but merely one of "the belated minds" to which Dr. Crane had referred. He told a good baseball story of the boy who was watching a game of ball. A passerby asked the score and he replied: "They've got 34 and we ain't got nothing." The passerby remarked, "Why, you're getting an awful trimming aren't you.?" "Oh I don't know," replied the boy, "we ain't been to bat yet."

The poet then recited in his own inimitable way several of his poems, prefacing each with ready wit or sober thought. Everyone present felt the charm of the poet's personality and at the close of his talk he was given a sincere ovation.

President Joseph L. Fearing before relinquishing the gavel to the newly elected president, Walter E. Perry, called on Philip T. Dodge, chairman of the Board of the International Paper Company, for a few remarks and Mr. Dodge spoke enthusiastically of the work of the Salesmen's Association, saying the paper industry was leading American indutry in the inculcating of true ideals of salesmenship through such an organization as its own Salesmen's Association. Co-operation, he said, was the secret of modern business success.

COST ASSOCIATION LUNCHEON

The Cost Association of the Paper Industry held its luncheon in Room 115, Tuesday noon, with about fifty members in attendance. Col. B. A. Franklin of the Strathmore Paper Company presided.

Prof. T. H. Sanders of the Harvard Graduate School of Business spoke on "The Value of Accounting to Manufacturers"; Alexander Wall, secretary-treasurer of the Robert Morris Associates on "Ratios as a Guide to Management"; and Thomas J. Burke, secretary-treasurer of the Cost Association of the Paper Industry on "Budgets and Business."

Mr. Burke, during the course of his remarks, said:—

"The particular business referred to in the title of this address, is the making of paper or pulp for profit, when possible. In every mill there are different department heads responsible for production, purchasing, selling and finances, and there is a direct head who has general supervision over these departmental heads. Perhaps in some cases two or more of these duties are combined in one individual, while in some larger organizations they may be split up among several individuals. However, no matter how small or large the organization may be, there undoubtedly exists an organization capable of preparing a "Budget," because there must be in the final analysis some one responsible for the primary functions. Most departmental heads and executives desire to give their best service to their businesses, and yet, we find from year to year, there is a regular stream of business undertakings that fail. Why is it? A careful study and analysis has been made of these reasons, such as insufficient working capital or the tying up of too much capital in fixed assets, inefficient manufacturing methods, poor buying, or an inadequate selling organization, to mention a few of them. It is not exaggeration to say, that in every instance a property constructed Budget would have brought plainly before the chief executive facts concerning his business, which would have enlightened him regarding the causes for the failure to make profits, a good deal quicker, than would have been possible without a Budget and thus have forestalled the final crash.

"The main reason for this fact is, that a Budget is in reality a coordinator of business activities.

"In your case, as manufacturers in order to know what you are going to spend, it is necessary to know what you are likely to sell, hence the importance of being able to estimate your future sales correctly. The sales having been estimated, the costs may be estimated. There are of course, a number of problems involved also in the estimating of the costs; the Purchasing Department for instance, must study the market for the various raw materials that it will be necessary to purchase in order to make the paper, so that it can estimate the total cost of these materials; this of course, applies also to supplies. Wages—seem to be more or less fixed, and little difficulty need be experienced in estimating these. The overhead expenses of course, can be compiled accurately. I refer to such matters as depreciation, insurance, taxes, and administrative cost, which are all known.

"Now a word as to manufacturing costs. If the estimated sales are about 80 or 85 per cent of the maximum capacity of your machines, we may refer to your sales as representing the "normal" capacity of your machines. No particular problems should be experienced therefore, in making up such costs. The difficulty will arise, when in times of depression you estimate that your sales will be below this normal capacity. How are you then to estimate with any degree of accuracy at what price it will be possible for you to sell your paper, and thus to ascertain what your total sales will be and your profit, if any? Of course, it will be necessary to do this in order to make up your Budget and to prepare the advance Balance Sheet, that is to show what your financial position is likely to be at the end of the period, for which you have estimated your sales. In dealing with that question, I would like to ask another. If you cannot foretell how much paper you are going to sell or at what price you are going to sell it, you must admit that you are taking chances with your capital. If you are taking chances with your capital, you deserve a high return. Are you getting it? I think from what I have seen of many Balance Sheets, that you are not. This being the case, is it not a fair question to ask why every mill cannot operate on a Budget, thereby reducing the risks without affecting the return on the capital invested.

"The detail work done in compiling the Budget will of necessity contain a list of the cost items in each department, thus each departmental head will have an objective too, and you will be in a position to watch results from month to month, and to take action promptly whenever the necessity arises. The compilation of the Budget also will of necessity force a decision in those cases where there is any doubt regarding the responsibility for certain activities.

"A monthly meeting of the departmental heads presided over by the executive, should be held to compare the actual with the Budget figures. I would suggest that the Budget should not be changed monthly, unless very serious differences, obviously due to mistakes made in the beginning, are found. Careful notes should be made of all differences, so that the next Budget can be better prepared in the light of the experience gained.

"My time is short and I cannot keep you any longer. Having as I think proved the advisability of working on a Budget system in times of depression, I have also proved the advisability of *always* making up a Budget. If it is a good thing in bad times, it is a good thing in good times, otherwise we must admit that we are in the class that is content to sit back and take things easily when times are good, instead of keeping our organizations in good fighting trim all the time.

"I believe I am correct in saying, that we are now fairly prosperous, and I believe that now is the time to put in a Budget System, so as to be prepared for anything that may come in the future."

WOODLANDS SECTION DINNER

About forty attended the dinner of the Woodlands Section held at 7 o'clock Wednesday evening in Room 115 at the Waldorf-Astoria Hotel. The chairman of the section, C. W. Hurtubis of the Hammermill Paper Company, acted in capacity of toastmaster.

Dr. C. D. Howe of the University of Toronto spoke on "Canadian Forestry," giving a fine outline of forestry conditions in Canada, of the various forestry problems and the manner in which they are being met.

E. P. R. Ross, Editor of the Journal of Insurance, spoke on "Timberland Insurance" and Dr. Hugh P. Baker, Executive Secretary of the American Paper and Pulp Association, on "Forestry and The Paper Industry."

The principal speaker of the evening was Congressman John T. Clarke, author of the Federal Forestry Law (Clarke-McNary bill). His subject was "The Next Steps in Forest Legislation" and he spoke in part as follows:—

"I take it we are all conservationists and I hope the kind that meets the spirit, if not the letter of my hand-made definition. '*Conservation* is the outlining of a policy and the enacting of a law that will save God Almighty's endowments in this country from the profiteering of the plunder-bund, the wastefulness of the ignorant and selfish and the utilization of these endowments by the prudent and wise, so that all the children of all the tomorrows shall not seem forgotten.'

"Timber is today a national necessity. Over two-thirds of our 822,000,000 acres originally covered with forests have been culled, cut over or burned and burned again, and there is left now in the United States only about 137,000,000 acres of virgin timber. 112,000,000 acres of culled and second growth, 133,000,000 acres part stocked, and 81,000,000 acres of devastated, practically waste land. Brother Kellogg estimates there is about two-fifths of our virgin timber still standing and of the three-fifths which has gone, as much has gone up in fire and smoke, as has been utilized or possibly more. It is, therefore, up to us to get busier than we have ever been before if we are to meet the obligations and duty that is resting upon us of this day, if treeless tomorrows is not our legacy to those who come after us.

"The States, as well, have a definite and fixed responsibility that cannot be shifted. That responsibility is the duty of going forward in each State, in its own way, with a cooperative policy and law, under the leadership of the Federal Government, yet recognizing the sovereignty of each State, and each State cooperating because of the fairness and practicability of Uncle Sam's program as a *national program* and the duty of each State to encourage and promote this larger policy.

"If you want a program for the States, here is one, a real definite survey of the States to get out of the realm of glittering generalities and,

Banquet of the Waste Material Dealers' Association of New York, Hotel Commodore

1. To ascertain the extent of its lands more suitable for reforestation than agriculture.

2. An exact, scientific determination of the kind of trees those lands will best grow in the light of that survey, and the needs of the State.

3. Proper protection from fire and enemies of trees.

4. Fair tax laws that will make certain that our public-spirited citizens will not be penalized for making wood lots and idle lands grow trees.

5. Getting going with a plan of growing and distributing seeds and trees.

"Private organizations, great corporations, municipalities, water works companies and individuals have their part to play in a cooperative way.

"I believe the single, most constructive meeting ever held in the United States, having to do with the products of our forests, was the National Conference on the Utilization of Forest Products, conceived by our late Secretary Wallace, carried out so successfully by Secretary Gore and Chief Forester, Col. Greeley, November 19 and 20, 1924, in Washington.

"The Federal Government is doing splendid work, in its laboratory of the University of Wisconsin. The allied timber manufacturing industries are going into these problems more carefully and progress is being made all along the line in preventable wastes.

"There is a lot of loose thinking and still looser talking regarding our national resources 'overstopping all the world.' Thus it seems a fitting occasion to dispel some popular illusions. While it is true that we embrace less than six per cent of the land area of the world and have about six per cent of the world population, we now have fifty per cent of its gold and about forty per cent of the railroad mileage, yet in Europe alone is more iron and coal, in Russia, (European and Asiatic), four times the forest area, and we possess a minority interest in the farm grazing and wheat lands of the world; gold and silver have been produced in greater quantity abroad, elsewhere is more oil and so we are in varying degree regarding other of God's benefactions. We are not endowed out of proportion to the rest of the world, nor is it true that our geographical situation gives us the advantage over the rest of the world, nor have we cornered all the brains. I'll tell you wherein is the secret of our success, it is the form of government that has guaranteed to individual initiative the rewards that go with perseverance and ability.

"The first national forest has been created under the Clark-McNary bill—when the President by Executive order, took out of the War Department and placed under the Secretary of Agriculture, about 79,000 acres of the Ft. Bennings, Ga., military reservation, and we expect to dedicate it to growing more trees for our people, and there are other military reservations to follow (two in New York State). And it is up to the States to enlarge on and broaden out their State policy of reforestation and get it going so that they can join hands with the National Government in a program that shall tell the world of today that they are not falling down in their opportunity to bring back to our hills and dales the trees, to adorn and make more helpful the tomorrows, under the national leadership offered in the Clark-McNary bill."

WASTE MERCHANTS BANQUET

The annual banquet of the Waste Merchants Association was held at the Hotel Commodore Tuesday evening.

The opening addresses were short and to the point. Mr. McBride the president introduced Francis P. Bent who represented Mayor Hylan. Mr. Bent then presented Sheriff H. Warren Hubbard. After a few words by the speakers the entertainment started with a bang.

The following concerns had tables: American Woolstock Company, Atterbury & McKelvey, D. Benedetto, Box Board and Lining Company, Vito G. Cantasano, Jas. Carrano & Son, Geo. Carrizzo & Company, Darmstadt, Scott & Courtney, J. Delia, Economy Baler Company, Gaccione Bros & Company, Gowanus Waste Material Company, P. Guariglia & Company, D. M. Hicks, Inc., E. J. Keller & Company, Geo. W. Millar & Company, Inc., A. J. Moran & Company, Inc., National Association Waste Material Dealers, M. O'Meara & Company, J. J. Patricoff & Company, Morris Reich, H. Rosenberg, J. Shapiro, William Steck & Company, Sterling Mill Supply Company, M. Stramiello, H. P. and H. F. Wilson, Wilson Paper Stock Company.

MANUFACTURERS IN CONVENTION

American Paper and Pulp Association Holds Forty-Eighth Annual Meeting at Waldorf-Astoria Hotel, New York.

Association Passes Resolution Protesting Against Imposition of Graduated Export Tax Increasing Annually Upon Logs and Pulpwood Exported from Freehold Lands in Canada—Norman W. Wilson, Vice President of the Hammermill Paper Co., Erie, Pa., is Elected President of the Association for the Ensuing Year—Meetings of the Affiliated Associations Are Interesting and Well Attended.

The most important feature of the forty-eighth annual convention of the American Paper and Pulp Association came during the annual meeting Thursday forenoon when the Association spoke emphatically its protest to the Canadian export tax.

Canadian Embargo Discussion

C. W. Gordon of the Oxford Paper Company presented a resolution on the subject. In introducing it he paid brief reference to the inquiry that has been conducted into the real animus back of the Canadian embargo discussion. He said there seemed little question but that the embargo propaganda was being done under the guise of patriotism, that Mr. Barnjum had been used to father it although there were undoubtedly some paper companies back of it. He referred to the fact that last week at the convention of the Canadian Pulp and Paper Association a resolution had been adopted favoring an export tax to be increased annually. He stated that it was plain to be seen that this tax would eventually become virtually an embargo. Mr. Gordon said the government officials had indicated their willingness to cooperate with the paper men in this country but that they wanted to be assured that the paper men are a unit on the subject.

Resolution Adopted

For the purpose of procuring an expression of opinion, Mr. Gordon said, a resolution had been prepared. It was handed to the secretary who read it and it was then unanimously adopted without discussion. The resolution follows:—

WHEREAS, the Canadian Pulp and Paper Association at its annual meeting held in Montreal on January 30, 1925, passed a resolution in favor of the imposition of a graduated export tax increasing annually upon logs and pulpwood exported from freehold lands in Canada, and

WHEREAS, although such action is urged as a measure for conserving the forests of Canada the amount of pulpwood annually exported to the United States is such an insignificant portion of the total annual depletion of paper in Canada that it bears no relation whatsoever to a conservation measure, and

WHEREAS the imposition of an embargo or an export tax which is intended to accomplish the same results would render useless large investments made by American manufacturers in good faith in the purchase and development of freehold lands in Canada, and

WHEREAS the imposition of such embargo or export tax while resulting in no material benefit to Canada would adversely affect the paper industry in this country increasing the costs ot all kinds of pulp and paper and paper products to the ultimate consumer, and

WHEREAS it is the opinion of this association that such action by the Canadian Pulp and Paper Association is not for the purpose of conserving Canadian pulpwood but its real intent is to enable the Canadian manufacturers to gain further control of our paper market, Be it therefore

RESOLVED that the American Paper and Pulp Association meeting in convention today hereby enters its formal protest against the enactment of such an embargo or export tax and urges its members to use their best efforts with their representatives in Washington to have our government take such action as may be necessary to protect the interests of the pulp and paper industry in the United States.

NORMAN W. WILSON, PRESIDENT

H. W. Stokes Presides

The meeting was called to order at 10:30 by President Henry W. Stokes. The usual reports were read and accepted and other routine business transacted.

The New Officers

The report of the nominating committee was made by M. E. Marcuse and the officers placed in nomination were all unanimously elected. They are as follows:—

President, Norman W. Wilson, Hammermill Paper Company, Erie, Pa.; Vice Presidents, D. C. Everest, Marathon Paper Mills Company, Rothschild, Wis., and Alex G. Gilman, Allied Paper Mills, Kalamazoo, Mich.

Executive Committee, F. J. Sensenbrenner, Kimberly-Clark Company, Neenah, Wis.; Hugh J. Chisholm, Oxford Paper Company, New York City; Herman Elsas, Continental Paper and Bag Mills Corporation, New York City; Philip Weston, Byron Weston Company, Dalton, Mass.; W. L. Carter, Nashua Gummed and Coated Paper Company, Nashua, N. H.

REPORT OF SECRETARY-TREASURER

The following report was presented by Dr. Hugh P. Baker, secretary-treasurer of the association:

An Incomplete Year

The change in the time of the annual meeting from April back to February makes it necessary to report on three-quarters of the fiscal year beginning April 1, 1924. In view of the change in the method of financing the association, put into effect at the beginning of the present fiscal year, the executive committee has felt that it would not be wise to change the fiscal year to correspond with the calendar year of the association until after the completion of the first fiscal year under the new plan of financing put into effect last spring.

It will make for a more satisfactory handling of the business of the association if the fiscal year is changed to correspond with the calendar year of the association, or still better, with the standard calendar year. Recommendation is made therefore that the change be made so that the next fiscal year should begin either January 1, 1926, or January 1, 1927.

The holding of the 48th Annual Meeting in February of this year, two months earlier than the annual meetings of the National Paper Trade Association, will probably determine whether the change in time has been a wise one and what is best for the entire industry as far as the manufacturers and merchants meeting separately or together.

Not Satisfactory as a Whole

Considering 1924 as a whole, the year has not been a satisfactory one for the paper and pulp industry. It is true that production has been maintained at a surprising level and yet the situation in other factors, affecting production, have been such as to make the year, generally speaking, one of low profits. There has not been a serious depression, and it is probable that the pulp and paper industry has been less affected by the slowing up of business which occurred in the summer and early fall than some of the other great industries. The defeat of the restless, dissatisfied and often radical groups at the last election produced calmness and optimism that immediately affected the whole business structure of the country. Where the production in the industry had fallen off during the month previous to election, it immediately showed a gain following election and the reports for December, even though the month was affected materially by the holiday season, was one of improvement.

There is an underlying spirit of confidence and optimism that appears to be firmly based upon a thorough-going knowledge that general conditions are sound and of such a character as to forecast very satisfactory business for the first half of the year.

The period during which the present secretary has served the association beginning as it did in 1920, has, generally speaking, been a period of reconstruction, readjustment, and, on the whole poor business. The experience of the industry during the past four years has not been entirely disadvantageous. It has in fact forced manufacturers to reduce cost of production and marketing and become accustomed to doing business on a closer margin of profit. The experience has not been a pleasant one and it is hardly in place to say that it was an experience necessary to a condition that would allow of satisfactory business. It seems to be apparent, however, that the past four years has brought the industry to a point where it is looking facts in the face and thereby putting itself into a position to carry on good business in the months immediately ahead, and possibly for the entire year.

The past four years have been exceedingly difficult ones in the work of the association. Naturally the association has felt the period of depression in much the same way as it has been felt by the industry. If the industry has been schooled and seasoned by what has been to many a period of adversity, to the same extent and even more, the association has through force of necessity accomplished changes which have put it on a much more satisfactory basis for its service to the industry in the years ahead.

Outstanding Service to the Industry

With the association on a sounder financial basis than it has been for a number of years, and with the assurance that the association will close the year with a moderate reserve in the bank, your officers have been able to carry forward the work of the association with much more confidence as to the results to be secured from service. In other words, the morale of the entire association organization has been on a much higher basis, and the results achieved during the year have proven the wisdom, if proof was needed, of making it possible for the secretary and his assistants to carry their work without the dread of a deficit of an uncertain amount hanging over them, or the fear that even with special appeals that it might be impossible to secure the funds necessary to meet the accepted budget.

The activities of the association have covered such a wide field that it will be possible to refer but to a few of the more outstanding forms of service and results achieved.

Initiates Important Activities

The articles of organization of the association indicates its function as that of promoting, protecting and perpetuating the industry. Living up to the requirements of this statement means covering a wide field of activity, watching keenly at all times for the things which may help or harm the industry. Possibly one of the very important fields of work of the association is to so watch every phase of our national life and our international relations that the industry may be warned when there are breakers ahead and members of the association so influenced that the problem will be taken up and met effectively directly from the association or indirectly through outside agencies.

Annual Reports and Talks

Interesting examples of the importance of this particular service of the association are the formation of the special committee on the perpetuation of the paper and pulp industry and the import committee of the pulp and paper industry. Your Secretary through annual reports and talks before affiliated associations and with manufacturers had emphasized constantly during 1922 and 1923, the necessity for better knowledge of conditions in foreign countries and for watching the careless and often wrong importations of pulp and paper. In the printed annual reports of the secretary-treasurer for 1923 and 1924 particularly, these matters were presented for consideration.

In many ways it is unimportant as to what agency takes hold aggresively of problems as they come up in the industry and often there may be conditions which make it more advisable to have the problems which the association has been keeping before the industry for years taken hold of by committees formed separately and outside of the association or even by agencies outside of the industry, such as the National Industrial Conference Board or the Chamber of Commerce of the United States. The point is to get the work done when it needs to be done economically, expeditiously and effectively. —However, with the association on the reorganized basis, with an executive committee made up of the leading men of the industry, it should be increasingly less necessary for important problems to be taken hold of by agencies outside of the association. If the association is not in a position to meet every emergency with which the industry may be faced, then something is wrong with the association and drastic steps should be taken to correct the conditions and the association put into condition where it can do all the work which is now accepted as its field of activity and its service to the industry.

Statistics

Since taking up the production of the Monthly Statistical Summary of the Paper Industry, as this work was laid down by the Federal Trade Commission in the summer of 1922, the reports have been greatly improved and these statistics are of much greater value to the manufacturers of paper than when issued by the Government, partly because they are gotten out more promptly and partly because they have been modified to meet the needs of the manufacturers.

The association has been assisted in this work in a very effective way during the past year by the affiliated associations. These associations are turning over to the American Paper and Pulp Association monthly the statistics secured in their different groups and these are then made a part of the monthly composite put out by the association.

In the spring of 1924, the association was requested by the Converting Paper Mills Association to get weekly statistics on book paper. A number of the larger book mills, not members of the Converting Paper Mills Association appreciating the value of these weekly statistics, are now contributing their statistics, with the result that a larger tonnage of book paper is being covered by the weekly statistical report than ever before in the history of the book paper industry.

The association is developing statistics for several of the smaller associations which do not have paid secretaries of their own. The result of its experience during the past two years in statistical work would seem to indicate that the association is in a position to give increasingly effective and economical service to the entire industry along statistical lines.

Information

Although the Information Service of the Association was discontinued in the early spring of 1924, the cumulative effects of the work of this service are being felt constantly. The association receives almost daily inquiries from its members, from other national trade associations, chambers of commerce, banks and business houses, which it is able to answer effectively, and to the advantage of the paper industry.

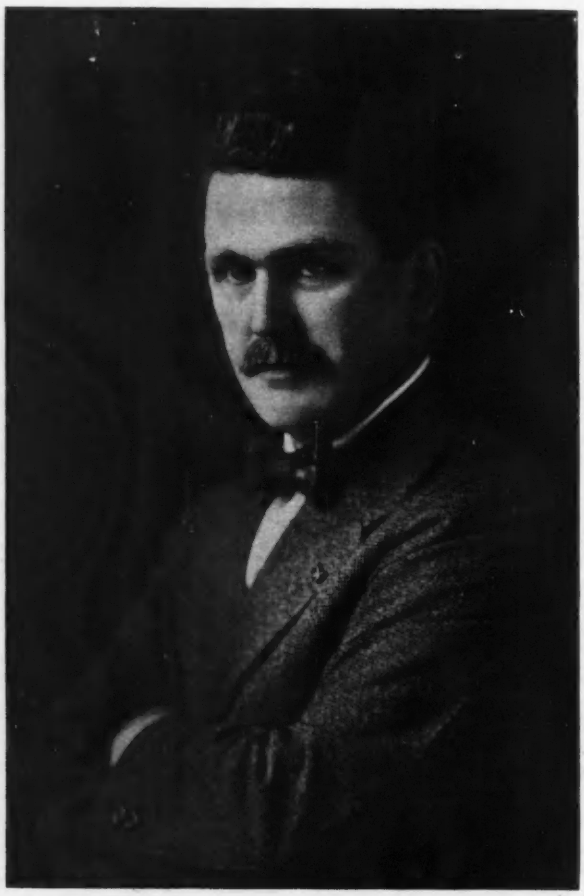
So many inquiries came to the association during the fall of 1924 from other national trade associations, that in the early winter a personal letter was sent to the secretaries of some hundred of the leading national trade associations, pointing out the fact that paper is one of the most widely used commodities in all the industries of the country, and suggesting that the association is in a position to give accurate information as to different grades of paper, how and where manufactured, etc. These letters have brought in some exceedingly interesting and valuable material to the association and has given us opportunity to give accurate and worth-while information to other industries and to pass on to members numerous trade inquiries. There is no question but what the paper industry will profit materially by having not only the other industries but banks and the public generally conversant with the fact that there is an agency ready to give accurate and helpful information at any time as to paper in all of its phases and relations.

These increasing demands for information from members and from the outside made such a demand upon the association that a thoroughly trained young woman was brought into the association in November, 1924, as reference clerk. This young woman is not only engaged in developing information, but is putting into operation a more effective library filing system than the association has ever had in the past.

As a matter of economy, the Monthly Bulletin which the association published for some four years was discontinued in the Spring of 1924. This Bulletin was of such a character that it did not conflict in any way with the trade journals serving the industry, and was in fact a valuable medium in taking information and the work of the association to its membership. It was distributed among nearly a hundred banks in the country and was serving the industry in a very helpful way. It is believed that it would be advantageous to again publish a Monthly Bulletin. The printing of such a bulletin would cut down the number of communications from the association to its membership and would be of particular value in increasing the effectiveness of the service of information by the association.

Representing the Industry

As stated in the leaflet which was prepared and sent to the members as a statement of the forms of service given to the association, the paper industry voices its needs and its activities through the association, thereby enabling the industry to speak effectively as a unit at Washington and at the several state capitals. The work of the association makes for increasing harmony of action with other great industries and the public, as it represents the entire industry in its larger general problems, such as tariff,



DR. HUGH P. BAKER, SECRETARY-TREASURER

legislation, taxation, simplification, forest conservation, etc.

Whether it is a matter of meeting the demands made for increased tariff rates on raw materials used by the industry, such as casein, china clay, etc., or getting unified opinion and action in such legislation as that proposed recently in Pennsylvania for the taxing of pressure vessels, the association stands ready at any moment to represent its membership at any time in fighting for helpful and opposing harmful regulations or legislation.

These are but a few of the outstanding forms of service given to the industry by the association.

The brief discussion of these activities should indicate fully the need for increasingly effective organized action and constant watchfulness on the part of the association.

Committee Activities

As indicated in the report of the secretary made last year, the association adopted the policy in 1922 of doing away with Standing Committees, believing that special committees for special pieces of work are much more satisfactory in all of the work of the association.

The Advisory Committee from the Paper Industry for the Department of Commerce was enlarged during the past year, and in December held a meeting at the Department of Commerce in Washington, which was of interest and help, not only to the members of the committee, but to the industry as a whole. Secretary Hoover met the Committee for a short time and the Committee then spent several hours with the Chief of the Bureau of Foreign and Domestic Commerce and the Chief of the Paper Division. So much of interest came out of this meeting that a further meeting of the committee has just been held here in New York in connection with these annual meetings to perfect a program of work for the coming year.

A similar committee, made up largely of technical men, of which Mr. S. L. Willson, of the American Writing Paper Company, is chairman, has been active in connection with the work of the Bureau of Standards. This committee met at the Bureau of Standards last summer and has just held a second meeting here in New York.

The Executive Committee of the Association, made up of a group of some of the most representative manufacturers of the industry, which has met this week in New York, has authorized the appointment of a special Tariff Committee and a special Committee on Membership. These committees will be faced during the coming year with work of great importance to the association and the industry.

The Woodlands Section

The Woodlands Section of the association was organized in 1920 to bring together both executives and men in charge of Woodlands Departments for the purpose of increasing the efficiency of woods operations in the industry. The section, immediately after its organization, developed the first accurate statistics ever put out by the industry on pulpwood. These pulpwood statistics have been and are of increasing value, not only to the mills owning timberland, but to the entire industry, as they tell the story of the raw material situation.

In the financial reorganization of the association last spring, and in meeting the need for economy, the Woodlands Section was authorized to go ahead, but without funds. Mr. Porter, assistant secretary of the association, who has been Secretary of the Woodlands Section since its beginning has been able to keep the Woodlands Section going in skeleton form and to continue pulpwood statistics. The section has held an unusually worth-while meeting here this week and we are confident that the section has a very definite service to perform for the industry. It should be given sufficient funds to do the work which has been outlined for it.

Income Tax Activities

In the report of your secretary for 1922, 1923, and 1924, the necessity of aggressive service to the industry along income tax lines was emphasized. In discussing this need in the past your secretary has urged the necessity of an income tax expert. This suggestion was made because of the knowledge of what other industries and other national associations are doing in meeting their income tax problems.

Conditions, with which you are familiar, made it impossible for the association to put on an income tax expert. Therefore, the Cost Association of the Paper Industry was urged to take up income tax work as a phase of its service. During the past year Mr. Burke of the Cost Association has been giving a great deal of time to income tax activities and results have justified fully the efforts made. The Cost Association should be supported generously by the industry, not only for the service which it may give along income tax lines, but for the help which it is giving in emphasizing the necessity for satisfactory cost work in the industry.

The Year Ahead

In last year's report in discussing "next year," it was stated that "the secretary counts the past year and the year ahead better years as there comes greater opportunity for service, and as he feels that the association has made its work amount to something in the upbuilding of the industry." There has been greater opportunity for service to the industry during the past year than in any year in the history of the association.

Your secretary has been with the association long enough now so that he feels himself a definite part of it, and he has come to the time when it is easy to sense the needs of the industry and the association and meet these needs with some hope of beneficial results. There is great opportunity for service that will result in protecting, promoting and perpetuating the industry, but only with your continued interest and help can this service be given as you want it given.

Last year considerable space was taken in the secretary's report in describing the splendid work done by the Special Committee on Finance and on Association Activities. The Special Committee on Association Activities, of which Norman W. Wilson was chairman, presented a report last year which embodied suggestions for improvement. This report was accepted by the association and every effort this past year has been expended in meeting the recommendations of this particular report. The greatest improvement in the work of the association which has come out of the recommendations of this Special Committee has been the change in the form of the governing body. The executive committee, which is the governing body, is now made of three elected officers and five others elected at the same time and in the same place as the officers. The past year has proven that a governing body made up of a small group of men can be gotten together effectively and can act promptly upon the association's problems.

The fundamental need for the coming year, and this need has been so expressed in the past years, is for a better personal contact between the working forces of the association and its membership. Five years of effort on the part of your present secretary to develop more direct service has brought better acquaintanceship and better contact. This contact should be carried still further, for only as there is a real working contact between the staff of the association and the manufacturers can the association know accurately the needs of the industry and meet these needs as you want them met.

The luncheons held in different paper making sections in past years have proven to be of a very definite help in making the work of the association better known and in getting acquainted. These luncheons are less expensive to the association than it would be for the secretary to spend sufficient time in any given section to meet the executives who would attend a luncheon in a group. It is planned to continue these luncheons during the coming spring in several of the different paper making sections.

It has been a real privilege for the staff of the association to work with President Stokes again the second year of his administration. Few of the members of the association appreciate the time and thought demanded of the officers of the association. The smaller size of the governing body of the association has made it possible for this group to get together more easily and this has resulted in much greater interest on the part of members of the Executive Committee in the work of the association than was possible under the former conditions where the governing body was a very large and a much scattered group.

It is believed that the executive committee will find it possible to get continuously into more effective contact with the work of the association.

This will make it possible for the association to profit in an increasing way from the help of these representative men who represent all groups of the industry.

This association is an organized effort on the part of the paper manufacturers to do certain things for the industry as a group, and like all organizations of men, the association is exactly what the members make it. Your officers and the staff of the association can but assist in making the organization what you want it to be. How much the association will mean to the industry will depend largely upon the way in which you meet not only the secretary, but your president and your executive committee in the work which they are trying to do for you.

The association has had a long and honorable career and the continuity of its existence evidences the need of the organization and the fact that organized effort in the form of associations has become a recognized value to the industry. The association will soon hold its 50th annual meeting. There are a few older National Trade Associations in the United States representing an entire industry and it is believed that some form of special celebration of our 50th anniversary will not only be of interest and help to the industry, but will be of very definite assistance to the furtherance of the right kind of trade association work in the United States.

LOOKING AHEAD IN PAPER INDUSTRY

The following statement from the American Paper and Pulp Association was given out at the annual meeting:—

Fundamental Conditions Sound

So much has been said and written the past six months as to the soundness of the fundamental factors influencing business that any lengthy discussion of these factors in a short statement on what seems to be ahead of the paper industry for the next few months would be out of place. Immediately following the general election of November, when the sane and sensible attitude of the great majority of the voters triumphed over what we feared might be a growing spirit of restlessness and radicalism, there was a great deal of real optimism as to the immediate future for business in this country. Everything seemed to be set for a decided upturn in business of all forms. This "Election Optimism" has cooled somewhat in view of seasonal retardence and because of the deep but nevertheless certain undercurrent of slowly changing economic and political conditions, particularly in the European countries.

Dependence Upon the Gold Standard

The interdependence of the nations of the world is well illustrated by the generally recognized fact that world commercial and business activities would not get back into a sound basis until some of the strangling political conditions in Europe could be changed for the better. Any attempt to interpret the effect of conditions in Europe upon the business of the United States and the world at large would be a waste of time without giving full consideration to the Dawes plan, and what its application is meaning in bringing the world back to a gold standard. It would seem as if the chief aim of the Dawes plan is to put Germany onto a stabilized gold basis and keep her there. As this cannot be done without harming to some extent other nations of Europe, which are not on a gold standard, it would seem as if the efforts of both the United States and England, or, rather, their combined efforts, are putting England back onto a gold basis and bringing the pound to par. Restoration of the gold basis in England is giving English manufacturers and merchants a depressing experience and probably rather serious losses, and yet such a return to a gold basis in Europe is apparently necessary to continued prosperity in the United States.

The Money Market, the Index

We have gradually awakened to the fact in this country that gold piled up in vaults will not help us. Idle gold is as much an economic loss as idle land or idle men. One has but to turn to the financial sections of any of the New York dailies to learn of the tremendous outward movement of gold. All of this is, of course, affecting the money market, and it would seem as if the money market must be, for the next year the index by which we are to gauge the trend of business, not only in the paper industry but in all of the industries, and in general business in the United States. The money rate has probably been too low and probably kept there deliberately. However, the money curve has now turned definitely upward and the curve will continue to rise. We may hope, from the Federal Reserve System, a control that will prevent a too rapid rise which might result in conditions that would harm rather than help stability.

Prospects for Spring and Early Summer

Some of the factors influencing the paper industry seemed on the surface to have been more favorable in February, 1924, than they are today. You know so well of what happened during the spring and summer months that there is no need of referring to the movement of business in those periods. There seems little question that the uncertainty of the people prior to the November election slowed business down, but the result of the election brought confidence, and there is every reason to believe that the factors which are influencing present trends are sounder today than they were a year ago. These factors, both direct and indirect, in their effects upon industry, seem to be affecting the situation in such a way as to promise good sound business ahead for the coming spring and early summer months.

The very uncertainty of some of the conditions affecting the European situation is making some of our leading economists very hesitant to attempt to forecast what may come in the late summer months and the months beyond.

The Raw Material Situation

We are fortunate in being an industry, the product of which is fundamental to the satisfactory progress of the lives of every man, woman and child. From certain standpoints we are fortunate in being an industry using raw materials coming from a renewable natural resource. Though conditions must become more difficult in the raw material situation, and that because we are cutting our forests four times as fast as they are growing and making very little provision for renewal, yet when the lean years ahead are past and the forest lands of the country are brought back into continuous productivity, the paper industry will never have reason to worry as to the permanency of the raw material supply. This reference to the raw material situation, of course, covers the wood situation only and it assumes that as time passes more, rather than less, wood will be used in the industry.

Capital Investment in the Industry

Careful estimates, based upon governmental reports, and upon data on file in the American Paper and Pulp Association, indicate that the capital invested in the pulp and paper industry in the United States in 1924 was approximately $1,200,000,000. The fact of the necessity for very large capital in relation to capacity of plants, and value of product, is not generally understood by the other industries of the country and certainly not generally by the financial agencies of the country. The paper industry owes it to itself to make this fact better understood.

Where the Industry Stands With Other Industries

In 1924 the paper industry produced over 7,000,000 tons of paper. A conservative estimate of the value of this tonnage, made in part from figures put out by the Bureau of the Census and the Department of Commerce, is $1,050,000,000. In the production of this great tonnage of paper there were employed approximately 125,000 men and women. Based upon figures which are often used by economists, if there are five dependents for each person employed in the paper industry, there were in fact 750,000 people dependent upon salaries and wages received from the paper industry.

The United States Bureau of the Census recently issued a statement indicating that paper and printing combined ranked sixth among the great industries of the country, the first being food and kindred products, the second textiles and their products, etc. The various directories of the industry indicate that there are approximately eleven hundred pulp and paper mills in the United States. A more accurate figure would probably be a thousand producing pulp and paper mills. These are scattered from Maine to California, many of them very much isolated, but most of them are grouped together in regions of good water supply.

The Paper Industry and Fundamental Economic Movements

It is well for the industry to consider the figures which have been given above as indicating the extent and character of the important industry in which we are engaged. These figures are given not only as a matter of information, but to emphasize the fact that we belong with and are closely entwined in our activities with the other great industries of the country. These figures indicate too that we are of sufficient size, as an industry, to be a very essential part of American business life, and that the trends in the industry are influenced by the same factors influencing such great industries as food and textiles, iron and steel, lumber, etc. In other words, if it is important for the iron and steel industry and the textile industry to watch closely the fundamental movements influencing the political and economic life of the world, then it is equally necessary for the paper industry to be conversant with these movements, that their influence upon the various groups and the individual mills may be understood and considered in carrying on the daily business of the groups and the individual mills.

The Pulpwood Situation

Reference has been made to the raw material situation and to the fact that the industry must adapt itself to a slow but steady increase in the cost of wood, and probably so in other raw materials entering into the production of paper and paper products. After all, the paper industry in large part goes back to the wood pile, so that the problem is that of maintaining a reasonably large wood pile, made up of the right kind of wood. Freight is playing too large a part today in determining the value of wood. It is not at all an uncommon thing for the mills of the country to be bringing their pulpwood from points anywhere from 500 to 1,000 miles from the mill. As the Canadians have their own wood supply problem to solve it is probably not wise for the American mills to count too much upon the continued receipt of Canadian wood. The facts as to the wood supply situation must be looked squarely in the face if the problem is to be solved in a way to make for the permanency of the industry in this country.

Use of Hardwoods

One encouraging phase of the wood situation is the increasing use of hardwoods. Hardwoods may in fact help in large part to tide over the lean years between the end of our virgin forests and the time when forest lands will be under reasonable management, resulting in continuous production. We know that there are very large amounts of hardwood throughout the Eastern sections of the United States. Good would come, beyond a question, from research and demonstration in the use of hardwoods in the manufacture of various forms of paper. It would make a decidedly favorable impression upon the people of this country, and bring very valuable direct if not indirect results to the paper industry, if we could, as an industry, through the Association, actually own small areas of forest land in two or three of the principal paper making sections for sensible demonstration of what may be done to insure permanency, not only of our forests but of our industry itself.

Pulpwood is now relatively plentiful, there having been some carry over from 1923 and prospects of a good cut and easy handling conditions this winter.

Paper Stock

Paper stock is and probably always will be an important raw material to many of the mills of the country. The paper stock situation, for reasons with which most of you are familiar, has been the least stabilized and the least satisfactory of any other situation as affecting raw materials. You are all familiar with the curve which represents changing prices of paper stock. It is a curve which does not represent either careful thought or concerted action on the part of the industry. Granted, that it is not an easy situation to meet, yet there is no situation in the industry which, if faced squarely by the groups concerned, could not be bettered even though possibly not solved entirely to the satisfaction of those concerned. It is believed this situation might be improved by group control or buying. This suggestion will make some shake their heads. Even so, the paper stock situation is worthy of more aggressive thought and action than it has been given in the past. Prices are moderate to high, and with the prospect of good business during the coming months there is also a prospect of somewhat higher prices for all forms of raw material.

The Rag Situation

The rag market has been exceedingly interesting. It is probable that the rag situation is never affected by the same factors as those which affect the paper stock situation, and it is not well therefore to confuse the two forms of raw materials. During the second half of the past year the cost of rags, especially new rags, continued steadily upward. At the opening of the present year new rags were more than 150 per cent higher than they were before the war. For example, No. 1 white shirt cuttings were 6 cents before the war, and are now approximately 16 per cent. This has resulted in a very logical and necessary advance in the price of rag papers. This advance has not been in any way comparable, however, to the great advance in the cost of rags, and is indicative of the conservative way in which the manufacturers of fine paper have maintained the stability of their industry in the face of an increasingly difficult raw material situation. It is believed that with the increase in the consumption of cotton goods, which has already started in this country, both new and old rags will be more plentiful and cheaper in price. Only by a lowering in the cost of raw materials and greater economy and efficiency in production will profitable operation of many of the fine paper mills be possible in 1925.

Domestic Versus Foreign Clay

That no raw material used by the paper manufacturer will continue to be an entirely satisfactory situation is evidenced by the efforts just initiated by the domestic producers of clay to bring about a 50 per cent increase in the tariff on English China Clay. While it is not at all probable that the domestic producers will be able to bring about such an increase in tariff on English clay under the flexible provision of the tariff law, at least until possible general changes are made in the tariff law in the next long session of Congress, yet such an effort is likely to result in increased prices of all clays, and therefore an increase in cost of producing paper.

The Pulp Market

While the situation as to pulps of various forms may not reflect directly the general wood situation, yet the gradual increase in the price of wood which we seem to be facing during the next few years, must, of course, affect the long range price of pulp of all kinds. The supply of bleached sulphite throughout the past year has been more than ample, largely because of the record breaking imports from foreign countries, including Canada, which is, of course, a foreign country. Imports of pulp have continued to increase from year to year and these imports have somehow been absorbed in our growing paper production. The position of the domestic pulp producer is a difficult one because of the constantly increasing importations of low cost foreign pulp. There are indications that the pulp market in this country is reaching saturation, and that the industry will be unable to continue to absorb increasing quantities of foreign pulps. The chemical pulp imports for the last five years show an increase of from 433,000 tons in 1919 to 1,250,000 tons in 1924. There is plenty of pulp in sight for the coming year, but prices today are firm, and while there may be fluctuations during the year it may be safe to assume that the curve representing prices of pulp will rise gradually but steadily, though increasing competition may flatten the curve for a time or even cause it to fall. The general direction would appear to be upward.

Excess Machine Capacity

The excess machine capacity in the mills of the country is a topic which should be given more than a paragraph in a short statement of this character. The paper machines in this country today have a potential capacity of 10,000,000 tons of paper per year, yet the estimated production of paper for 1924 of all grades is a little less than 7,250,000 tons. In the five year period ending 1924, 210 new paper making machines were installed with an estimated daily capacity of over 8,000 tons per day. What's the answer?

Conditions in the several groups of the paper industry are being discussed by prominent manufacturers at the 48th Annual Meeting of the American Paper and Pulp Association. Therefore, this statement will not be lengthened by commenting on the different grades of paper when it might repeat in part what you have heard from individual manufacturers taking part in the discussion just referred to.

The Newsprint Situation

Newsprint paper, not being included in the discussion at the Annual Meeting, will be referred to briefly. It would seem as if the newsprint industry of the United States is gradually becoming Canadian, in that Canada is approaching, if it has not already reached the point, where it is now producing monthly more newsprint paper than is being produced in the United States. As the American market for newsprint and pulp is free to the Canadian mills it is probable that as long as this condition exists the Canadians will continue to absorb an increasing part of our market. The United States mills made 1,471,000 tons of newsprint in 1924, a decrease of 14,000 tons from 1923 and of 40,000 tons from the high mark of 1920. Canadian newsprint production in 1924 was 1,353,000 tons, an increase of 80,000 tons over 1923 and 54 per cent more than in 1920. For the first 11 months of 1924 we imported 1,121,000 tons of newsprint paper, almost entirely from Canada. It would seem as if the peak of consumption of newsprint had been reached, and one wonders how much longer we can continue to turn valuable softwood forests into pulp and then into newsprint, to be sold at prices that justify us in saying that we are giving our forests away for a song.

Production Without Profit

In general, production during the past year has been satisfactory. This does not mean that production has been continued at a reasonable profit. Capitalization of the producing plants of the industry are so great that production is often continued when it would be better for both producers and consumers if the production could be actually discontinued for a time. There are increasing evidences that even with high cost of raw materials that prices will be somewhat better during the next few months. There seems to be no possibility of a boom, and no one wants a boom. We are approaching the coming spring and early summer with confidence and in anticipation of good business. We are approaching this period also with full knowledge that we must face in time increasing competiton which will demand of the industry greater economy and efficiency in production and merchandising, if not combination and elimination of high cost plants.

Promise of good business should not close our eyes in any way to the factors discussed somewhat at the opening of this statement. We must be watchful at all times and keenly appreciative of the responsibility which is ours in carrying on an industry of the size and fundamental character of the paper industry. We must look beyond the immediate present to what may be ahead in the raw material situation; to what all are facing in ever keener competition with Canada and other foreign countries and through it all we must so act as to retain the confidence of the public, insure our permanency in this country, and get a fair return from what we are putting into the industry in the way of money, brains and energy.

VALUE OF STATISTICS

John C. Howell, vice-president of the Brookmire Economic Service, Inc., presented an extremely interesting paper on "Statistics in Trade Association Work." In the coarse of his remarks he said:

"There is no activity and there never can be any activity that is not based upon and determined by statistical facts. Statistics enter into every phase of life and all forms of knowledge are most forecfully presented when presented statistically. From the cradle to the grave we are vitally interested in the statistical record which is the most concrete estimate of a man's life.

"Statistics fall into two general groups, at least for the purpose of this talk. First, we have the Scientific Field of statistical data. These are affected generally by immutable laws and natural forces—a field in which man is practically helpless. The material which enables the geologists to locate oil wells or gold mines and the astronomer to deduce the times of eclipses and the approach of storms is based on statistical material from which first principles and accurate formula have been computed.

"The second Great Field of Statistics is That of Business. Here we have to contend against changing laws, inaccurate information and the human element. Now, it is characteristic of human nature, especially in business, that the predominating idea is the desire for profits—these to be obtained as quickly as possible and by any or every means.

"Another aspect of the human element in business statistics is the desire for the retention of personal initiative. Many fear that the association for the gathering, compilation and interpretation of statistics would result in reducing the value of personal judgment and initiative in the conduct of their own affairs. This may be true in some instances, but the general result of co-operation within an industry has shown that where judgment and initiative are superior to the competitors' in the same line of business, the aid of statistical information has but intensified the value of such superior judgment.

"The use of statistics in business is a product of recent years and trade associations generally have been a great force in stressing the value of statistics to business concerns, especially in the field of compilation. As a result of the availability of statistics, organizations for their interpretation have arisen with a record showing a high percentage of success.

"The inherent characteristics of business statistics flavored as they are by the uncertainties of human conduct have for many years given business a hit or miss character, where the programs and policies were largely the result of one man's snap judgment. Trade associations have had considerable success in eliminating this characteristic and raising business more nearly to the plane of scientific accuracy.

"Business has long supported drones and management that has been shackled to the past, but the race today is only to the industrious, and those of sound judgment and informed intelligence. Business has long been without the aid of a clearing house for vital information. This is one of the particular points of value in the trade association available to every man and valuable beyond the conception of many even today. Business has long been negligent of and indifferent to its place and power in the world.

"In these fields of usefulness, the trade associations have played a large and important part. They have been generally the sources from which the truth of a given situation can be obtained and the freedom which comes through the knowledge of the truth has been of great assistance to their membership. Freedom, that is, from the burden of overproduction, freedom from the malady of underproduction, freedom to take advantage of a period of expansion, to develop new uses for present products, new sources of raw material supply, new methods of manufacture, and above all, freedom for the individual initiative where the field has been clearly indicated by the facts obtained through the co-operation of members. As agency such as this elicits the support of every man and every concern in any line of activity.

"1. The first use of trade association statistics is to lift business out of the "hit or miss" state and bring it up more nearly to the scientific plane.

"2. The second use is to furnish a guide as to the trend of industry as a warning or an incentive, and is the only way of establishing the vital facts.

"3. Third, to harmonize, confirm, or refute conflicting opinions and judgments as to policy within an industry by exhibiting substantial facts instead of unsupported opinions.

"4. Fourth, use as a means of preventing waste in production and inefficiency in manufacture.

"5. Fifth to act as a spur and stimulant to those in the industry who see by comparison with their competitors that they are not getting their full share of the business.

"6. Sixth, as a clearing house of vital information, not only of value to men in the trade but to the business world as a whole. Further, of value to the historian of the future and the generations to come.

"7. Seventh, and this is to my mind the principal value of trade association statistics. It tends to build up a body of specialists who are devoted to the industry that can and would, if given proper support, be to business what the captain is to a ship, the general to an army, or the governor to a steam engine."

CONDITIONS IN FINE PAPER

Charles McKernon, president of the B. D. Rising Paper Company, of Housatonic, Mass., spoke in part as follows on conditions in the fine paper industry:—

Prices Stable

Although we have had ups and downs in demand and production during 1924, the year has been one of stability in the way of prices for finished products. This was caused largely by the fact that as demand fell off in the early summer, the prices of raw materials—especially rags—began to increase so rapidly as to seriously affect the cost of fine paper production. This increase in the cost of rags, especially new rags, continued progressively upward in the second half of the year. At the beginning of the present year, new rags were more than 150% higher than they were before the war. For example, No. 1 White Shirt Cuttings were 6 cents before the war, and are now 15 to 15½ cents. Consequently, during the last month, a good many of the rag papers were advanced 5 to 10%, which certainly is not very large when compared to the progressive increase which has been absorbed in the manufacturing costs during the last six months.

It is hoped that the increase in the consumption of cotton goods because of the large crop and lower price of cotton in the bale, will cause rags to be more plentiful and cheaper in price; for only by a lowering in the cost of materials will successful operation for the fine paper mills be possible for 1925. The recent increase in operation of the cotton goods mills and the cutting up trades is good grounds for hope that there will be a larger supply and lower price for new cuttings.

Bleached Sulphite Prices

During 1924 there was no change in the contract price of bleached sulphite. In the open market bleached sulphite declined during the summer, but regained most of its loss during the latter part of the year. The supply of bleached sulphite was more than ample throughout the year because of the record breaking imports from Canada and abroad. Imports of bleached sulphite, as well as other grades, have continued to expand year after year, and are apparently being absorbed by our larger paper production, and to some extent to the disadvantage of the domestic pulp mills. It is felt that should the imports for 1925 show as much increase over 1924 as 1924 showed over 1923 the supply will be so great that importers will meet with increasing difficulty in disposing of their enormous quantities.

Chemical Pulp Imports

Total chemical pulp imports for the last five years are as follows:

	Tons
1919	433,763
1920	673,149
1921	506,356
1922	1,043,150
1923	1,082,818
1924 estimated	1,250,000

In other words, nearly three times as much pulp was imported in 1924 as in 1919.

Is there an over production of paper in the United States?

In the sense that there are no large stocks of paper which cannot be disposed of, the answer to this question would be no. This is largely so because paper is usually made on an order basis.

Potential Overproduction

But if we take the *capacity* of the existing paper machines, we undoubtedly have a potential over production. The paper machines in the United States today can make about 10,000,000 tons of paper per year, whereas the estimated production of 1924 for the entire paper industry in the United States is less than 8,000,000 tons. That is to say, the industry is equipped to produce 25% more than is now being consumed.

It seems almost unbelievable that, despite the fact that capacity is already too large for the country's requirements, the building of new machines should continue. This building of new machines has gone on in 1924 and there are plans for further extensions in 1925, although the percentage of idle time was larger in 1924 than in any year on record except in the severe depression of 1921.

It will take from four to five years for normal consumptive requirements and growth to absorb the product which the existing machines can make under normal conditions. This does not mean running absolutely full but 85% of capacity.

In the five years ending 1924, 210 new paper-making machines were installed with a stated daily capacity of 8,815 tons per day. During the past year, 33 new machines were installed, with a stated daily capacity of 1,189 tons.

A Situation for Careful Study

There is a situation for every paper manufacturer to study very carefully. It is certain that we cannot continue to add year after year more capacity than the normal increase of consumption requires, when we already have a capacity more than 2,000,000 tons above our present requirements and certainly 1,000,000 tons above our requirements when the volume of business is at its peak.

WALTER E. PERRY SALESMEN'S PRESIDENT

H. V. Kaltenborn of the Brooklyn Eagle opened the meeting of the Salesmen's Association, Tuesday, with a half hour talk on "Current Events," which was followed by a motion picture story of "The World of Paper," and the annual meeting of the Association.

At the business meeting Fred W. Main presented a memorial to the three members who died during the year, J. B. Thayer of the United States Envelope Company, O. Bache-Wiig of the Wausau Sulphate Fibre Company, and J. E. McQueen of the Wrenn Paper Company. George K. Gibson added a personal tribute to Mr. Bache-Wiig.

In presenting the report of the nominating committee, H. H. Reynolds paid high tribute to the work of the retiring president, J. L. Fearing, who refused reelection after serving two years. The report of the committee was accepted, the following being elected:

PRESIDENT—Walter E. Perry, Chemical Paper Co., Holyoke, Mass.

VICE PRESIDENTS:

New England Division—Ray E. Wingate, Crane Company, Dalton, Mass.

New York Division—R. C. Tilden, International Paper Company, N. Y. C.

Miami Valley Division—Carlton W. Smith, Miamisburg Paper Company, West Carrollton, Ohio.

Chicago Division—J. H. Coy, Flambeau Paper Company, Chicago, Ill.

The annual report of the secretary was submitted as follows:

From every standpoint the past year of the Salesmen's Association of the Paper Industry has been a successful one. Beginning the year with a deficit of $497.58, the Association was able to wipe out the old deficit and secure sufficient income so that with no allowance for possible profit or loss on the 1925 annual banquet, the year will end with a small surplus.

From the standpoint of membership, the actual condition shows an improvement over that at the last annual convention, though some dead wood has been taken off the books. At the beginning of the year there were 196 members on the rolls. Of these, 22 were dropped for non-payment of dues or resigned, but 15 new members were added, making a present total of 183, a loss in figures, but an actual gain in active membership.

During the year the Chicago weekly round table conferences have gained in interest and attendance; Chicago being the center where these conferences were originated on a regular basis. New York too has made its Monday luncheons a weekly fixture, with occasional special programs. The Miami Valley division has held monthly meetings which have been well attended, but the New England group has evidently considered itself too widely scattered to make regular conferences possible.

A special feature of the year was the New England outing at Stockbridge, an affair so pleasant that it has been suggested that it be made an annual pilgrimage of the Salesmen of the country. There was no fall conference at Chicago of the American Paper and Pulp Association this years, so the October meeting of the Salesmen's Association was not held as was the case in preceding years.

The Secretary attended luncheons of the Chicago, New England and Miami Valley groups during the year.

The publication by the Association of "Paper—An Index of Civilization," the address given in Stockbridge, New York and Chicago by H. H. Reynolds, former President of the Association, has resulted in a considerable sale of this fine review of the paper industry. The Association still has a quantity of these booklets available at a moderate cost to all desiring them.

The report of the Secretary would not be complete without the recording of the organization of the Import Committee of the American Paper Industry on the lines proposed by the Salesmen's Association to the American Paper and Pulp Association, as a result of the advocacy by the Salesmen's Association of the so-called "Wise-Plan."

The Salesmen's Association can look upon its part in this movement as one of the most outstanding accomplishments of the Association in its entire history.

RESOLUTIONS ADOPTED

The resolution committee at the meeting Thursday morning of the American Paper and Pulp Association presented a number of resolutions, all of which were adopted. These placed the Association on record in the following manner:—

1—Reaffirming interest in forestry protection, etc., and expressing approval of the Clark-McNary bill.

2—Approving of the efforts being made to induce the American Government to reduce passport fees and declaring it to be, in its opinion, highly advantageous that the government seek for reciprocal arrangements with foreign countries.

3—Favoring an increase in pay for postal employees if the money therefor is available.

4—Expressing approbation of a plan for development of Muscle Shoals by government lease.

5—Stating the Association's opinion that the Railroad Labor Board should be continued.

6—Opposing the passage of the proposed twentieth Constitutional amendment concerning the child labor law.

7—Favoring the repeal of the Income Tax publicity law.

8—Resolution on the death of members who died during the past year.

9—Expressing appreciation of the services of Secretary Baker and confidence in him.

10—Expressing appreciation of the devotion shown by President Stokes to the Association.

11—Protesting against the imposition of a graduated export tax increasing annually upon logs and pulpwood exported from freehold lands in Canada.

WRITING PAPER MANUFACTURERS

The Writing Paper Manufacturers' Association held its annual meeting Wednesday morning, transacting only routine business and discussing several matters of interest to the trade. The present officers were reelected. They are:

President, Philip Weston, Byron Weston Company, Dalton, Mass.

First vice-president, W. M. Crane, Jr., Crane & Co., Inc., Dalton, Mass.

Second vice-president, Chairman Sulphite Bond Division, A. H. Nevius, Miama Paper Company, West Carrollton, Ohio.

Secretary-treasurer, E. H. Naylor.

Executive Committee: Chairman, Philip Weston, Byron Weston Company, Dalton, Mass.; W. M. Crane, Jr., Crane & Co., Inc., Dalton, Mass.; A. H. Nevius, Miama Paper Company, West Carrollton, Ohio; D. K. Brown, Neenah Paper Company, Neenah, Wis.; A. H. Dwight, Hawthorne Paper Company, Kalamazoo, Mich.; E. A. Oberweicer, Whiting Plover Paper Company, Stevens Point, Wis.; A. R. Smith, Keith Paper Company, Turners Falls, Mass.

Member of Advisory Council of American Paper and Pulp Association, Philip Weston, Byron Weston Company, Dalton, Mass.

ADDRESSES WOODLANDS SECTION

W. V. S. Happener of the R. V. Atkins & Co. addressed the Woodlands Section on Wednesday on "Saws as an Element in Conservation." Mr. Happener, who is a manufacturer of saws for cutting and preparing wood for various uses, told of the many problems of ways and means for doing this work with the least waste and of the progress which has been made in solving them, especially along the line of saving in remanufacture of wood products after the lumber has been cut at the mill.

He said fifteen years had been spent in experimenting to develop a power machine that would overcome discouraging operating problems, namely: the first cost and upkeep. The last trial was with a chain saw, really a link belt made up of chain-saw teeth operating over sprockets driven by gasoline motor. This device was tested in Carolina pine, West Virginia hardwood, Louisiana pine and when the direct question was put to each timberman, "Will you buy one or two machines at $1,200?" only one answer was "yes."

The speaker then told of tests made of narrow band saws, a circular saw machine, etc. and then said: "To sum up the whole matter of logging, it comes to one conclusion. Low stumps can be attained by the use of a chain saw, driven by a gasoline air-cooled engine, the saving of timber being offset by the extra cost of operation."

COVER PAPER MANUFACTURERS

At the meeting of the Cover Paper Manufacturers' Association held in Room 110 on Tuesday afternoon, the election resulted in the choice of the same officers that govern the association at the present time for another year's service. They are as follows:

President, D. L. Quirk, Jr., Peninsular Paper Company, Ypsilanti, Mich.; vice-president, B. A. Franklin, Strathmore Paper Company, Mittineague, Mass.; secretary-treasurer, E. H. Naylor. Executive committee, chairman, D. L. Quirk, Jr., Peninsular Paper Company, Ypsilanti, Mich.; B. A. Franklin, Strathmore Paper Company, Mittineague, Mass.; Minor M. Beckett, Beckett Paper Company, Hamilton, Ohio; member of Advisory Committee of A. P. & P. A., D. L. Quirk, Jr., Peninsular Paper Company, Ypsilanti, Mich.

TISSUE PAPER MANUFACTURERS

The Tissue Paper Manufacturers' Association met in room 110 Tuesday morning. The attendance was larger than usual. A few matters were discussed but no business other than the election of officers was transacted. The present officers were all reelected to another term. They are as follows:

President, F. W. Hoefler of the Oswego River Paper Mills, Phoenix, N. Y.

Vice-presidents, J. B. Rieg of the Erving Paper Mills, Erving, Mass., and H. W. Brightman of the Northern Paper Mills, Green Bay, Wisconsin.

Secretary-treasurer, Emmett Hay Naylor.

WOODLANDS SECTION OFFICERS

The Woodlands Section held its election of officers Wednesday afternoon, selecting the following to serve for 1925.

President, George N. Ostrander, Finch, Pruyn & Co., Glens Falls, N. Y.

Vice Presidents, George W. Sisson, Racquette River Paper Company of Potsdam, N. Y., and N. B. Collins of the Dill & Collins Company, Philadelphia.

Executive Committee, C. W. Hurtubis, Hammermill Paper Company, Erie, Pa.; Howard E. Beedy, Oxford Paper Company, New York; Franklin E. Bragg, Orono Pulp and Paper Company, Orono, Me.

Secretary-Treasurer, O. M. Porter.

WAXED PAPER MANUFACTURERS

The American Waxed Paper Manufacturers Association decided at its annual meeting held Tuesday to continue the work of research into the new uses of waxed paper, and found that the advertising campaign now under way is having excellent results. There will be established an equipment and supply exchange, for the service of the members. Officers elected were: President, W. L. Carter, Nashua Gummed and Coated Paper Company; Western Vice-President, C. R. Donnelley, Central Waxed Paper Company of Chicago; Eastern Vice-President, A. H. Havameyer, Package Paper & Supply Company, Springfield, Mass.; Secretary-Treasurer, O. M. Porter.

U. S. PULP PRODUCERS

The United States Pulp Producers Association at its annual meeting Tuesday, voted to carry on with greater efficacy its present operating efficiencies work, and its statistical service, and heard an illuminating report on Scandinavian sulphate conditions by Elias Olsen. Officers elected were: President, Herman Elsas, Continental Bag & Paper Mills, New York; Eastern Vice-President, J. P. Hummel, Hummel Ross Fibre Corporation, Hopewell, Va.; Western Vice-President, D. C. Everest, Marathon Paper Mills Company, Rothschild, Wis.; Secretary-Treasurer, O. M. Porter.

PRESIDENT'S LUNCHEON

The President's luncheon held at 1.30 Thursday afternoon in Room 115, was termed "A Foreign Trade Luncheon." It was one of the most interesting gatherings of the kind the Association has ever had. The guest of honor and the speaker of the day was O. K. Davis, Manager of the Foreign Trade Council, who spoke on "Some of the Aspects of Foreign Trade." He gave emphasis to various reasons why the paper men should pay greater attention to foreign trade and its problems. There were about forty present, including an unusual representation of Past Presidents of the Association.

GLAZED PAPER OFFICERS

At the meeting of the Glazed and Fancy Paper Manufacturers Association held Wednesday afternoon, officers were elected for the ensuing year as follows:—

President, A. H. Shuart, Springfield Glazed Paper Company.

Vice President, A. S. Guggenheim, United Manufacturing Company.

Treasurer, G. Frank Merriam, Holyoke Card and Paper Company.

Secretary, O. M. Porter.

OTHER LUNCHEONS HELD

Several other organizations held luncheons during the convention. The Paper Makers' Advertising Club had luncheon in Room 112, on Wednesday noon and the American Association of Paper Specialty Manufacturers in Room 142 at the same time. Thursday afternoon the Binders Board Manufacturers Association had luncheon in Room 112. None of these had any particular features, the gatherings simply exchanging ideas and discussing in an informal manner trade conditions and other matters of trade interest.

WRITING PAPER DIVISIONS

The Middle Grade Division, Sulphite Bond Division and Fine Paper Divisions of the Writing Paper Manufacturers Association all held meetings Wednesday afternoon. No business was transacted at any of the sessions, the time being spent in general discussion of subjects of especial interest to the divisions at this time.

ADVISORY COMMITTEES MEET

On Wednesday afternoon meetings were held by the Advisory Committees to the Department of Commerce and Bureau of Standards. The time was largely spent in talking over the conferences which have been held during the past year and in discussing the program of work for the year.

WRAPPING SERVICE BUREAU

At a meeting of the Wrapping Paper Manufacturers Service Bureau held in the Tea Lounge on Wednesday various projects touching the interests of the Wrapping Paper Industry were taken under consideration. No actual business was tranacted.

TECHNICAL ASSOCIATION MEETS

Tenth Annual Meeting of the Technical Association of the Pulp and Paper Industry Is Held at the Waldorf-Astoria, New York

George K. Spence of the New York and Pennsylvania Company Is Chosen President of the Organization for the Ensuing Year—Retiring President Pays Tribute to Men from Whose Inspiration TAPPI Was Born and Says that Organization Is Now So Well Established that It Is Certain to Continue an Influence of Great Helpfulness in the Industry—Secretary-Treasurer MacNaughton Presents Good Report.

The tenth annual convention of the Technical Association of the Pulp and Paper Industry held at the Waldorf-Astoria Hotel February 3 to 5 was unusually well attended by technical men from all over this country and Canada and was undoubtedly the most interesting meeting in the history of the association. President H. S. Taylor delivered his annual address Tuesday morning as follows:

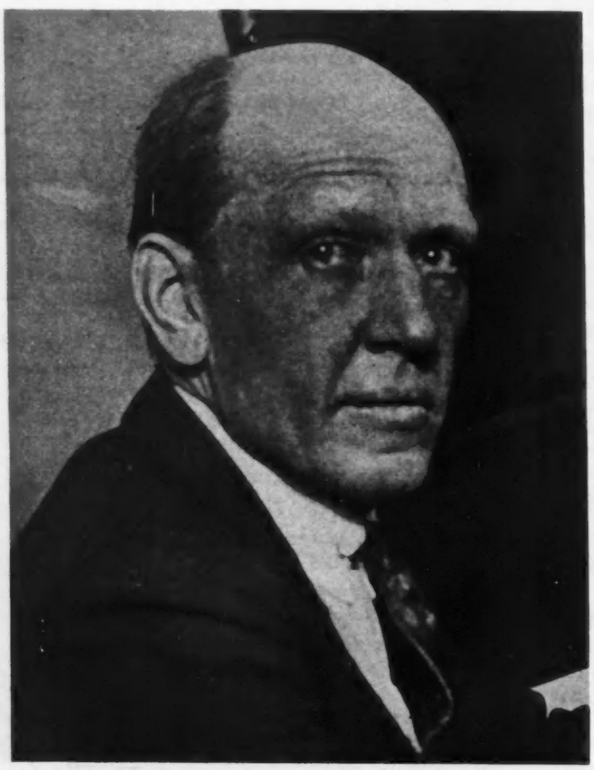
PRESIDENT'S ADDRESS

Again we assemble at the opening session of the annual meeting of our Technical Association, and there is a special pleasure this morning in greeting you who are here, and those to come, and bidding you one and all a welcome to this year's gathering, for it marks the tenth anniversary of TAPPI.

Ten years of endeavor and good fellowing have been meted out to many of us under the banner of our beloved TAPPI, and many others have seen a portion of this period pass while within its ranks. Ten good years they have been, and we should at this year's meeting honor those three gentlemen who, in the year 1914, conceived and acted upon an inspiration to form an Association to be known as the Technical Association of the Pulp and Paper Industry, the tenth anniversary of which we attended this year.

Henry W. Stokes, that most able executive and leader of the Industry today; Harry E. Fletcher of unquestioned ability in all lines of commercial endeavor, as well as pulp and paper; and Professor R. H. McKee, who knows chemicals, and the science of chemistry, as the master knows his pupils, were the three who jointly laid the cornerstone of TAPPI, and passed it on to us who come after to build and extend.

The scope of this association has broadened and become more varied, as it must in the natural course of progress. To stand still in science, or any form of endeavor for that matter, spells backward, and with industrial and economic conditions becoming more intricate each year, this Association must do more in the next few years, to lead on to a greater efficiency in the handling and manufacture of product, together with the selection and treatment of raw materials, than may have ever been considered during the past ten year period.



WILLIAM G. MACNAUGHTON, SECRETARY

Keep in mind always, however, no matter how great the stress and rush of work, that in an exchange of ideas and experience often lies the greatest asset to advancement. Your fellow worker may have the bit of knowledge that will help you, and you may have the bit he needs, and this fact is one of the reasons for such an association as ours. To meet and exchange ideas and events of the past half year, and often with them the viewpoint too, is of unquestioned value, for to start right in any undertaking is the surest safety factor for a successful result, and where better can the information that will provide the right start be secured than from within the ranks of an association such as yours.

Again, such institutions as the Forest Products Laboratories at Madison, Wis., and Montreal, P. Q., and the Bureau of Standards at Washington, D. C., should receive our most earnest support, for in the practical application of theory and principle, most valuable assistance has been, and will be given to us as an Association, and also individually. We have many members of the staffs of these institutions as members of our Association, thus allowing us to work closely with them and their organizations, which can but be greatly to the advantage of us all.

To the new and younger members, let me say, that the expression of your ideas and findings, are desired by this association just as much as those of the older members, and in many ways more so, for it is you who will carry on the active work of TAPPI, and the sooner you take a part in its affairs, the sooner you will find the enjoyment that it will bring to you, and the benefit that will accrue.

Experience, while a hard task master, nevertheless has been, and always will be, the foremost teacher of the race, and therefore, ride over that feeling of diffidence, and bring on your papers and discussion, for we need and must have willing workers, the capacity for which is in many a younger member, once he forgets this fact, and lets himself be heard, and selected for active work in one or the other of our standing committees.

As this is the last meeting over which I will preside as your President, I wish to thank you one and all for the unstinted co-operation and good fellowship that you have given me, and which has made these past two years the most enjoyable to me, of perhaps any that have proceded them.

To your secretary, W. G. MacNaughton, should be given unlimited praise for his work in the association's behalf, and I wish to thank him most sincerely for his help and kindness to me. You will go very far before you can find one who would do what your present secretary has done in the behalf of TAPPI.

Another member whom I wish to thank is R. S. Kellogg, who is working at all times in behalf of this association, and who has never failed it when his time or experience was needed. I sincerely trust that Mr. Kellogg will remain a member of the Executive Committee, for he is needed in this capacity by the association.

To the chairmen of all standing committees I wish to express thanks for the work they have done, and to repeat from former addresses, that it is you, the committee chairmen, that the association must look to for results, and it is your duty to the association and to yourselves to select those members on your committees, who will give of time and endeavor in preparing data and description for presentation, for in this way, and only in this way, will the association function to the best advantage.

I have talked somewhat longer than usual this morning, but it is the last time, and I have had much to say. This association will go on, bigger and better than we have any thought of today. The first ten years can be but a beginning in any association's life, and with the future before it, and the talent that I know is back of it, real interest by our membership, with attention to detail and hard work, will carry it to achievements as yet little dreamed of.

REPORT OF SECRETARY-TREASURER

William G. MacNaughton, secretary-treasurer, submitted the following report:

In connection with the work of my office I beg to report as follows:

Publications

Technical Section

In the publication of the Technical Association Section of the *Paper Trade Journal,* of which each member receives a subscription, our relations with the publishers and editorial staff have continued to be eminently satisfactory. During the year numerous original papers and translations of great value from foreign publications have appeared in it.

The publication in *Pulp and Paper Magazine* and *Paper Mill* of the Abstracts of Current Literature, prepared by C. J. West and the able members of his committee, have been appreciated. These journals, as well as *Paper* and others to which I have been able to supply Association Material without detracting from our own Technical Section, have extended us many courtesies.

Technical Association Papers VII (1924)

About the middle of the year the proceedings of the 1924 Annual Meeting, together with some valuable additional material, were issued and a copy sent to each member. This number contained a translation by B. L. Kassing of Doctor Lorenz's "Colloid Studies in Rosin Sizing" and translations by W. E. Byron Baker and G. P. Genberg of three valuable articles by Dr. Peter Klason. It also carried the Bibliography of Paper Making for 1923 prepared by C. J. West and A. Papineau-Couture.

Standard Methods of Testing Materials

Shortly after the Annual Meeting there was issued a companion handbook to *Paper Testing Methods,* on standard methods of testing materials, prepared by H. U. Kiely and her committee.

These two handbooks have had a distribution that has warranted their preparation. They are of particular value to chemists entering the industry and to mills undertaking the technical control of their manufacturing.

Index and Folders for Technical Section

The Technical Section has continued to be paged independently of *Paper Trade Journal,* and for each volume of six months C. J. West has prepared an index. This makes it possible for members to bind their Section with the index. The index is available separately and also at a nominal cost strong folders that will accommodate the Section for three months.

The demand for the indexes and folders has been small and if they are to be continuously available members must make use of them.

Manufacture of Pulp and Paper, Volume IV and V

Early in the year a forward step in the work of the Joint Vocational Education Committee and its able editor, J. N. Stephenson, was marked by the publication of the fourth volume of the textbooks by McGraw-Hill Book Company. The fifth and final volume is now ready for delivery.

While the demand for the Association publications and also for the textbooks, as well as Smith's "The Action of the Beater" which we distribute, has been fairly satisfactory, I would urge that the members assist the Association by giving publicity to their friends and associates regarding them.

Papermaking Reference Library

As a suggestion for a reference library containing the minimum amount of material, I would offer the following:

Manufacture of Pulp and Paper, 5 volumes, J. N. Stephenson, Editor. McGraw-Hill Book Company, publishers. $5 per volume.

Witham—Modern Pulp and Paper Making. Chemical Catalog Company, publishers. $6.

Sutermeister—Chemistry of Pulp and Paper Making. John Wiley & Sons, Inc., publishers. $6.

Kellogg—Pulpwood and Wood Pulp. McGraw-Hill Book Company, publishers. $4.

Smith—The Action of the Beater. $3.60.

Paper Testing Methods. $3.

Standard Methods of Testing Materials. $3.

Technical Association Papers, Series III to VII available. $3 per copy. Series V, VI, VII contain West's Bibliography of Paper Making.

Technical Association Section, with Index, containing Abstracts of Current Literature. Gratis to members.

Service to Members

Under the plan inaugurated two years ago a considerable number fo inquiries on many subjects have been handled and it is believed that the plan has been of material value to the members who participated. Each inquiry is published in blank in the Technical Section and a mimeographed copy sent to a number of members believed to be conversant with the problem. As the replies are received a copy in blank is sent to the inquirer and when all are received a complete transcript of the inquiry and replies in blank is sent to all who have participated in the discussion.

Sections

A Section of the Association was formed in Dayton, known as the Miami Valley Section of the Technical Association, with Arthur B.

Harvey as chairman and James J. O'Connor as secretary. A number of meetings have been held in different papermaking centers in the Miami Valley. It is hoped that during the present year several more sections will be formed which will serve to stimulate the interest of our members and others in the scientific study of their manufacturing problems. I would urge the support of all of our members in this undertaking.

Membership

Since the last Annual Meeting, in spite of the usual number of resignations, the individual membership has increased from 539 to 553. The Corporate Membership has suffered a decrease of one firm. The membership for 1924 and 1925 is classified as follows:

	1924	1925
Members	347	356
Associate Members	102	126
Juniors	90	71
Corporate Members	32	31
Total	571	584

In addition there are a number of applications for membership.

In the paper industry there are several times as many eligible to membership as we have at present. There are many companies having from one to several plants without a representative in the Technical Association; there are many also where there is but a single member. I would urge the members to analyze the value which membership in the Association is to them personally as well as to their employers, and present their findings to their friends and colleagues and invite them to join the Association.

We have been honored this year in the election to membership of several distinguished paper mill engineers not only of the United States and Canada but also of Norway and Sweden. One of them, Otto Nordstrom of Stockholm, appears on the program of our convention in collaboration with A. J. T. Taylor of Toronto, also a distinguished engineer.

During the past year we welcomed to Corporate Membership the St. Regis Paper Company, Watertown, N. Y., where for a number of years we have had Charles H. Plantz as a member. In the same period we had to suffer the withdrawal of two companies by resignation.

As the work of the Association is devoted, in its last analysis, to the development of the paper industry, I would urge the officers and members again to bend a part of their effort this year towards increasing the number of individual and Corporate Members on our books. It would be easy to demonstrate that in most cases the modest cost of membership is more than offset by the value of the direct service that goes to the members.

Meetings

In October, 1924, a Fall Meeting was held in Buffalo which continued two days and was devoted largely to practical manufacturing problems. On that occasion we had the honor of the attendance of R. W. Hovey, chairman of the Canadian Technical Section; Magnus Christiansen and Paul Naucke, presidents, respectively, of the Norwegian and the German technical associations, as well as over 125 of our own members. I am pleased also to record that following the Fall Meeting Magnus Christiansen and A. C. Skjenneberg, his chief engineer, have been elected to membership.

During th past year our Association lost, through a fatal accident, one of its original members, Olai Bache-Wiig, vice-president and general manager of Wausau Sulphate Fibre Company, Mosinee, Wis., a distinguished engineer, who, although a young man, had introduced the sulphite pulp industry on this continent and had built several of the most successful sulphate pulp mills in America.

We have also to record the loss through death of a very good friend of the Association, Frank B. Gilbreth, whose fame as an industrial engineer was world wide. Mr. Gilbreth, whose topic was "The One Best Way of Doing a Job" addressed the Association several times and was frequently a guest at our annual dinners. Since his death his wife, Mrs. Lillian Gilbreth, who was his engineering colleague, is successfully continuing the work in which they were associated.

Tenth Anniversary

When the original members of the Technical Association review its ten years' history and accomplishments, they cannot but agree that what it has done has justified its existence. Besides its specific accomplishments in the standardization of the quality of materials and products, the preparation of five volumes of *Manufacture of Pulp and Paper,* the stimulation of vocational education, the establishment of technical control in manufacturing, and the war on waste of materials in the industry which it initiated, it has served as one of the chief stimulating influences for applied engineering in the pulp and paper industry.

It must be recognized, however, that many of the members lose a large part of the potential value of the Technical Association by failure to participate in the work of the committees. While in some cases this is due to the restrictive policy of their companies it is unfortunate that this should be so. The problems dealt with in the Association are those of general interest and there is no desire to pry into secret processes if there are any such in the industry.

While in the past ten years may be noted a marked advance generally in the industry, along the lines of greater economy and enlarged production, what has been done only emphasizes how much is still lacking.

An extended treatise might be written on the work the Association could do for the industry in the next decade or two, with the co-operation of other associations, engineering bodies and the state and federal bureaus interested in different phases of the problems.

In conclusion I would express my appreciation to the members who have so freely assisted me during the year and also in particular to the Bureau of Standards and the United States Forest Products Laboratory, both of which are doing conspicuous service for the industry.

TECHNICAL ASSOCIATION OFFICERS

The great interest which marked all the meetings of the Technical Association culminated in the meeting on Wednesday afternoon when the chief matter of business was the election of officers. The following were elected:

President, George K. Spence of the New York and Pennsylvania Company.

Vice-president, E. C. Tucker of the Chemical Paper Manufacturing Company of Holyoke, Mass.

Secretary-treasurer, W. G. MacNaughton.

The two new members elected to the Executive Committee are R. S. Kellogg, secretary of the News Print Service Bureau, and D. C. Everset of the Marathon Paper Mills Company.

A pleasant feature of this session was the presentation of a set of books, de luxe edition, to J. N. Stephenson, editor of text books.

AMERICAN WRITING PAPER CHANGES

Edward M. McDonnell of Hyde Park has been secured by the American Writing Paper Company to act as manager for the Crocker & Albion Divisions of that Company. He assumed his new duties yesterday. He was born in Holyoke learning the business at Holyoke paper mills. Several years ago he joined several others in conducting a paper mill at Carlisle, Penn. Previously was superintendent of the Tilestone & Hollingsworth Company at Hyde Park. He is very well known in the paper trade.

M. Hazen Chase will be placed as manager of the Mt. Tom, Nonotuck, Gill and Norman Divisions acting as contact man for William Nixon who has general charge of the coarse paper mills and Leon M. Yoerg who has charge of the finer grade papers and mills manufacturing them.

Technical Association Papers and Reports

Presented at the Annual Convention of the Technical Association of the Pulp and Paper Industry at the Waldorf-Astoria, New York, February 3 to 5, 1925—Representative Men in the Pulp and Paper Industry Discuss Numerous Problems of Timely Interest

The Alexander Electric Paper Drier

By John E. Alexander*

In the past few years electrical energy has been used in practically every phase of industrial work and the development of larger hydro-electric units has made this commercially possible. In the paper industry electrical energy has been used for practically every purpose except drying the paper directly. All classes of papermaking machinery are now generally motor driven, and even steam boilers are operated electrically where energy is cheap.

The use of electricity for drying the paper directly has been talked of for many years, and various electrically heated rolls and similar devices are shown in the patent office records.

Development

In 1910 the writer visited several of the large mills and water power developments on the Pacific coast and became interested in this phase of papermachine development. Following this, rather extensive experiments were carried out with various electrically heated drying cylinders. The results of these experiments was the abandoning of the cylindrical drier on account of its mechanical disadvantages, and attention was turned towards the possibility of drying the paper on a web of wire.

In 1916, while at the Armour Institute of Technology at Chicago, a design was worked out which looked commercially possible. This design was developed and a complete experimental unit was constructed in 1922. This unit consisted of an experimental digester, beater and a complete paper machine. A cylinder mold was used instead of the fourdrinier wire. The sheet of paper was 20 inches wide and passed through two presses before entering the electric drier. The electric drier chamber itself was 16 feet long and the paper was carried on endless 60 mesh fourdrinier wires passing through the electrically heated chamber seven times.

Space heaters were used for heating and a very elaborate and flexible control system was installed to give every possible combination of heat control.

This was strictly an experimental machine, and was operated for nearly two years, during which time many ideas were developed and tried out. Special attention was given to various methods of baffling and recirculating the air in an effort to increase the efficiency of heat application. Various temperatures were tried out, and it was at this point in the development that the use of temperatures above ordinary steam pressures were developed. The abandoning of air to carry away the vapor from the paper followed very quickly, and brought out the point that with the temperature of evaporation above the boiling point of water that the large volumes of air required in the ordinary paper machine to carry away the moisture were no longer necessary, as this passes away in the form of superheated steam, which is a gas in itself and needs no conveyor.

*Member TAPPI, Treas. and Asst. Gen'l Mgr. Nekoosa-Edwards Paper Co.

Many grades of paper were made successfully on this experimental machine, including Kraft, bond, sulphite wrappings and news, and it was decided to proceed with the construction of a medium sized commercial unit.

First Commercial Machine

In 1924 work was started on a 94-inch standard fourdrinier paper machine with an electric drier unit designed to run 300 f. p. m. on standard news and with equipment for commercial production of 1,000 pounds per hour. After 6 months of intensive construction work the first sheet of paper was produced July 7, 1924, and the machine has been in operation since that time.

The accompanying drawings and illustrations indicate the construction of the machine quite clearly, but a brief general description will be given in the following paragraphs.

The electric drier section consists of a brick oven which in this installation is approximately 36 ft. long, 17 ft. wide and 12 ft. high. The walls are 14 inches thick and consist of two 4-inch courses of brick with 6 inches of mineral wool between them. With this construction the heat loss by radiation was reduced to a minimum. The oven walls are practically room temperature, and a recording thermometer laid on the roof averaged about 110° F.

The oven is built around a structural steel frame which supports the roof and all of the bearings and working parts of the machine. This frame is rigidly braced and is set on sole plates similar to the regular paper machine, and adequate provision is made for expansion and contraction without possibility of its getting out of alignment.

The oven is divided into three compartments; one outer chamber approximately 5 feet long at each end and an inner chamber 27 feet long in which the actual drying of the paper takes place. The paper makes 5 passes through the machine being carried back and forth between 6 endless fourdrinier wires which run over 6 rolls at each end of the machine. The rolls at the wet end of the machine are driven by gears, while the rolls at the opposite end are driven by the wires themselves. These breast rolls are mounted on suitable carriages with counter weights for taking care of the expansion and contraction of the carrying wires.

Carrying Wires

There are 6, 69 feet long by 88 inches wide wires used in the machine. Each wire is supported between end rolls by one 8½-inch guide roll and 6 4½-inch table rolls. The breast rolls, drive rolls and the 6 guide rolls are in the end compartments, and the table rolls are all in the inner compartment. In this way it is possible to maintain the inner chamber at temperatures above 450° F., while the end compartments are about 250° F.

The method of changing wires is very similar to that long in use for fourdrinier wires on a standard paper machine. The table rolls, guide rolls, baffles and heating elements inside of the loop of the wire to be put on are all removed and carried out of the oven. The tension in the wire is relieved by removing the weights from the breast roll counterweighing system, and the breast roll itself is rolled out on suitable carriage. The balance of the operation is similar to changing the wire on the wet end of the standard fourdrinier machine.

At each corner of the machine there is a large door giving access to the end compartments at both the front and back sides. When these doors are opened the end compartments cool off sufficiently so that one may enter to make any necessary adjustments. If they are not opened for too long a period, this does not have any noticeable effect upon the drying.

All of the drive rolls, breast rolls, guide rolls and table rolls are carried in water cooled bearings which are lubricated with a heavy grease.

Practically all of the evaporation of moisture from the sheet takes place in the inner chamber. Slight pressure is maintained in this chamber to preclude any chance of air in filtration. This vapor escapes into the end compartments, where it is removed by exhaust ducts connected to the exhaust fan. These outer chambers are built as tightly as possible with the idea of reducing air leakage to a minimum and thereby reducing the volume of the exhaust vapor and making the recovery of heat in this vapor easier. Suitable dampers are located in the exhaust ducts to control the flow of exhaust vapor. In this first commercial machine the temperature of the vapor in the exhaust stack averaged 195° F. dry bulb and 161° F. wet bulb with the machine running 220 f. p. m.

Application of Heat

The heat is applied to the paper by open type radiant heating elements in contrast with the space heaters on the experimental machine. They consist of two radiant type chromium heating coils supported on insulating bricks which are in turn held in a steel channel carried on the frame of the drying oven. These elements operate at a nominal voltage of 440 v. They are all located inside the central compartment, and are distributed to give suitable temperature gradient through the machine. Each section of heating elements is controlled by automatic thermostats on the main switchboard.

Suitable safety devices are installed to take care of (a) proper running of the fourdrinier wires, (b) slowing down or stoppage of the machine drive, (c) break in the paper.

The paper is fed through this machine by hand very easily, and it was not found necessary to use automatic feeding devices, although these can be very readily applied.

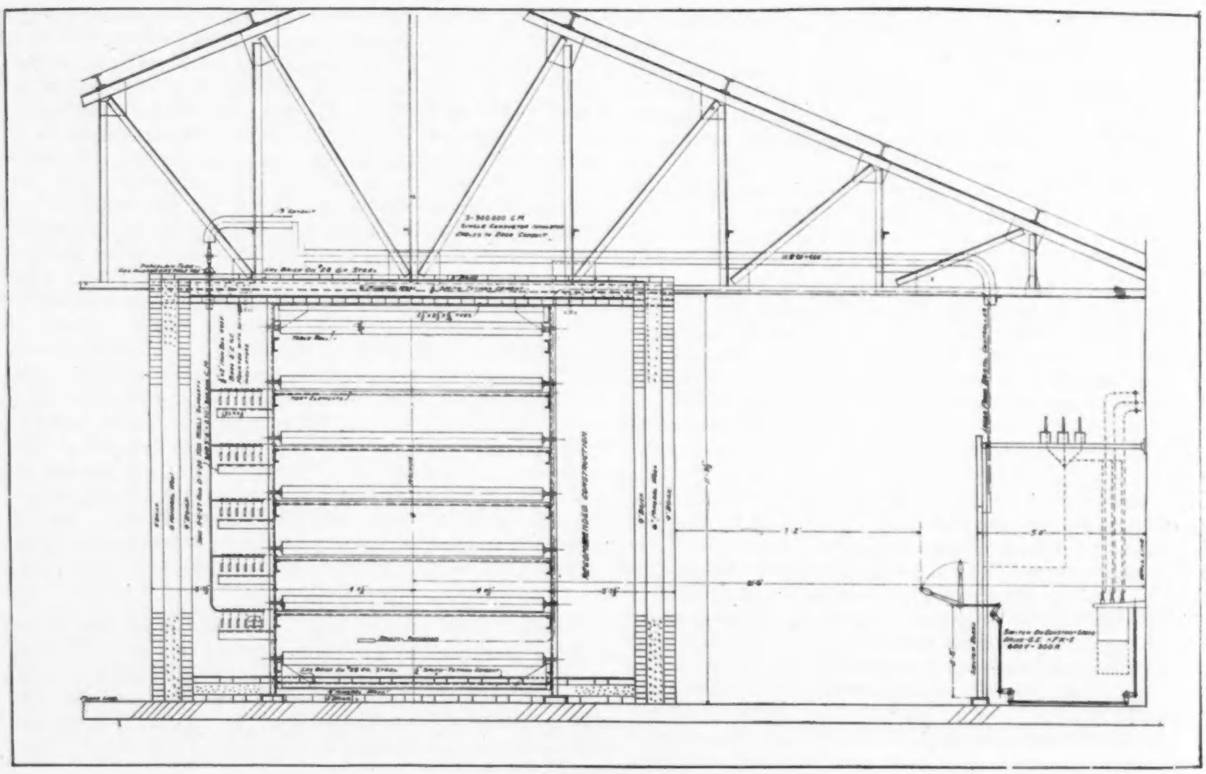
Character of Product

In addition to the many mechanical advantages discussed later, the strength and character of the paper produced by the electric drier is very noticeable. With the standard steam driers the paper is held against the drier by the drier canvas, and is prevented from shrinking as it dries. This characteristic is emphasized in the case of the Yankee drier where the web of paper is *stuck* on to the polished surface and can shrink very little. This results in a tendency to strain the fibers in the process of drying and makes it more difficult to get a strong sheet.

In the electric drier the paper is held loosely between the carrying wires and is in effect a loft dried sheet. Under these conditions the maximum strength, toughness and pliability is developed.

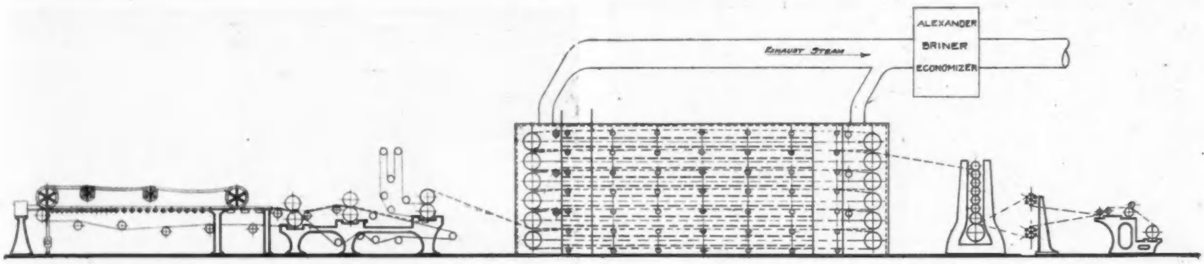
Floor Space

The electric drier for a given machine will be much shorter than the steam drier section with a material saving in building cost and maintenance and better operating conditions due to shorter drier section.



ALEXANDER ELECTRIC PAPER DRIER

Cross Section of Machine and Drying Chamber showing Bus Bars, Heating Elements, Control Panel—Commercial Machine.



FRONT ELEVATION

ALEXANDER ELECTRIC PAPER DRIER

Front Elevation and Longitudinal Section of Commercial Machine at Plant of Nekoosa-Edwards Paper Company, Port Edwards, Wis.

Drier Canvas

The drier canvas on the regular machine is replaced by the carrying wires and should effect considerable savings.

Breaks in Driers

We have never had a break in the electric drying chamber, and it is not uncommon to run between washups without a break from any cause whatever. This will appeal to those familiar with this very noticeable trouble in the ordinary steam drier machine.

Moisture Control

The simplicity and accuracy of electrical heat control is apparent and needs no amplification. Drying conditions can be changed almost instantly to suit operating conditions.

Working Conditions

With the electric drier practically all the heat and moisture is in the closed chamber. The ordinary machine room is either excessively hot and damp, or a very elaborate and expensive heating and

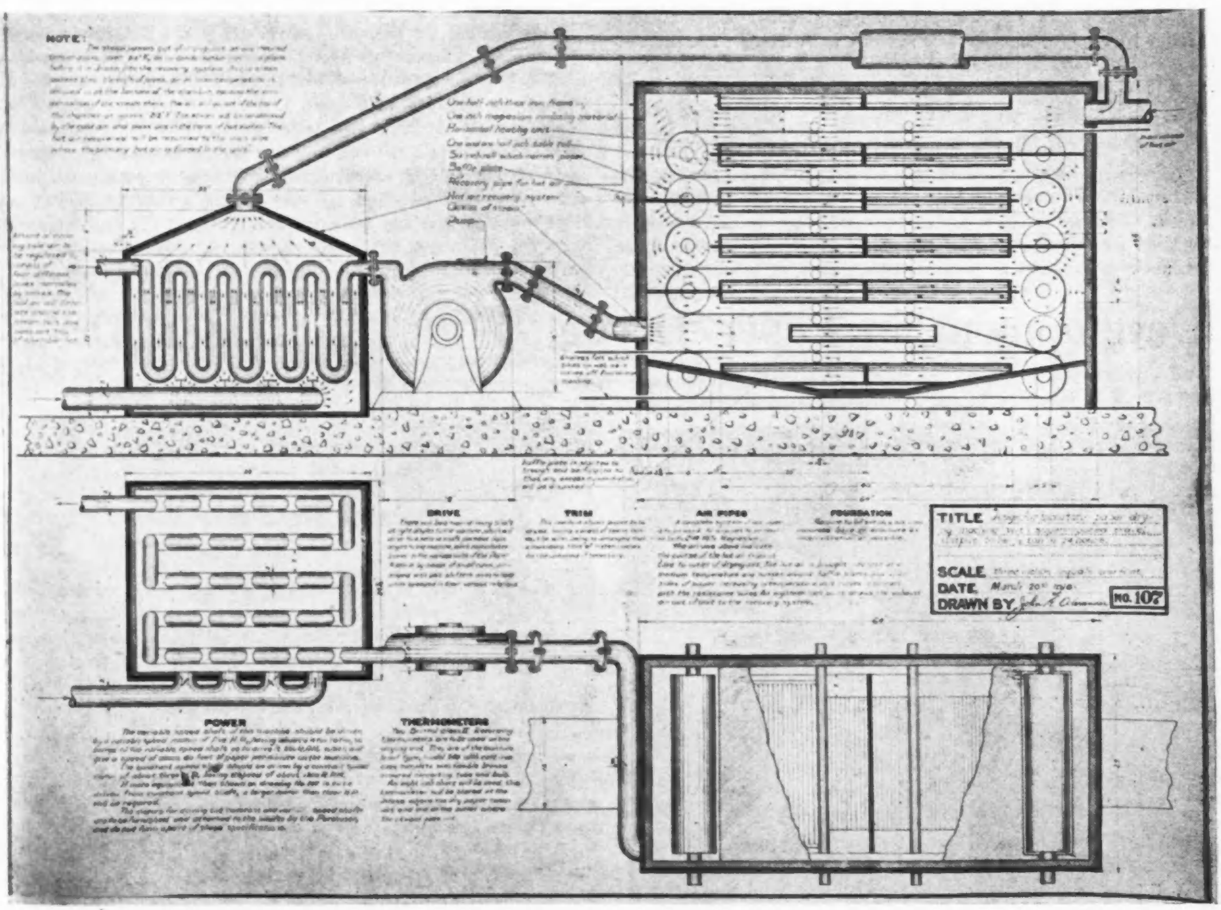


FIG. 1

ALEXANDER ELECTRIC PAPER DRIER

Experimental Size—Showing Plan, Longitudinal Section and Method of Circulating the Air.

ventilating system is necessary. The electric drier machine room will be as comfortable as any ordinary room.

Heating and Ventilating

The ordinary machine room requires about 1,000 c. f. m. of warm air per ton per day, for machine room ventilation. There will be practically no ventilation required in the electric drier machine room and air will be needed only for heating and for ventilating over the wet end of the papermachine. This will make a very noticeable saving in both installation and operating expenses.

Power

This machine is ideal for the use low priced electric power. In places where there are extensive hydroelectric developments or possibilities in this direction the price of coal is generally very high. The use of electricity for drying should effect a considerable economy under such conditions.

Application

The electric drier may be installed as the entire drying unit of a new papermachine or may replace present steam driers. It can also be used to supplement present steam driers by adding an electric drying unit to the present installation.

Air, Water and Dirt in Driers

The removal of air and water from the steam drum drier has always been a big problem and has never been really solved. The steam packing boxes and expansion joints have always given trouble. Not keeping driers clean inside and outside is undoubtedly responsible for poor operating conditions in many mills today. The accumulation of oil films from exhaust steam on inside of driers increases back pressure and reduces heat tranfer through the drier shell. These problems are entirely eliminated in the electric drier.

Power Required for Drive

The electric drier unit for a given machine will be smaller than the steam drier unit, and will not have the heavy rolls or tight canvas now used. On larger machines we expect that the power required for the electric drier section will be but a fraction of the amount now required for steam driers.

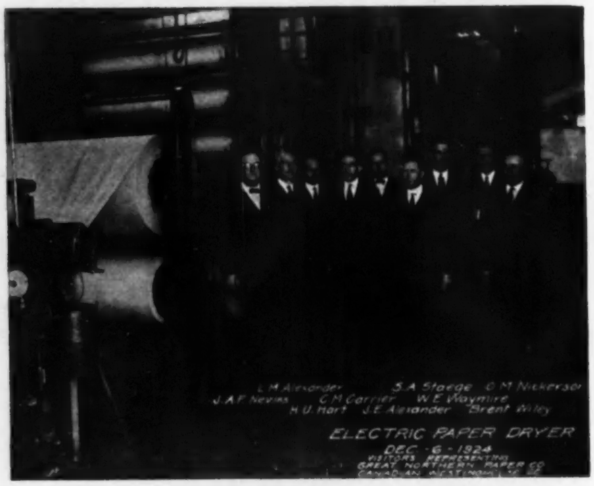


FIG. 3
ALEXANDER ELECTRIC PAPER DRIER
Commercial Machine, 80 Inches in width at Plant of Nekoosa-Edwards Paper Company, Port Edwards, Wis. Shows Discharge End of Machine

Exhaust from Drier

The fact that the moisture is removed in the form of high temperature steam is one of the outstanding features of this machine, and in further development work the drier will be designed to exclude air as much as possible.

Much credit is due to the Westinghouse Electric and Manufacturing Company for the use of a considerable amount of equipment and valuable advice in connection with this experimental work. Also to the Nekoosa Edwards Paper Company and its employees for their lowal support and assistance, and to the J. O. Ross Engineering Corporation and Beloit Iron Works for valuable assistance and advice.

Development in Paper Drying With Alexander Drier

By Stephen A. Staege, General Engineer, Westinghouse Electric & Manufacturing Co.

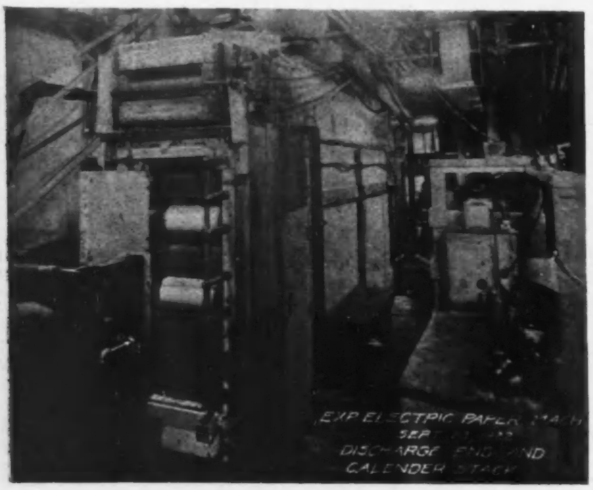


FIG. 2
ALEXANDER ELECTRIC PAPER DRIER
Experimental Machine Showing Discharge End.

The development history of the Alexander Electric Paper Drier, together with illustrated descriptions, general outline and reference to particular characteristics and performance data, have been presented in the preceding papers, and the writer's present object is to bring out some of the high points of interest from an engineering and an economic standpoint that have developed during the operation of the drier.

We have all been so accustomed to thinking that wherever water vapor is present air is necessary to carry it away, and that where enormous quantities of water are evaporated from a sheet of paper, thousands of cubic feet of air must be circulated to remove the water vapor resulting from the evaporation, and it is exceedingly difficult for one to visualize the removal of such large quantities of water vapor without the use of air. Such is the case, however, with the Alexander electric drier.

In a substantially closed chamber, radiant heat from open type electric heating elements falls upon the moving sheet uniformly covering and penetrating every part, raising the temperature of the incoming sheet to the point of evaporation and thereafter furnishing the latent heat of vaporization until all but the desired residual of water has been evaporated.

The heating elements operating at a temperature in excess of 1,000° F. maintain the temperature within the drying chamber well above 212° F., effectively preventing condensation or dripping. Inasmuch as substantially atmospheric pressure is maintained, the water vapor or steam emerging from the sheet at once becomes superheated and this superheated steam is capable of and does act as its own vehicle for its removal from the drying chamber through exhaust flues suitably arranged.

The drying chamber is made as nearly air-tight as possible, with the exception of slits at either end for the passage of the sheet into and out of the chamber.

No Air Required

It is interesting to observe that inasmuch as no air is required to carry out the moisture, no energy is lost in heating such air, and no power is required for operating blowers, etc., for ventilating purposes.

Inasmuch as steam only is removed from the drying chamber, with the exception of a small trace of air, this steam can readily be condensed in an economizer or condenser and practically all of the heat units be recovered for the performance of other useful work, and this recovery of heat can be made at temperatures of substantially 212° F.

Heat Recovery

Although a certain amount of recovery of heat can be made in systems employing air for carrying out the moisture liberated in drying paper, only a relatively small percentage of the total heat energy in the air can be recovered for useful work on account of the considerable amount of energy contained in the air at temperatures below that at which it can be economically used and on account of the large volume of air to be handled.

The electric drier in a way functions much like an electric boiler, the sheet carries the water, the electric heating elements furnish the energy for its evaporation, the steam generated from the evaporation of the water from the sheet emerges from the drier ready to do other useful work. In the case of the electric boiler, water is put into the boiler, electric energy is applied and steam emerges from the boiler ready to dry paper. In the case of the electric drier, however, the paper has already been dried in the process of generating the steam, and the steam is available for other work, adding greatly to the efficiency of the thermal cycle. As will be seen, the work done in the electric drier chamber is only one step in the complete use of electric energy put into the drier.

The greatly increased strength of the sheet dried in the electric drier is another notable factor which has already been pointed out. I attribute this increased strength largely to two factors; first, the

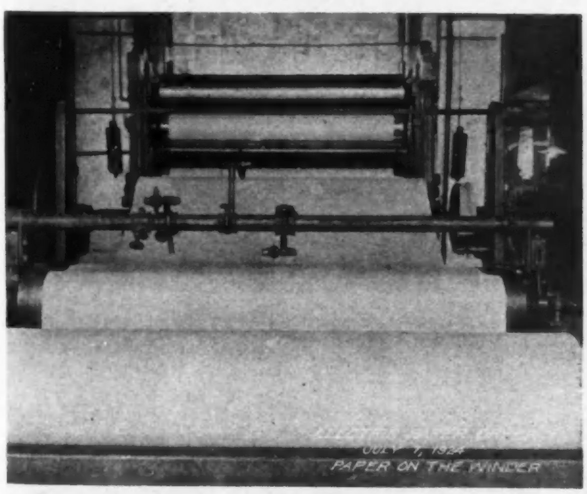


Fig. 4
Discharge End with Calender and Reel of Alexander Electric Paper Drier, Commercial Machine.

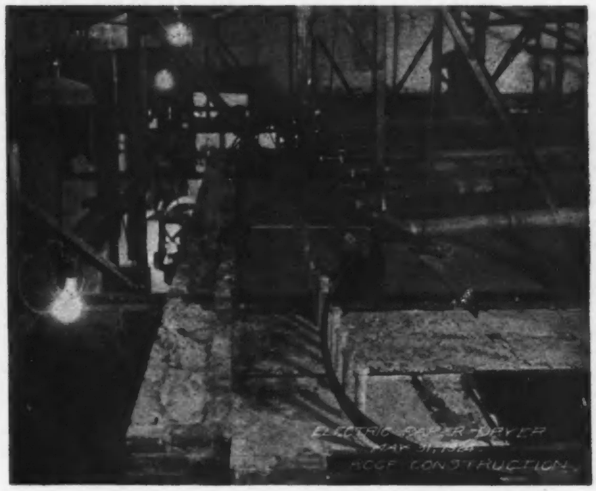


Fig. 5
Roof and Wall Construction of Drier Chamber of Alexander Electric Paper Drier, Commercial Machine.

more uniform drying of all fibers in the sheet from the surface to the center, and second, a drying cycle more nearly approaching the loft dried or air dried principle.

In the case of a sheet dried on the cylindrical drum drier heated with steam, certain fibers in the surface of the sheet come in direct contact with the hot metallic surface, doubtless drying those surface fibers nearly or quite bone dry, whereas, those fibers in the center of the sheet are fairly moist, resulting in an average moisture content of a desired degree when the sheet leaves the drier. The fact that any of the fibers are quite or nearly bone dry tends to make the sheet brash and brittle and detracts from its strength and particularly from its folding strength. Furthermore, when these fibers in the surface of the sheet make contact with the hot metallic surface of the drier drum there are doubtless miniature explosions caused by the rapid evaporation of the moisture in the cells at the surface tending to disrupt and blow apart the fiber formation and thereby tending to weaken the sheet.

Radiant Heat

In the case of the electric drier, the sheet does not come in contact with any hot metallic surface. A considerable part of the heat received by the sheet is obtained in the form of radiant energy direct from the heating elements, and the greater part of the remaining heat received by the sheet comes indirectly from the wire on which it is carried through a film of steam and which in turn receives its heat from the heating elements in the form of radiant energy; the flow of heat, however, through the wire and steam to the sheet is so rapid that the wire does not rise in temperature very greatly above the temperature of the sheet itself, which, of course, cannot exceed 212° F. as long as it carries any substantial amount of water. The wire, unlike the surface of a drier drum, consists mostly of openings between the mesh and makes very slight contact with the sheet. It will, therefore, be seen that the sheet is heated uniformly, and although the rate of heat flow in the aggregate is relatively high on account of the uniformity, it is not high enough at any point to cause explosions of moisture particles or violent ebullition of the water within the sheet at any time or any point; furthermore, and perhaps most important of all, is the fact that none of the fibers in the sheet become overdried, but all of the fibers from the surface to the center are dried with substantial uniformity resulting in greatly increased strength of sheet.

Doubtless, the more uniform application of heat and the more uniform temperature at which the sheet is maintained at all times within safe limits contributes toward the better bonding of

FIG. 6
Drying Chamber of Alexander Electric Paper Drier under Construction Showing Steel Frame in Place to Support Guide Rolls and Heating Elements. Commercial Machine 80 Inches Width.

FIG. 9
Alexander Electric Paper Drier Commercial Machine under Construction—Shows Wall of Drying Chamber and Iron Bus Bars.

the fibers of the sheet with their natural adhesive properties than is possible in the case of a sheet dried on steam heated drum driers where the sheet is constantly changing in temperature as it passes off and on to heated drier rolls and with the necessarily different temperature in different parts of the sheet.

The elimination of the use of air in the drying operation so greatly increases the overall efficiency that many mills who would not have thought it possible may afford to dry electrically.

Decreased Costs

There are many other substantial factors expected in favor of drying with the Alexander electric drier, among which are greatly decreased cost of machine clothing made possible by the entire elimination of drier canvas and the substitution of drier wires; greatly decreased power for driving the drier section; greatly decreased maintenance expense, all of the large drier gears, steam joints, etc.,

FIG. 7
Breast Rolls and Guide Rolls of Alexander Electric Paper Drier Showing Water Cooled Bearings and Automatic Guiding Equipment, Commercial Machine.

FIG. 8
Alexander Electric Paper Drier View Taken Inside the Drying Chamber Showing Table Roll Bearings, Paper Carriers and Air Deflectors. Commercial Machine.

being eliminated; reduction in lubrication cost and practically entire elimination of paper break in the drier section. In addition to this is the elimination of steam, moisture and dripping in the machine room, better working conditions, etc.

In the case of a new installation, there should not be lost sight of the fact that no steam boiler plant would be required for drying the paper, a large saving in capital expenditure.

This electrical drier lends itself admirably to automatic control and drying can be accomplished with a uniformity difficult to obtain with other systems.

On account of the greatly increased strength of the sheet, doubtless great savings in the cost of the machine furnish will be found possible.

Power Requirements

As the power requirements for drying paper with electric drier, let us take a typical case. Assuming that the sheet enters the drier containing 70 per cent moisture and at a temperature of 62°F., that the sheet comes out of the drier containing 8 per cent moisture and at a temperature of 212° and further assuming that the steam evaporated from the sheet becomes superheated 200 degrees, or to an ultimate temperature of approximately 412°F., then the total energy theoretically required to this work, amounts to substantially 2589 B.t.u. or 0.76 Kw. hours equivalent electrical energy per pound of paper dried. This does not take into consideration any radiation losses or losses of any other kind, nor does it take into consideration any further use of the exhaust steam as a byproduct. In actual operation of the electric drier at Port Edwards with substantially the above conditions of drying, we have gotten down to approximately 0.84 kilowatt hours per pound of paper drier over long enough periods of time to conditions which can be obtained with this particular drier. This is equivalent to approximately 90 per cent efficiency and includes all radiation losses from the outside of the drier and also includes the heating of a certain amount of air which, in the case of this drier, leaks into the drier chamber on account of its not having been built tight enough originally to exclude all of the air. Only a very small amount of energy is lost by radiation from the drier and most of this loss is represented by the energy required to heat the air which leaks into the drier. This, with a tighter drier structure, can be largely prevented, so that it is logical to expect a very high operating efficiency.

Thermal Conditions

In order now to visualize the true thermal conditions we should bear in mind that we are obtaining from the electric drier under the conditions outlined 2.07 lbs. of steam per pound of paper dried as a byproduct or approximately 2198 B.t.u. byproduct heat per pound of paper dried, which energy is available for other useful work. This

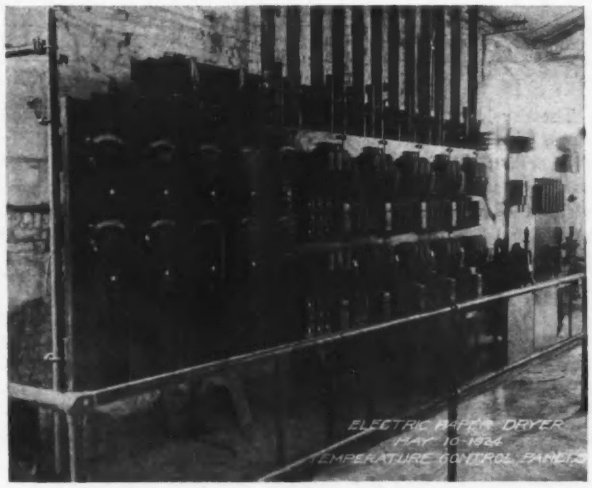


FIG. 10

Temperature Control Panels for Alexander Electric Paper Drier, Commercial Machine.

heat energy is available for heating air or water for mill heating, process work or other purposes, and with suitable facilities this exhaust or byproduct steam can be used for drying paper. In this connection, two different methods immediately present themselves—one, to put this exhaust steam into the familiar drum drier using an adequate vacuum system for the removal of the condensate and the other, to use heated air from an economizer in a paper drying machine designed for the purpose.

From these figures it will be seen that if full use could be made of the byproduct exhaust steam from the electric drier, the electrical energy requirements per pound of paper for drying could be reduced at least one-third.

The relatively short time that the electric drier has been in commercial productive use has demonstrated many pronounced advantages and merits, and has opened up a field of interesting possibilities which may mean much to the paper industry in economic development and technical progress.

The following table gives approximate theoretical values as to energy required for drying with the Alexander electric drier with various percentages of moisture content of the sheet. To obtain the actual energy required the overall efficiency will have to be considered.

TABLE SHOWING EFFECT OF VARYING PERCENTAGES OF MOISTURE IN SHEET ENTERING DRIER UPON THE THEORETICAL KW. HOUR PER POUND OF PAPER REQUIRED FOR DRYING

		Moisture in sheet entering drier.				
		% 75.0	% 72.5	% 70.0	% 68.0	% 65.0
For 100 lb. of Sheet Entering Drier	Pounds of water	75	72.5	70	68	65
	Pounds of stock	25	27.5	30	32	35
	Pounds of finished paper	27.2	29.9	32.6	34.8	38
For 100 lb. of Sheet Leaving Drier	Pounds of stock	0.92	0.92	0.92	0.92	0.92
	Total pounds of water	2.76	2.43	2.15	1.95	1.71
	Pounds of water evaporated	2.68	2.35	2.07	1.87	1.63
	Pounds of superheated steam	2.68	2.35	2.07	1.87	1.63
150° x 0.5 x 0.92 lb. stock	= B.t.u.	69	69	69	69	69
150° x 1.0 x lb. water	= B.t.u.	415	365	322	293	257
966 x lb. water	= B.t.u.	2,590	2,265	2,000	1,800	1.575
200° x 0.475 x lb. steam	= B.t.u.	255	224	198	178	155
Total B.t.u.		3,329	2,923	2,589	2,340	2,056
$\frac{\text{B.t.u.}}{3412}$ = Kw. Hr.		0.980	0.857	0.760	0.685	0.604

BASIS OF FOREGOING TABLE

8% moisture in finished sheet
200° superheat of steam (212°—412°)

150° F. temperature rise of sheet (62°—112°)
Specific heat of stock—0.5

Specific heat of of steam — 0.475

Report of Committee on Sulphite Pulp

By B. S. Summers, Chairman; R. N. Miller, Vice Chairman

The developments in sulphite pulp manufacture in the past ten years, with a few noteworthy exceptions, have been along the lines of general tightening up of the process, and elimination of small wastes. Led by a few farsighted concerns, who realized the possibilities of careful control of the process, the general level of quality and uniformity of the sulphite pulp made in this country has been raised until only the backward mills have difficulty in making pulp suitable or the grades of paper made.

Turning Toward Other Species

The rapid depletion of spruce and balsam forests is turning the eyes of manufacturers toward other species for their supplies. Hemlock already provides the entire wood supply for some mills and hardwoods are gradually being introduced into sulphite pulp suitable for some grades of paper. Further development along this line may be expected. Tamarack is used to some extent where available and jack pine is reported to have been used successfully.

Echos from Europe indicate that efforts are being made there to utilize the more resinous woods and should success appear, the extension of the sulphite process to woods of the type of jack pine, scrub pine, and lodgepole pine will no doubt follow.

Reports of successful utilization of more resinous woods by the introduction of soda base in place of some of the calcium or magnesium have been heard. One quite revolutionary step is the building of a mill to operate with normal sodium sulphite as the cooking chemical. This mill in its operation approaches that of the alkali mills and is more properly considered there than under sulphite. At the other extreme is the report of the successful operation of a mill in Sweden using sulphurous acid alone as the cooking chemical.

Economies in heat are beginning to receive more attention as evidenced by the introduction of the Decker process for cooking sulphite.

The utilization of the waste sulphite liquor containing rather more than half the dry weight of the wood digested, has made progress. In a number of the larger plants a portion of the waste liquor is evaporated and a market is found for the material as a tanning extract, a core binder or a road dressing. For complete utilization and to obviate the stream pollution at present necessary, it is possible that in a few more years the sulphite waste liquors will be applied as a fuel to supply part of the steam required for digestion.

Accompanying the process development and frequently pointing the way, the study of the chemistry of wood and of the reactions underlying the process is adding to the knowledge of the underlying principles, and laying a foundation for the further intensive control of the quality of pulp, and for still more economical utilization of materials.

In the field of bleaching the most notable step has been the introduction of equipment for bleaching at high densities. This field also has seen a gradual application of scientific principles to processing until the old axiom that bleached pulp was necessarily weak has been discarded.

Further development in this field in the use of bleaching agents other than hypochlorite will probably follow.

Special Pulp for Special Purposes

Special pulps for special purposes have been the logical outgrowth of better control of processes and have necessitated the more thorough understanding of methods for determining the quality of pulps. The study of methods for determining the potential paper-making qualities of pulps has been undertaken with a view of determining, first, the effect of variations in cooking conditions on the quality, second, the relation between quality as determined by a beating test and the paper to be made, or in other words the value of the beating test as a measure of the utility of the pulp, and, finally, the selection of a beating test that may be proposed as a standard method.

Report of Sulphate Pulp Committee

By O. S. Egan

The Sulphate Pulp Committee, which was recreated at the last annual meeting of TAPPI, has had considerable difficulty in getting organized. Of the members appointed, only two are situated so that they can take an active part in the committee work. Regardless of this handicap, however, a course of procedure has been partly worked out and with a full committee for the coming year, we hope that much valuable work can be done.

At the time of the organization of TAPPI, the sulphate process had been in operation on this continent but seven year. The first sulphate mill was put in operation by the Brompton Pulp and Paper Company at East Angus, Quebec, in 1907.

During the past seventeen years the number of sulphate mills in the United States and Canada have increased until there are now forty.

Methods of Operation Still Crude

In the sulphate process, as in any other process in its early stages, methods of operation are still crude and only time and labor can refine them. We produce a strong pulp from woods which can not be utilized in the sulphite process. However the pulp is dark colored and hard to bleach. Our chemical losses are high. Our recovery systems are expensive to operate and we throw away thousands of dollars worth of byproducts into the air and sewer every year. Likewise we still have the disagreeable odor from the organic sulphur compounds which advertise the presence of a Sulphate mill for miles around and many of us are still dumping lime sludge into the sewer.

Some work has been done on the bleaching of kraft pulp but to date the results have not been satisfactory because of the excessive decrease in strength of the pulp when bleached to a medium white.

Improvements

In the recovery, improvements have been made in the furnaces and methods of operating. One mill has made a long step in advance in the recovery. Other mills will follow but it is the writer's opinion that recovery changes will be along lines that will facilitate the recovery of byproducts from the black liquor.

A number of mills are now recovering turpentine from the digester relief gases. This is a simple matter but the chief difficulty seems to be the elimination of the obnoxious odor from the turpentine in order to make it salable.

The sulphate odor is one of the problems which has received a lot of attention, especially abroad where the population is more dense. Various methods have been proposed for its elimination but to the writer's knowledge there are none in use in this country.

The problems cited in the preceding paragraphs are for the purpose of giving a slight idea of the work to be done in the sulphate pulp industry. I, as chairman of the present Sulphate Pulp Committee, would recommend that the committee for 1925 consist of six or seven members.

Ventilation of Paper Machine Rooms

Reducing Costs by Efficient Use of Air and Heat

By R. Skagerberg*

Ventilation of paper mills may be defined as the process of removing, by means of air, water vapor that is liberated in the process of papermaking. It is important from the following considerations:

Dry Roofs Save Steam

Keeping the building structure dry prevents deterioration and eliminates dripping of water onto the floor, operators and machinery. Another very important point must not be overlooked: A wet surface absorbs and transmits heat much more rapidly than a dry surface. Tests of galvanized iron as a heat transmitting medium showed the following:

Both surfaces dry (air to air), heat transfer coefficient—2.

One surface dry, one wet (water to air) heat transfer coefficient —8.

Both surfaces wet (water to water) heat transfer coefficient—50.

This accounts for the fact that roofs drip considerably when there is a layer of snow or cold rain on the outside. As soon as moisture starts forming on the under-surface it is aggravated by the increased heat transferring quality of the roof; when there is snow or rain on the outside and moisture on the inside, the cooling effect is very much greater than when both surfaces are dry.

Reason for High Back Pressure

The next consideration is that of the drying efficiency of the paper machine. Drying is the process of changing water into vapor by the addition of heat. The rapidity of drying depends on the vapor pressure of the air immediately in contact with the material to be dried. Water boils at atmospheric pressure at a temperature of 212 deg. F.; if the pressure is 10 lb. above atmosphere the boiling point is 240 deg. F., and so forth. If the dew point of the air immediately in contact with the paper is 50 deg. F., the vapor pressure is 0.36 (inches of mercury); for 60 deg. F. the vapor pressure is 0.517; for 70 deg. F. it is 0.732; for 100 deg. F. it is 1.9; for 120 deg. F. it is 3.43. Vapor pressure corresponds to boiler pressure and it is necessary that the water be heated to higher temperatures in order to overcome the vapor pressure before the water will change into vapor. If the vapor is allowed to accumulate between the dryers in what are called "vapor pockets," until the air becomes saturated at 100 to 170 deg. F., it is clear that the water in the paper must be heated to a much higher temperature than if the atmosphere in the immediate vicinity of the paper is at a dew point of from 50 to 100 degrees. To heat the water to such a high temperature necessitates high pressure steam in the dryer.

In all drying processes it is desirable to maintain the temperature as low as possible, not only from the standpoint of safety but also from that of obtaining a better product. Excessively hot dryers tend to bake and harden the surfaces of the sheet, making it difficult for the moisture to work out from the interior of the sheet, causing cockling and curling.

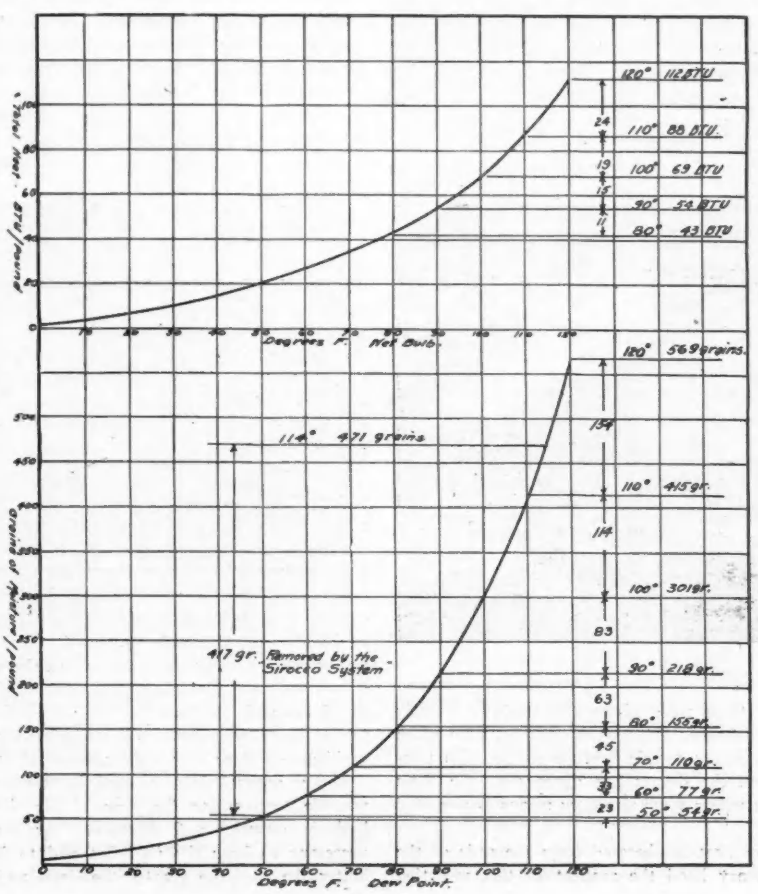


Fig. 1

Machine Room Ventilation Complicates Heating Problems

To maintain proper atmospheric conditions in the mill is another phase of the ventilating problem. This not only applies to the machine room, where the problem is usually that of reducing the humidity, but also to the heater room, finishing room, basement and other adjoining rooms, where the problem is usually that of proper heating, made difficult by the excessive indrafts.

Indrafts Harmful to Product

The atmospheric conditions in the mill also play an important part in the quality of the paper shipped. It is difficult to obtain a condition of equilibrium such that the paper will not give up or take on moisture. Excessive indrafts aggravate this condition since the conditions in the mill change with fluctuating atmospheric conditions outside; at one time there may be a condition of too dry atmosphere so that the paper gives off moisture and in a few hours the temperature outdoors may change so that the air is nearly saturated and consequently will give up moisture to the paper. Such fluctuations can easily take place within a few hours.

Two Classes of Systems

The ideal ventilating system is the one which will accomplish all these results at the minmium expense. Various systems have been employed with more or less success. Some are

*American Blower Company, Detroit, Mich. Associate Member TAPPI.

fundamentally wrong to accomplish any of the desired results; others accomplish one or two of the desired results at the expense of others and at the expense of excessive steam and power consumption. There are two general methods that have been in common use and can be classified as the "no-hood system" and the "overhead exhaust hood system."

In the no-hood system vapor is allowed to escape into the machine room where it quickly seeks points of low vapor pressure. Open monitors, ventilators or fans are provided on the roof to exhaust air from the machine room to serve as a medium to carry the vapor out. Where air currents exist moisture will be kept moving; but all of the moisture will not remain in these air currents, some will find its way into dead air spaces.

Condensation will occur wherever the temperature is lower than the dew point temperature of the air. In order to prevent condensation then, it is necessary to keep the temperatures of all surfaces, such as the roof, walls, trusses, etc., above the dew point temperature of the air. This is accomplished by heating the surfaces by artificial means, such as steam pipes and hot air. Supply hot dry air not only heats the surfaces but reduces the dew point of the atmosphere, since it reduces the moisture content of the air by distributing the moisture through a large volume of air; the dew point depends entirely upon the number of grains of moisture per cubic foot of air. In some mills the heat given off by the dryers and steam piping is so excessive compared with the moisture liberated that no difficulty is experienced in keeping the room dry.

Hoods that are in common use are constructed with exhaust vents attached above the dryers so that the air and vapor must rise vertically to reach the vents. None of the air comes in contact with the sheet except at the very edges, and this occurs mostly at the front edge. The vapor liberated between the dryers must be forced out by more vapor liberated from the sheet; as pointed out before, this is the reason for high steam pressures in the dryers.

The ordinary hood systems are ventilated either by natural draft (open monitors or ventilators) or by mechanical draft (fans). Air enters the hood along the lower edges at points closest to the vent stacks; if the vent stacks are numerous there may be a fairly uniform flow of air into the hood, but no attempt is usually made to

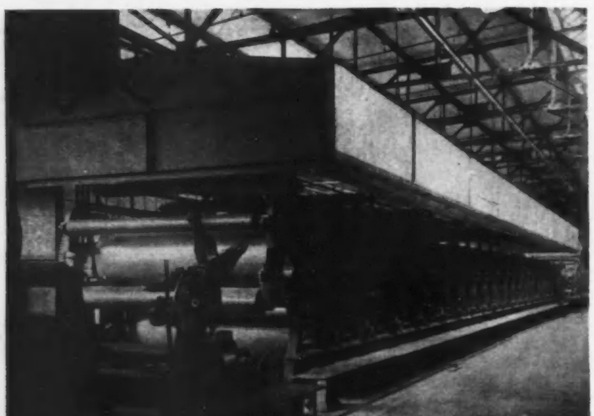


FIG. 2

regulate the flow so as to obtain most where it is needed. Usually a considerable amount of moisture escapes into the machine room with this type of hood; it is not visible because of the high temperature that exists around the dryers but appears in the form of condensation on the roof unless some auxiliary means is provided to absorb it.

A considerable amount of heat is liberated from the ends of the dryers, and with the ordinary hood the amount of this radiation is aggravated by the method of exhausting the air. None of this heat is employed in the drying process except insofar as it helps to keep the vapor in suspension after it has been liberated.

In order to keep a comfortable condition in the machine room the air entering the hood should be not over 80 degrees. By the time it reaches the hood it has passed through the beater room, various parts of the machine room and perhaps the basement where it has picked up a considerable amount of moisture, since at these points it is applied quite hot and is able to absorb moisture from

FIG. 3

every wet source. Therefore, the air that enters the hood at 80 deg. F. is likely to be of a high relative humidity and have very little moisture-absorbing capacity. This, together with the fact that the hoods are no warmer than the surrounding atmosphere, causes them to drip considerably, which not only shortens the life of the hood but also concentrates the dripping at the driers rather than distributing it throughout the machine room as with the no-hood system.

Systems Are Extravagant

All systems employing these two general methods must use more air than is actually needed for ventilation purposes. This is largely due to the fact that the vapor is allowed to escape into the machine room, and since it is not known where this vapor will precipitate in the form of condensation, the whole roof is usually flooded with a blanket of warm air through a ramification of air ducts. The more the moisture that is liberated into the machine room the higher will the dew point of the air tend to be, and the higher must the temperature of the roof be maintained, which means excessive heat losses.

Fogging

Air that is exhausted from the machine room must enter from some space outside the machine room and, as previously pointed out, this usually occurs through adjoining rooms, largely through the beater room. The temperature at the wet end of the machine room, near the screens and wire, is usually quite low and has a capacity for holding a relatively small amount of moisture and is therefore quite nearly saturated. Incoming colder air from the beater room further chills this atmosphere and saturates it, causing it to cloud and precipitate moisture. Cold air rushing in through the doors and windows has the same effect. Since cold air clings to the floor the indrafts through adjoining rooms make the heating problems of these rooms difficult to solve.

Where natural draft is used for ventilation it is practically impossible to regulate the flow of air through the machine room both in quantity and direction. As previously mentioned, it is necessary to keep the roof hot and to keep the air moving; the hotter the roof the greater the draft and, as shown by numerous tests, air is usually exhausted from such ventilators at dew points as low as 80 to 85 deg. F. In designing the ordinary hood system it is necessary to assume the air leaving at a dew point of about 90 to 95 deg. F.

High Exhaust Temperatures Mean Economy

If the air can be exhausted at a high dew point and a high-relative humidity we are obtaining high efficiency both from the standpoint of power consumption to handle the air and from the standpoint of steam consumption to supply the heat. Fig. 1 shows a curve representing the moisture content of air at different dew point temperatures. The curve is far from a straight line, and there is a marked acceleration in the increase in moisture-carrying capacity of air from 80 to 120 deg. F. As shown in the curve, by increasing the temperature of the air from 80 to 90 deg. F. you increase the moisture-carrying capacity 63 grains per pound; by increasing from 90 to 100 deg. F. you increase the moisture-carrying capacity 83 grains per pound; and from 100 to 110, 114 grains per pound. At 114 deg. F. dew point, air contains about three times as much moisture as air at 80 deg. F. dew point. In other words, if the entering air were 0 deg. F. and it were possible to exhaust air at a dew point of 114 deg. F. we would need to use but one-third as much as would be required at 80 deg. F. dew point. As compared to the ordinary hood exhausting at a dew point of 90 deg. F. the ratio would be about one-half.

Fig. 1 also shows a curve of total heat per pound of air at different wet bulb temperatures. This curve is not so steep as the moisture curve, indicating that the heat absorbed by the air is not in proportion to the moisture-carrying capacity.

With a monitor, pent house or any other exhausting apparatus on the roof of the mill, it is necessary to carry a relatively low humidity in the exhaust air. With a dew point of 80 deg. and a dry bulb temperature of 110 deg. the wet bulb temperature is 87 deg. and the total heat is 50.4. With a dew point of 90 deg. and a dry bulb temperature of 115 deg. the wet bulb temperature is 95 deg. and the total heat is 61 B. t. u. per pound. With a dew point of 114 deg. and the dry bulb temperature of 120 deg. the wet bulb temperature is 115 and the total heat is 99.1

Fig. 4

B. t. u. per pound. For every pound of air that is exhausted at 114 deg. dew point containing 99.1 B.t.u., 22 pounds of air at 90 deg. dew point containing 134 B.t.u., and 3 pounds of air at 80 deg. dew point containing 153 B.t.u., would be required. In other words if the air is exhausted at a dew point of 114 deg., 74 per cent as much heat would be exhausted as with the dew point at 90 deg., and 65 per cent as much heat as with the dew point at 80 deg. These figures are chosen on the assumption that the machine rooms are kept dry. There are some mills where the air is exhausted at a higher degree of saturation, but there is a considerable amount of condensation on the roofs and walls.

Example

A concrete example will illustrate this better:

Suppose a newsprint mill making 100 tons in 23 hours, including broke and trimmings:

Per cent moisture in paper entering driers—70
" " " " leaving " — 6

Fig. 5

Evaporation is 2.13 of water per lb. of finished paper.
" per minute is 309 gross or 2,160,000 grains

Provision must be made to take care of the moisture from the wet end, steam leaks, etc. This amount varies in different mills and with different papermaking equipment and must be determined by an analysis of the conditions. For the sake of comparison, let us assume it is 15 per cent of that liberated at the driers, making a total of 2,485,000 grains to be removed.

Besides this, if there are indrafts from adjoining rooms account must be made of the moisture entering with the air from these sources; if these rooms are heated this amount of moisture may be considerable since warm dry air will absorb considerable moisture from all wet sources. We shall assume, however, that this is an installation where indrafts are negligible and that the air is supplied to the machine room by means of blower equipment.

Ventilating equipment must be installed to take care of the worst condition. This condition will be when the air contains a considerable amount of moisture when it enters the mill and the roof, walls and windows are in a condition to conduct a large amount of heat which would result in condensation on the inside surfaces. This would perhaps be during a sleet storm when the building is more or less covered by ice or wet snow and the air is saturated at 32 deg. The same condition would exist during a very cold rain storm. However, let us choose 32 deg. saturated as the outdoor conditions when air contains 26.5 grains per pound, 11.8 B. t. u. per pound.

The following table shows the comparison:

	Case 1	Case 2	Case 3
Exhaust temperature (wet bulb)	87	95	115
Exhaust temperature (dew point)	80	90	114
Grains picked up per pound	129.3	191.1	445
Pounds of air required per minute	19,200	13,000	5,600
B.t.u. picked up per pound	38.6	49.2	87.3
Total B.t.u. picked up per minute	742,000	640,000	488,000
Per cent of air required compared to Case 1	100	68	29
Per cent of heat required compared to Case 1	100	86.3	65.8
Per cent saving in air handled compared to Case 1	0	32	71
Per cent saving in heat picked up compared to Case 1	0	13.7	34.2

It is clear that a remarkable economy can be obtained if we are able to exhaust the air at high temperature and high relative humidity.

The Sirocco Method

During the last four years there has been developed The Sirocco System, patent applied for and manufactured by the American Blower Company and the Canadian Sirocco Company. It is the result of a considerable amount of experimenting with different arrangements of equipment, various means of applying and exhausting the air and proper temperatures to obtain the results desired. In designing this system care was taken to obtain simplicity and economy of construction and operation with the maximum results.

Results

The outstanding results obtained by this system are:

(1) No vapor is allowed to escape from the driers into the machine room which eliminates the necessity of complicated roof duct systems. This reduces the temperature at the roof and consequently the heat losses.

(2) By the cross-current system of ventilation warm dry air flows through all openings between the driers, thus clearing out the vapor and reducing the vapor pressure. As a result, drier steam pressure is decidedly reduced and the drying capacity of the paper machine is increased. The following results were obtained on different grades of paper:

On 80-pound kraft wrapping paper, steam pressure was reduced from 18 to 7½ pounds; on 220-pound bristol board, from 22 to 8½ pounds; on 50-pound book paper, from 11 to 4 pounds. It is needless to say these results reflect favorably on the steam consumption of the engines which exhaust into the driers.

(3) Air that is drawn across the driers is warm, being supplied from the hood above and from the pit below, which tempers the balance of the air coming from the machine room. Heat liberated from the front of the driers is absorbed by this cross-current and consequently applied directly in the drying processes, and instead of being wasted is made to do useful work. This further reduces the steam consumption of the driers.

(4) The hollow hood and housing about the driers reduces materially the radiation losses from the driers and confines the heat at the driers where it will do the work it is intended to do instead of allowing it to escape through overhead vent stacks or monitors. This greatly reduces the amount of steam required for drying.

(5) The quality of paper is improved because of the low steam pressure required and because drying is uniform across the sheet.

(6) The special construction of hood keeps it dry without excessive heat. This is an important factor, not simply because of cost of hood maintenance but also from the standpoint of making good paper.

(7) Air is exhausted at high temperatures and at high relative humidities, thus requiring much less air and heat than with systerms exhausting at low dew points and low relative humidities.

(8) The machine room is kept dry with a relatively small quantity of air applied into the machine room, since the only moisture that must be taken care of is that liberated at the wet end.

(9) All indrafts are stopped since it is a balanced system. This does away with the troublesome fogging and the difficulty of heating adjoining rooms.

(10) All roof apparatus is eliminated together with stack effects and dripping penthouses. Apparatus placed on the roof usually receives the minimum of attention on the part of oilers and mechanics, and is a fire hazard.

(11) All material is fireproof and easily kept clean.

(12) There is nothing to interfere with the operation of making paper. The entire installation is simple in construction and operation.

(13) The system is easily regulated and controlled so that air is applied where needed and no more is used than is necessary.

(14) Power consumption for handling the air is very low due to the fact that the resistance of the system is low and the volume of air is at the minimum.

(15) When combined with the Sirocco patented air washer economizer (pat. applied for) there is practically 100 per cent heat reclamation during cold weather since nothing is exhausted outdoors.

(16) With the economizer there is also a constant condition of humidity in the supplied air which helps to maintain uniform drying conditions and less fluctuating steam pressure.

(17) With the economizer the air is recirculated after having been thoroughly washed and therefore contains no dust nor smoke.

Description

The system consists of:

(1) A hood extending the full length and width of the drier section. It is a continuous hollow chamber built up of steel trusses with sheet metal on the top and asbestos board on the bottom. It can be made in one large section or in a number of small sections. The standard construction consists of 6 foot sections, so arranged that any one can be removed without disturbing the rest, thus giving access to the driers from above. This construction facilitates erection since the whole hood can be built up on the floor in sections and mounted in a few hours while the machine is down over the weekend.

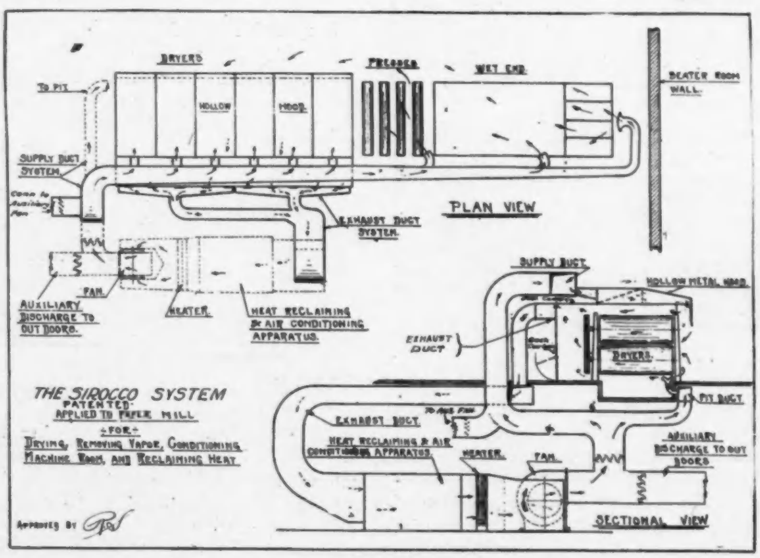


FIG. 6

This hollow chamber is filled with warm air which keeps the surfaces of the hood warm and helps to prevent condensation on the undersurface. Air escapes from the hood along the front edge in such a manner as to create a curtain of warm air in front of the driers. Some air is also applied to the undersurface of the hood to reduce the dew point of the air in contact with the hood; this does away with the necessity of keeping the hood excessively hot.

(2) A back canopy which is a horizontal surface (asbestos board on a steel framework) extending back from the hood to a convenient distance. This is also made in removable sections.

(3) A back curtain extending vertically from the outer edge of the back canopy to the floor. The standard construction is of sheet metal on a steel framework, although it can also be made of asbestos board or any other material; in one installation the top half of the curtain is made of glass. It is placed at such a distance back of the driers as to give the best results from the standpoint of handling the air and also to permit ready access to the back of the driers.

(4) A pit supply duct is provided to properly distribute the air under the paper machine. The application of this air must be determined by the conditions in the mill, it being different for open pits than for closed, and for a machine using no felts than for one using felts.

(5) A hood supply duct is arranged to supply warm air to the hood. With the deep sections hood it is necessary to make only one or two connections to the hood since it acts as a plenum chamber. This simplifies the duct work.

(6) Machine room supply system consists of a duct supplying air to the wet end of the room. In some mills this can consist of one riser extending about 8 foot from the floor and discharging air vertically toward the roof. In other mills it is necessary to use a distributing system, but this usually need not be very extensive.

Compact and Light

(7) The air supply system consists of a fan with a copper Aerofin heater, recommended on account of its high efficiency, its small weight and the small floor space required. It weighs about 10 per cent as much as cast iron radiation and about 18 per cent as much as pipe coil radiation for the equivalent heating surface, and it occupies about one-third the floor space.

(8) The exhaust system can consist of several ducts extending from the back curtain to the wall back of the driers, each duct containing a disk exhaust fan. A more satisfactory arrangement is a continuous duct with numerous openings into the exhaust chamber either through the back canopy, this continuous duct connected to a centrifugal housed fan which can exhaust either through the wall or through the economizer.

100% Heat Reclamation

(9) The Sirocco economizer is a multistage air washer. The air passes from the driers through the successive stages of the economizer, coming in contact with colder and colder water until it finally comes in contact with the cold fresh water that is taken into the mill from the river or from artesian wells. The temperature of the air is reduced and the vapor condensed so that the economizer operates as a dehumidifier.

The air being dehumidified can be recirculated through the system so that nothing is exhausted outdoors. The air will be reduced in temperature to within 5 or 10 deg. of the incoming fresh water and can be maintained uniform during the cold weather by controlling the amount of water supplied to the system. In northern climates the air can be recirculated through the system approximately eight months during the year so that if the warm water can be used effectively there will be practically 100 per cent reclamation during these eight months. Only one fan need be used to supply and exhaust the air.

Concentrated Heat Means Greater Economy

The cold water is sprayed into the last stage of the washer, from which it is pumped and sprayed into the next stage, and so on, coming in contact with warmer and warmer air until finally it has been heated to within a few degrees of the wet bulb temperature of the incoming air. The final temperature of the water depends upon the efficiency of the cross-current system at the driers, since the more the heat can be concentrated in a small quantity of air at a high temperature and high relative humidity the less water need be used in the washer and the higher will be its final temperature. Temperatures as high as 115 deg. F. have been obtained, although the usual temperatures are between 105 and 110 deg. F. when the system is properly adjusted. There will be approximately 10 gallons of water for each ton a day capacity of the paper machine. This is dependent largely upon the amount of moisture liberated at the driers and varies with other conditions.

Summer Economy—A Cooling System

During the summer weather when fresh water is too warm to humidify the air properly, it is necessary to exhaust the air outdoors after it has been passed through the washer to heat the water. If the hot water is not desired during these summer months it can be shut off and the air can be either bypassed around the washer or passed through it. If the warm water can be used all year around the reclamation will be 50 or 60 per cent during the summer weather. During these months air can be supplied to the machine room through the doors and windows. Thus the system will serve to cool the machine room, since the flow of air will be along the floor and toward the driers, and the heat, instead of radiating into the room, will be carried out with the moisture. During this weather no trouble is experienced from condensation and the outdoor air usually contains enough energy to take care of the moisture liberated at the wet end.

Ideal Air

As an example, if the air enters the economizer at 120 deg. dry bulb, 115 deg. wet bulb, 114 deg. dew point, it contains 99.1 B. t. u. per pound and 471 grains of moisture per pound. If the fresh water enters the economizer at 40 deg. the temperature of the air will be reduced to 50 deg. containing 53½ grains of moisture per pound and 20.19 B. t. u. per pound. In other words, 80 per cent of the heat will have been removed from the air in the form of warm water; the remaining 20 per cent will still exist in the air and be recirculated through the system; 87 per cent of the water vapor will have been removed so that when the air is reheated to 70 deg. it will have 50 per cent relative humidity, which is ideal for living conditions. When heated to 120 deg. the relative humidity will be 11 per cent so that it will have a large vapor-absorbing capacity. The air will be thoroughly washed and bring in no dust nor smoke. The amount of heat that exists in air at 50 deg. saturated is the same as the heat that exists in dry air heated from zero degrees to 80 degrees.

Uses of Warm Water

In a board mill a considerable amount of warm water can be used in the beaters especially where old paper stock is used.

With some exceptions, it is possible to make good paper during the summer weather with stock entering the papermachine at around 70 deg. F. or even higher. There is a considerable amount of fresh water added at the head boxes, and during cold weather this water has a temperature of slightly over 32 deg. If this 32 deg. water were tempered with warm water so that the resultant temperature would be the same as that obtained during the summer weather, the conditions at the papermachine would approach those obtained during the summer.

Warm water can be used very effectively in connection with barking drums, especially during the cold weather, since it will help to loosen the bark and prevent the formation of ice, which occurs in some mills where barking drums operate in cold buildings.

Logs used for grinding can be thawed out and softened by being soaked in warm water and grinding can be accomplished with less power, fewer slivers, longer fibres.

In many mills lap stock is usually received during the winter weather in a frozen condition. An effective method of thawing lap stock is with warm water either in the beaters or in a separate chest.

Good use of warm water can be made in sulphite mills for washing the stock in the blow pits. If properly applied, it has been found that the stock will wash more rapidly and thoroughly especially if the first one or two washes can be made with warm water. Cold water has a tendency to congeal the resinous matter and prevents its washing out, retaining with it a certain amount of acid. Warm water will hold these ingredients in solution and flush them out.

In places where there is a considerable amount of make-up water used for the boilers warm water could be substituted in place of much colder water during the winter weather.

There are many places where warm water can be used in a paper mill, some of which are not apparent to the papermaker since he has not had the opportunity to use warm water because of its having been too expensive to obtain.

Another important phase of heat losses is usually neglected. There is about four times as much water by weight, as there is air used for ventilating, in the process of making a ton of paper. Water has four times the specific heat of air. Consider the water piping, pumps, tanks, exposed water surfaces, showers and sprays that exist in the mill and you have a picture of a considerable refrigerating plant. Water pipes can be covered to prevent heat losses. The cooling effect of sprays and showers can only be reduced by increasing the temperature of the spray water.

Fig. 2 shows a photograph of a Sirocco hood applied to a board machine. Fig. 3 shows the back curtain and the exhaust duct. Fig. 4 shows the Sirocco economizer installed in the room adjoining the basement. Fig. 5 illustrates an Aerofin copper heater in connection with a Sirocco system showing its compactness, simplicity and accessibility. Fig. 6 shows the plan and end elevation of a diagram illustrating the application of The Sirocco System to a papermachine.

Chemistry in the Soda Pulp Process

By Martin L. Griffin*

I have often remarked that no other process of making pulp and paper involves so much chemistry or requires anything like the extensive knowledge the chemical engineer must have. This process is the oldest chemical process for reducing wood to pulp. Alkalies are among the few oldest of our essential chemicals and have served the human race as no other chemical has. Of the alkalies, soda ash is the outstanding representative. Sodium is a very strong base, capable of entering into many combinations with acids, both weak and strong, and thereby producing a great variety of salts of varying degrees of alkalinity. It is possible to charge a solution of soda ash with carbonic acid to such a degree that it will show an acid reaction. Some years ago I was very much impressed with the idea that a way ought to be found to precipitate and remove a large part of the resins, waxes and other substances having acid properties from the spent liquor of the soda process before evaporation and incineration, and thereafter remove the excess carbonic acid and treat with lime, with the idea of reaching a stage of purification which would perhaps eliminate the destructive process of burning out.

We know that it is possible to precipitate these substances with mineral acids, but having done so we have barred the way to recover the soda. It is easily possible to cause the precipitation of these substances by charging under pressure with carbonic acid. The easiest way to prove it to your own satisfaction is to take a ginger ale bottle filled with black liquor to a friendly bottling establishment and charge it with the gas. The precipitate will be very bulky and the problem will be to reduce this bulk so that a good degree of separation from the liquor may be accomplished readily. It is quite possible that useful byproducts may be obtained through this avenue, as well as a more effective way to recover the soda. This experience came to me several years ago when I was not equipped with sufficient chemical knowledge or situated in a favorable atmosphere for such experimental work.

For many years wood has been cooked with a straight caustic soda solution with little attempt to abate the harsh action. With this liquor, high temperatures and pressures have been the practice, with little appreciation of the destructive action of such a treatment upon the fiber itself. Fluctuations in the yield were attributed to varying quality of the wood rather than to the process. Some appreciation of the fact that the process could be improved or a different process substituted which would conserve the yield was realized when the sulphite process became successful and the modified sulphate process was developed, but I offer the same criticism of the sulphite process as practised, as I have made of the soda process. In many instances it is carried to such an extreme end point that destruction and tendering of the fiber are conspicuous.

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Four Great Fundamental Processes

There are four great fundamental processes in applied chemistry which are paramount to all others. They comprise the reactions of acids and alkalies, oxidation and reduction. These four all enter into the processes of making chemical pulp. The soda process is not primarily an oxidizing process in any degree; neither is it a reducing process in any sense of the term, but as conducted in an atmosphere of high pressure steam, oxidation with its attendant consequences is in evidence. This, as I have said elsewhere, is not so apparent in the manufacture of pulp as it is in textile finishing, where as we know full well, high pressure steam exerts an oxidizing influence which is recognized in its tendering effects. However this may now be explained; it is now recognized that reducing sulphites and sulphides act beneficially when used in connection with the chemical processes of making pulp.

By way of contrast let us consider the sulphite process in this connection. It is well known that both acids and alkalies exert a strong hydrolyzing action, which is fundamental in both processes. In this process we have the reducing action of the sulphur dioxide carried to the extreme at the beginning of the process, gradually diminishing until the end of the cooking period when the protective reducing action of the dioxide gas gives way to oxidation. There was a time when the sulphite cooker was supposed to be on his job and not let the cook burn, and it was recognized at the time that serious consequences would result if there was any failure to blow. In the stress to make easy bleaching pulp and pulp which was half beaten before reaching the beaters, the fine edge of the knowledge of the consequences has been lost sight of. Who will deny that the results of overcooking in the soda process do not produce similar results? It has always been assumed that soda pulp was inevitably weak. Though it has been customary to cook woods of shorter fiber by the soda process, are we to conclude that the process cannot be conducted in such a manner as to yield a much stronger pulp? Much has been accomplished by shortening the time of cooking and events are tending to a better knowledge of some of the chemical factors entering.

What is known as the sulphate process has been in successful operation for several years. What the original idea and purpose of the experimenters in this field was, I cannot state definitely, but if I may draw an inference from the title of the process, it is natural to conclude that the main idea was to substitute the cheap by-product salt cake for the more expensive soda ash, depending upon the reducing action of the organic matter in the furnace process to convert the sulphate into the strongly alkaline sulphides. As a natural consequence stronger pulp resulted, partly from the fact that these sulphides were not as harsh in their action, and partly because they exerted a strong reducing action. In the process no attempt has been made to produce a very clean bleachable pulp, as the product has found its own place in the making of fine wrapping papers. I have traversed this field to show as vividly as I can the past practice which I believe has been lacking in a full and complete knowledge of many essential features.

In view of the phenomenal growth of the association of technical chemists in the paper industry and what has already been accomplished and the strong desire to advance further, I believe we should apply ourselves to the problem of improved methods of reducing raw stock to paper pulp. We know the virtues of both the soda and sulphite processes with their paramount features. Each attacks the problem from a different angle but have several overlapping factors. Shall we not investigate and attach more importance to these overlapping areas? There is nothing inconsistent or incompatible in adding sulphites and sulphides to our caustic soda liquors, nor is there anything to prevent the addition of caustic or carbonate of soda to a sulphite process liquor. There are several workers in this field now who have accomplished flattering results, but it will require a high degree of intelligence to reap the full benefits of the problem.

Cross and Bevan Chlorination Process

At this point I would like to revert to the now old chlorination process of Cross and Bevan for the analytical determination of cellulose in wood and the like. As you know the prepared sample is first treated with a 1 per cent solution of caustic soda at boiling temperature for 30 minutes. It is then well washed and exposed to an atmosphere of chlorine gas for about an hour and then washed and given a light treatment at boiling temperature with a 2 per cent solution of sodium sulphite to which about 0.2 per cent caustic soda has been added. It is then washed in hot water and may be given a very light bleach to remove last traces of impurities. I believe careful thought should be given to these three stages of treatment and the very mild treatment necessary when the conditions are made favorable. There are also certain types of raw fibers which such a mild treatment is adapted to, like the straws and esparto grass. The De Vains process participates in this formula.

Why is it that such extremes of pressure, temperature and strength of liquor have been used in our chemical cooking processes? The law of mass action states that the velocity of a reaction is proportional to the product of the reactants. We know that the greater part of the total reaction takes place easily and quickly, but that the final stages of the process take a relatively long time, and besides under influences which are destructive. Add to this the "buffer" action of the residual products and again the process is slowed up.

It is well known that if a process can be divided into stages where each stage is carried forward under mild condition, results are much superior. For instance, I have known of bleaching processes where a partial bleach has been accomplished, then a wash and the process repeated. Generally speaking manufacturers have preferred to forego these refinements for a quick process, which at the time appeared to satisfy the conditions. Other instances might be cited. It may not appear at all practicable to apply this reasoning to the cooking of soda pulp, but at least I believe the subject should receive careful study.

Again electro-chemistry has provided many important chemicals which otherwise we should not have, or at least have them commercially available. For instance, sodium peroxide is coming into extensive use for many purposes, and just as a few years ago one would not have thought liquid chlorine could compete with bleaching powder, it is today an accomplished fact. If now we consider sodium peroxide, we shall see that it is capable of two important functions joining in one operation. Its decomposition products are atomic oxygen and caustic soda, and in their joint action become very effective. It is now claimed by large makers of peroxides, that in the bleaching of cotton, silk and wool textiles, sodium and hydrogen peroxides are no more expensive than the customary processes, and have some advantage in other ways. They are prepared to substitute for high pressure kier boiling, washing and chemicking, a single treatment without pressure and at temperatures below boiling in the bleaching of cotton gray goods, in much less time and at no increase in cost. I am not prepared to say whether it would work out advantageously in the soda process to use some proportion of sodium peroxide, but there is nothing incompatible in the suggestion, and it is quite possible that the usual practice might be modified so as to make a place for it.

Broader Field of Soda Process

At this point, if you are thinking only of the application of the soda process to the treatment of wood, I want to lead you into the broader field of its adaptation to treating many other papermaking straws and grasses. Here is a rich prospect for the skilled technologist and business man. Cotton and wood celluloses are very resistant to both chemical and mechanical action. They require harsh treatment to fit them for fine grade of paper. Certain straws, grasses, and bast fibers are well adapted to make high grades of paper if they are properly treated, and a modification of the soda process which will exert a mild and selective action, I believe it best adapted for this field of technical adventure in paper making. You will realize that these fibers are naturally more hydrated than wood and cotton and are therefore much more reactive at the start and will disintegrate much easier. Therefore more discriminating methods of processing must be employed. The longer and closer we study these problems the more we shall see that physical chemistry enters largely into the problems. I believe some of the newer tools in this field will give us new insights into many conditions of which we have been in ignorance. It has long been the desire of the paper chemical engineer to measure the results of beating stock so that paper of certain characteristics might be made uniformally. The problem has been attacked with intelligence by the adaptation of a special form of viscosimeter located in the beater during the refining process. I am disposed to speculate whether or not this viscosity, which is a phenonom of hydration, cannot be determined by means of the hydrogen electrode. It is certain that if we add hydroxyl ions to the stock the equivalent hydrogen ions must be in evidence and if they do not enter into combination, are capable of measurement by means of the hydrogen electrode or a suitable indicator. So it may come about that we may specify degrees in beating by pH values. This is a problem I have set for myself to work out.

It may not be self-evident that these digressions are connected with the soda process, but I have attempted to show some of the fundamentals of the alkaline and acid processes which are antipodal, each possessing strong characteristics in one direction and lacking in the other; Whereas, as we know, both oxidation and reduction, speaking with some liberty, are essential to the isolation of cellulose, andl that therefore both processes should approach each other chemically. We may expect that alkalinity will prevail or remain in excess, because we associate saponification, detergency and dispersion with alkalinity all of which contribute to the cleansing and isolation of paper pulp. Acid processes do not perform these functions. It is not at all the function of cooking to participate in the results of "beating," but I have indicated the close relationship between chemical and mechanical hydration, and the papermaking processes will partake of both. If in the cooking of some raw materials they are sensibly hydrated it is an advantage worth while to gain, but not at the expense of yield. Such results cannot be won haphazardly, but only by a close application of chemical technology and experience.

Steam Prime Movers for the Paper Mill

By R. W. Leeper*

For the paper mill wherever it may be located, heat in the form of steam is an essential, and to utilize this heat for manufacture of product, prime movers of one type or another must play their part between steam plant and whatever equipment must be energized.

Many Different Types

There are on the market today many different types of steam prime movers of varied design and principle that are serviceable for, and can be efficiently applied to, papermill requirements, and it is equally true, as indicated by the above statement, that papermill requirement itself is varied in the extreme, and calls for the type of prime mover that will best apply to the individual conditions.

We have as one extreme the paper mill where the demand for steam is confined to drying and heating requirement only, the power demand being supplied either electrically or hydraulically from other sources, and as the opposite extreme, the mill where steam is responsible for the entire operation, including drying, heating and power, which for the purpose of this article, will be designated as Byproduct Steam Power and All Steam mills respectively.

Between these two extremes are the mills that buy a portion of the power requirement and generate the balance, those that buy steam from outside sources, and those operating a part of all the manufacturing equipment through direct connected hydraulic units, but each mill can in itself be divided into one class or the other, and this division calls for the first consideration as regards the type of steam prime movers most suited for the demand to be placed upon them.

The fact that steam will give up its kinetic energy and yet retain at least 85 per cent of its heat value for drying and heating, is recognized and made use of by the paper industry, as in perhaps no other, and is the second most important factor in the consideration of the steam prime mover best fitted for the location.

By-Product Steam Power Mills

For Byproducts Steam Power Mills, where drying and heating are only to be considered, a backpressure unit, or what might be called a reducing power valve, is the first choice. It can, however, be readily seen that the power derived is practically limited to that available from the steam required for drying, as the power supply must be continuous, while the heating demand is seasonal. To this backpressure unit, steam at boiler pressure is delivered, and steam at drying or heating pressure discharged with energy to drive the machine or machines being given off between, this energy being in reality a byproduct. With such a reducing valve from 3 to 15 per cent of the heat is used for power and dissipated through radiation losses, but provided the steam discharged can all be utilized, the cost of power generated will be lower than any form yet available.

That this is true is evidenced by the following tabulation, showing in round figures the approximate heat consumption per kilowatt hour for various types of plants:

Type of plant	B.t.u.
Perfect heat engine	3,412
Byproduct steam power	5,000
Mercury steam turbine	10,000
Super power (proposed)	13,000
Central station (proposed)	15,000
Central station (large in service)	18,000
Central station (average)	20,000
Average industrial station	30,000

According to published reports the best average Central Station performance to date is in the neighborhood of 18,000 B.t.u. as listed, with expected results from proposed Superpower Station operating on a reheating cycle of 13,000 B.t.u. representing thermal efficiencies of 19 and 26 per cent respectively, compared with 5,000 B.t.u. and an efficiency of 68 per cent under favorable conditions for by-product steam power.

For such installations different types of noncondensing reciprocating engines or turbines are open to selection that will function properly as reducing power valves, the actual selection depending on the volume of energy required, the type of drive to which it is to be connected, and the speed and service that is required of it.

It will be noted that steam consumption has not been mentioned as a deciding factor, the reason being that the low pressure steam demand for this type of mill is almost without exception greater than that required for power purposes. Live steam is therefore required for makeup in any case and any amount that can pass through the prime movers up to the total low pressure demand is acceptable.

It is also obvious that it would be extremely difficult to utilize any additional power that might be developed from the steam required for drying with a more efficient unit, as an individual prime mover is generally required for each paper machine, either to limit the liabilities or on account of the variable speed requirement.

For Demands Under 500 HP.

For demands under 500 horsepower the reciprocating engine, either variable or constant speed, depending upon the type of drive, is the best suited in the majority of installations as represented by the throttling governor, the four-valve, the unaflow, and the compounded vertical, each possessing certain advantages under proper conditions that may warrant its selection. While the variable speed engine is frequently considered as a distinct class, a variable speed control gear may be applied to any of the above types of engines, and with this gear that engine may be used for driving the variable line.

The throttling governor type of simple engine, either with single or twin cylinders, has been used for many years on account of its reliability, ease of control and low first cost. Of the various kinds of engines, its steam consumption is the highest, the capacity limited, and it frequently happens that a different type can be used to advantage.

Among the higher grade engines are the four-valve, such as the Corliss, which is perhaps the most widely used and best known of this type, and for this reason little need be said about it. For the larger sizes, a releasing valve gear is generally used; for the smaller and higher speed unite, a nonreleasing gear, the limit for the former being approximately 150 r.p.m. The Corliss engine possesses the same advantages as to reliability and ease of control; its steam consumption is much lower than for the throttling governor type, and as would be expected, its cost higher. Other four-valve engines there are with piston, gridiron, rotary and poppet valves, the only requirement for an engine to be so designated being that it be equipped with the equivalent of two admission and two exhaust valves for each cylinder.

Poppet Valve Appears Solution

With increasing steam pressures and higher temperatures, thus making internal lubrication more difficult, it is believed the Corliss engine will be gradually superseded by one of the other types, due to the necessity of reducing friction parts in the steam path to a minimum. The poppet valve appears to be the solution, as with this type of engine large steam openings may be provided with minimum valve stem travel, this stem being the only rubbing or sliding part in contact with the steam. The same problems, however, remain with respect to proper lubrication of the piston and piston rod. Manufacturers, however, have been devoting considerable

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thought to this problem, and at present engines are obtainable that will give practically no trouble operating under the steam conditions contemplated for the larger mills.

The Unaflow engine has been much discussed and, while it possesses distinct advantages for certain applications, these do not apply to any great extent for by-products steam power. Primarily this engine was designed for condensing operation and for such service has been extensively used. In mills of this type, however, where engines are always operated against a back pressure, its advantages over the four-valve are usually not sufficient to warrant the additional investment required for its installation.

An Economical Selection

The vertical compounded high speed engine offers a most economical selection for the higher ratings up to at least 800 horsepower. Its advantages are reliability, ease of lubrication and control, minimum floor space and suitable speeds for direct connected mechanical drives. It may also be used with the higher steam temperatures, and it is predicted that this type of engine, which so far has been built either in England or on the continent, will be more widely used in the future in this country as in the Dominion where it is operating successfully in many of the larger installations.

All engines previously mentioned are primarily constant speed, Variable speed control gear may, however, be applied to these or any other type of engine and with it, that engine may be used for variable speed service.

Backpressure turbines under 500 horsepower are available and have been used for noncondensing service, their main advantages being simplicity, low first cost, minimum space, and freedom from oil in the exhaust steam. The disadvantages are high steam consumption, and unsatisfactory speed control for mechanical drive of variable lines. Some form of speed reduction is also necessary to keep the steam consumption within the desired limits, although a slow speed turbine could be designed with practically the same water rate, but the cost would be prohibitive. Turbines of this type are generally limited to direct connection to plant auxiliaries, such as fans and pumps, or to generators supplying power to electrically driven machines.

For All Steam Mills

For All Steam Mills practically any type of prime mover may be selected for the various drives; there are, however, certain factors that, to a greater or lesser degree, influence the selection, such as reliability, steam consumption, flexibility, initial cost, space occupied, manufacturers' reputation and shipment, the first four being considered of major importance, reliability being required to keep the mill in operation; efficiency to keep down conversion costs; flexibility to provide for varying conditions, and an initial cost commensurate therewith.

With such mills the power demand is generally high with reference to steam demand, thus requiring condensing equipment for at least a portion of the installed prime mover capacity. It is therefore, essential to select the most types of prime movers and thus reduce the quantity of steam to the condensers to a minimum.

While individual prime movers may be selected for the paper machine drives with condensing equipment provided for the remainder of the load, it is generally conceded that regardless of type, a few large units are more efficient in the use of steam than several smaller ones having the same combined capacity. With the larger units a centralized power plant with motor drive for all equipment is desirable, as it offers better facilities for repairs, the prime movers may be placed in a clean dry room under the control of skilled operators, the labor costs are reduced, and the equipment may be located in accordance with manufacturing requirements.

For the Centralized Plant

For the centralized plant it is generally admitted that the turbine-generator set of one type or another is superior to the engine driven generator unit. When properly selected it is more efficient; it is capable of being operated for long periods with minimum attention; the first cost is less; a minimum of space is occupied; and the exhaust or extracted steam therefrom is not contaminated with oil. Among the various types of turbine available for such service are the following—condensing, non-condensing and the bleeder or extraction type.

The field for the strictly condensing turbine in this class of mill is limited, as a large percentage of the power demand can be obtained from the steam required for process work, and with a reduction of from 3 to 15 per cent in its heat content, the remainder is saved that otherwise is carried away by the condensing water. As will be shown later on, for some of the larger plants, the condensing turbine may, however, be combined with one of the backpressure type, and in this way high economy and the much desired flexibility for varying conditions obtained.

The extraction or bleeder type turbine when selected with due consideration of operating demands, is particularly adapted to the requirements of centralized plants for mills of medium capacity, as within the limits of the machine the supply of exhaust steam may be automatically adjusted to meet the demand, and is not supplied irrespective of demand as with a strictly backpressure unit. There is therefore no reason for wasting exhaust steam to atmosphere during breaks, washup periods, or under other similar conditions, when there is little change in load, but a decided reduction in the demand for process steam.

During the past few years manufacturers of bleeder turbines, realizing the possibilities of such installations, have devoted considerable time and money to their improvement with the result that today their efficiency compares favorably with any prime mover that may be considered, and at the same time certain distinct advantages are offered over other combinations of several units that might be selected to provide the same service. The first cost is lower, a minimum of space is required, and the liabilities are reduced.

Above 500 kilowatts capacity it is generally admitted that the turbine is today the selection for the majority of installations. The efficiency is at least as good as for the engine; the first cost is less; less space is required; the installation cost is less; it may be operated continuously for long periods; and the exhaust or extracted steam therefrom is free from oil contamination.

All Steam Power a Distinct Problem

The all steam power question in each mill presents a distinct problem, requiring individual analysis in order to select the prime movers best suited to the demand. It is therefore believed that the following data covering assumed typical cases of centralized mill plants showing the possible economies will be of interest.

For the first case a mill of moderate capacity has been selected, with a load demand of approximately 2,500 kilowatts, a low pressure steam requirement for drying of 30,000 pounds per hour, and 10,000 pounds additional during the winter season for heating. Further, steam conditions such as apply in many mills of 175 pounds pressure with superheat, a steam cost of 50 cents per 1,000 pounds and condensing possibilities are assumed.

A preliminary inspection of these data, which are representative for many mills, indicates that the power demand cannot be generated with the steam required for drying and heating, since to fulfill this condition the steam rate for power would be from 12 to 16 pounds, an impossibility noncondensing with average backpressure. Therefore, a portion of the load must be carried by prime movers of the condensing type, in order to secure high economy, and for this same reason, as previously mentioned, centralization of the power equipment with a few large units is desirable.

Bleeder Turbine Particularly Adapted

The bleeder turbine of one type or another is a prime mover particularly adapted to such installations, and units are available with steam consumption varying 5,000 pounds or more at a corresponding difference in price of approximately $12,000. With the assumed conditions, however, an elementary calculation shows that the difference in initial cost for a high economy unit will be returned in less than two years, thus justifying the additional investment.

With a high economy turbine of this type when bleeding 30,000 pounds of steam per hour for drying, and crediting the turbine with the heat in this steam, also that in the condensate returned to boiler room, a kilowatt hour may be produced for 12,550 B.t.u. with 40,000 and 50,000 pounds of extracted steam for 11,250 and 9,800 B.t.u. respectively.

The consumption of fuel in the boiler plant adds approximately 1,160 B.t.u. to each pound of steam produced, the steam consumption for power on the basis of heat units used is therefore 10.8, 9.7 and 8.5 pounds respectively. The corresponding heat consumption per kilowatt hour for the power producing equipment with an assumed plant efficiency of 70 per cent being 17,900, 16,100 and 14,000 respectively, compare favorably with even the expected results from proposed super power stations.

Another Example of Centralization

As another example of centralization, a mill of large capacity has been assumed, with an increasing demand for both power and steam that will not reach its maximum for three years. In this solution, it is understood that there are other sources of low pressure steam supply, such as papermachine engines, the replacement of which is not justified at this time; therefore, the exhaust steam demanded from the proposed units does not represent that of the mill.

Assumed conditions:

Load first year	7,000 kw.
Load third year	8,500 kw.
Process steam first year	30,000 lb. per hour
Process steam third year	40,000 lb. per hour
Heating steam first year	25,000 lb. per hour
Heating steam third year	35,000 lb. per hour
Initial steam pressure	185 lb. gage
Superheat	125 deg. F.
Steam cost per 1,000 lb.	$0.40
Fixed charges	15%
Yearly operation	7,200 hr.

Among the almost innumerable combinations that may be considered for such an installation, five have been selected for comparison, it being assumed that where a backpressure unit is called for that it is so arranged as to operate automatically under the load required to supply the exhaust steam demand, the additional power being carried by the condensing turbine, that where extraction turbines are specified, the low pressure steam required will be extracted therefrom.

COMBINATION 1

1—7,500 kw. moderate economy condensing turbine
1—2,000 kw. moderate economy backpressure turbine

COMBINATION 2

1—7,500 kw. moderate economy condensing turbine
1—2,000 kw. high economy backpressure turbine

COMBINATION 3

1—7,500 kw. moderate economy steam extraction turbine
1—1,000 kw. high economy condensing turbine

COMBINATION 4

2—5,000 kw. high economy steam extraction turbines

COMBINATION 5

1—6,000 kw. high economy steam extraction turbine
1—4,000 kw. high economy condensing turbine

For the five combinations the comparative hourly steam consumptions for the first three years' operation, with average loads of 7,000, 7,500 and 8,500 kilowatts respectively may be summarized as follows:

	Pounds steam first year		Pounds steam second year		Pounds steam third year	
Combination	Summer	Winter	Summer	Winter	Summer	Winter
No. 1	119,500	132,200	129,700	144,500	148,000	165,300
No. 2	119,000	132,000	128,800	144,200	147,000	165,800
No. 3	123,800	142,200	135,800	158,800	154,300	180,600
No. 4	122,200	138,000	131,000	150,000	145,000	167,200
No. 5	116,900	132,900	126,000	145,000	141,200	163,400

The comparative hourly costs including fixed charges on the turbines with preceding steam consumption are approximately as follows:

Combination	First year	Second year	Third year	Average
No. 1	$53.30	$57.60	$65.40	$58.75
No. 2	53.30	57.40	65.10	58.60
No. 3	55.75	61.10	69.00	61.95
No. 4	54.70	58.70	64.90	59.45
No. 5	52.40	56.50	62.90	57.30

Combinations 1 and 2

Combinations 1 and 2 are directly compared, as the only difference is that for the latter a higher economy and therefore a more expensive 1,000 kilowatt noncondensing turbine has been selected, and it is evident that the increased investment for the more economical unit is justified.

Combination 3

Combination 3 is the same as 2 except the condensing unit has been provided with an opening in the casing from which steam may be extracted. This unit would carry the load of the entire mill for the first two years, and could then be supplemented by the 1,000 kilowatt high economy non-condensing turbine, after which it would be operated as a condensing turbine. Upon comparison this is the most expensive of the selections.

Combination 4

Combination 4, consisting of two 5,000 kilowatts high economy automatic steam extraction turbines, while fourth in line in so far as costs are concerned, offers the preferable solution, as with duplicate units, the mill could be operated at about 60 per cent capacity with one unit, where with the other combinations, should one be out of service, the mill must be shut down or else live steam used for process requirements, an expensive undertaking. This combination must, therefore, be credited for this partial duplication.

Combination 5

Combination 5, consisting of one 5,000 kilowatt high economy steam extraction turbine and one 4,000 kilowatt high economy straight condensing turbine, offers the best solution in so far as economy is concerned. It does not, however, offer the same advantages as to duplication and partial operation with one unit out of service as for Combination 4.

While only the fixed charges on the turbines have been taken into consideration, this cost on the remainder of the equipment required, as well as that for foundations, buildings and piping, would not seriously affect the choice.

The steam consumption of Combination 4, which appears the preferable solution on a heat basis for the assumed operating cycle, the third year is of especial interest, as this operating condition may exist for many years thereafter.

Steam Consumption for Power

Under the assumed conditions, the average reduction in heat content of the extracted steam will average approximately 8 per cent, the steam consumption for power purposes is therefore as follows:

Summer:	
Steam to condenser, lb. per hour	105,000
Extraction, 40,000 lb. by .08	3,200
Steam required for power	108,200
Kilowatts, load	8,500
Pounds steam per kilowatt hour	12.7
Winter:	
Steam to condenser, lb per hour	92,200
Extraction, 75,000 lb. by .08	6,000
Steam required for power	98,200
Kilowatts, load	8,500
Pounds steam per kilowatt hour	11.5

Results

With an overall plant efficiency of 75 per cent, and assuming that 1,160 B.t.u. is added for each pound of steam produced, these steam rates are equivalent to the production of a kilowatt hour for 19,650 and 17,800 B.t.u. respectively, or a yearly average of approximately 19,000 B.t.u. This compares favorably with the results secured in any but the very largest of central stations, and were this a new mill still more power could be obtained from the process steam, thus improving materially the overall heat consumption.

In this article the steam conditions are confined to those considered good practice and in common use in the mills of the present, the question of high pressures and temperatures being considered a separate subject, which even to attempt to cover would far exceed the limits of this paper.

Cost, Economy and Reliability

When selecting prime movers it should be remembered that the same type may vary in so far as cost, economy and reliability are concerned, over a wide range, depending upon the refinements of design and construction. Further, the same manufacturer may be able to offer several different units with varying economies, the most efficient being the higher in first cost as would be expected. This applies to both engines and turbines, the greatest variations probably being with the latter, as its development has not reached the stage held by the former.

Determining Factors

In general for by-product steam power the factors determining the selection of prime movers are reliability, initial cost, ease of control, suitable speeds for either direct mechanical or generator drive, space occupied, shipment, and the reputation of the builder. For all steam power installations, while the foregoing conditions are important and must be considered, high efficiency from a steam consumption standpoint is the governing factor.

Standard Method for Testing Rags

By Materials Testing Committee—H. V. Kiely, Chairman

Moisture

Sampling: Ten per cent of the bales shall be sampled on shipments of one car or more, twenty per cent on less than car lots. Two samples of approximately ½ pound each are taken from each bale, one from the center and one 10 inches from the wrapper and placed in sealed containers.

Procedure: The entire sample obtained as stated shall be dried to constant weight at 212 to 220° F. Twelve hours will usually be sufficient. Moisture should be below 3 per cent. Results as high as 6 per cent are not uncommon, however, and may possibly indicate intentional wetting.

Oils, Fats and Grease

A 200 gram, bonedry sample is boiled under a reflux condenser for four or five hours, then washed with 100cc additional solvent. The combined extraction and washing carbon tetrachloride is distilled in a weighed flask, which is dried to constant weight at 212° to 220° F. and weighed. This figure may be used to good advantage as a control on alkali concentrations for cooking oily rags, as well as to detect undesirable paraffine sizing in such rags as suit linings.

Shrinkage

Mill Test: All the washers from the bleach of rags to be tested are dropped to a drainer which has been carefully examined to insure uniform draining with no loss of fiber. Each car of half stuff is weighed and sampled from top, middle and bottom for moisture test. From the dry weight of half stuff and the weight of dressed rags charged to the rotary, the shrinkage is calculated. Regular mill procedure is used in determining alkali concentration, pressure and time of cook.

Laboratory Tests A bone dry sample of from 5 to 10 pounds (either that used for moisture test or one taken at uniform intervals from the rag cutter in the mill) is cooked in a gas fired rotary boiler, using mill procedure for time, pressure and alkali concentration. If this is not available, 8 per cent lime, 2 per cent soda ash, 35 pounds pressure for 10 hours may be used, cutting the soda ash to 1 per cent on new, light colored rags. The rags are then washed for 4 hours to insure complete removal of alkali and filler in a miniature washing and beating engine, drawing them out to approximately the same condition of fiber used in mill practice. 2 per cent bleach and 1 per cent alum are added. After 2 hours, the half stuff is dropped to a cloth lined perforated box and allowed to drain over-night. As much moisture is pressed out as possible; the stock is dried at 212° to 220° F. for 24 hours, weighed and shrinkage calculated.

This method has been found to check the mill test within 5 per cent and is particularly valuable in figuring cost estimates on new lots of rags.

Approximate Laboratory Method: A dry 1 pound sample is cooked with 2 per cent NaOH for five hours in an autoclave at 300° F.* The stock is washed for 6 or 8 hours with running water, allowed to stand 2 hours with 2 per cent bleach and 1 per cent alum, washed 2 hours, dried and weighed. The shrinkage figure by this method will be considerably lower than that obtained on the mill test (at times only ½). Another test should be run at the same time on rags of similar grade that have been tested by the mill or laboratory method. This method has been found to be of considerable value in determining excess filler in rags such as buckrams, when only a small sample is available.

Color After Bleaching: The color of the half stuff obtained from the shrinkage test by the laboratory method is determined by comparison with mill half stuff of rags of the same grade and price, or by comparison with standard color discs used in pulp testing. The presence of any raw or unbleached fiber should be noted.

The stock obtained from the Approximate Laboratory Method will give some measure of the ease with which the rags will bleach in mill practice.

*NaOH is used instead of lime and soda ash to facilitate washing when the fibres cannot be drawn out to half stuff in a beater. Boiling in an open beaker has been found to give practically the same results as the autoclave cook.

JACK PINE AS PULPWOOD IN LAKE STATES

The once despised jack pine of the Lake States is coming into its own at last, according to A. E. Wackerman of the Lake States Forest Experiment Station, now that its more popular rivals, particularly white pine, have practically disappeared from the former "inexhaustible" forests of Minnesota, Wisconsin, and Michigan. Jack pine is, indeed, considered of sufficient importance by the members of this Forest Experiment Station to warrant the painstaking preparation of tables of growth and yield for this species.

Numerous tree measurements taken last summer in a series of localities, providing examples of every age and density of jack pine growth, are being worked up this winter into tables that will show the amount of timber in well-stocked stands, on poor, medium, and good forest lands of the region.

The Federal foresters regard the future of jack pine in this region as assured, as a pulpwood and for other purposes where trees of large dimension are not required. Hence an effort has been made to prepare a dependable and broadly applicable set of yield tables for a tree that the old time lumberman a few years ago would have scorned to recognize as other than a "forest weed."

Refiners for Groundwood Tailings

Preliminary Report of An Investigation by Mechanical Pulp Committee

By C. K. Andrews,*

The Mechanical Pulp Committee undertook as a part of last year's program, an investigation of the various types of refiners on the market for refining groundwood tailings. The investigation has not been completed because of insufficient time to get all the desired information together, but a report is given herewith of results to date and details of several installations in use by various companies.

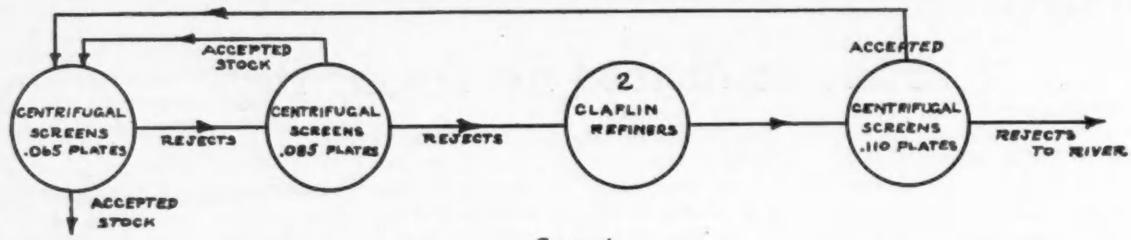

CHART A

in handling them. Several companies not utilizing their tailings at all send them direct to the sewer. One company reported putting its slivers through jordans and selling them as commercial No. 2 pulp. The capacity of the jordans was 15 tons requiring 175 hp. each. The investigation brought out information on 6 types of refiners in use. These were the Claflin, Berkshire, Valley Iron Works, American Voith Contact Company, Improved Paper Machinery Company and the ordinary jordan.

The following questionnaire was sent to 49 news print manufacturers in the United States and Canada:—

1. Do you use refiners?
2. If so, what make?
3. What is the capacity?
4. Is the quality of pulpwood from same as good as the average run of pulp accepted by the pulp mill screens?
5. What is the horsepower required?
6. Does the accepted pulp from the refiners go back through centrifugal screens?
7. Does your paper show more fine shives and slivers when using a refiner than when not using it?
8. Will it make pulp out of the rejections of an Improved Paper Machinery Company knotter and similar screens?
9. In case the pulp is not of first quality, would it be worth while running the refiner and putting the refined stock over a flat screen?

Would appreciate your answering the above questions and also giving us any other information that you think might be of value in getting out a report on refiners. If not too much trouble would appreciate your sending us a sample of the stock before going to the refiner and after coming from the refiner.

Of the 37 replies, only 8 were refining all the slivers from the pulp mill screens. The majority of the companies not refining their slivers used them in making wrapping paper and a few were shipping their slivers to companies making wrappers at a saving of approximately $7 to $10 per ton above cost of power and labor

Claflin Refiner

Of the 8 companies reporting using refiners, one uses centrifugal screens, 0.065 plates, the rejections from which go to a centrifugal screen with 0.085 plates. The rejections from this screen go to 2 Claflin refiners which have a capacity of about 25 tons air dry each in 24 hours, and require 100 hp. to drive. (Sample No. 1 taken before and after jordan.) After passing through the Claflins, the stock is screened through a centrifugal screen with 0.110 plates. The rejected stock from the 0.110 screen goes to the sewer. The accepted stock from the 0.085 plate and the 0.110 plate screens is rescreened through the primary screens. The quality of the pulp is not as good as the average accepted by the 0.065 plate screens and the sheet shows more slivers than when not using the refiner,

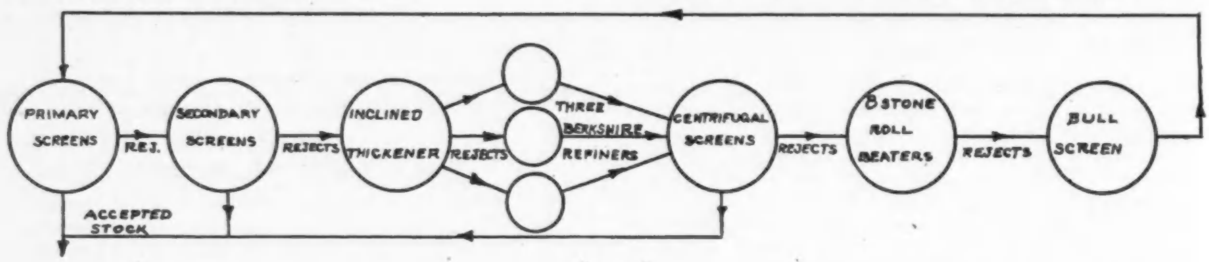

CHART B

but not enough to affect the stock materially. The rejections from the knotter screen are not refined.

Berkshire Refiner

Three companies use Berkshire refiners with stone roll beaters. One company passes the rejections from the secondary screens over an incline thickener from which the thickened stock passes through 3 Berkshire refiners operating in parallel. The stock is again diluted with water and passes through centrifugal screens and the accepted stock put in with the regular stock. The rejections go to 8 stoneroll beaters and from the beaters go to the bull screen and again pass through the screening system. The power required is about 595 hp. for 3 refiners and 8 beaters on a total groundwood production of 350 to 375 tons. No attempt is made to refine the rejections from the knotters. They do not think this system of

*Associate Member TAPPI. Manager Itasca Paper Co., Grand Rapids, Minn.

refining introduces enough shives into the stock to be a detriment, but feel the horsepower is high. (See Chart B.)

The other companies using this method of refining report similar results and apparently consume about the same power. One reports putting the stock from the stoneroll beaters over flat screens. Samples of stock taken before the Berkshire, after the Berkshire, after being beaten, and after being put through the flat screens (Sample No. 2,) show reasonably clean stock from the flat screens. Power consumption is given as 245 hp. on 10 tons of rejections in 24 hours.

Valley Iron Works Refiner

The Valley Iron Works manufacture a refiner consisting of one stationary and one revolving vertical stone made by the Carborundum Company. The stock is fed to the center and passes between the stationary and revolving stones which are grooved and require resharpening every 30 days, as it is important to keep the abrasive surface in condition for efficient operation of stock. This machine is recommended to run at a speed of 370 r.p.m. and requires approximately 75 hp. with a capacity of 6 tons in 24 hours. The machine is made with an adjustment and the quality of stock and horsepower depends on how tight the stones are set together. The installation of trial machine follows:

Operating on 4 grinders. The rejections pass over a ⅝ in. opening steel plate. The stock is carried to the floor above, where it is put through a revolving tapered cylinder 2 ft. in diameter at the small end and 3 ft. in diameter at large end, made of ½ in. perforated plates and provided with a shower to wash the fiber from the coarse slivers which will not pass through the ½ in. perforations. Information received does not state whether the stock goes through centrifugal screens before or after the tapered cylinder, but our understanding is that it goes through centrifugal screens before. The stock is then passed over an incline screen about 2 x 6 ft. and thickened to a consistency of 3½ to 4 per cent before going to the refiner. After passing through the refiner, the stock is again put through the regular pulp mill screens and any stock not sufficiently refined returned to the refiner. They claim a saving of 2,500 to 3,000 lb. per day. The writer is informed these refiners work better when some good stock is allowed to pass through the refiner with the rejections and is of the opinion that about 50 per cent of the above saving could be made by using secondary screens. It is estimated this refiner could handle the rejections from 6 grinders easily. (Sample No. 3—stock before and after passing through refiner.) (See Chart C.)

The writer saw this make of machine in operation at another mill making a finer grade than No. 1 news. At that time the refiners were not set up tight, and stock from them was being put over wet machines without being screened, and shipped to a mill making hanging paper. At other times the refined stock was used in the grade of paper they were making which was similar to paper used in the rotogravure section of Sunday papers. While watching this machine, the stones were set up tight and a sample of stock from refiner taken. (Sample No. 4.) The groundwood used in this mill was ground much finer than the ordinary news stock and rejections contained less coarse slivers. The method of taking out coarse shives was similar to the installation of the trial machine described by Valley Iron Works.

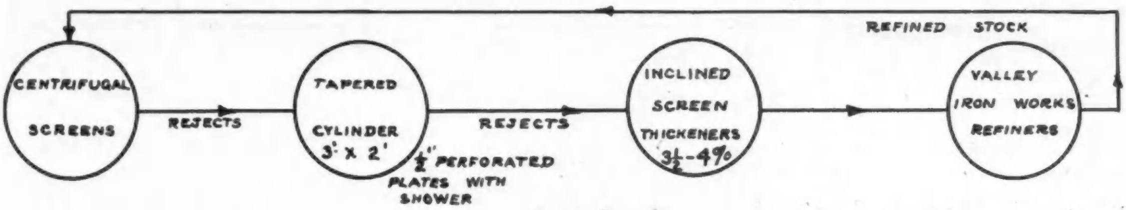

CHART C

American Voith Contact Co. Refiner

The American Voith Contact Company makes a machine similar to that of Valley Iron Works, except the stones are of basalt lava and are grooved, but are not dressed on the face. This refiner is made in two or more sizes, 39½ in. with capacity sufficient for a 30 ton pulp mill, and 50 in., with capacity sufficient for a 45 ton mill, provided the rejections run from 3 to 5 per cent of total pulp ground.

One mill the writer visited has been using one of these refiners, 59 in. size for the past 9 years. The capacity of their pulp mill is 36 to 40 tons of pulp. The coarse slivers are taken out by a Voith bull screen. The stock then passes through centrifugal screens and rejections with about an equal amount of good stock pass through the refiner and back through the centrifugal screens. The refiner is connected to a 100 hp. motor, but is not set up tight, and only takes 25 hp. to operate. (Sample No. 5, before and after refining.) The coarse slivers from the bull screen are put in one of the grinders between the wood, and reground, making a completely closed system. The paper made by this company is very good quality of news print and as free from shives as any sample submitted by the News Print Service Bureau. The refiner stones are regrooved about every nine months. (See Chart D.)

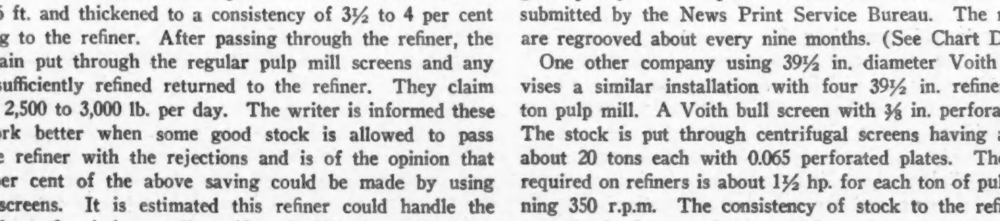

CHART D

One other company using 39½ in. diameter Voith refiners, advises a similar installation with four 39½ in. refiners for a 120 ton pulp mill. A Voith bull screen with ⅜ in. perforations is used. The stock is put through centrifugal screens having a capacity of about 20 tons each with 0.065 perforated plates. The horsepower required on refiners is about 1½ hp. for each ton of pulp made, running 350 r.p.m. The consistency of stock to the refiner is 4 per cent, depth of groove in stone ⅝ in. and stones are regrooved every three months. The rim on outside of stone is not grooved and is ¾ in. wide. The surface of the stone is never dressed. The sheet of paper manufactured at this mill is good. It is well finished, but shows slightly more shives than the average sheet made without refiners.

Improved Paper Machinery Co. Refiner

The Improved Paper Machinery Company makes a refiner which it advises handles 7 to 8 tons of slivers in 24 hours, requiring 60 hp. to operate and runs at a speed of 165 r.p.m. The process of refining is done by crushing between heavy rotating rolls and the inside of the shell. This method, it is claimed, draws out the fiber rather than cuts it. The weight of the machine is 15 tons. One company using this refiner advises that one refiner takes care of all the rejections from a 100 ton mill and will handle more, using 50 hp. The pulp from the refiner is not as good quality as comes from the centrifugal screens, but shives are not noticeable in the paper. The tendency of this refiner is to make very short stock. The stock from the refiner goes back through the pulp mill screens. (Sample No. 6, before and after refining.)

Jordan Refiner

One company reports having tried one make of refiner and discarded it for an ordinary jordan. Its present system consists of 12 grinders with a capacity of 75 tons. Stock passes over a screen with 1⅛ in. holes, with sliver loss of 2 lb. per cord, to Voith bull screen with ⅜ in. holes, with stock loss of 6 lb. per cord, over riffler with stock loss of 2 lb. per cord, to four Improved centrifugal screens having 0.065 plates, with rejections of 12 per cent of pulp production. The rejections from the centrifugal screens pass through a Majestic jordan, 5 ft. long, 32 in. diameter, running 495 r.p.m., requiring 200 to 250 hp., and are pumped back to the centrifugal screens. This system shows a loss of only about ½ of 1 per cent. (See Chart E.)

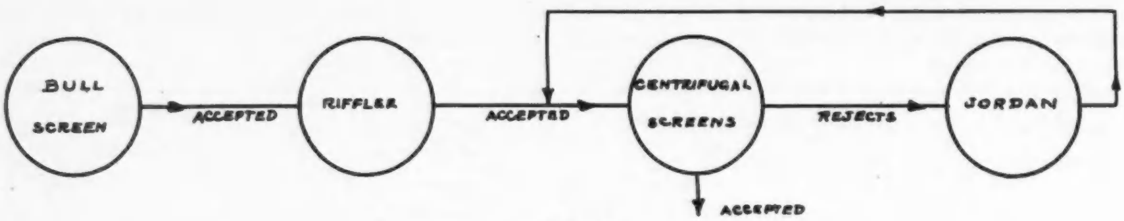

CHART E

At another pulp mill operated by this company with 16 grinders, making 80 tons, the stock from grinders passes over screen with 1⅛ in. holes with stock loss of 3 lb. per cord, through two knotters with ⅜ in. holes with stock loss of 20 lb. per cord; through four Improved centrifugal screens with 0.065 plates, with about 15 per cent rejections, which pass through two Improved tailing screens. The accepted stock from the tailing screens goes back through the four centrifugal screens, and the rejections amounting to 60 lb. and 100 lb. per cord, go to the sewer or into wrapper stock. This system shows an approximate loss of 4.4 per cent. It is advised that the jordan is to be replaced in the 75 ton mill by two tailing screens and layout similar to the 80 ton mill. The reason for the change from jordan to tailing screens is to improve the quality of pulp made and eliminate short chunky fibers resembling sawdust. The jordan tends to cut tailings up rather than draw them out into individual fibers, and the sawdust passes through the first screens into good stock, making a bad effect in the paper.

One company puts the rejections from its primary screens through a second set of screens. The accepted stock is returned to the first set and is rescreened. The rejected stock goes through a third set of screens. The accepted stock from the third set of screens goes through the second set of screens and the rejections are put through a jordan and are returned to the third set of screens, no stock being wasted. When not using the jordan, but the three sets of screens, the rejections amount to less than 2 per cent of total stock ground. The quality of the stock depends on how much the jordans are set up, but the paper shows more fine shives when using the jordan. (See Chart F.)

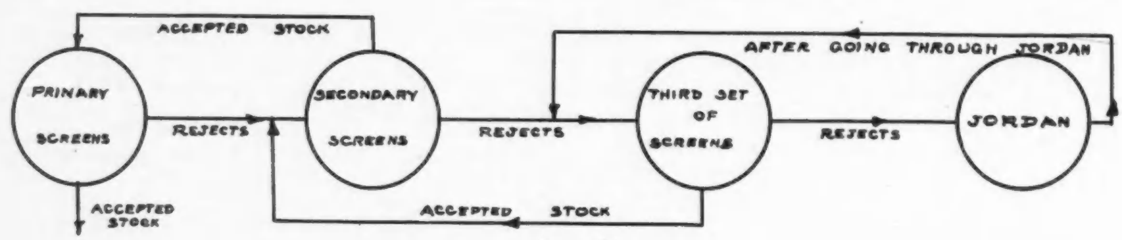

CHART F

Howard Refiner

Several years ago at our mill we tried a Howard refiner, which is a wood lined cylinder about 5 ft. in diameter by 10 ft. long, filled with flint pebbles, on groundwood slivers, but found it unsatisfactory, as it did not refine the stock, but broke up slivers so they would pass through the screens. Also we had trouble with the screens filling up with slivers and resulting in breaking the plates. Until a few months ago we were grinding between 40 and 55 tons, putting the stock over a bull screen with ⅜ in. perforations with a loss of 0.5 to 0.6 per cent. From the bull screen stock was pumped through one Improved knotter with ¼ in. perforated plates, with stock loss of 0.1 per cent. From the knotter the stock passed through three Improved centrifugal screens with 0.075 plates, with rejections of about 9 per cent. The rejections went through an Improved tailing screen with 0.100 plates. The accepted stock went back through the centrifugal screens and the rejections, amounting to 1.21 per cent, went to the sewer. This system allowed too many shives to get into our sheet and we put 0.065 plates in our centrifugal screens. The perforations of the plates in our tailing screen were somewhat larger than originally, due to wear, and we still found more shives in our sheet than desired. We discontinued the use of this screen and installed two 10 plate flat screens with 0.10 cut plates. When grinding about 36 tons, our loss on flat screens was about 1.28 per cent, but when grinding 50 tons, the loss went up to between 4 and 4.5 per cent. We are now installing a Voith 59 in. refiner.

There has not been sufficient time to follow out all the leads in this investigation. We have been promised a more detailed report on the Valley Iron Works refiner by a mill that has had one in operation some time, but it has not arrived at the time this report was written. Have also been promised a more detailed report on the Improved Paper Machinery Company refiner. We understand that the Forest Products Laboratory and Allis-Chalmers Company have done some experimenting with an Allis-Chalmers tube mill at Madison, but have not had a report of the experiment.

The information on this subject is not conclusive enough to warrant this committee's making a recommendation on any type of refiner or method of disposal of the tailings. The quality of paper to be made determines largely if refined tailings can be used. The screening system and the grinding greatly influence the amount of tailings produced. Using the rejections in manufacturing wrappers or insulite seems the more satisfactory method of utilizing them, but there are many small mills that cannot adopt this plan. The development of a refiner which will refine the slivers to a good quality of pulp without the use of too much power would result in a considerable saving to many mills. We believe this investigation should be continued until some satisfactory method that can be recommended is found.

The Moisture Meter and Its Use In Water-Removal[1]

By E. A. Rees[2] and E. J. Wilson

In these days of economies it is most necessary that we keep before us the cost per ton of drying paper. For every pound of water taken from the sheet of paper before it comes in contact with the driers a very considerable saving is made. The whole process of papermaking is essentially one of removing water yet for years the industry has gone on year by year with little or no definite knowledge concerning this water removal and the possible economies that might be effected by its proper distribution between presses and driers.

Accurate knowledge of the moisture content of the sheet is necessary before much progress can be made along water removal lines and yet there is no continuous method of successfully measuring the moisture content of a sheet as it passes over the machine. The old and usual method of taking a sample and determining the moisture from bonedry weight, may be reasonably accurate for the particular sample taken, but it represents only a small amount of the paper made. Many tons are manufactured that are in no way represented by the sample and furthermore, in the ordinary weight test for moisture, the knowledge of the water content usually becomes available several hours after the conditions and factors which may have been responsible for it have occurred. It is also quite costly to have to break down the sheet and interfere with production in order to make this test.

Necessity for Such An Instrument

We will all agree that the industry is ready for some device that will indicate and record in a continuous manner the moisture content of a running sheet of paper. There is no doubt that such an instrument would be of inestimable benefit to the papermaker. It was with this idea in mind that we started work and have developed such an instrument. It may be that the instrument needs further development and greater refinement but several installations have been made and the valuable data which has already been obtained convinces us that in the near future the moisture meter will be perfected and many more variables in the making of paper will be eliminated.

Three or four years ago our research work was started in the field to find out the duties of woolen felts on the presses. Our investigations led us to the question of moisture content. We were particularly interested in the moisture of the sheet as it left the several presses and entered the driers. The ordinary test of sampling would not do at all. It was slow and the constant changes of stock conditions and the variations in the manipulation of weights and felt tensions during the operation of the felts, made the old method impractical. In the absence of any other suitable method we then resorted to methods of measuring the water removed at each press. A great deal of information can be obtained from such figures in regard to the properties of woolen felts and pressing conditions in general. Such information is valuable from a research viewpoint but is quite unwieldy and involved for practical use. Some new method of testing for moisture was needed. Some device that could be brought in contact with the sheet while it was running on the machine and would, without breaking the sheet, indicate a record whenever a change in moisture content occurred. We were unable to find any such device on the market and so we started to develop the moisture meter.

Principle of the Moisture Meter

The principle of the moisture meter is based on the fact that the resistance of a sheet of paper to the flow of electricity is directly proportional to its moisture content. All of our preliminary tests to date have shown that variations in moisture content can be reflected with extreme sensitivity by a suitable electrical meter. The question may come to you as to whether variations in temperature of the stock, thickness of sheet, salt and chemical concentrations, etc., will not also affect the reading to such an extent that there will be a grave doubt as to the real meaning of the reading in terms of moisture content. We cannot state definitely at this time just how these factors will complicate the method but we do know from our tests that for any particular stock condition, the effect of the fluctuation of these other factors will be so small as compared to the effect of the moisture variation that they can be ignored.

We are at present working on a correcting or calibrating device that will premeasure the conductivity of the water in stock as it is being pressed out so that readings above zero will indicate the conductivity of the sheet only.

Possibilities of Water-Removal Field

Before proceeding to the detailed description of the meter let us consider briefly the possibilities of the water removal field. The desirability of knowing accurately the moisture content of a running sheet will be evident. Table 1 shows the relative cost of water removal at presses and driers for newspaper at different degrees of dryness.

It will be noted that *the relative cost of removing water at the driers is about* 10 *times as great as that of removing it at the presses.* The reduction of the percentage moisture content of the sheet, entering the driers, by only 1 per cent saves enough of money to pay for one fourth to one half of the entire felt bill. An increase in dryness of 5 per cent, say from 26 to 31, saves $1.06 in steam costs for every ton of paper. In a 100-ton mill, this would mean a saving of $32,000 a year.

The moisture meter cannot of itself produce drier sheets of paper. It merely points the way by indicating accurately the moisture content that is obtained.

[1] From the Research Laboratory of F. C. Huyck & Sons, operating Kenwood Mills, Albany N. Y., and Kenwood Mills, Arnprwr, Ont.
[2] Associate Member TAPPI.

Determining Press Roll Conditions

Such an instrument would fulfill its usefulness in determining also the proper combinations of press roll conditions. What occurs at the nip of the press rolls may be resolved into certain fundamental principles and the extent of water removal at each press determined by:—

TABLE 1

DISTRIBUTION AND COST OF WATER REMOVAL AT PRESSES AND DRYERS
(Sheet entering presses at 14% dry)

Fiber in sheet entering dryers. %	Tons water removed at presses per ton paper	Tons water removed at dryers per ton paper	Cost of water removal per ton paper: At presses	Cost of water removal per ton paper: At dryers	Total cost water removal per ton paper
25	3.14	2.91	$0.51	$4.88	$5.39
26	3.29	2.76	.51	4.64	5.15
27	3.44	2.61	.51	4.38	4.89
28	3.57	2.48	.51	4.17	4.68
29	3.69	2.36	.51	3.96	4.47
30	3.81	2.24	.51	3.76	4.27
31	3.92	2.13	.51	3.58	4.09
32	4.01	2.04	.51	3.43	3.94
33	4.11	1.94	.51	3.26	3.77
34	4.20	1.85	.51	3.11	3.62
35	4.28	1.77	.51	2.97	3.48

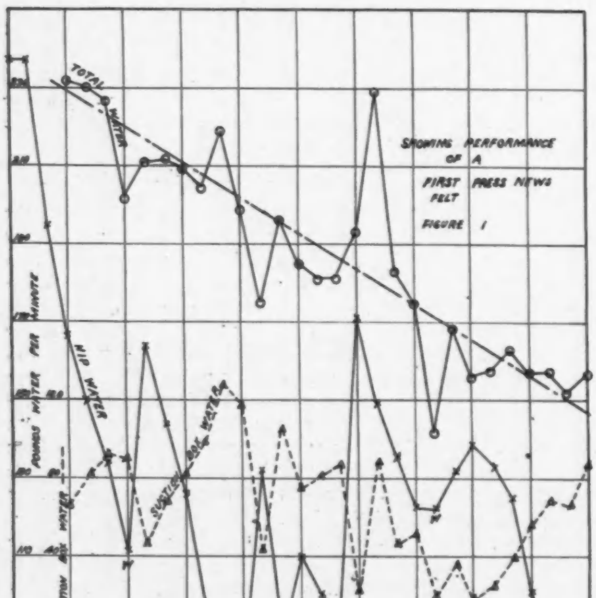

FIG. 1

The pressure applied.
Hardness of rolls.
Diameter of rolls.
Speed of sheet and felt.
Resistance of felt to flow of water.

The pressures used in expressing water from newspaper vary from 50 pounds to 300 pounds per inch. In the absence of a suitable moisture meter it is impossible to give exact figures on the relation between pressure and moisture content. There has also been very little systematic selection of hardness of rolls, thickness of rubber covering and diameter of rolls from the standpoint of the most efficient water removal. The moisture meter would enable a more exact and definite basis for the best lineup of pressing conditions.

Water Removal and Wearing Life

There are also many possibilities in the manipulation of the felt design for better water removal. There are two essentials properties in felts; one is water removal and the other is wearing life. Now it so happens that these two qualities are opposed to each other in felt construction. Whenever we have had to impart more

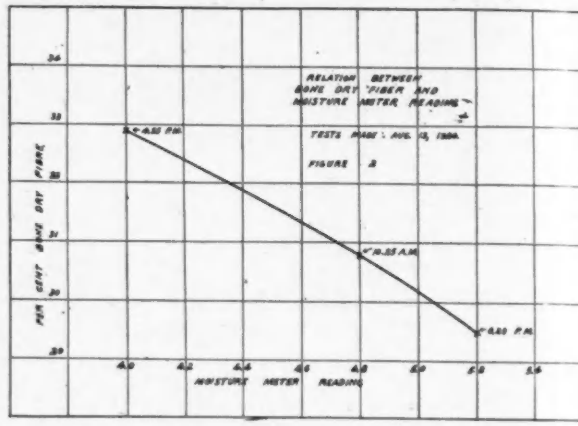

FIG. 2

pulling strength, more wearing life or resistance to mechanical variations of machine conditions, we have always had to do it at a sacrifice of water removal. The amount of this toughness which is necessary to permit of the felt to run, for after all this is the first consideration and the felt must run and make paper, is the limiting factor which will eventually decide just how far the felt maker can proceed in the development of water removal qualities in felts. The problem of the felt-maker is the one of finding the most desirable compromise of "give and take" so to speak, between the necessary qualities of toughness and strength and that of water removal for each particular condition. Exact knowledge of the moisture content of the sheet would be of inestimable benefit to a felt maker in building the best design of felt for the longest life and consistent with the greatest water removal.

Now for any given condition of press rolls and felt design there is a gradual loss in water removal day by day as the felt continues to run. The water removal efficiency of each press felt may be defined as the amount of water removed by that particular felt in proportion to the amount of water that is available for it to remove, or, in other words, water removal efficiency must be regarded on the basis of opportunity. Fig. 1 shows a typical performance of a first press news felt obtained by actual measurement of the water in a practical running condition. The water is extracted at the nip and the suction box. Variations in couching and stock conditions as well as pressure and tension variations in the mechanical handling of the felt may have caused variations in the presented opportunity and also in the response to that opportunity so that there are many fluctuations in the recorded water removal. The effects of washing may also be clearly observed. All of these variations mean variations in the moisture content of the sheet.

Inherent Characteristics of Felts

It will be noted that the general tendency of water removal is downward and this is an inherent characteristic of all woolen felts and *there is a gradual decrease in water removing ability day by day as the felt continues to run*. For each particular press and for each particular design of felt, then, there is the question of deciding just what life is consistent with economy as referred to the ultimate drying costs. It has been found by close observation and actual measurement that *a fluctuation in steam consumption of as much as 20 per cent be caused by the effect of changes in the performance of the felts.* A moisture meter is absolutely necessary in order to level off the many variations as they occur and to determine more definitely the proper time at which a felt should be removed from the machine.

Every practical running condition operates with the sides of press rolls unevenly weighted to a more or less degree. Even with the weights placed at the same notches on the lever arms, we have found differences as great as a ton on the two sides of the press roll. Binding at the knife edges of the fulcrums always occurs and the effect is exaggerated many fold by compounding. The moisture meter, recording the moisture content at different places across the running sheet would detect uneven weighting, defects in rolls and would also eliminate the large amount of guesswork that now exists in the crowning of rolls.

The moisture meter would be of such a benefit in every phase of the actual papermaking operation that it is quite difficult to foresee how the greatest of progress can be made without one.

The moisture meter which we have developed measures electrical resistance primarily but the evidence shows that the electrical readings can be calibrated for any particular stock condition. The relationship is a very simple and direct one and the resistance of the sheet is directly proportional to its moisture content. Fig. 2 shows data which has been obtained on a high speed news condition running at 975 feet a minute.

The instrument consists of panel board on which is mounted a very sensitive specially built indicating meter with resistance to control the position of the pen and the flow of electric current through the sheet. (Figs. 3 and 4.) A special designed relay automatically cuts off current when the sheet breaks, causing a short circuit, and also automatically cuts in when the sheet is carried through the con-

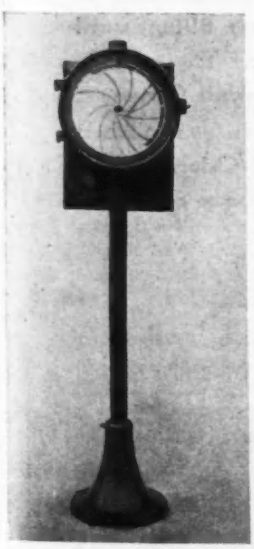

FIG. 3

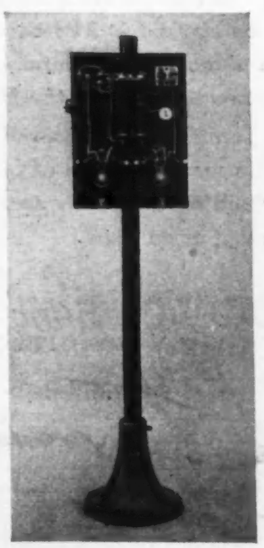

FIG. 4

tacts again. The contact consists of a flexible phosphor bronze strip that can be moved and placed at will so that moisture measurements can be taken at any position on the sheet as desired. (See Fig. 5). The lower contact can be any smooth metal roll over which the sheet runs. Several contacts can be placed across the running sheet at different places and plugged in to the same meter. They can also be inserted between the presses. The simplicity and adaptability of such an instrument lends itself easily to practical use. Fig. 6 shows an actual 24 hour chart obtained on a high speed news condition running at 975 feet per minute. This indicates the variations in the

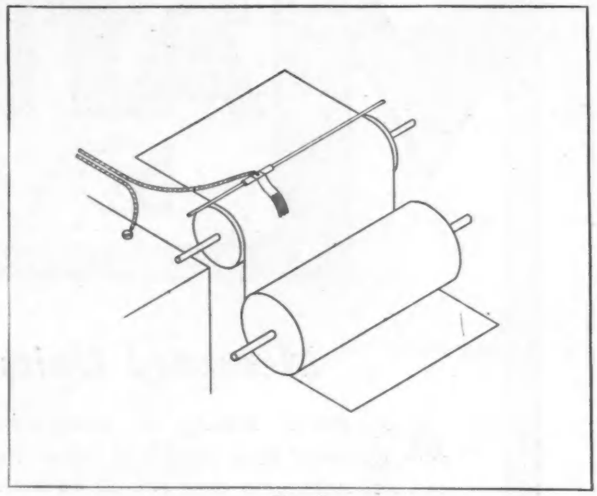

FIG. 5

moisture content of an ordinary running sheet of newspaper.

The meter can be connected with the ordinary mill circuit, 110 or 220 volts a. c., and presents no particular mechanical difficulties. It can be installed by the plant electrician and requires no attention except to keep the bottom contact clean and free from all paper slime of any kind. An ordinary doctor blade should do this quite easily. The top contact of phosphor bronze foil is self cleaning. There has been no tendency of any kind to cause breaks on the

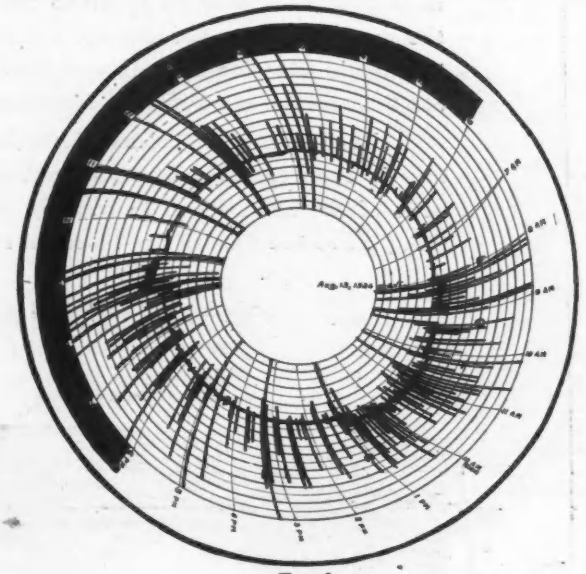

FIG. 6

machine or to interfere with the regular routine of production of paper.

It is hoped in the very near future, after this instrument has received the proper amount of trial in all sorts of different conditions and demands of actual practice, that we can offer it to the Industry to fulfill a long felt need.

Burning of Wood Refuse

By R. L. Beers*

During the last five years, remarkable progress has been made in the economical use of fuels. The World War greatly stimulated this advance. Because of the scarcity of coal, high prices and high freight rates, it became imperative that the maximum amount of production be realized per pound of fuel. General publicity brought to bear by government and engineering societies during and since the war has tended to make plant operators realize that large savings in fuel are possible in most boiler plants.

Losses That Are Not Visible

Fuel can be burned with widely varying results. There are many losses going on continually that are not visible. The average person believes that if the ashes are free of coke the fuel is being economically utilized; however, the loss in the ash is very small compared to the loss up the stack due to incomplete combustion and excessive temperature of the gases. For economical operation, it is first necessary to have the proper boiler setting and furnace equipment. Then this equipment must be intelligently operated. The firemen should receive instructions as to the proper operation. The pressure gage and water columns were considered the only gages necessary for most of the installations in the past; however, they serve no useful purpose to assist the fireman in obtaining proper combustion. Instruments should be provided so that the results and conditions are being continuously indicated and the firemen can intelligently make the necessary changes in drafts, air supply and fuel supply to secure best results. It is advisable to provide instruments for indicating the steam flow, temperature of the outlet gases, draft conditions, and the carbon dioxide in the flue gases.

It is equally important that the burning of wood receive attention equal to that of the combustion of coal, particularly in plants where there is not sufficient wood refuse to supply the steam demand. In such plants low efficiency in the burning of wood means that more coal will have to be consumed. The sawdust, shavings and the waste refuse such as trimmings, edgings, chips, blocks, etc. from lumber and paper mills, that have passed through the hogging machine or macerator and contain up to 40 and 60 per cent of moisture, are valuable as a fuel. Because of the extensive lumbering operations in the Pacific Northwest, large quantities of hogged wood have been available for fuel. It is being used in some central stations on a large scale for the generating of electric power. The Portland Electric Power Company recently had a pile of hogged wood which contained over 7,000,000 cu. ft. and covered several acres.

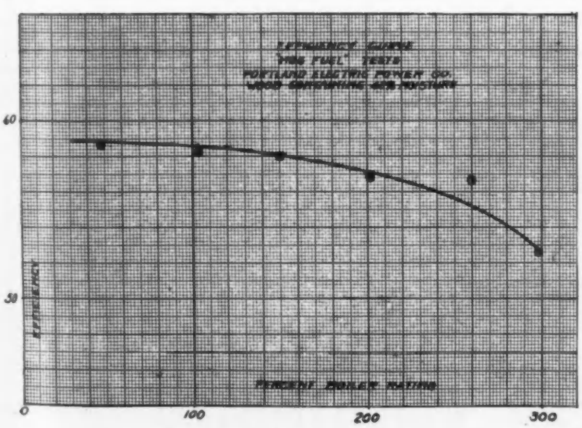

FIG. 1

* Detroit Stoker Company, Detroit, Mich.

Different Treatment for Economical Results

Wood is largely gas, consisting of about 85 parts gas to 15 parts of carbon per pound of combustible. It requires entirely different treatment than coal for the most economical results. On account of the high gas content, most of the combusion takes place above the fuel bed and it is necessary to provide large combustion space. Furthermore, because of the high moisture content, it is necessary to provide ignition arches to dry out the material and ignite the gases. The gas is driven off at a low temperature and it is particularly important to admit air above the grates properly distributed, so that it will allow the gases to start burning as soon as driven off. in case there is a deficiency of air above the fuel bed, the combustion will be incomplete. The fire will smolder and pale blue flames will be noticed. The material burns mostly from the surface and the fuel bed should not be distributed as combustion would be hindered. The supply of fuel should be so regulated that it will be fed continuously without interruption and at a rate varying with the load demand. There is a chance for improvement in most plants in this respect by

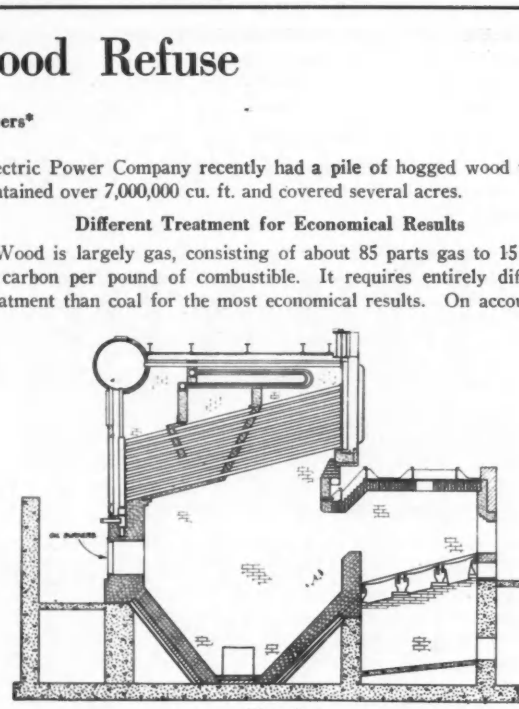

FIG. 2
Wood Burning Setting Equipped with Oil Burners.

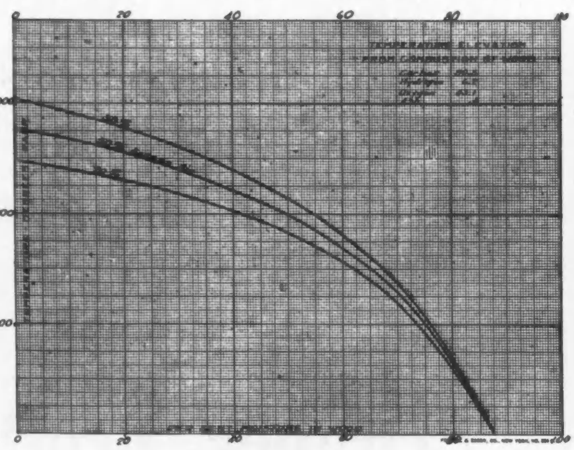

FIG. 3

keeping the air supply and fuel supply in synchronism with the load demand. The tedency is to allow the wood to be fed into the furnace at a uniform rate regardless of the load; consequently at times there will be too much material in the furnace with a deficient air supply, an incomplete combustion will result. Again the fuel bed becomes too thin and there is an excess air supply with the resulting large loss of heat up the stack. There is probably more tendency for a deficiency rather than an excess of air on account of the low temperature of distillation of the gases. Wood burning stacks, emitting

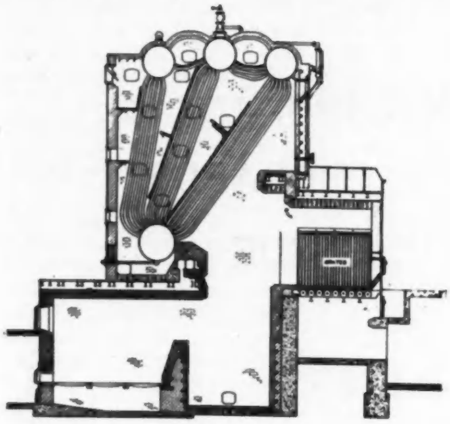

FIG. 4
Wood Burning Setting Equipped with Multiple Retort Underfeed Stokers.

black smoke, indicate usually a deficiency of air near the fuel bed, combined with insufficient combustion space.

The general practice is to spout the hogged wood from overhead conveyors on to the grates through openings in the top of the extension furnaces. There is usually a space between the end of the spout and the top of arch which leaves the feed hole practically wide open. This permits of a large volume of air being drawn into the furnace. Under certain conditions this air might assist in combustion but not being regulated it is likely to be detrimental by admitting too much

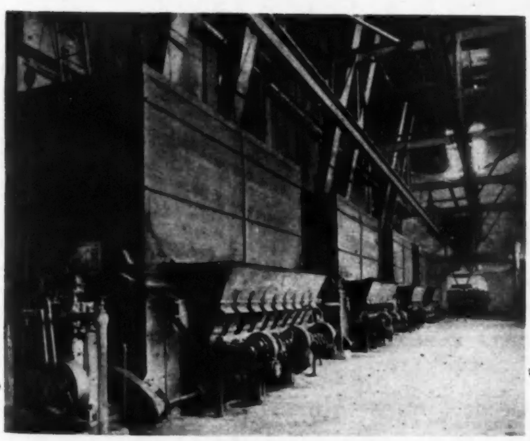

FIG. 5
Interior View of Boiler Room..

air at a point where not desired. It is advisable to run the spout to the opening and make a tight connection and then a floating balanced damper should be placed in the spout. This damper can be so constructed that it will remain closed when there is no wood being fed, keeping out the excess air, and will open automatically by the weight of the wood when it falls in the spout. by using forced draft the best regulation of the air supply can be obtained. A low draft in the furnace can be carried. This will reduce the leakage of air through the brickwork and through openings where it is not needed and in turn increase the furnace temperature. The supply of air above and below the fuel bed can be positively adjusted for best results.

Combustion Space Too Small

In many instances, coal burning furnaces have been changed over to wood burning and the combustion space is entirely too small. Wood requires more combustion space than coal. There should be

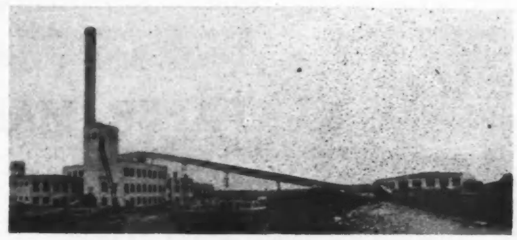

FIG. 6
Exterior view of Boiler Plant showing Conveyors.

from 3 to 5 cu. ft. of combustion space per boiler horsepower for wet hogged wood, depending somewhat upon the conditions and the overload to be caried. Sawdust, and shavings from kiln dried wood, burn almost entirely in suspension and require even more combustion space. In case there is insufficient space, combustion will be incomplete and there will be considerable loss by unburned gases up the stack. With unseasoned wet hogged wood, it is necessary to keep the furnace temperature fairly high in order to drive off the moisture in the wood and to ignite all of the gases which are driven off rapidly and at low temperatures. This can be accomplished by providing brick arches and by surrounding the fuel bed with plenty of brickwork so as to reflect the heat back on the hogged wood. It is necessary that ample temperature be maintained in the furnace with sufficient air supply otherwise part of the gases will not be ignited and will pass out the stack unburned, hence it is customary to use extension furnace settings for wood burning installations.

The underfeed stoker set in extension furnaces has proved particularly valuable in handling wood high in moisture by providing a hot fire underneath the pile. It forces coal in at the bottom of the pile of wood, and the hot gases from the coal fire are driven by a forced draft fan up through the wood, igniting it and driving off the moisture. Thus the heat is applied to the top of the pile from reflection by the arch and at the bottom by a coal fire. This combination

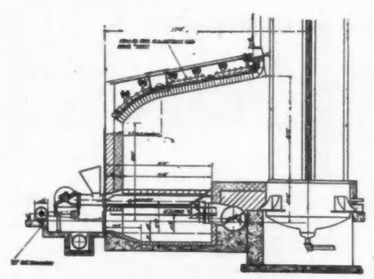

FIG. 7
Wood Burning Furnace Equipped with Single Retort Side Cleaning Underfeed Stokers.

permits burning greater quantities than can otherwise be burned, particularly of wood containing more than 50 per cent moisture.

Lower Temperatures With Hogged Fuel

The furnace temperatures obtained with hogged fuel are much lower than are obtained with coal; this being due particularly to large quantities of water in the fuel. The heat from the wood must raise the temperature of the fuel up to the boiling point and then evaporate

the moisture and superheat it. The curves in Fig. 1 show the theoretical elevation of temperature resulting from the combustion of wood. The curves are computed for wood containing various percentages of moisture. In actual practice, however, the temperatures would be 100 to 500 deg. Fahr. lower depending upon the type of setting, which would affect the amount of heat radiated to the boiler. A furnace with a large arch and a small part of fuel bed exposed to the boiler heating surface would have a higher furnace temperature than one with a short arch and large part of fuel bed exposed to the comparatively cold boiler heating surface. It will be noticed from these curves that, theoretically, the wood would have a heating value up to 86 per cent moisture, at which point all the heat in the wood would just be sufficient to evaporate the moisture. However, it is necessary to have sufficient temperature in the furnace to ignite the fresh fuel and the moisture limit must be less in order to maintain a temperature high enough. It will be noticed that excess air has a decided effect upon the temperature and should be kept down as low as possible consistent with obtaining complete combustion.

It has been claimed in some plants from actual practice, that wood containing more than 70 per cent moisture is of no value as a fuel. This is also shown in the temperature elevation curves of Fig. 1. It will be noted in the curves that a temperature rise of 1200 deg. will be obtained for a moisture content of 70 per cent. It is necessary to obtain approximately this rise in order to support combustion. Carbon has an ignition temperature of about 900 deg., hydrogen 1130 deg. and carbon monoxide 1210 deg. Fahr. If a furnace temperature of only 1100 deg. Fahr. were carried, the carbon monoxide and hydrogen would not be burned. It is also necessary to provide ample combustion space in addition to maintaining sufficient furnace temperature. In case combustion of the gases is not completed before striking the comparatively cold boiler heating surface, the gases will be chilled below their ignition temperature, the combustion will be complete and a large part of the gases will pass up the stack unconsumed.

Bark from barking drums is usually very wet and frequently contains over 70 per cent of moisture and consequently becomes practically a waste disposal proposition; however, heat from it is being recovered by the use of underfeed stokers which provide a hot coal fire underneath the pile. The coal fire elevates the furnace

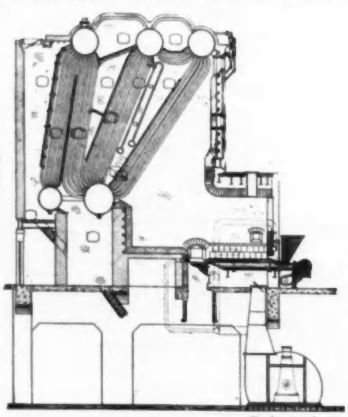

FIG. 8

Double Furnace Setting Equipped with Overfeed V Type Stokers with Wood Burning Furnace at Rear of Boiler.

temperature, increases the rate of bark burning and recovers some of the heat of the wood which would otherwise be lost. Tanbark from tanneries also runs high in moisture and the general practice is to burn it in conjunction with a stoker coal fire.

Volume of Gas from Wood

The volume of gases from wood is much greater than from burning coal, and the passes through the boiler, size of breeching, and stack, should be correspondingly large. Table 1 gives the approximate volume of flue gases at 600 deg. Fahr., and ratio of the volume as compared to that of coal at the same temperature:

TABLE 1

Moisture %	Efficiency %	Wood per hp. as fired lb.	Flue gases per hp. lb.	Cu. ft. per hp. at 600°	Ratio of volume to coal
0	70	6.00	61	1,560	1.11
20	65	8.05	66	1,715	1.22
40	57	12.25	80	2,120	1.51
60	43	24.40	114	3,150	2.24

It will be noted that in wood with 40 per cent moisture the volume of gas will be 50 per cent greater, and in wood of 60 per cent mois-

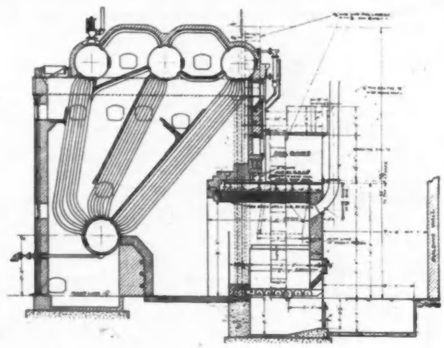

FIG. 9

Furnace Equipped with V Type Overfeed Stoker for Burning Coal with Saw Dust and Shavings.

ture the volume will be over two times greater than that for coal for developing the same boiler steaming capacity.

Unseasoned hogged wood is usually spouted through openings in the top of extension furnace settings and burned in high conical piles, sometimes 6 or 8 ft. in height. However, if the supply of wood is stopped, as frequently happens, the pile is quickly consumed and the steaming capacity of the boilers is likewise stopped. The wood burns at a high rate of combustion. Under proper conditions, rates of 200 lb. per sq. ft. of grate area are quite common. It takes approximately 8 cu. ft. of average hogged wood to equal 1 cu. ft. of coal in steaming capacity. Although the fuel bed of wood is comparatively deep, its reserve capacity in the furnace is much less than

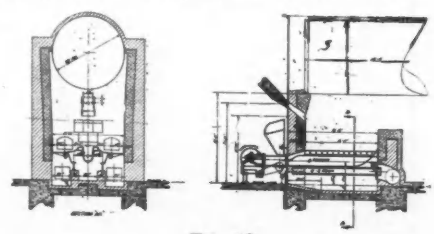

FIG. 10

Furnace Equipped with an Underfeed Stoker for Burning Saw Dust and Shavings.

with the average coal fire. Thus if the wood supply is stopped, the steaming capacity of the boiler would also be quickly lowered.

Extensive Conveyor Systems Necessary

Extensive conveyor systems are usually necessary to handle the bulky material, and frequently the hogged fuel clogs up the conveyor and shuts off the supply. The supply of material from the source and quality of the wood varies somewhat with the season. Also, some plants have a supply of wood during the day but none at night although the plant is kept in operation continuosly. It is consequently important that equipment be provided which will quickly pick up the boiler load with another fuel when the wood supply is stopped. This can be done by providing extra boilers that are coal

fired. However, this requires extra investments and is not necessary. The most practical arrangement is to have the wood-fired boilers also equipped to handle other fuels.

In some of the northwestern states where oil firing is prevalent, it is used as a standby fuel. This makes a satisfactory combination with wood as the oil burners take up very little space and can be inserted in the rear of furnace, permitting a good furnace design for handling straight wood.

Oil Used as Standby Fuel

Fig. 2 shows an installation setting at the Portland Electric Power Company where oil is used as a standby fuel At this plant considerable experimenting and investigation have been carried on and very successful results have been obtained, in burning straight wood of about 40 per cent moisture content. It will be noted that the arch is inclined down at the rear end for improving the ignition and mixing of gases. It will also be noticed that the wood furnace is not used when the oil is burned. Fig. 3 shows the efficiency curve for various ratings with a wood containing about 42 per cent moisture.

In the middle west and eastern states, oil is prohibitive on account of its high prices as compared to coal, and it is more practical to use the latter as a standby fuel. Highly satisfactory installations have been made with underfed stokers for burning straight wood, straight coal, or a combination of both fuels at the same time.

Fig. 4 illustrates the setting of an installation of Detroit multiple retort underfeed stokers in wood burning furnaces at the plant of the Northwest Paper Company under 834 hp. Stirling water tube boilers. At this plant the boilers are operated either with straight wood, or a combination of wood and coal, or with a straight coal fire. The equipment is arranged so as to burn efficiently either fuel and so that a change can be quickly made from one fuel to the other. The walls are made of hollow construction and are connected to the forced draft fan. Dampers are provided to the ducts in the sections in these walls for regulating the air supply above the fuel bed. Instruments are installed which continuously indicate and record the conditions under which the boilers are operating and guide the fireman in the proper and intelligent operation of the boilers.

Fig. 5 is a picture of the boiler room and Fig. 6 is an exterior view of the power plant showing the wood conveying system from cars to boiler plant.

Results of Various Tests

Following are results of a straight coal test; a straight hogged wood test, and of a test with a combination of wood and coal.

Boiler Make: 834 hp. Class 13, No. 30, Stirling with 8,340 sq. ft. of water heating surface and 2,264 sq. ft. of integral economizer surface.
Stoker: Nine retort Detroit Multiple-retort Underfeed set in extension wood burning furnace.
Conditions: Normal operating load.

Fuel	Coal	Wood	Coal and wood
Duration .... Hr.	20.0	5.55	7.42
Steam pressure .... Lb.	150.9	148.6	153.9
Superheat .... °F.	107.2	128.4	129.8
Feedwater temp. .... °F.	168.8	169.1	167.1
Flue gas temp. .... °F.	466.2	490.9	498.1
Pressure in air chamber .... In.	2.87	1.01	1.33
Draft at damper .... In.	0.74	1.00	1.16
Furnace draft .... In.	0.16	0.06	.10
Carbon dioxide .... %	13.1	16.4	16.26
Oxygen .... %	6.3	1.5	2.03
Carbon monoxide .... %	0.0	1.6	0.6
Proximate analysis—as received:			Wood
Moisture .... %	6.72	58.1	60.0
Volatile matter .... %	31.78	34.35	32.56
Fixed carbon .... %	49.48	6.53	6.43
Ash .... %	12.02	1.02	1.01
Sulphur .... %	1.08	....	....
B.t.u. as fired	12,056	3,794	3,638
dry	12,925	9,054	9,095
Ultimate anlysis—dry:			
Carbon .... %	70.96	49.5	49.5
Hydrogen .... %	5.44	6.0	6.0
Oxygen .... %	8.14	41.2	41.2
Nitrogen .... %	1.44	1.0	1.0
Sulphur .... %	1.10	...	...
Ash .... %	12.92	2.3	2.3
Coal burned per hr .... Lb.	5,215.8	.....	1,016
Wood burned per hr ...... (approx.) cu. ft.	.....	1,428	836.9

Fuel	Coal	Wood	Coal and wood
Coal burned per sq. ft grate .... Lb.	35.9	.....	6.99
Horsepower developed	1,514.9	1,450	1,583
Boiler rating .... %	181.6	174.0	189.8
Test No. 2			
Heat absorbed by boiler .... %	80.66	51.4	60.65
Loss due to moisture in fuel .... %	0.68	18.9	16.30
Loss due to hydrogen .... %	4.60	7.6	7.24
Loss in dry flue gases .... %	8.87	7.6	8.83
Loss in unburnt CO .... %	0.00	5.5	1.98
Loss in combustible refuse .... %	2.38	0.0	0.0
Radiation and unaccounted .... %	2.81	7.0*	5.00*

*Assumed.

For the coal burning test the boiler was operated at 205 per cent of rating during the first 10 hours and at 158 per cent of rating

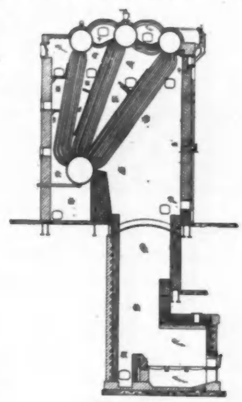

FIG. 11
Setting for Burning Saw Dust and Shavings.

for the last 10 hours. For the wood burning tests it will be noted that the moisture in the wood was 58.1 and 60 per cent. Better results were obtained in the coal and wood test than with the straight wood test; although the coal fired was only 5 per cent by weight of the total fuel burned.

Straight Wood

Fig. 7 shows an installation of Detroit single retort side cleaning underfeed stokers under 300 hp. Wickes boilers at the Riverside Fibre and Paper Company which are operated at about 200 per cent of rating during the day on straight wood. At night the supply of wood is stopped and the boiler load is carried with the stokers on straight coal. Electric motors are used for operating both the stokers and the forced draft fan.

Fig. 8 is of a double furnace setting in an industrial plant. The

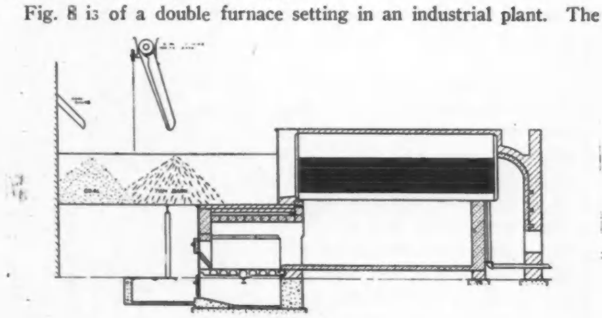

FIG. 12
Furnace for Burning Wet Tan Bark.

furnace at the rear has stationary grates and is used for burning large pieces of refuse wood material. The coal burning furnace at the front of boiler is equippd with V-type overfeed stokers and is kept in operation continuously to offset the unevenness of the wood fire. This plant has several other coal burning furnaces equipped for burning sawdust, shavings and refuse wood that has passed through a hogging machine, all of this material being obtained from

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> Bird Screens in each case deliver to the paper machine a homogeneous admixture of perfectly screened stock and water, free from lumps, slugs, and slime. Capacity is large; upkeep is almost nothing, and less power is required than for other types of screens.

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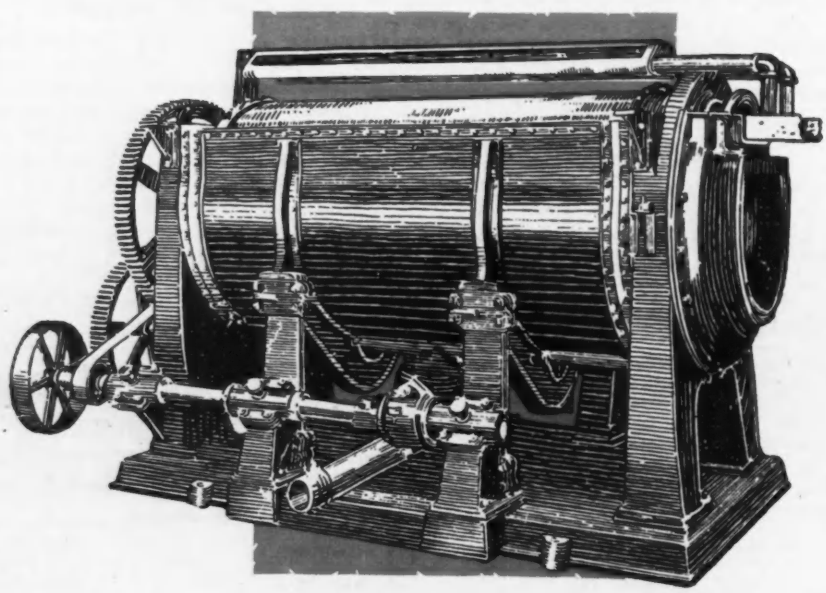

BIRD MACHINE COMPANY

South Walpole - Massachusetts

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kiln dried wood. The wood is blown up to cyclone receivers and then spouted into front of the V-type stoker settings over the coal fire as shown in Fig. 9.

Fig. 10 illustrates the application of a single retort underfeed stoker setting under a small boiler for burning sawdust and shavings. The wood is spouted into the front of the furnace directly over the coal fire. The moisture content of the wood being low, high furnace temperatures are maintained and ignition arches are not necessary.

Kiln Dried Wood Sawdust

Kiln dried wood sawdust and shavings are practically all burned in suspension and large combustion is necessary. Fig. 11 illustrates an installation for handling this material with ordinary grates, the fuel being fed into furnace by a screw conveyor. This boiler has approximately 7 cu. ft. of combustion space per rated boiler horsepower. It will be noted that this boiler is equipped only for burning wood; however, it is only a 300 hp. unit on a plant of 7000 hp. of boilers that are coal fired so that the capacity of this unit would have very little effect on the total boiler plant output.

Fig. 12 illustrates a settling commonly used for burning wet tanbark on an overfeed V-type stoker. The bark and a small amount of coal are mixed and fed into stoker from an overhead platform. The tanbark contains about 70 per cent of moisture.

In practically all of the typical settings shown for burning wood refuse the boilers are also equipped for burning coal. It is important that the boilers be so installed in order to avoid costly interference with the plant production should there be a stoppage of the wood supply. Equipment should be provided that will permit the making of a quick change from wood to coal.

The essential requirements for burning wet wood refuse are: first, provide an extension furnace setting or equal that will produce a temperature sufficiently high to dry off the moisture and ignite all of the gases; second, admit enough air for complete combustion and properly distribute it above and below the fuel bed and third, have ample combustion space so that the large volume of gases will have time to be completely burned before reaching the boiler heating surface. In addition conveyors should be used that are rugged and simple in construction and that will provide a continuous supply of fuel. Endeavor should be made to vary the wood and air supply with the load demand so that the fuel bed will continuously be kept in the best condition.

The application of underfeed coal burning stokers to wood burning furnaces provides flexible equipment for the burning of either coal or wood or a combination of both and in addition makes it possible to burn wood high in moisture with both increased efficiency and capacity.

It is understood that some progress is being made in the application of air preheaters to wood burning boilers. The fact that furnace temperatures with wet hogged wood are very low and the heat losses up the stack are high offers a good field for the application of them. Air preheating would not only recover part of the heat loss up the stack but would increase the furnace temperature and improve the combustion and heat absorption of the boiler. There is also opportunity for making very substantial progress by reducing the amount of moisture in the wood before it enters the furnace by either mechanical or atmospheric drying. The high moisture content in the wood makes a corresponding high heat loss up the stack. Any system for reducing the moisture should receive consideration. It is to be hoped that with the interest being given this important subject of burning wood progress and improvements in existing plants will continue to be made and that the paper industry will profit thereby.

Report of Paper Drying Committee

By W. N. Baker, Chairman

At a committee meeting held at the time of the 1924 annual meeting in New York, certain changes in the drying code as it then existed were discussed and decided upon. Because of the fact that some paper machines were equipped with more or less elaborate systems for supplying and removing air, with economizing devices, etc., it was felt that the drying code then in use was not so compiled as to secure results by which the drying on all machines might be compared. The changes in the code above mentioned were submitted to the members of the 1924 committee for approval, the revised code printed and distributed among our members.

It had been the hope of the committee this year to have a large number of tests tabulated for discussion, but unfortunately and in spite of our endeavors the response has been rather disappointing. The reason lay, undoubtedly, in the prevailing curtailment throughout the industry in the expenditure of money for test purposes unless such tests were absolutely necessary.

We wish to impress upon the industry in these days of increased costs and rapidly increasing competition the advantages of the keeping of continuous records of steam used on paper machines both for drying and ventilating. By the use of adequate meters for this purpose, costs may be kept at a minimum as an abnormal condition is immediately noted and its cause located and remedied, whereas without some check of this sort a high steam consumption may run on for a month before it comes to the notice of the management or control engineer. It is gratifying to note that almost without exception all of the more recent paper machine installations have been fully equipped for keeping such continuous records.

There is little need in calling attention to the many new systems for vapor absorption and steam circulation which are being advertised to prove the rapidly growing interest of not only the paper industry but also of the manufacturers of paper mill equipment in this drying problem, or to show that existing conditions along this line are, for the most part, considered far from satisfactory. It is gratifying that at this meeting the industry will get data on the operation of John Alexander's application of electrical heat in combination with heat recovery, and it is hoped that Ogden Minton's vacuum system, the value of which has already been demonstrated from the theoretical standpoint, will get a practical tryout during the year.

We hope that Dr. von Lassberg's article, Waste Heat in Pulp and Paper Mills, a translation of which was published in the PAPER TRADE JOURNAL of Dec. 11 and 18, received the attention from the industry which it warranted. He points out that we should strive for a final air temperature leaving the machine of from 140°-176° F rather than from 86°-122° F, which is a more common range at present. He shows that under the former condition the amount of air will be reduced about one-sixth over the latter with but a very slight increase in the heat which must be applied to gain the higher temperature. With the lesser quantity of air at these higher temperatures the author goes on to show that a much greater recovery of heat is possible. He also points out that 64 per cent of the total heat leaving a paper machine is in the water vapor carried off by the air from the driers. Since much of this may be recovered by apparatus now on the market, it is not surprising that all manufacturers are evincing greater interest than ever before in heat recovery from this source.

For the coming year we recommend the continuation of at least a small standing committee for the purpose of collecting drying test data from the various mills and its tabulation for comparison.

Artificial Pulpstones

By W. W. Greenwood*

The desirability of an artificial pulpstone which would reduce logs to satisfactory groundwood with a good rate of production has been apparent to those interested in paper making for a long time. This casts no reflection on the sandstones now almost universally employed, because a uniform, properly seasoned stone containing as it does rounded sand grains is ideally suited for producing the long thin, well-frayed fibers necessary for satisfactory news stock. But like most rock products, natural pulpstones are subject to imperfections which in some cases are entirely hidden until the stone is put into service. Sandstones frequently are uneven in structure, having hard and soft spots, thus requiring constant attention in order that a uniform grade of pulp may be secured. Sandstones, because of their relatively low heat conductivity, sometimes spall or even break under sudden temperature changes. Any one who has had a satisfactory stone damaged by the careless use of shower-water will appreciate how easily a stone may be destroyed in this manner. Then again, the low tensile strength of sandstones as compared, for instance, with an artificially bonded product has practically restricted the speed and size of pulpstones to within rather narrow limits.

The Norton Segmental Pulpstone

The Norton segmental pulpstone offers a solution to most of these problems. It is composed of abrasive blocks which are fastened to a suitable cast iron drum or mandrel. This whole assembly is then mounted on the usual grinder shaft, using either keys or flanges for holding it in place. The crevices between the segments are filled with a special metal which melts at a low temperature and has a composition similar to a high grade babbitt, and thus an even surface with neither depressions nor ridges is presented to the logs during grinding. In their entirety the assembled segments act like any solid pulpstone.

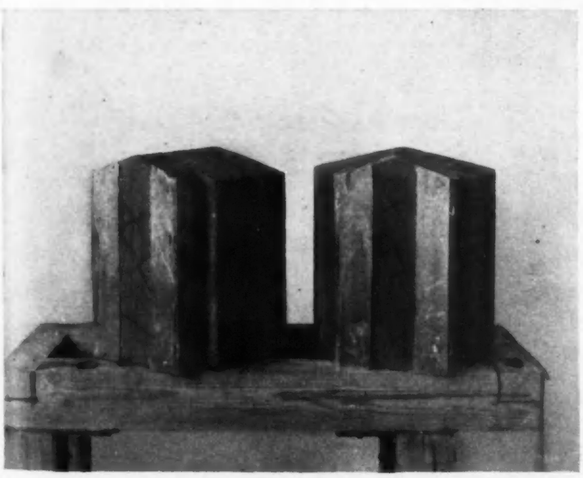

FIG. 1
Individual Segments Composing a Norton Pulpstone Showing Babbit Shoes.

The blocks or segments are composed of Crystolon abrasive bonded with a vitrified bond. Crystolon is Norton Company's brand name for the abrasive known chemically as silicon carbide. Its chemical formula is SiC, and its characteristics as an abrasive, aside from its ability to withstand high temperatures, are hardness and brittleness. The raw materials used in its production are silica sand and metallurgical coke. These materials, when heated to a high temperature in an electric furnace, react and produce the abrasive crystals. The crude abrasive ore from the furnaces is then sent to the abrasive mill where it is crushed, run over magnetic separators to remove iron compounds, and washed to remove dust. From this stage in the process it goes to the screening plant, where the abrasive grains are separated into various sizes on vibrating screens.

The grain sizes regularly produced are from No. 8 to 200 inclusive, each designation referring to the "mesh" of the screen through which the particular grain passes. For example, No. 30 (which is the grit in pulpstones used by some mills for news) is that which passes a screen having 30 apertures per linear inch, and is retained on a screen having 36 meshes per inch. To insure accurate grading, a rigid inspection of each keg of abrasive is made, and in the event of any being reported below the inspection standard, the keg is returned to be rescreened.

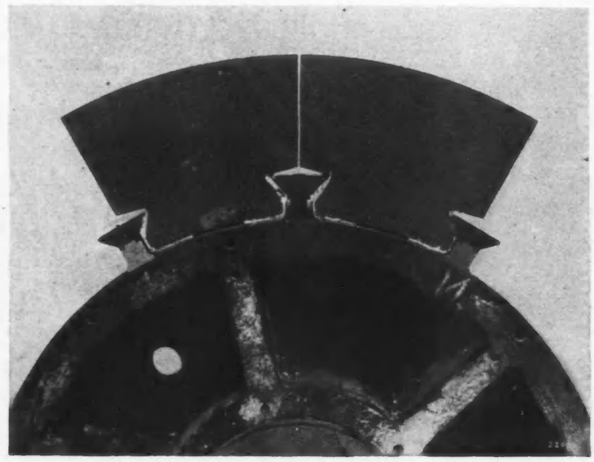

FIG. 2
Closeup of Segments Set in Place on the Drum Before Crevices Between them have been Filled with Metal. Note Loose and Permanent Keys for Holding Segments in Place.

It has been found in artificial pulpstones that the grit or grain size has a marked effect on the length and quality of the wood fibers produced. Other things being equal, the finer the grit, the finer and shorter the groundwood fibers. Here is one feature which makes artificial pulpstones valuable. By their use the groundwood superintendent can forget one set of variables in the process. Once he has determined which grit size is best suited for the needs of his mill, he can specify it for all stones and be assured that variations from this standard will not occur, no matter how many stones he buys through any period of years.

It is the practice in the manufacture of artificial pulpstones to mix these abrasive grains with a cementing material called the bond. This bond is essentially a mixture of feldspars and clays. These ingredients are very finely ground and accurately weighed because on their specific composition depends, to some extent, the degree of hardness of the finished stone. For pulpstones, a suitable bond is very important, both in order that the stone may produce satisfactory groundwood and also that it may stand up under the severe conditions in the grinders. Lack of knowledge of a suitable bond for this operation has been largely responsible for the many failures of artificial pulpstones in other years.

This mixture of bond and abrasive is then molded into the seg-

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ments making up the stone, dried and placed in large kilns for the purpose of vitrifying the bond. As no shaping of the segments is done after the firing, great care is required in setting in the kiln to prevent warping of cracking during this operation. The kilns are fired to a temperature sufficiently high to cause the bond to flow about the abrasive particles and vitrify. After burning, the kiln is sealed up and its contents allowed to cool slowly so that proper annealing of the bond may take place. When removed from the kiln, the bond has changed into a stony, porcelainlike mass, which is not affected by either heat or water and so is ideally suited for pulpstones. The tensile strength of the bonded segments is about 1013 pounds per square inch, making them approximately three times as strong as sandstone which has a tensile strength between 300 and 400 pounds per square inch.

Discussion of the Problem

Perhaps the chief limitation to this type of bond for use in pulpstones is that pieces of very great size cannot be made of it commercially, which will withstand the severe conditions in a grinder pit. It is for this reason that a segmental stone has been designed and in order that this may be clear it might be well to review the problem which the production of pulpstones presents to the abrasive wheel manufacturer. When the desirability of an artificial stone became apparent to us, the question of the quality of wood fibers which such a stone ought to give was first considered. It was recognized that the composition of the stone itself must be of such a character that proper fibers would result. Sand is ideally suited as an abrasive for this purpose but in bonding sand artificially either a cold set cement or one of the low fusing silicates (for example sodium silicate) is usually employed. Such bonds are more or less affected by the heat of grinding and it was felt that a bond would have to be developed which would be unaffected by either water, acid or heat. A bond of this character which will be inert to the action of water or heat, matures only at comparatively high temperatures; so high in fact that the sand grains

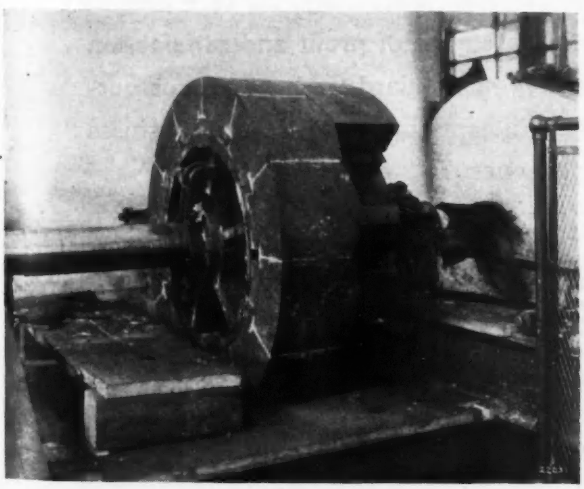


Fig. 3

A Partially Assembled Pulpstone.

shatter and a soft friable mass results. Therefore, in employing such a bond, it was also necessary to use an abrasive which would stand these temperatures.

Small stones were first constructed using different grit combinations and having a variety of bonds. These were tested in an experimental grinder which had been constructed by the Bureau of Tests of the International Paper Company. In using this little grinder, temperatures, cylinder pressures and speeds were regulated to correspond with grinder room practices, and in this way a stone composition was developed, capable of producing satisfactory newsprint stock.

The next step was to adopt such a stone composition to the great sizes required by the paper industry. Large stones which were really composed of rings of Crystolon bonded material were assembled but in every case they broke, the reason being that the heat of grinding caused an expansion of the rings which in spite of the care taken in annealing the kiln resulted in cracking.

The only other practical way appeared to be to make stones which were composed of segments assembled around a drum. These segments could be made of the same grit and bond as the small satisfactory stone and any expansion as the result of grinding

Fig. 4

Norton Pulpstones Ready for Installation.

temperatures would be taken care of by the joints between the segments. By using such a design it was found that full sized stones could be constructed which would stand severe temperature changes without breaking. This in brief, presents our side of the problem and gives some of the reasons for the type of construction being used in the Norton stone.

The Assembly

Norton pulpstones consist of a large cast-iron mandrel or center which may be keyed to the grinder shaft. The photographs show the type of drum construction used when it is planned to key it to a shaft. If, however, it is preferable to use the ordinary flanges, this can easily be done and the whole assembled stone mounted in the same manner and with no more labor than a sandstone. Around this drum are assembled the abrasive segments which are held to it by clamps. To insure against loosening, each segment before it is mounted, is placed in a special fixture and a light babbitt shoe cast around its base. Examination of the three segments shown in the foreground of the picture will show how this is done. By such a procedure the segments can be made to fit perfectly to the drum and in tightening the clamps an even support throughout the entire length of the segment is assured.

Care has been taken in designing the segments so that there is presented to the log being ground as nearly an unbroken surface as is possible. The segments when placed around the drum are staggered so that the joints between them parallel to the axis of rotation extend only half way across the stone face. This prevents the possibility of wood shims catching between the segments and the finger plates of the grinder. At the center of the stone, the joints have been arranged in zigzag fashion to insure against the production of waste. This zigzag is enough off center so that

the metal wears and avoids any danger of a "black streak" in the pulp.

The crevices between the segments are filled with a special metal of the nature of a hard babbitt. This metal was developed in the laboratories especially for this purpose. In attempting to find something suitable a great variety of materials were experimented with and discarded. These included a number of different types of both hot and cold setting cements which are found to be undesirable because they would not stand grinder temperatures without cracking. Various fibrous materials, such as wood, cellulose and leather were tried. We also experimented with rubber, vulcanized to different degrees of resiliency but without success. After investigating a number of metals having different physical and chemical properties, one was found which served the purpose nicely. Its characteristics are the ability to flow into very small crevices when hot and its resistance to wear. Although tough, it still has the property of handness at grinding temperatures, so that it wears down at the same rate as the stone, thus preventing the formation of wood slivers and also giving proper protection to the edges of the segments from undue wear. This metal is anchored sufficiently by the design of the segments so that it does not crawl during grinding. It expands slightly as the stone heats up thus keeping the spaces between the segments closed at all times.

From this resumé of the problem it will be seen that the construction of this stone is the result of considerable thought and that it involves a number of novel features made necessary by the problem itself. These features have been fully protected by the patents both granted and pending.

Theory of the Grinding Action

The question of the grinding action of an artificial pulpstone as compared with a sandstone is one of interest. As nearly as can be determined both types of stones behave in practically the same manner as far as quality of stock is concerned. There are, however, certain differences in the way they grind which it may be of value to discuss. The production of ground wood by pulpstones is probably not so much a grinding operation as it is one in which the wood fibres are rubbed of the log. If it were strictly grinding most of the finished material would be flour; but actually what is desired are long thin and flexible fibers which lock together and give strength to the sheet. To produce these without too much cutting into fine waste, is the function of the stone when running efficiently. When sandstones are employed for this purpose it is common practice to put them in condition for securing the best results by burring at frequent intervals. There seem to be two important reasons for the use of a burr with sandstones. One is perhaps to make the stone produce a different type of pulp than it would if its natural grit only were in contact with the log. A stone surface suitable for grinding pulp for wall board and various book papers might not be suitable for making a light weight manila or newsprint sheet. Since the grit in many sandstones is not coarse enough to produce the long coarse fibers for news, it is only by giving the stone an apparently coarse grit size that a suitable product will result. Such a stone will continue to produce these longer fibers only while the pattern which has been applied with a burr lasts, and as the pattern wears off and the natural grit comes more and more into play, a product results corresponding to the true character of the stone. A coarse sandstone needs little if any burring and will still produce longer fibres than will a fine stone after the pattern has been worn away. Such natural stones, however, are rather rare.

Another reason for the use of a burr with sandstones is to provide grooves in the stone face which act as paths by which the fibers can leave it. As the stone revolves the fibers from the first pocket may tend to be rubbed to a finer condition by the friction between the stone and the logs in the other two pockets. The grooves or depressions put in by the burr probably allow for a little clearance so that the fibers are not subjected to so great a rubbing action.

In the case of the Norton stone, it is possible to use an abrasive grit coarse enough so that the stone face, without burring, acts in the same manner as does a sandstone properly burred. In the production of news for instance, this is what happens if an artificial stone with No. 24 grit is used. In this case the artificial stone with no burring will produce the fibers which a properly bured sandstone produces. The individual coarse grits, or abrasive grains, act like groups or clumps of sand to rub the fibers from the log. The spaces between these abrasive particles act like the grooves in a burred sandstone to prevent the wood fibers being refined too much as they pass through the other pockets.

Such a stone, however, has one disadvantage. It will produce one type of long fiber only and it would perhaps not be so suitable in the event that it was necessary to grind a "slow" stock for, let us say, half-tone paper. In practice, therefore, we have found it better to supply stones of a little finer grit, say about No. 30, and rely more upon the burr for quality. Such a stone may be a little more universally used since the type of fiber which it produces is largely dependent upon the burring. With a finer grit stone, different types of fiber can be produced with the same stone by using different burrs. This is particularly important to mills having a varied output or to those so situated that it is necessary for them to make "freer" stock in winter than in summer.

It would be very nice if we could report that the Norton stone requires less horsepower per ton and produces more groundwood in a given time than does the sandstone. And such would be the case if the operation were strictly one of grinding. But unfortunately for us the quality of fibers desired can only be secured when they are rubbed from the log and it has been found that when this is done to best advantage with a sandstone, the horsepower per ton is practically a constant. We find that this same condition holds with the artificial stone. To make it work to best advantage, as far as quality is concerned, it is necessary to run it a little dull and therefore, it consumes about the same horsepower per ton as does a sandstone. The artificial stone can be sharpened so that it cuts almost too fast for the handling of one grinder by an operator, but under such conditions, the product in the pit is largely composed of "hay" or "toothpicks."

In practice it has been found to be better to burr the stone much more lightly than is usually done with sandstones. Since the artificial stone is somewhat harder than the sandstones it tends to hold the pattern put on by a burr for a longer period of time in spite of this lighter burring. Roughly, an artificial stone has to be burred only about a third as frequently as do the sandstones; but this condition, of course, varies with different mills. The artificial stone will take and hold any style of burr in the same manner as does a sandstone. The burrs do not break the edges of the segment to any extent and examination of the babbitt on a freshly burred stone, shows that the pattern has extended across it.

Advantages and Economies of the Norton Stone

Norton pulpstones have certain advantages over sandstones apart from the fact that they produce uniformly satisfactory groundwood. They are even in structure throughout; hard or soft spots, open places, or seams will not appear after the stone has been put into operation. They will withstand severe temperature changes without spalling. Their grit is uniform and they will always have the same degree of hardness. This last feature is especially important in standardizing the conditions of groundwood production. Since their manufacture can be controlled within close limits, these stones may be secured at any time without trouble or delay. This is an advantage which should appeal particularly to those using the large stones for the magazine type of grinder. Norton pulpstones do not have to be seasoned, another interesting feature. The economies which the use of such stones should bring about are many.

In the first place the stone cost per ton of groundwood will probably be lower than a most favorable sandstone cost. The reason for this is that although the initial cost is higher, the life of the stone is so much longer than that of the sandstone that when the cost is distributed over its entire production, it is found to be extremely low. As the development of this stone is of comparatively recent date, it is impossible to state definitely what the life will be since no stones have worn out in service. But based on the wear of several stones now in operation, it is probable that the life of a stone in the ordinary three pocket grinder will be from four to five years. Because of this longer life, less storage space will be required since fewer stones will be used. Labor costs of installation should be cut considerably since they will occur at less frequent intervals. The fact that the stones do not require seasoning is another characteristic which will cut down the cost of their use. No capital needs to be tied up in these stones for they can be secured so easily that only a small stock need be carried on hand at the mill.

Installations

The information contained in this paper is based upon installations at the Hudson River and Montague mills of the International Paper Company and also upon those at the Great Northern Paper Company and the Pejepscot Paper Company. Exact figures as to production, horsepower per ton of groundwood and life of the stone have purposely been omitted first, because these vary greatly between mills owing to different conditions in handling stones and second, because in some cases these data have not been determined accurately as yet.

Future Developments

As has been stated before, the production of such stones by the Norton Company is of recent development and so it is of interest to theorize a little as to changes which they may bring about in the paper industry. Tests conducted in our laboratories upon the segments themselves indicate that they are sufficiently strong so that stones composed of them may be run at somewhat higher speeds than is customary with sandstones. Segments corresponding to a 54 x 27 inch pulpstone have been speeded up to 450 revolutions per minute with no breakage occurring. This indicates that with an artificial stone the usual speed of from 220 to 240 revolutions could be increased to at least 300 revolutions with safety. Just what the effect on groundwood quality would be of increasing the speed, is not known but it seems reasonable to suppose that a greater production per unit of time could be obtained in this way.

Another possible change in the industry is that of being able to increase the size of stones without sacrificing safety. Within reason, a segmental stone could be made of almost any size, a condition which should be of interest to manufacturers of grinders.

It is also possible that an artificial stone using a different type of abrasive would be as efficient as the Crystolon stone. The Norton Company produces an aluminious abrasive which is marketed under the name of Alundum. This is also an electric furnace product, the abrasive grains being somewhat tougher than Crystolon grain. Alundum grains are also more equidimensional and less sharp at their edges than are Crystolon grains. Pulpstones containing this type of abrasive have not been tried as yet because their construction offers a number of problems which have not been thoroughly investigated. It is possible that an experimental one would prove of interest.

It will be seen in this paper that the problem of standardizing groundwood production by using artificial stones is one filled with interest. A great deal of study has been given to it and as has been indicated there is still much work to be done. What we have attempted to point out in this brief summary of our work is that a satisfactory pulpstone has been developed. This is proved by the fact that stones in a number of mills have been in operation for many months and that satisfactory results are being obtained by their use.

Report of Soda Pulp Committee

By G. K. Spence, Chairman

The Soda Pulp Committee has been active ever since its inception. Among the different phases of the soda pulp industry to which the committee has devoted considerable time and study a few are here enumerated.

The different filter presses were studied and recommendations made regarding their use as a means of increasing the capacity of the alkali room and decreasing the loss of soda in the lime sludge discharge. A number of mills installed filter presses for this purpose and the results were very satisfactory.

The loss of black ash and other rotary room problems were studied and discussed and methods cited for increased efficiency and decreased loss in this department which have been of assistance to recovery foremen in all soda pulp mills.

Leaching of black ash has been discussed, and improved methods suggested for this department.

The use of sulphur in digester liquor was taken up and discussed which was later followed by the use of other reducing agents such as monosulphite of soda, which have increased the yield and strength of pulp produced and decreased the bleach consumption.

Washing of brown stock has been studied and discussed, resulting in better washing for bleachability as well as decreasing the work of the evaporators due to increasing the strength of weak liquor furnished. The use of continuous filters for this purpose has developed to such an extent that several installations have been made and are reported to giving very satisfactory results.

Evaporators have been discussed and suggestions made for control of work accomplished as well as increasing their efficiency, which suggestions have been of considerable assistance to the members.

Variables affecting the cooking of wood, and variables affecting the bleaching of soda pulp have been discussed and no doubt the discussions have proven of benefit to the members.

Disposal of lime sludge has been studied and discussed. A number of mills have installed lime reburning plants, which have proven a profitable investment in addition to removal of this material from the streams.

The chemistry of the cooking process has been studied and discussed in sectional meetings. This has brought out phases of the cooking which have never before been understood.

Distructive distillation of black liquor for production of acetone, wood alcohol, ammonia, etc., disposal of black ash from the soda mills, and many other topics of interest to the pulp manufacturer have been touched up on during the discussions in sectional meetings of the Soda Pulp Committee.

We can safely state that greater progress has been made in the manufacture of soda pulp, control of the recovery department, and utilization of by-products, in the past ten years, than in the thirty years preceeding the organization of the Technical Association.

The Soda Pulp Committee is at present studying the utilization of black ash, reburning of lime, new methods of cooking, washing with continuous filters, efficiency of evaporators, etc.

All soda pulp manufacturers will be interested in the paper to be presented by Martin L. Griffin at our sectional meeting. This paper which is entitled "Chemistry in the Soda Pulp Process" contains some very good suggestions regarding future work that can be done relative to the development of improved methods of cooking. There will also be a paper on "Economy of Lime Reburning."

Strength Testing of Chemical Wood Pulp

By Gösta P. Genberg,*

Introduction

The strength is an important quality to consider in the evaluation of pulp for paper making, and a reliable and standard method for testing pulp for strength before it reaches the paper mill would be most desirable.

The present methods of testing are unfortunately of such limitations that they can hardly be recognized as standard methods. This is largely due to lack of knowledge of the factors which influence the strength of the pulp, whether it is beaten or unbeaten.

In order to make a sheet of paper the pulp has to be beaten and felted together, and we can distinguish between two strength factors in a sheet of paper; namely, the actual fiber strength and the strength due to the cementing effect of the hydrated cellulose fiber.

Pulp increases in strength with prolonged beating of the fibers until a certain maximum is reached after which a decrease takes place.

In the report of 1917 by the Committee on Standard Methods for Testing Materials, referred to by Sindall, Baker and Jennison in English investigations of strength testing, the following is suggested as taking place when a sheet of pulp is tested for strength.

"When the sheets made from the unbeaten pulp are tested, the break is due almost entirely to the separation of the fibers one from the other. As we beat the pulp the strength of the fiber probably decreases. At the maximum point of strength, the two strength factors should be practically balanced, so that a portion of the fibers are pulled apart, and the other portion broken. As we pass beyond this point in beating, the ultimate strength of the fiber has decreased to such an extent that it is the determining factor in the break, and the test is lowered."

Each individual grade of pulp changes strength properties differently with varying beating, and it is therefore useless to compare different grades of pulp, or even different samples of the same grade of pulp, by beating a certain predetermined length of time.

In order to be of value to the paper maker the strength test should be done in such a manner that it duplicates as much as possible the actual mill operations in preparation of the sheet; as well as in computing the results.

The paper maker hydrates his pulp in the beater and cuts it into the jordan, two essential operations for making a sheet of paper from rag or chemical wood pulp.

A small laboratory beater would therefore be the logical beating engine for a strength test. However, due to the difficulties in controlling the setting of the beater rolls and the sharpness of the beater bars, the ball mill has been more generally adopted for strength testing purpose than the laboratory beater.

The ball mill should be a perfect beating medium for a scientific study of hydration and its relation to strength and other properties of the pulp, because it gives the pulp the hydration action only without any cutting of the fibers. There are however several drawbacks in using the ball mill, one of which is taken up in the latter part of this paper.

The principal difficulty in determining the strength of pulp whether beaten in a beater or in a ball mill is due to the difficulty in making a uniform sheet.

Bachelder[1] has shown that by making a sheet by mean of a hand mold, the personal equation is a factor causing variable results.

Cameron[2] has studied the effect of ununiform pressing of the hand sheets and suggests mechanical devices for controlling the pressing.

In recent investigations at the Bureau of Standards[3] a suction mold and a uniform pressing have been found to produce a uniform sheet, which permits duplication as frequently as desired.

The drying of the sheets and its bearing on the strength test has not yet been studied to fullest extent, and in the writer's opinion the drying, or indirectly the shrinkage, of the test sheet is a matter that requires careful attention in standardization work of methods for strength testing.

Scope of Paper

The scope of this paper can be divided in four parts:

(1) The description of a working method for strength testing.

(2) The results obtained for various samples of pulp, and for various conditions of pulp using this method.

(3) The effect on the strength of the pulp of drynig under tension compared to drying under shrinkage.

(4) The effect on the strength test of the wear of the ball mill jars.

Method of Testing

The method of testing used in the below investigations is as follows:

PREPARATION OF SAMPLES. Several portions, each equivalent to 100 grams air dry are cut from the sample representative of the pulp to be tested, and each portion is soaked in 2,000 cc. of water and hand kneaded until thoroughly disintegrated.

BEATING ENGINE. Abbé ball mills are used with jars 11⅛ x 13⅝ inches dimensions, revolving at a speed of 56 revolutions per minute. The charge of pebbles for each jar is 1780 cc. of such a size that the weight of the charge is 10 pounds.

CHARGING THE BALL MILL. The different batches of kneaded pulp, diluted in 2000 cc. water, are poured into the different jars together with the pebble charge.

BEATING TIME. The different charges are beaten different convenient lengths of time depending on the nature of the pulp. For ordinary bleached sulphite the beating times are 30, 40, 50, 60, and 70 minutes; for unbleached 60, 70, 80, 90 and 100 minutes.

PREPARATION OF BEATEN PULP. Each ball mill charge is dumped in a pail, and the fibers are separated from the pebbles by washing over a coarse screen. The pulp is then diluted to 7200 cc. and run in a disintegrator for exactly 15 minutes. The pulp is then diluted in a vat to 120 liters.

SHEET MAKING. Four hand sheets are made of each batch by single dipping a handmold 6 x 9 inches.

PRESSING. The sheets are couched off on felts and are pressed in an ordinary letter press, care being taken to apply the same pressure every time.

DRYING. The handsheets are dried without any tension in an enclosed drying rack equipped with a hot air blower. The temperature in the rack being 35 deg. cent.

PREPARATION OF HANDSHEETS. The four handsheets for each batch are trimmed 4 x 7 inches after drying, and are weighed together on an anylitical balance, the weight being expressed in grams. Each sheet is cut diagonally in half.

TESTING. Each half sheet is punched four times along the diagonal cut by means of an Ashcroft paper tester. The total number of readings for each batch is 32.

CHECKING THE ASHCROFT TESTER. The Ashcroft tester is occasionally checked against paper tested by the Bureau of Standards which is of a strength similar to the average strength for a sheet of pulp, of such size and weight as employed in the strength test. If the tester is found to be incorrect a correction factor is determined, which is applied to the different readings.

*Junior Member TAPPI. Fraser Companies, Ltd., Edmundson, N. B.
[1] Paper, Nov. 17, 1920
[2] Pulp & Paper Mag., Feb. 1, 1923.
[3] Shaw and Bicking, PAPER TRADE JOURNAL, Nov. 20, 1924

Computing Results. The total sum of the 32 bursting tests divided by twice the weight of the four sheets expressed in grams is the strength test.

a = Sum of 32 bursting tests
c = Weight of four sheets in grams

$$\text{Strength test} = \frac{a}{2c}$$

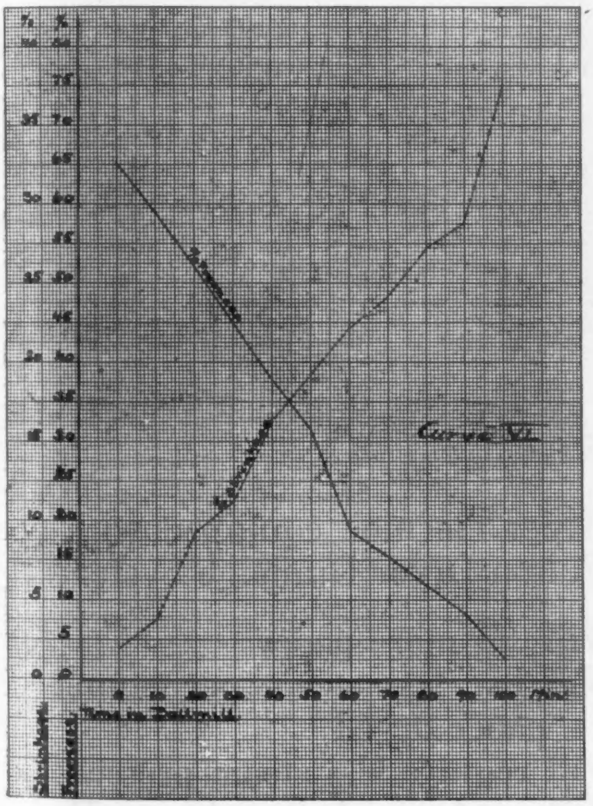
If the strength factor expressed in points per pound basis weight (500 sheets: 24 x 36) is desired, the following formula is used:

$$\text{Strength factor} = \frac{a}{2c \times 135.94}$$

The results are plotted against the beating time, and an approximate curve is laid through the maximum point.

Exceptions may be taken to this method for the following reasons:

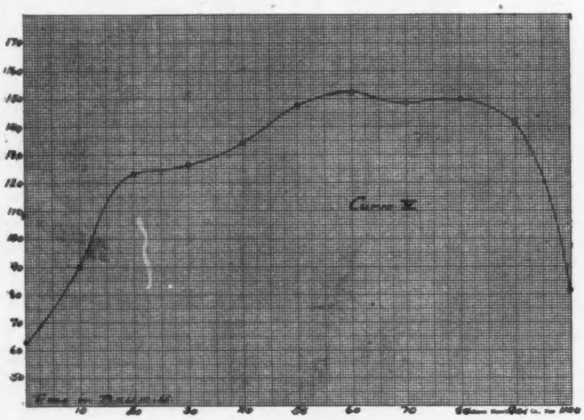
(1) Ununiform formation of hand sheet.
(2) Inconstant application of pressure.
(3) Ununiform atmospheric conditions at the time the pulp is tested.



The first two reasons can be partly eliminated by using mechanical devices as already mentioned and by testing the handsheets at constant humidity this last reason would be removed.

For practical control purposes however, these reasons cause variations in the method which may be considered as falling within the limits of error for the method itself and the results referred to in this paper are of such limitations as may be expected from the ball mill method as carried out in this instance.

The principal difference between this method as compared to the method adopted by the Technical Association of the Pulp and Paper



Industry, is that the sheets after drying are trimmed to a certain size and then weighed, while in the Technical Association Method the whole sheet, as made on the mold or handsheet making machine is weighed without previous trimming. The former method is to be preferred because by trimming the sheets a certain correction is made for the shrinkage of the sheet, while in the latter method the effect of shrinkage of the test sheet is neglected.

In mill practice, the bursting strength of paper is expressed in strength per unit weight, and the unit weight is the weight of a certain number of sheets, cut to a certain size. According to the method described, the results are computed in a similar way in this respect, namely, that the value of the bursting strength is based on the same weight of a standard sheet. This is not the case in the present Technical Association method.

Examples Where the Above Method of Testing Is Used

Table 1 and Curve V illustrate the results obtained of the bursting strength of a sample of bleached sulphite beaten from 0 to 100 minutes and sampled at ten minute intervals. The zero point is the strength obtained of the pulp treated in the disintegrator alone for 15 minutes. The curve illustrates the good beating qualities of this sample. Table 1 and Curve VI also show the effect of the beating on the shrinkage of the sheet, when dried without tension. The same table and curve sheet also show the freeness, as tested by the Schopper-Reigler freeness tester.

Table II—Comparative Strength Tests of Pulp Before and After Bleaching at Different Lengths of Beating in Ball Mill

Time in ball mill—min.	30	40	50	60	70	80	90
Unbleached	.....	145.7	146.0	149.9	150.9	137.0	132.6
Bleached	117.2	133.2	142.7	132.3	137.9	.....	.....

Table III—Comparative Strength Tests of the Same Grade of Bleached Pulp After Wet End and Dry End at Different Lengths of Beating in Ball Mill

Time in ball mill—min.	30	40	50	60	70
After wet end 40% A. D.	143.34	146.44	144.71	139.32	133.65
After dry end 88% A. D.	137.44	145.55	144.64	145.67	138.06

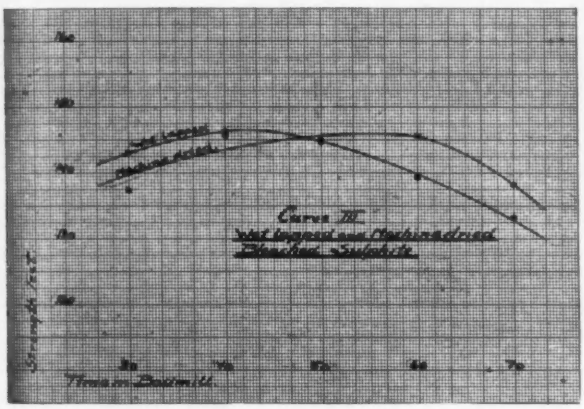
TABLE I—STRENGTH, SHRINKAGE OF TEST SHEET, FREENESS OF PULP AND HYGROSCOPIC MOISTURE IN BLEACHED SULPHITE AT DIFFERENT LENGTHS OF BEATING IN BALL MILL

Time in ball mill—min.	0	10	20	30	40	50	60	70	80	90	100
Strength—pts	63.07	89.85	123.12	126.62	134.44	147.66	152.32	148.38	149.83	140.64	81.98
Shrinkage of test sheet—%	1.9	3.7	9.3	11.2	16.2	....	22.2	24.1	27.3	28.8	37.5
Freeness of pulp	65.2	59.0	52.0	....	37.5	31.4	18.5	15 2	11.5	8.0	2.5
Hygroscopic moisture in pulp at testing—%	6.643	6.708	6.792	6.642	6.565	6.331	6.517	6.619	6,729	6.990	7.073

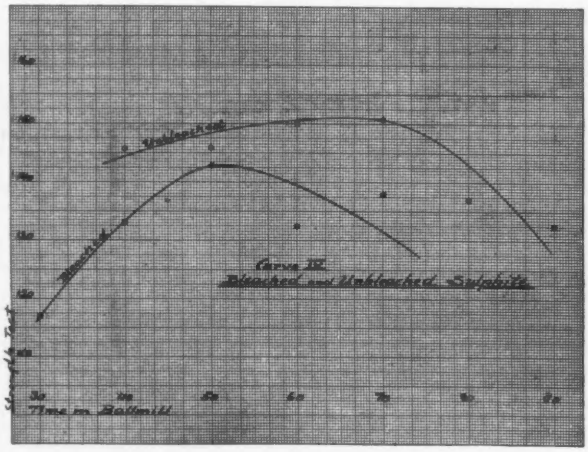
The effect of bleaching on the bursting strength of a sample of easy bleaching sulphite is shown in Table II and Curve IV. The bleaching process apparently lowers the strength, as well as it makes the pulp more easily hydrated.

Table III and Curve III show that a sample taken at the wet end is easier hydrated than the same pulp gone over the driers. This should indicate that the drying removes some of the water of hydration of the pulp, which has been absorbed during the chemical and mechanical action in water suspension, which the pulp is exposed to during its conversion from wood to finished pulp. It is emphasized that the dried sample of pulp was just as well disintegrated as the wet sample, before the beating action was started.

Table IV contains the results using this method for various samples of foreign and domestic grades of bleached and unbleached sulphite, and also for one sample of bleached sulphate. Sample M. T. for instance is a well known brand, used for glassine paper, and the strength tests of this pulp show conclusively its easy hydrating and high strength qualities. B. Sp. is a strong pulp of American make used in the manufacturing of bond and book and resembles the grade K. P. A. Mitscherlich pulp of Norwegian make very much; the later sample was, however, too small to allow a complete test to the maximum strength.



In the group of unbleached sulphites, we have a sample C. M., a German Pulp of remarkable high strength, surpassed however by sample H. W. of American make, unusually easy hydrating for an unbleached pulp but of high strength.



The sample of the bleached sulphate was, as could be expected, slow hydrating but of high strength compared with some of the grades of bleached sulphites.

Effect of Drying Under Tension on the Bursting Strength of Pulp

As mentioned earlier in this paper the strength of a sheet of paper can be considered to be a combination of actual fiber strength and strength due to hydration. Klason[4] suggests the simile of true cellulose and its transformation products with silicic acid, which occurs in the nature in both crystalline and amorphous state. Pulp should according to this theory consist of crystalline *alpha* cellulose and amorphous celluloses, either as remains from the original combination in the cellulosic plant, from which the pulp is made, or from the chemical, physcial and mechanical attack on the cellulose proper during the isolation process.

[4] Svensk Pappers Tidning, July 15, 1924.

TABLE IV—STRENGTH TESTS OF VARIOUS SAMPLES OF WOOD PULP AT DIFFERENT LENGTHS OF BEATING IN BALL MILL

Grade of Pulp	Description of Pulp	Bursting Strength Test at Time in Ball Mill—Minutes 30	40	50	60	70	80	90	100	110	120	Maximum Strength	Time to Max. Min.
	Machine dried and bleached sulphite												
B. 1	U. S. A.	.....	117.50	125.60	131.70	127.90	.....	.....	.....	.....	.....	131.70	60
B. 2	U. S. A.	118.60	122.10	134.60	133.00	123.85	138.80	.....	.....	.....	.....	138.80	80
P. 1	U. S. A.	.....	129.20	124.20	136.40	137.90	.....	.....	.....	.....	.....	137.90	70
P. 2	U. S. A.	127.70	121.35	126.55	118.30	103.00	104.50	.....	.....	.....	.....	126.55	50
E. W.	U. S. A.	123.10	131.37	132.48	128.51	116.89	.....	.....	.....	.....	.....	132.48	50
E. P.	U. S. A.	107.50	114.36	120.94	109.23	125.85	.....	.....	.....	.....	.....	125.85	70
F.	Canada	126.62	134.44	147.66	152.32	148.38	149.83	140.64	81.98	.....	.....	152.32	60
U.	Sweden	100.46	108.52	115.97	111.26	112.15	.....	.....	.....	.....	.....	115.97	50
U. P.	Sweden	.....	.....	147.90	148.66	144.86	150.65	146.82	.....	.....	.....	150.65	80
U. P. E.	Sweden	.....	.....	148.56	145.11	150.13	137.01	137.92	.....	.....	.....	150.13	70
U. S.	Sweden	.....	131.46	146.78	156.78	149.95	159.42	158.15	.....	.....	.....	159.42	80
H.	Canada	95.49	118.52	128.42	122.43	121.97	.....	.....	.....	.....	.....	128.42	50
K.	Canada	99.74	115.94	126.79	124.98	125.83	.....	.....	.....	.....	.....	126.79	50
B. St.	U. S. A.	91.70	116.00	120.96	139.05	135.12	.....	.....	.....	.....	.....	139.05	60
B. Sp.	U. S. A.	.....	146.25	150.24	149.23	151.96	156.08	161.65	162.01	.....	.....	162.01	100
K. P.	Norway	115.96	141.48	146.40	147.10	151.48	.....	.....	.....	.....	.....	151.48	70
	Wet lapped bleached sulphite												
M. T.	U. S. A.	162.65	164.45	156.95	147.50	133.15	.....	.....	.....	.....	.....	164.45	40
K.	Canada	.....	.....	131.80	133.69	126.01	125.06	.....	.....	.....	.....	133.69	60
W.	U. S. A.	126.34	126.70	129.04	129.22	119.43	.....	.....	.....	.....	.....	129.22	60
H. S.	Canada	110.33	152.21	152.50	148.43	141.50	.....	.....	.....	.....	.....	152.50	50
H. W.	U. S. A.	.....	146.09	161.89	157.07	163.77	.....	.....	.....	.....	.....	163.77	70
L.	Canada	146.64	157.87	155.92	164.27	166.83	.....	.....	.....	.....	.....	166.83	70
	Machine dried unbleached sulphite												
C. M.	Germany	.....	.....	156.97	164.38	175.00	167.08	159.50	146.14	144.42	.....	175.00	70
S. 1	Sweden	.....	.....	138.77	143.03	152.03	151.17	157.63	167.29	161.99	.....	167.29	100
S. 2	Sweden	.....	.....	.....	132.56	122.17	134.85	120.98	121.21	.....	.....	134.85	80
K.	Finland	.....	.....	.....	142.22	145.25	131.25	126.19	114.84	.....	.....	145.25	70
Ch.	Canada	.....	.....	.....	147.45	148.42	169.19	158.32	175.15	.....	.....	175.15	100
—	Canada	.....	.....	.....	123.56	136.30	121.05	141.52	.....	.....	.....	141.52	90
	Unknown foreign origin				130.75	139.35	134.21	149.86	.....	.....	.....	149.86	90
	Wet lapped unbleached sulphite												
J. R.	U. S. A.	.....	.....	.....	136.23	140.19	128.82	129.85	.....	.....	.....	140.19	70
H. W.	U. S. A.	.....	.....	.....	189.41	188.17	185.55	177.17	183.43	.....	.....	189.41	60
	Bleached sulphate												
U.	Sweden	.....	.....	.....	.....	144.56	158.11	159.75	163.41	160.17	156.13	163.41	100

The cellulose occurs in the various plants in combination with noncellulosic substances, which are removed during the isolation process. This results however in an attack on the cellulose itself. The sulphite method, for instance, being an acid treatment, results in a partial lowering of the cellulose molecule under the formation of hydrocellulose, which is a mixture of cellulose with cellulose dextrines.[5]

The bleaching process causes an unavoidable oxidation of the cellulose under formation of oxycellulose. Pulp made by any of the alkali processes is very sensitive to oxidation[6], and a bleached soda or sulphate pulp contains always oxycellulose as an impurity.

Hydrocellulose and oxycellulose contain aldehyde groups and have reducing properties. They are resolved[7] by alkali treatment leaving a residue without reducing power, which resembles the true cellulose. Hydrocellulose and oxycellulose in dried state can, by mechanical action, be disintegrated to a fine powder which has no strength. These two celluloses together with hemicellulose and lignocellulose from the raw material, from which the pulp is made, should represent the amorphous cellulose, contained in commercial wood pulp while the residue after the alkali treatment, the *alpha* cellulose should represent the crystalline form of cellulose.

The mechanical treatment of pulp in the beater or ball mill results in a swelling of the fibers under absorption and absorption of water under formation of hydrated cellulose, with a final complete destroying of the original fibrous structure of the pulp. The outstanding characteristics of the hydrated cellulose are its high hygroscopic power[8] and its greasy feel when kept in a water suspension. Hydrated cellulose parts with difficulty from the water, in which it is kept in suspension, when filtered over a cloth or fine wire. From this characteristic the terms "slow" and "free" originate. When the hydrated cellulose is formed in a web, and dried, it shrinks, because the swelled fibers regain their original shape, under an increase of the friction between the fibers themselves.

The presence of amorphous cellulose in the pulp causes an increase in the rate of hydration, and it is therefore important to study the hydration properties in connection with the strength when valuing the pulp. This can be done by beating the pulp various lengths of time, as described in the above method, and by studying the increase in "slowness" of the stock, and the shrinkage of the test sheet, dried under strictly standardized conditions.

We know that when pulp is beaten, formed in a sheet of paper, and dried, the sheets shrink if it is dried without tension. This is due to the presence of the hydrated cellulose.

In the manufacture of paper we distinguish between machine dried and loft dried paper the fundamental difference being that the former is dried under tension, the latter without tension. Loft drying, besides giving the paper certain desirable qualities such as "cockle," "snap," etc., also increases the strength of the sheet.

In the strength testing of pulp, where the beating is done to and above maximum strength, the shrinkage of the test sheet should be controlled in order to get a result of value.

Table I and Curve VI show the shrinkage of the pulp after being beaten different length of time and after being made in a hand sheet.

The effect of the rate of drying, due to varying temperature and humidity condition at the time of drying, on the shrinkage of the sheet, and the effect of the shrinkage on the strength test, are preliminarily shown in the experiment tabulated in Table V.

Several sheets were made from the same batch; four of which were dried in the drying rack equipped with hot air blower 35 deg. cent., and four were air dried. Four sheets were, after being formed on the mold, each placed between two sheets of bond paper and then pressed between felts. The sheets were allowd to dry between the paper, and it was found that they had retained their original size after drying by this method. All sheets were then trimmed 4 x 7 inches and were tested according to the above method.

TABLE V

Strength of Bleached and Unbleached Sulphite Dried Under Different Conditions

	Bleached sulphite Beating 50 min.		Unbleached sulphite Beating 80 min.	
	Shrinkage %	Strength pts.	Shrinkage %	Strength pts.
Dried at 35° C..............	20.6	144.84	23.7	165.20
Air dried	19.5	140.77	22.6	159.41
Dried under tension............	None	128.33	None	152.25

This experiment shows that the shrinkage of the test sheets had an important influence on the strength of the samples in question, despite the fact that all sheets were trimmed to the same size and were corrected to the same weight. It is therefore brought to attention the importance of standardizing the drying condition to insure a uniform shrinkage of the test sheets.

TABLE VI[a]

Strength of the Same Grade of Bleached Sulphite Dried Without and Under Tension

		Dried without tension		Dried under tension	
Sample No.	Time in Ball mill min.	Shrinkage of sheet %	Strength pts.	Shrinkage of sheet %	Strength pts.
1	70	....	116.38	None	115.05
2	50	....	134.75	"	120.91
3	50	....	133.15	"	133.66
4	50	....	143.33	"	131.13
5	50	21.4	148.06	"	135.60
6	50	11.5	135.63	"	110.97
7	50	19.8	129.95	"	129.22
8	50	16.7	134.70	"	134.59
9	50	19.8	140.74	"	126.75
10	50	....	147.90	"	126.75
11	50	....	135.38	"	123.43
12	50	15.4	132.26	"	120.44
13	50	18.6	141.82	"	120.04
14	50	....	143.36	"	117.59
15	50	14.5	135.50	"	116.23

TABLE VI[b]

Strength of the Same Grade of Unbleached Sulphite Dried Without and Under Tension.

		Dried without tension		Dried under tension	
Sample No.	Time in ball mill min.	Shrinkage of sheet %	Strength pts.	Shrinkage of sheet %	Strength pts.
1	80	....	133.61	None	140.17
2	80	18.0	127.70	"	127.21
3	80	25.9	134.88	"	146.91
4	80	20.2	127.92	"	135.03
5	80	....	141.73	"	139.17
6	80	....	144.77	"	150.21
7	80	16.7	130.97	"	119.08
8	80	24.8	156.34	"	141.24
9	80	17.4	152.06	"	137.57

TABLE VII[a]

Strength of the Same Grade of Bleached Sulphite Dried Without and Under Tension.

		Dried without tension		Dried under tension	
Sample No.	Time in ball mill min.	Shrinkage of sheet %	Strength pts.	Shrinkage of sheet %	Strength pts.
1	50	19.5	143.79	4.0	126.42
2	50	19.1	134.98	4.0	126.97
3	50	19.4	140.15	4.0	134.04
4	50	18.5	145.52	4.0	127.10
5	50	20.0	145.93	4.0	136.08
6	50	20.7	142.62	4.0	140.15
7	50	21.1	147.49	4.0	146.00
8	50	19.8	152.22	4.0	141.51
9	50	17.2	149.83	4.0	143.82
10	50	21.1	148.34	4.0	138.66

TABLE VII[b]

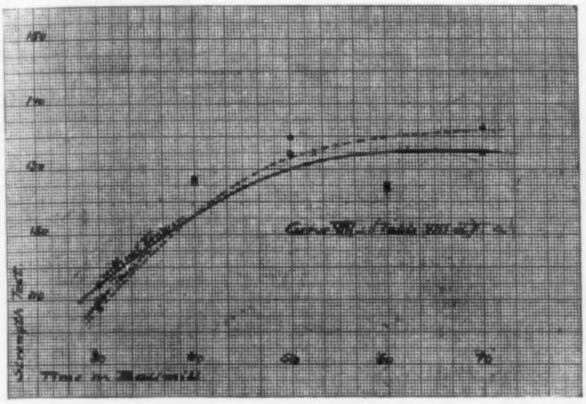
Strength of the Same Grade of Unbleached Sulphite Dried Without and Under Tension.

		Dried without tension		Dried under tension	
Sample No.	Time in ball mill min.	Shrinkage of sheet %	Strength pts.	Shrinkage of sheet %	Strength pts.
1	80	23.4	148.79	4.0	155.38
2	80	25.0	141.58	4.0	146.95
3	80	22.9	146.52	4.0	145.32
4	80	21.6	151.63	4.0	143.28
5	80	21.5	148.70	4.0	143.69
6	80	21.4	163.42	4.0	159.32
7	80	22.2	157.17	4.0	148.99
8	80	22.9	155.95	4.0	155.11
9	80	22.1	158.00	4.0	142.74
10	80	....	147.27	4.0	148.99

It was decided to study closer the drying under tension. This was

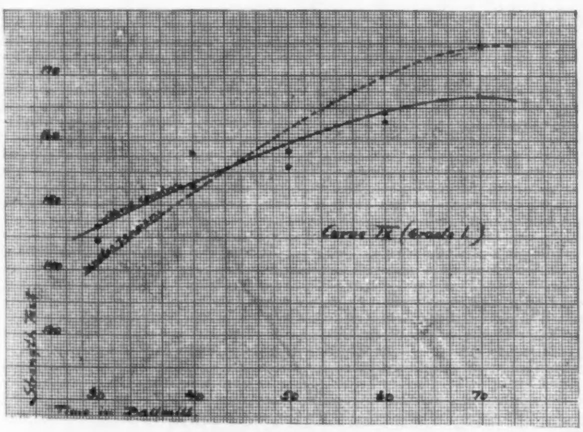
[5] Schwalbe and Becker, J. prakt. Chem. 1919, 100.
[6] Worden Tech. Cell. Esters Vol. 1.
[7] Cross & Doree Res. on cellulose IV.
[8] Schwalbe: Chemie der Cellulose 1918.

done by taking duplicate sheets of the daily control tests and dry part of them between paper, and part of them in the rack and then test the sheets under similiar conditions. The standard beating time for bleached sulphite is 50 minutes and for unbleached 80 minutes for the daily tests. Table VI[a] and VI[b] cover the results of these experiments. It is noticeable that an average of 9.3 per cent lower strength is obtained for bleached pulp dried under tension, then when dried without tension, while for unbleached pulp 1.1 per cent is found respectively. In fact, by studying the tables closely, it will



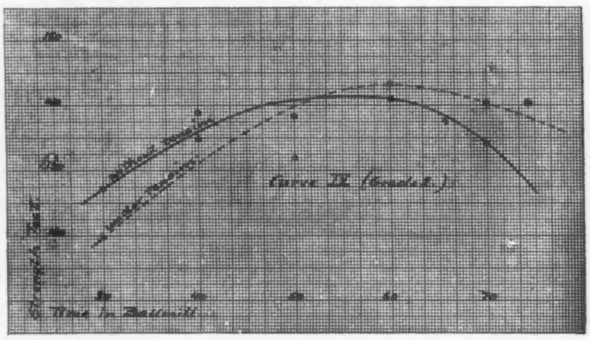
be found that, while in the case of bleached pulp, the strength of the pulp dried under tension as a rule is lower than without tension, the unbleached pulp, in four cases out of nine, showed a higher strength for the sheet dried under tension.

Due to difficulties in making an even hand sheet between bond paper, filter paper, which has a coarser surface, was tried, and it was found that the test sheets pressed and dried between two layers of filter paper, shrunk exactly 4.0 per cent regardless of the

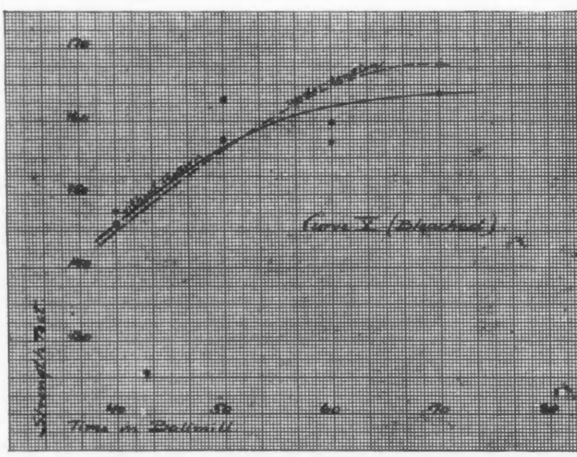


beating time or the nature of the pulp. The observations were continued and Tables VII[a] and VII[b] cover the results.

The results indicate an average lower strength of 6.2 per cent for the bleached sulphite, when dried under tension, compared with dried without tension, and 1.9 per cent correspondingly for unbleached sulphite. In the tabulation of strength for unbleached sulphite, we find in two cases out of ten a higher strength for the sheets dried under tension while the bleached pulp shows a lower strength in every case, where the test sheets are dried under tension. If we examine the figures closely, we find that in those cases where this higher strength occurs, the shrinkage of the sheets is the largest, which evidently means a higher degree of hydration. At a constant beating time, as in the cases referred to, this means an easier hydrated pulp. The remarkable thing about these results is, that at constant beating time, the values for the strength of the pulp dried with and without tension are closer the higher hydrated the pulp is. In the case of unbleached pulp the strength for the pulp dried under tension can at times be higher than when dried under shrinkage. We certainly encounter here the problem of actual fiber strength, and strength of the sheet, due to hydration which is more noticeable when the strength of sheets dried under tension and without tension are compared.



Some experiments were undertaken to study this matter, and various samples of pulp were beaten various lengths of time. Duplicate sets of hand sheets were made, half of which were dried without tension and half between sheets of paper as described above. Freeness and shrinkage of the pulp were recorded in some cases. Tables VIII[a] and VIII[b], IX, X, XI, XII, and XIII and corresponding Curves VIII, IX, X, XII and XIII show the results on



various samples of bleached and unbleached sulphite and on one sample of bleached sulphate.

The tables and graphs show that of the bleached pulps tested, four showed a lower strength of the sheets dried under tension, during the first part of the beating, but, when approaching the maximum strength, the strength curve for the sheets dried under tension crosses the corresponding curve for the pulp dried without tension. At a prolonged beating the curves seem to have a tendency to part, due to an increasing higher strength value for the pulp dried under tension.

TABLE VIII[a]

Comparative Strength of Bleached Sulphite Beaten Different Lengths of Time in Ball Mill, and Dried Under and Without Tension

Time in ball mill min.	30	40	50	60	70
Freeness of pulp	45.0	37.0	28.0	21.0	16.0
Strength test of sheet dried without tension—pts.	112.24	127.88	132.27	127.21	132.38
Shrinkage of test sheet dried without tension—%	12.0	13.9	16.1	22.0	23.7
Strength test of sheet dried under tension—pts.	108.74	128.50	134.89	127.29	136.34
Shrinkage of test sheet dried under tension—%	None	None	None	None	None

TABLE VIII[b]

Comparative Strength of Bleached Sulphite Beaten Different Lengths of Time in Ball Mill, and Dried Under and Without Tension

Time in ball mill min.	30	40	50	60	70
Freeness of pulp	45.0	36.0	26.0	17.0	14.0
Strength test of sheet dried without tension—pts.	124.42	144.47	147.45	148.20	143.53
Shrinkage of test sheet dried without tension—%	10.7	16.7	19.9	22.6	25.9
Strength test of sheet dried under tension—pts.	101.96	123.30	135.94	134.17	123.03
Shrinkage of test sheet dried under tension—%	None	None	None	None	None

TABLE IX

Strength Tests of Two Different Grades of Bleached Sulphite At Different Lengths of Beating

Time in ball mill min.	30	40	50	60	70
Grade 1					
Dried without tension—pts	145.64	157.87	155.92	164.27	166.83
Shrinkage of sheet—%	12.0	15.3	16.7	23.1	24.8
Dried under tension—pts	144.37	152.80	158.37	162.72	174.68
Shrinkage of sheet—%	4.0	4.0	4.0	4.0	4.0
Grade 2					
Dried without tension—pts	127.10	138.78	138.40	140.72	134.49
Shrinkage of sheet—%	10.9	15.3	16.7	20.8	24.1
Dried under tension—pts	119.90	134.99	132.00	143.28	140.43
Shrinkage of sheet—%	4.0	4.0	4.0	4.0	4.0

TABLE X

Strength Test at Different Lengths of Beating of the Same Make of Sulphite Unbleached and Bleached

Time in ball mill min.	40	50	60	70	80	90	100
UNBLEACHED							
Dried without tension —pts.	.....	.....	189.41	188.17	185.55	177.17	183.43
Shrinkage of sheet —%	.....	.....	22.2	27.8	31.5	32.4	33.4
Dried under tension —pts.	.....	.....	188.55	202.14	213.42	192.36	202.96
Shrinkage of sheet —%	.....	.....	4.0	4.0	4.0	4.0	4.0
BLEACHED							
Dried without tension —pts.	146.09	162.89	157.07	163.77	.....	.....	.....
Shrinkage of sheet —%	15.4	19.2	21.3	25.9	.....	.....	.....
Dried under tension —pts.	147.63	157.55	159.87	167.89	.....	.....	.....
Shrinkage of sheet —%	4.0	4.0	4.0	4.0	.....	.....	.....

TABLE XI

Strength Tests of a Sample of Unbleached Sulphite at Different Lengths of Beating.

Time in ball mill min.	60	70	80	90	100
Strength dried without tension—pts..	148.86	147.40	157.95	150.53	154.39
Shrinkage of test sheet—%	13.9	15.7	19.6	21.2	22.2
Strength dried under tension—pts...	141.65	138.25	152.12	150.76	153.20
Shrinkage of test sheet—%	4.0	4.0	4.0	4.0	4.0
Freeness of pulp	36.8	29.4	21.2	17.5	11.9

TABLE XII

Strength Tests of a Sample of Unbleached Sulphite at Different Lengths of Beating.

Time in ball mill min.	50	60	70	80	90	100
Strength dried without tension —pts.	140.70	168.38	154.92	165.23	156.58	158.46
Strength dried under tension —pts.	133.63	159.59	155.38	167.89	160.55	165.98
Freeness of pulp	.....	19.3	17.0	12.5	8.1	3.1

TABLE XIII

Strength Tests of a Sample of Bleached Sulphate at Different Lengths of Beating.

Time in ball mill min.	70	80	90	100	110	120
Strength dried without tension —pts.	144.56	158.11	159.75	163.41	160.17	156.13
Shrinkage of test sheet—%..	13.0	15.1	19.2	21.0	22.3	24.7
Strength dried under tension —pts.	133.90	155.65	149.94	160.82	156.47	158.23
Shrinkage of test sheet—%...	4.0	4.0	4.0	4.0	4.0	4.0
Freeness of pulp	40.0	31.2	25.6	18.1	9.8	3.9

TABLE XIV

Ash Content of Bleached Pulp Beaten Different Lengths of Time in Ball Mills.

Time in ball mill min.	Ash %
No beating	0.417
10	0.610
20	0.774
30	1.664
40	1.625
50	1.798
60	1.869
70	3.200
80	2.560
90	2.170
100	1.611

TABLE XV

Per Cent Ash in Bleached Sulphite Beaten Different Lengths of Time in the Same Ball Mill.

Time in ball mill min.	Ash %
No beating	0.19
20	1.05
30	1.54
40	1.90
50	2.57
60	3.13
70	3.76
80	4.38
90	5.10
100	5.80

TABLE XVI

Strength and Ash Content of the Same Sample of Bleached Sulphite Beaten 50 Min. in Different Ball Mill.

Mill. No.	Strength pts.	Ash content of beaten pulp %
1	147.85	1.37
2	142.08	1.60
3	133.71	2.00
4	142.43	1.58

Of the three samples tested of unbleached pulp, two show a similar condition and the sample tabulated in Table X shows some remarkable strength qualities when tested in this manner. Table XI shows a case, where the two curves do not cross but it is apparent, that the strength values for the two drying conditions are becoming closer, with increased beating time.

Table XIII and Curve XIII cover the results of tests on a sample of bleached sulphate and while the two curves do not cross, there seems to be a tendency for them to meet.

These observations are altogether too few, and the working methods of such limitations, that a conclusion is not permissible. The results however suggest the speculation, that an overbeaten pulp, or a pulp beaten to maximum strength, may in some cases give an equal or higher bursting strength of the test sheet when the sheet is dried under tension, than when it is allowed to dry under shrinkage.

In the light of the above tests, it is recommended that in the standard procedures for testing woodpulp is included the drying of the handsheet under tension. This is preferably done by placing the handsheet, after it is formed on the mold, between two sheets of dry filter paper or some other kind of paper with a coarse surface and by pressing and drying the test sheet between the paper.

The drying of the test sheet under tension would appear the more logical when that fact is considered, that chemical woodpulp is mostly converted into machine dried paper and is only in exceptional cases and then in low percentage contained in loft dried papers.

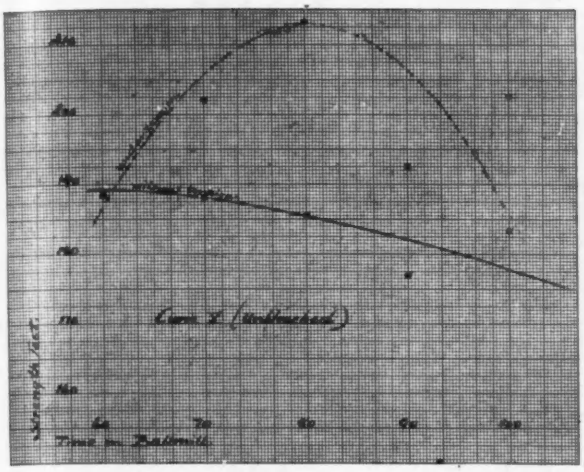
Effect of Wear of the Ball Mill Jar on the Strength Test

To determine to what extent an eventual wear on the ball mill jars should have on the increase of mineral matters in the beaten pulp, the pulp beaten in the series tabulated in Table I was tested for ash content. Table XIV shows the results and there is apparently an increase in the ash content with continued beating. The large irregularities in the figures of the ash content are undoubtedly due to the fact, that the pulp was beaten in four different jars, which evidently must have been of different hardness.

A run was made, in which the pulp was beaten in the same ball mill, and samples were taken with ten minutes intervals. The samples were diluted to 0.5 per cent consistency and filtered under

vacuum over a piece of cheesecloth. The ash contents of the air dried pulp so treated are shown in Table XV and Curve XIV.

There is evidently an increase of ash with increased beating time, due to the continued wear on the jar, combined with a higher re-



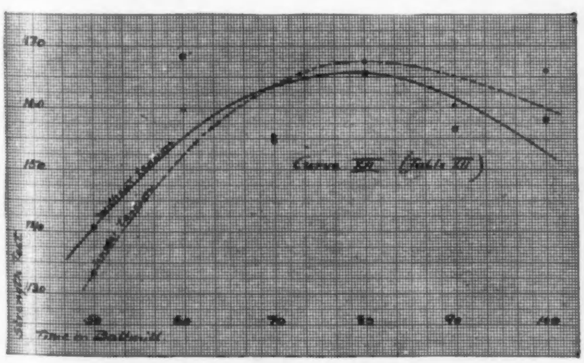
tention of the fine powder from the jar with decreased "freeness" of the stock.

It was assumed that this increase of the ash content would have the same influence on the strength as the loading of paper stuff with clay, namely a decrease in strength of the paper. The experiment tabulated in Table XV tends to show, that the ash has a most decided influence on the strength test.

Referring back to Curve V we find an unwarranted "kink" in the curve at 70 minutes beating, and the high ash content of the pulp beaten this length of time as tabulated in Table XIV may explain this matter.

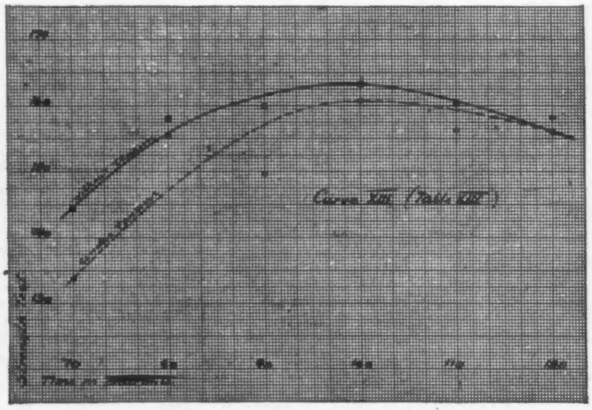
Returning to Table XVI we find that when beating the same pulp in four different jars, the strength test varied 10 per cent with a variation in the ash from 1.37 per cent to 2.00 per cent all other conditions being equal. This indicates a serious drawback in the ball mill method.

An attempt was made to check the results of Table XVI by

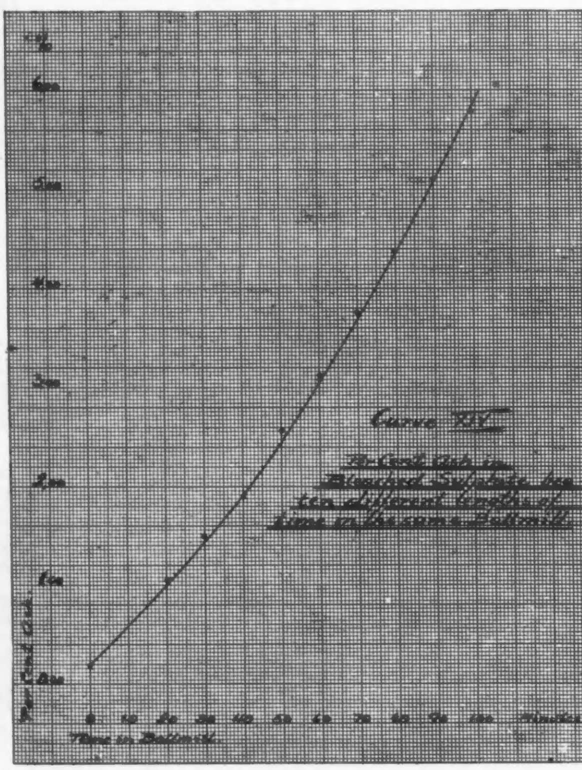


beating another sample in exactly the same way. This experiment, however, gave negative results, so far as the effect of ash was concerned, which is shown in Table XVII. From this table we note that the pulp must have been hydrated differently despite absolutely similar conditions, and no relation between ash and strength can be found. From its low freeness and high shrinkage we note however that the pulp beaten in Mill 2 is the highest hydrated and has possibly even passed the maximum point for strength.

Table XVIII shows the results of a second endeavor to check the results of Table XVI by beating samples of the same pulp



in four different jars, and testing the sheets under absolutely similar conditions. The results were here again negative, as they failed to prove that pulp with high ash content gives a low strength test. It is however noticeable that the lowest strengths of the



sheets dried under tension are obtained from the pulp with the highest ash content.

Summary

A working method for strength testing of wood pulp has been described and made use of in experiments to determine: the strength and beating qualities of various grades and samples of wood-pulp, the effect of drying the test sheets under tension compared

TABLE XVII—STRENGTH, FREENESS, SHRINKAGE AND ASH CONTENT OF PULP BEATEN 50 MINUTES IN DIFFERENT BALL MILL JARS

Mill No.	Freeness	Shrinkage %	Strength pts.	Strength under tension pts.	Ash content %
1	21.5	19.1	154.73	150.76	1.69
2	18.9	21.1	153.96	154.16	1.76
3	23.0	18.5	156.45	149.94	1.85
4	21.9	18.7	148.77	144.91	1.69

TABLE XVIII—STRENGTH, FREENESS, SHRINKAGE AND ASH CONTENT OF PULP BEATEN 70 MINUTES IN DIFFERENT BALL MILL JARS

Mill No.	Freeness	Shrinkage %	Strength pts.	Strength under tension pts.	Ash content %
1	16.2	18.2	142.75	137.30	1.92
2	17.0	18.2	150.16	134.17	2.57
3	19.1	17.1	139.95	131.73	2.72
4	15.5	18.0	143.69	139.07	2.03

to drying under shrinkage and the effect of wear on the ball mill jars, on the strength test.

It has been found that by beating the pulp various lengths of time, some interesting results are obtained, which give an opinion of the relative strength and beating qualities of the pulp.

It has also been found that the strength tests of sheets made from the same sample, dried under and without tension, tend to indicate, when they are compared, that a pulp, when overbeaten or beaten to maximum strength, may give a sheet of equal or higher bursting strength when dried under tension, than when the sheet is allowed to dry under shrinkage. This matter does, however, need more thorough investigation with a method of higher dependability than at the present time is available, before a conclusion can be made.

The wear on the ball mill jars has been found to increase the ash content of the pulp, with increasing beating time, and within the limitation of the method of testing, has been found to have an effect on the final strength test.

Chemical Stains for Use in Microscopical Analysis of Paper

By H. N. Lee*

At the present time there are available a number of stains or dyes which may be used very successfully in the analysis of paper. Without doubt the Herzberg stain gives as good a differentiation as can be desired for rag-sulphite mixtures and for sulphite-groundwood mixtures. Likewise the Lofton-Merritt stain for unbleached sulphite-sulphate mixtures, the Bright stain for unbleached-bleached pulp mixtures, and the Alexander stain for soda-sulphite mixtures, may be used. To these latter stains, which involve the use of aniline dyes, may be added the Sutermeister stain, a strictly chemical stain which differentiates various fibers in much the same way as the stains which are described but has the disadvantage of requiring application of two successive solutions. The following stains are submitted as being equal or superior to the foregoing so far as bleached fibers are concerned and of greater ease in application.

Formulas as Examples

In making up stains all original solutions are saturated at room temperature except the iodine-potassium iodide mixture which is made up of 5 grams of iodine in 10 grams of potassium iodide in 10 cc. distilled water. Table 1 gives formulas which may be taken as examples, for considerable variation can be made in any formula within which differentiation of fibers occurs although the degree of differentiation varies.

TABLE 1

Formula No.	Parts of $MgCl_2$	$CaCl_2$	$ZnCl_2$	$BaCl_2$	I in KI	KI	H_2O
32	..	50	..	2	1	..	..
35	..	50	..	..	1	..	to 8
37	..	..	..	30	1	..	..
*42	..	..	10	..	(*see note*)	4	1
119	39	9	13	..	1	..	..
120	39	13	13	..	1	..	..
121	40	20	20	..	1	..	..
122	33	33	33	..	1	..	..
123	27	27	27	..	1	..	..

* Two drops I-KI in each cc. of potassium iodide. (KI)

Made up in a different manner are Formula 50, - 20 g. $ZnCl_2$ in 10 cc. H_2O, 6 g. $CaCl_2$ in 10 cc. H_2O, 1.2 g. KI and 0.1 g. I in 3 cc. H_2O and Formula 53, - 5 cc. Herzberg stain (either new or old), 5 cc. saturated solution $CaCl_2$, to which it may be desirable to add 1 drop I - KI solution and perhaps a few drops of water.

It may be seen from Formulas 119 to 123 that a wide variation may be made in the stains and still secure a good differentiation.

Using the Stains

In using the stains, they should be added to the disintegrated paper or pulp after water has been blotted off with hard filter paper. The drier the fibers are, the darker the resulting colors will be. The exact colors obtained are difficult to describe. Roughly speaking, the following are the general results:—

Rag—Brownish red.
Bleached sulphite—Violet or lavender.
Unbleached sulphite—Violet to greenish brown.
Soda—Deep blue.
Sulphate—Greenish brown to grayish blue.
Groundwood—Lemon to golden yellow.

Depth of Color

The depth of color is about the same in each kind of fiber. Bleached sulphite shows the weakest color, and, if stains are not properly made or if too much water is present, this may be nearly colorless. The colors vary with variations in the proportions used in making up the stains. In general more zinc chloride increases blue shades, more magnesium or calcium chloride increases the red shades, while more iodine makes all colors darker and sometimes bluer. Variation in the iodine content causes more difference in the shades than changes in the other chemicals. Addition of water or of potassium iodide solution tends to make the colors less strong, but in general, if colors are too dark due to too great a proportion of iodine, it seems to be better to add one of the chloride solutions rather than water. The changes in shades resulting from varying the constituents of the stains may be utilized in adjusting the stains in case unsatisfactory results are obtained.

In making up the stains it has been found advisable to hold back some of the iodine solution and add the latter portion only drop by drop. Possibly variation in chloride solutions due to changes in temperature makes this necessary. Stains should be kept in colored glass bottles or in the dark. If the iodine has bleached out, cautious addition of the iodine solution will renew the efficacy of the stain.

These stains may be safely used to determine percentages of rag, bleached sulphite, soda, groundwood, and to establish the presence of sulphate and of unbleached sulphite. For percentage determination of these latter fibers the Lofton-Merritt and the Bright stains should be used.

The writer is making further studies of these combinations with the hopes of developing better formulas, especially for use with unbleached fibers.

SUMMARY

1. Formulas are given using magnesium, calcium, zinc or barium chlorides with iodine and potassium iodide, for identification of paper-making fibers.

2. Proportions used in making up the stains may be varied considerably.

3. Stains may be adjusted by adding certain constituents. Old or bleached stain may be restored by adding iodine.

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Baryta Paper

By Dr. Th. Bentzer*

About fifty years ago when I, still a student of chemistry, took up the practice of paper making, the art of photography had just passed its childhood, and the silver plate as picture material had been followed by paper. A high grade of bond paper was covered with the white of egg to prevent the silver solution from penetrating into the paper. But it was not long before his kind of paper, which the photographer himself prepared in the dark room of his study, was followed by the collodion emulsion paper, the bromide emulsion paper and the so-called gaslight paper, which made it necessary to cover the paper with a coating which was able to resist the hot emulsion during the coating and drying, and at the same time was sufficiently flexible to prevent the surface from cracking and breaking.

This was obtained by coating the base paper with what is called baryta, that is, a fine, ground barium sulphate mixed with gelatine, which was soaked in water and melted at about 50 degrees Cent. This mixture forms the proper coating material, but to obtain certain qualities it is necessary to add different other matters, as:

Citric acid, to obtain "power" in the picture and at the same time give resistance to the free silver in certain kinds of emulsions (special for printing out paper).

Alcohol, to help on the drying of the baryta layer.

Chrome alum, and sometimes also formaldehyde, to harden the baryta layer and make it resistant against the hot emulsion, which it has to pass in a slow speed to be made sensitive to light as photographic paper.

Glycerine, to keep the paper flexible in spite of the sometimes high amount of chrome alum.

Milk, to prevent foaming of the baryta mixture during the brushing, and of course,

Dyestuff, to obtain the wanted shade of color.

The coating, or more correctly expressed, the brushing of this baryta mixture upon the paper, is performed by a machine in which the paper, usually about 3 feet in width, coming from the roll, passes a roller while an endless felt belt transfers the baryta mixture from the pan upon the paper. It then passes a cylinder upon which alternately moving and fixed brushes (usually eight altogether) create a high grade smooth surface upon the paper. The paper is dried in hangers and rewound, and the manipulation is repeated one, two or three times to make the paper serviceable as material for photographic emulsion paper. As such it must be flexible, not have any tendency to curl during the drying, it must be able to resist the melting influence of the hot emulsion and keep it on its surface to enable the photographer to obtain contrasting and brilliant prints, which means that the baryta coating must not be soaked by the moist emulsion during the drying time, but, nevertheless, the emulsion must stick to the baryta. And together with the photographic emulsion, the baryta must be capable of resisting the developing solution, the fixing bath and hours of washing in running water.

Three Classifications

Paper used for photographic printing processes can be classified in three different varieties:

Printing out paper (P. O. P.).

Developing paper.

Commercial paper as it is used for the different kinds of photographic printing machines for simplex and duplex record.

Of these the commercial paper is a common base paper without baryta finishing, covered on one or both sides with a not too fast bromide emulsion. The base paper to be used for the other two kinds of photographic paper must be covered with a mixture of barium sulphate and gelatine.

As far as I know, nothing was ever published about this matter, at least no full instructions, either in books or in magazines. I therefore believe that a brief discussion based upon my experience of this special paper finishing will be of interest. Of course, such a discussion will never enable anybody to start and to run a baryta plant. It will only bring information to those who want to know how this kind of finishing is prepared, and it will give those who already know about it some help for their troubles.

THE BARIUM SULPHATE IS USED IN THREE DIFFERENT SHAPES:

Barium sulphate, the dry, natural, fine powdered barium sulphate.

Matt blanc fixe, barium sulphate pretty finely ground with about 20 to 25 per cent water, forming a uniform paste.

Glossy blanc fixe, the same but still finer ground.

(Note: This blanc fixe paste is mixed in barrels with distilled water and stirred until the mixture is perfectly uniform. The glossy baryta is usually made to contain about 56 per cent dry matter and 44 per cent water, the matt about 67 per cent dry matter and 33 per cent water—exactly 66⅔ per cent + 33⅓ per cent).

OF OTHER MATERIAL USED:

The gelatine must be neutral, rather acid than alkali, and as clean as possible.

Only distilled water is to be used during the whole process; also for cleaning of machine, brushes, jars, etc.

Citric acid solution. Ten per cent must be freshly prepared each day.

The milk must be brought three times to boiling point and kept there for a few minutes before it is added to the baryta mixture.

I shall divide my subject matter into three parts:

I. The formulas.
II. The instructions for the operator.
III. The testing of baryta paper.

I. The Formulas

We will start with a normal formula for *Glossy Gaslight Paper*, but it must be understood that any formulas given in this instruction must be regarded only as fundamental. They have to be regulated and completed, perhaps more or less rebuilt according to materials (gelatine and baryta), to speed of the machine, to air conditions and to the special qualities of the emulsion (with respect to speed and contrast) for which they are intended.

Formula for one preparation (batch) equalling 22 kg. (about 48½ lb.)

12 kg.	glossy blanc fixe, 56 per cent. (about 26½ lb.)	
550 g.	normal medium hard gelatine.	
8,350 cc.	distilled water (about 8¾ qt.).	
100 cc.	citric acid—10 per cent.	
500 cc.	denatured alcohol, 95 per cent.	
333 cc.	chrome alum solution, 10 per cent.	400 cc. hardening.
5 cc.	formaldehyde*	400 cc. hardening.
62 cc.	glycerine	400 cc. hardening.
100 cc.	milk.	

(*It is usually better not to use formaldehyde, as it may have a bad influence upon certain emulsions. In this case the amount of chrome alum is increased to 400 cc. or—according to kind of gelatine—more.)

INSTRUCTIONS.

1. For our demonstrating experiment we will prepare 1,000 square meters of paper to be covered in three different brushings.

2. Normally 10 sq. m. of paper are covered three times (three different brushings) with 1 kg. of baryta mixture. Therefore 100 kg. would be needed for the 1,000 sq. m.

3. Besides these 100 kg. some is needed for necessary waste.

4. The pan needs about 12 kg. (but this amount of waste would be the same also for a whole day's run) and about 9 kg. are wasted by filtering and transferring the mixture to the machine.

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5. In this way we should need $100 + 12 + 9 = 121$ kg. mixture or 5½ batches.

6. But as such small runs never can be made without enough delay between the three brushings to let the paper dry out, which will cause some more waste, we had better prepare—

Three times 2½ batches, that means
2½ batches for each of the three brushings.

PREPARATION:

1. Soak the gelatine.

If dyes are wanted to give the paper a special tint (usually slightly blue or red, sometimes both combined) they are as a rule only added to the mixture for the third brushing. It is necessary to add them with about 1,000 cc. of water, and this amount of water must be taken from the amount of water to be used for the gelatine solution. Mix the dye solution thoroughly with the blanc fixe by hand before filtering, and be sure that no trace of dye can be observed in the mixture. This is very important.

2. Be sure that the blanc fixe contains the required per cent of barium sulphate (in this case 56 per cent, evaporating test).

3. Filter the blanc fixe (eventual plus dyes) through cheese cloth.

4. Melt the (well soaked) gelatine at 45 to 60 degrees Cent. (113 to 122 degrees Fahr.).

5. Filter the gelatine through cheese cloth.

6. Add the gelatine solution to the blanc fixe (and not the other way).

7. Mix thoroughly by hand and be sure that the mixing is thoroughly done.

8. Add the 400 cc. hardening mixture slowly, mixing thoroughly by hand.

9. Add the alcohol, mixing thoroughly by hand.

10. Add the milk, mixing thoroughly by hand.

Remark: If the baryta mixture is perfectly good (the barium sulphate perfectly suspended by the gelatine, and the gelatine sufficiently hardened by the chrome alum and formaldehyde) then it will be difficult to wash the mixture down from the finger tips around the nails.

11. Filter the mixture through cheese cloth and bring it to temperature, to be coated (brushed on) at 40 to 42 degrees Cent. (about 104 to 108 degrees Fahr.). Then bring the baryta mixture into the pan, etc., according to "Instructions for the Operators" and start with a speed of about 28 to 29 m. per min. The 1,000 m. are running over the drum in about half an hour. The speed of the machine is usually to be regulated from 25 m. per min. up to about 50 m. per min.

For *Semi Matt Gaslight Paper* the formula would demand more or less barium sulphate in powder instead of an equivalent part of the glossy blanc fixe, and for *Matt Paper* only matt blanc fixe, sometimes with addition of a small part of glossy. But this may be varied according to demand. Any chemist will be able by hand test to build up a suitable formula, and it is possible that I may come back to this matter in another discussion, especially if it should prove necessary or desirable.

We shall now proceed to THE MOST IMPORTANT of the three chapters.

II. Instructions for the Operators

Do not read it over but read it to *know and remember* every paragraph.

1. What Is To Be Done And Which Conditions Are To Be Established Before Starting The Barytine Work.

(a) Be sure that the machine room is absolutely clean, especially the floor. The floor should be cleaned every day (wet). Keep all doors closed and keep visitors out; everyone brings dust and dirt into the room.

(b) The hanger must be absolutely clean.

(c) All parts of the machine must be kept slightly greasy to protect them against rust.

(d) Moving parts must always run in oil, so that no grinding or wearing off can take place which could cause millions of iron spots on the baryta paper.

(e) The chains must be kept slightly greasy.

(f) The sticks must, at least once a week, be washed over with benzine.

(g) The rewind machine must be carefully examined to be sure that it is absolutely free from dust.

(h) The rollers, covered with felt, must be brushed until they are absolutely clean every evening after work is finished; but do not scrape them clean with a knife or other tool. The hardest spots must be removed by means of a brush and with nothing else.

(i) All bearings, worms and toothed wheels and pinions have to be oiled during the running (if necessary), but not in a way or in a quantity that would cause the moving parts to fling or hurl oil upon the paper.

(j) The brushing machine must be examined with utmost care to be sure that it is absolutely clean. All bearings must be sufficiently oiled. The rollers and the drum must be washed over before starting, although they perhaps are supposed and seem to be clean.

(k) The brushes must be knocked out by hand to remove the least trace of dust.

(l) When starting brushing of the paper, the drum must not be too cold, especially during the winter, as the baryta would set in passing it. This would prevent the proper functioning of the brushes, the single hairs would make an impression on the setting mixture and a "sharp stroke" would be the result.

(m) Before starting the transporting felt (or feeding belt) run for half an hour in distilled water 50 degrees Cent. (never any other water than distilled is used for baryta or baryting) to adjust the exact motion and to make the felt itself soft and flexible. After this the felt, without removing it, must be pressed out as perfectly as possible, to remove the excess water.

(n) The pan must be washed and cleaned before the baryta mixture is brought in.

2. The Temperature of the Baryta Mixture.

The temperature should always be 40 to 42 degrees Cent. but never and under no conditions higher than 45 degrees, because this would cause the baryta mixture to stick to the upper part of the walls of the pan and never could it be washed off again.

3. Measures To Be Observed When the Machine Is Starting.

(a) Brake serviceable.

(b) Do not let the paper roll run out.

(c) Regulate the thickness of the layer.

(d) Take care that the felt is transporting the mixture so uniformly that no brush trace can be observed. The surface must look as if the mixture were brought upon the paper without any use of brushes.

(e) In the meantime, the "backman" takes care that the sponges are placed and adjusted suitably to take away the excess of baryta mixture from the borders of the drum.

4. Measures To Be Observed When the Machine Is Running.

(a) Take care to obtain a smooth coating (surface).

(b) Take care that every brush is working exactly.

(c) Watch that the hairs of the brush are not pasting together, which will hurt the surface.

(d) Watch that the sponges are in shape and work all right.

(e) Take care that the right amount of baryta is brought on the paper.

(f) Watch that the mixture is brought on so that both sides of the paper path are uniformly covered.

(g) The felt must not unravel. If it starts doing so, then it must be changed for a new and better one.

(h) The mixture must not contain any hard, small things like sand or gravel, usually caused by insufficient filtering.

(i) The baryta mixture must be exceedingly clean white, and this must be carefully examined by bright light, because the impurities usually consist of nearly invisible dust atoms, which mostly pass the cheese cloth filter.

How to prevent this:

1. Use only absolutely clean materials.
2. Be sure that the water is clear.
3. Prevent all smoke and dust from entering the preparing rooms.

(j) Watch that the speed of the machine may not cause oil or grease drops to be flung on the paper.

(k) Take care that the ventilation does not bring dust or smoke into the machine room.

(l) The temperature must be so regulated that the paper can dry normally and be rewound neither too moist nor too dry (bone dry).

5. To Regulate the Temperature.

(a) Watch the humidity of the outside air.

(b) Watch the quantity of the baryta mixture to cover a certain area of the paper to be consumed.

(c) Watch and regulate the speed in proportion to (a) and (b).

(d) Pay attention to (a), (b) and (c) according to the different conditions demanded for the first, the second, the third, and perhaps a fourth brushing.

6. The Consequences of Rewinding the Paper Too Wet After the First Brushing.

(a) Wrinkles during the rewinding.

(b) Impossibility or sufficient breaking.

(c) Troubles to bring the right amount of mixture upon the paper at the second brushing, because the paper already carries too much water from the first brushing and is therefore unable to suck up still more.

In the same way the "too wet" will cause the same troubles during the later brushings and rewindings.

7. The Consequences of Rewinding the Paper too Wet After the Last Brushing.

(a) Wrinkles as by Paragraph 6.

(b) Insufficient breaking as by Paragraph 6.

(c) Troubles on the calender: If the paper is not uniform in its condition or state of drying, if for instance the edges are more dry than the middle part of the paper, then will this middle part expand more than the edges. In the same way if one side (the right or left) is more dry than the other, a corresponding result will take place.

And the well known result of such kind of irregularity will be that (1) it is impossible to obtain a uniform emulsion coating and (2) to avoid that the emulsion comes on the back edge of the paper and makes belts and sticks dirty.

(d) But worst of all: If the baryta paper is kept in stock for a shorter or longer time, it will grow moldy.

8. The Consequences of Rewinding the Paper too Dry After the First Brushing.

The water was sucked up too much and this causes the second brushing, in case only a small amount of mixture is demanded for the second running, to stand too "sharp."

Only if a *rich* second brushing is demanded should the first layer be dried entirely out, and in this case it is a necessity that the first brushing be quite (and for all uniformly) dry.

9. The Cause for "Long Strokes" like Waves.

The first brushes were adjusted too deep.

10. The Cause for a Sharp Stroke like Zigzag.

(a) The moving brushes are adjusted too deep.

(b) The baryta mixture is too thick or too hard.

(c) The layer is too thin.

(d) See Paragraph 8.

11. How Is a Sharp Stroke To Be Corrected?

(a) Raise the moving brushes sufficiently, especially both the last ones.

(b) Raise the speed of the paper and at the same time bring more mixture on the paper after some water has been added. This correction is not so good as (a).

12. What Is the Cause for Straight Lines in the Paper Direction?

(a) The moving brushes are not working fast enough.

(b) The layer is too thin.

(c) One or more of the fixed brushes was too deeply adjusted.

13. When Is Water To Be Used During the Running?

(a) If sharp strokes show up (see Paragraph 11b) and this fault cannot be corrected by other means (see Paragraph 11a).

(b) If the mixture is giving a too thick layer.

(c) To remove dry spots in the feeding belt.

14. When Is the Speed Increased?

(a) If sharp strokes show up (see Paragraph 11b).

(b) If too much mixture is brought upon the paper.

15. When Is the Speed Decreased?

(a) If not enough mixture is brought upon the paper.

(b) If the hanging paper cannot be sufficiently dry when it reaches the rewinder.

16. What Is To Be Done if the Machine Has To Be Stopped for a Longer Time?

(Sometimes a few minutes are sufficient to make the following measures a necessity.)

(a) Remove the brushes and wash them.

(b) Remove the mixture from the pan.

(c) Filter the mixture and clean the pan.

(d) Let the feeding belt run through water to wash it out.

(e) Prepare all for a new clean starting.

17. Why Does the Dye Sometimes Swim on Top of the Baryta Mixture?

Because the mixture is too thin. Mix entirely until the dye is distributed uniformly through the entire mixture and watch that it does not separate again.

18. Why Are Sponges Placed on the Drum?

(a) To keep the parts of the drum on each side of the paper wet.

(b) To wash off the mixture which is brought on the drum itself by the brushes.

19. What Will Happen if the Sponges Are Getting Dry?

(a) The brushes would bring small baryta parts on the paper.

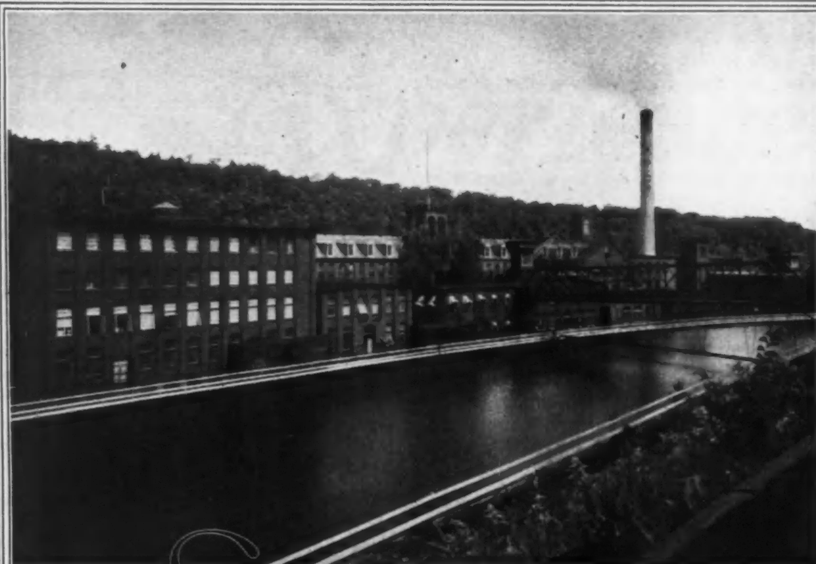
(b) The friction of the dry sponges against the drum would spoil the rubber and at the same time cause black spots in the emulsion paper.

20. Both the Foreman and the Backman Are Responsible that these Instructions Are Complied with.

III. The Testing of Baryta Paper

Baryta paper should never leave the mill before it is tested and proves to be good. Should it not be good for the intended purpose (emulsion) it may be serviceable for some other kind of work, for instance, photomechanical printing or lithography, and sometimes one brushing more will correct the fault (e. g., the color). Should the emulsion plant first cover it with the expensive emulsion and it prove to be too slow or too speedy, too hard or too soft, too red or too blue, to flabby or too brittle, or perhaps too curly, then money and time is lost and reputation too.

The baryta paper must be tested in two different directions, its



mechanical and chemical qualities. The mechanical qualities which have to be tested and proven are color, flexibility and capability of resisting the hot emulsion during the coating, and later the developing and fixing processes. The chemical qualities must correspond to the emulsion and its special character with regard to speed and contrast.

Color and flexibility are easily tested by comparing the paper in question with standard samples. The determination of the resisting capability takes more time and demands much accuracy. It must be remembered that most emulsions are applied to the baryta paper at a temperature of 35 to 40 degrees Cent. and at a speed of about 15 feet per minute, following which the paper passes a cooling tunnel to cause the emulsion to set before it enters the drying room. During the time the paper is passing the emulsion pan, the cooling tunnel, and the drying process, the emulsion must not soften, penetrate, or even dissolve the baryta. A softening might cause the baryta, together with the emulsion, to glide or slide during the time the paper passes from the tunnel over the first hanger and into the drying room, causing the well known "mottle," which is so noticeable in the halftones (light gray) of the picture (for instance in sky or background). Penetration of the emulsion into the baryta injures the permanence of the base paper, and it will keep white for only a short time; also the pictures will have no contrasts at all. A dissolving of the baryta layer will change the surface from glossy to matt, and at one time, as professional expert, I had the opportunity of seeing a roll of about 600 m. of glossy baryta paper pass the emulsion pan, with the result that the beginning of the roll turned out as glossy photographic paper, the middle as semi-matt, and the last of the roll as matt, according to the extent of the dissolving action. In this connection it may be remarked that it is often preferred to produce a matt or semi-matt paper by adding blanc fixe or starch to the common glossy emulsion, instead of mixing a special emulsion and using special baryta paper.

I have tried all different kinds of testing methods for the resisting capability of baryta paper, and I have found that the following will insure the good quality of the paper in this direction:

A strip of the paper to be tested, about 12 inches long and about 1 inch wide, is hung with the help of a glass rod in a 500 cc. cylinder filled with distilled water at 40 degrees Cent. After hanging undisturbed for five minutes the strip is lifted without touching the wall of the cylinder, but slowly to give the water an opportunity to wash down the baryta, if it has not sufficient resistance. Then the contents of the cylinder are stirred with a glass rod to make sure that the liquor is perfectly uniform, whereupon 50 cc. are placed in a nessler tube to be compared with another tube containing distilled water. If the test does not show any tint of turbidity, the paper is all right.

If the paper cannot stand this test, it will hardly be fit for use as a material for photographic emulsion paper. The trouble is caused by the gelatine used being too easily soaked or not being hardened enough (too little chrome alum), and it may happen that both of these factors are working together to give a bad result.

With respect to testing the chemical qualities of the paper, two different tests must be performed; the well known determination of possible iron or copper present, and also a hand coating with the emulsion which is to be used to find out if speed and contrasts are satisfactory.

The iron test is usually made by bathing a piece of the paper 20 to 30 min. in a 1 per cent solution of hydrochloric acid (iron free) and then 20 to 30 min. in a 1 per cent. solution of potassium ferrocyanide. Iron will appear as blue spots, copper as fine brown branches, and a paper with such spots cannot be used at all for P. O. P. emulsions (proof paper for instance). It is possible that iron will not cause trouble if the paper is coated with bromide or gaslight emulsion, but copper is always bad, as it sooner or later will cause white spots in the picture. It would take too long to explain the reasons, but as it is absolutely necessary to understand all about it to be able to meet the troubles and to avoid them, I hope I shall have an opportunity later to take this matter up for another discussion. The same holds good too of the testing of paper with emulsion and as long as the paper maker is not able to make the different kinds of emulsions for this purpose, he had better let the customer send him some emulsion with information how to melt it and coat it for hand tests.

Notes on China Clay

By Donald V. Lowe*

An article by Jas. Strachan, read before the Aberdeen division of the Paper Makers' Association of Great Britain and Ireland about two years ago pointed out the economic advisabilty of setting definite standards for moisture and grit in china clay. Mr. Strachan was perhaps considering the subject more from the angle of paper making than paper coating but his remarks suggest the advisability of giving careful study to the question of standards for coating clays.

Clay is one of our basic raw materials. For a fair sized plant, a consumption of 5,000 tons per year is not unusual. At an average delivered price of $20 per ton this makes an item of $100,000 per year. It will therefore require only a nominal saving, in per cent, by the average laboratory to more than cover the expense involved.

If we search in the literature for an account of the origin and definition of clay, we discover that it is considered "the result of feldspathic decay." Feldspar is a term covering the combinations in nature of silica, potassium, aluminum, sodium and, in lesser degree, calcium, which combinations are widely distributed, rock forming minerals.

When the Feldspar decomposes, the final result may obviously vary according to the original composition, the natural agents which were effective in producing decay, the degree to which decomposition has taken place and other factors, so that we may have almost infinite possible variations in the character of the final clay. Furthermore, whether the clay is primary or secondary, i. e., whether it exists in the original bed where decomposition took place or whether it has been transported to a new bed by water wil have a considerable influence on the method of preparation necessary before bringing it to market, and may introduce characteristics which it would be well for us to discover.

The question which the practical paper coater asks regarding clay is, however, "What must I know about clay to determine its most economical use?" and it is to answer this question that the determination of standards among clays is desirable.

Properties Which Determine Value

Now the properties of clay which determine its value to the paper coater are:—

1. Color. For certain work exceeding whiteness is demanded, while for other work a much less white clay may answer just as well and be much cheaper.

2. Moisture. This item has commercial importance, as a large factor in the cost of clay is freight.

3. Grit. Too high percentage of grit, which generally is off color and has no covering power, may prove very destructive to machinery, particularly strainer wires, trimmer knives, etc., as well as cause an inferior finished surface. As Strachan points out, 1

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per cent of sand means a direct loss of $1,000 per year (on the basis of our assumed mill,) as well as many other less visible losses.

4. Covering Power. This is one characteristic which is of particular interest to the coater.

5. Suspension. In the coating mill this is apparently closely allied to covering power.

6. Glazing or Finishing Character.

These six properties will be considered in the order given, and methods of determination suggested.

Color

This is capable of numerical expression by means of a Pfund Colorimeter, as outlined on page 353 of Bureau of Standards, Paper No. 262, Vol. 18. It is probable, however, that the average plant will be satisfied by a simple comparison with an accepted standard, made as follows:—

A block of wood about 2x4x6 inches, through the middle of the upper flat side of which is cut a lengthwise groove ½ inch deep by ¾ of an inch wide, is prepared. Across the top of the block, and penetrating to ⅛ of an inch below the bottom of the groove, are made thin sawcuts, into which strips of sheet copper are fitted. These strips are just wide enough to come flush with the top of the block, and are about ¾ of an inch apart. By placing in adjoining squares a standard sample and the clay being examined, and pressing uniformly with a spatula, any marked difference in color is visible. Sample to be tested in this way should be dried to a constant weight at 105 degrees Cent. before testing.

Moisture

In the preparation of clay for coating, the original clay substance is mixed with large volumes of water, both for purposes of transportation and for the settling out of grit and impurities. After the completion of this process, as much as possible of this water is drained off, and the balance dried out by means of artificial heat. Obviously, this moisture, which we will call mechanical water, may vary considerably, even in the same batch of clay.

Besides the water mentioned above, clay carries varying amounts of water chemically combined, or absorbed by the colloidal matter, the amount of this water depending, in all probability, on the character of the original feldspar and the method and degree of its decomposition. As it probably remains with the clay after coating and drying, it is a question apparently of whether or not it affects the covering power as to its importance. It can be determined by heating to a high temperature, or igniting.

Strachan states that an arbitrary figure of 12 per cent has been adopted in England as a standard for moisture content, but that he thinks it could be reduced 1 or 2 per cent with safety. Variations between different clays of from 6.6 per cent to 14.7 per cent have been found, the money significance of which needs no emphasis.

The usual method of drying to constant weight at a temperature not exceeding 105 degrees Cent. gives the necessary information regarding mechanical moisture.

Grit

Grit is commonly determined by means of sieving, either wet or dry, and recording the weight left on a screen of certain mesh as percentage grit. This method has the advantage of simplicity, and that is about all that can be said of it.

Strachan develops a method, based upon Stoke's law for the flotation of fine particles, which is very simple and gives as a result, the percentage of grit present as sand, mica, feldspar, etc. It seems that this method offers a good chance of arriving at the true figures for grit. He suggests, as allowable standards,

For coating papers,...... 0.1 per cent
For fine papers,......... 0.25 per cent
For news, etc., not over.. 0.5 per cent

It should be remarked in passing, that Strachan has not mentioned two factors which might possibly affect his results; first, the water used should be free of any "flocculator." In other words, it should be "soft," distilled water preferably. The presence of any such flocculator might cause some of the clay to be retained along with the grit, giving too high a result, and second, the possible solvent action of the water on the finer particles of grit, especially if alkalies are present or an excess of water is used. This might cause breaking down of the finer crystalline particles, and show too low a result.

At present we are without definite knowledge of the amount of grit which might be permitted in clays for different purposes. It is apparent, however, that, other things being equal, the best clay for our purpose will be the lowest in grit.

Covering Power, Suspension and Glaze

In Technical Paper No. 23, published by the Bureau of Standards in 1911, which is essentially a study of ceramic clays, the theory is developed that plasticity is definitely related to the amount and character of the colloid content, and methods for estimating this colloid content are outlined. It seems altogether probable that an analogy can be drawn between ceramic and coating clays, so that a study of the amount and nature of the colloids in our clays may enable us to predict with reasonable accuracy the comparative value of a clay as to its covering power, ability to stay in suspension and glazing property. (Suggest this study by Bureau of Standards). Such a study should be undertaken by a well equipped and organized research laboratory to be of value.

Meanwhile, for practical purposes, a fair comparison of covering power may be obtained by a method similar to that used with linseed oil paints, using a standard solution of casein as vehicle. For this purpose fairly stiff cardboard with a pattern printed on it in light type and marked off into squares of 10 inches is used. Enough coating must be applied to cover the entire square, just heavy enough to obliterate the pattern. The weight of clay mixture required is determined directly.

Suspension

This is immediately important to the paper coater, as a clay which settles quickly means difficulty in maintaining uniformity of sizing and color, as well as direct loss on account of clay washed down the sewer from the bottoms of tanks, etc. The usual test is to shake with water in a graduated cylinder, alongside of a standard sample, and measure the height of the sediment after stated periods of time. This method is in general satisfactory. Certain precautions, however, should be taken. For example, the addition to the water of a certain amount of the casein solution which will later be used, and the use of regular mill water, will result in parallel interaction, if any, between the bases and the colloids present.

Glaze

Glaze, or the ability of the clay to take a finish, is capable of being expressed numerically by means of an Ingersoll glarimeter, an instrument designed to measure the amount of light reflected from the surface being considered. It is not known, however, that a definite method has ever been worked out for this particular question, as a very good general idea of glaze can be gotten at the time of comparing color, if the finish that can be given to the clay when pressed into the block is noted.

In all of the tests suggested it is assumed that sampling is carried out with the utmost care, as in a material of this kind results can only be taken seriously if obtained on fair samples. A fair sample from a single 25 ton carload of clay, in bulk, would be the result of no less than seven samples taken at irregular depths and at intervals of 5 feet through the length of the car, properly quartered and reduced to laboratory size.

Color

If a clay is suspected of artificial coloring, and it is desired to discover any such color as may not be fast to light, it should be mixed to a thin paste, a small amount of ammonia added and gradually heated to drive off the excess. Artificial color, except indanthrene, which is fast to light, will come to the surface, (G. K. Spence, American Dyestuff Reporter 12 890-1 [1923].)

Comparison of Paper Tests Made at Various Relative Humidities

By Helen U. Kiely*

At the annual meeting in 1924 the Paper Testing Committee undertook the problem of ascertaining the most suitable, most economical and most reliable relative humidity at which to test paper. Previous to the establishment of a laboratory at the Government Printing Office in 1922 paper had been tested at 65 per cent relative humidity both in the United States and in Europe. The Government Printing Office changed from the existing conditions and established their laboratory at a relative humidity of 50 per cent, claiming that 65 per cent relative humidity is too high and does not represent the condition of humidity at which paper is ordinarily used and converted. They have maintained this relative humidity of 50 per cent and it has given them satisfaction. They also claim that it has made it posible for them to reject paper that would have passed at 65 per cent relative humidity.

At the American Writing Paper Company laboratory we are in a position to test at any relative humidity during ten months of the year. We are not equipped with any dehumidifying device but in this locality it has not been necessary, save possibly in July and August. About a year ago we started testing paper at both 50 and 65 per cent relative humidity and have compiled considerable data that may be of interest to the Association.

It is a well known fact that moisture content of all paper varies directly with the relative humidity, all grades being affected in practically the same manner, increasing more rapidly at higher humidities. At 65 per cent relative humidity the average moisture content of paper is about 6.6 per cent; at 50 per cent it is 5.6 per cent, while at 35 per cent it is 4.2 per cent. It is, therefore, obvious that for the general run of fine papers the last figure of 4.2 per cent of moisture at 35 per cent relative humidity would be most suitable for testing purposes as far as obtaining comparable results with the actual condition of using paper is concerned. It would, however, be impossible to maintain a relative humidity of 35 per cent without installing an expensive dehumidifying apparatus.

It was for this reason that 50 per cent was adopted by the Government Printing Office as they claim 50 per cent relative humidity may be maintained without expensive dehumidifying equipment.

Object of the Work

The object of this work was to ascertain, if possible, if any advantage is to be obtained by changing from the existing procedure of testing at 65 per cent and at which relative humidity all previous data had been collected. In Europe 65 per cent is also the relative humidity used. If it can be shown that papers are incorrectly graded when tested at 65 per cent relative humidity, it would be much better to change the standard than to continue testing under false conditions.

Following are data collected by the American Writing Paper Company laboratory showing the effect of 65 per cent relative humidity versus 50 per cent, on various kinds of paper, including bond, ledger, writing, book and cover of different grades on Mullen, tensile, tear and folding tests. (Tables 1, 2, 3).

Tub Size in the Folding Test

From these results, with the exception of folding endurance, the tests—Mullen, tensile and tear are not sufficiently different to warrant a change of relative humidity from 65 per cent to 50 per cent. This would seem to indicate that tub size plays a most important part in the folding test. At 65 per cent relative humidity this is due to the glue which becomes more flexible and consequently the fold increases. Therefore at this relative humidity the high fold is due to the flexibility of the glue tub size and not to the inherent characteristics of the paper itself. This is one of the arguments in

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TABLE I

Grade	Mullen			Tensile						Tear						Fold					
				Machine Direction			Cross Direction			Machine Direction			Cross Direction			Machine Direction			Cross Direction		
	50%	65%	Ratio	50%	65%	Ratio	50%	65%	Ratio	50%	65%	Ratio	50%	65%	Ratio	50%	65%	Ratio	50%	65%	Ratio
Bond 16 lb. folio																					
70% Rag	35.0	31.8	1.10	15.7	15.4	1.02	7.5	8.3	.91	59.5	41.0	1.45	60.0	47.5	1.26	294	449	0.66	68	193	0.35
50% Rag	32.1	31.6	1.02	14.5	14.4	1.01	8.5	7.3	1.16	47.0	37.5	1.25	52.0	45.5	1.14	273	340	.80	104	142	.73
40% Rag	34.0	34.0	1.00	15.1	14.7	1.03	9.1	8.9	1.02	55.0	47.0	1.17	56.0	50.0	1.12	318	412	.77	149	214	.70
25% Rag	31.8	30.8	1.03	15.8	14.8	1.07	8.5	7.5	1.13	37.5	35.0	1.07	53.5	41.5	1.29	143	333	.43	112	105	1.06
35% Rag	28.0	27.8	1.01	15.6	15.1	1.03	7.5	7.3	1.03	44.0	30.5	1.44	48.5	36.5	1.33	102	214	.48	72	59	1.22
100% Sul	22.4	22.6	.99	15.2	15.1	1.01	6.2	5.8	1.07	34.0	26.0	1.31	41.0	28.5	1.43	56	61	.92	39	23	1.70
90% Sul, 10% Soda	23.0	22.2	1.04	14.6	14.3	1.02	6.4	6.0	1.07	34.0	26.0	1.31	37.0	36.5	1.02	80	114	.70	15.4	16	0.96
Ledger 24 lb. folio																					
100% Rag	58.8	55.0	1.07	24.1	23.3	1.04	14.3	14.5	0.99	...	108	...	...	106	...	...	2,038	...	...	1,056	...
80% Rag	....	49.0	....	....	19.4	....	....	10.7	....	...	101	...	...	104	...	...	1,201	...	...	312	...
60% Rag	54.0	54.6	.99	22.8	21.8	1.05	13.8	13.6	1.02	75.0	68.5	1.10	83.0	77.0	1.08	569	913	0.62	289	595	0.49
40% Rag	34.2	36.2	.95	16.8	15.0	1.12	10.7	9.3	1.15	59.0	58.0	1.01	57.0	62.0	.92	86	68	1.27	88	75	1.17
25% Rag	29.6	29.8	.99	18.3	16.9	1.08	12.3	10.3	1.19	67.5	66.0	1.03	66.0	72.5	.91	33	70	.47	34	45	.76
100% Sul	26.6	25.8	1.03	14.6	15.5	.94	10.2	8.6	1.19	55.0	48.5	1.14	50.0	46.5	1.08	52	59	.88	50	47	1.06
Writing 20 lb. folio																					
65% Rag	19.4	20.2	.96	10.1	9.1	1.11	7.0	6.1	1.15	42.0	37.0	1.14	52.0	37.5	1.38	5.4	7.2	0.75	4.4	5.4	0.81
50% Rag	21.0	25.2	.83	9.3	12.4	.75	7.5	7.1	1.06	26.0	48.0	.54	51.0	56.5	.90	5.8	49.8	.12	9.8	32	.30
15% Rag	21.2	20.8	1.02	13.5	11.3	1.20	7.0	6.1	1.15	22.0	40.0	.55	35.0	42.0	.83	8.2	14.6	.56	9.0	11.6	.78
90% Sul, 10% Soda	24.6	23.8	1.04	17.6	13.9	1.27	7.9	6.2	1.27	39.0	46.5	.83	48.0	37.0	1.30	27	119	.23	15.8	17.4	.91
Book 60 lb. folio																					
100% Sul	27.6	25.4	1.09	17.9	16.2	1.11	7.3	5.6	1.30	49.5	50.0	1.00	64.5	58.5	1.10	64	78	.82	61	41	1.49
35% Rag, 65% Sul	16.4	14.0	1.17	9.3	7.3	1.27	4.4	3.3	1.30	40.0	48.0	.83	41.0	50.5	.81	4.4	4.4	1.00	4.0	3.4	1.17
30% Soda, 70% Sul	21.0	23.4	.90	15.0	14.3	1.05	8.0	7.0	1.14	55.0	51.0	1.08	61.0	58.0	1.05	19.8	38	.52	15.6	14.4	1.08
Cover lb. folio																					
25% Rag 65	31.6	31.6	1.00	23.9	18.1	1.32	13.0	11.9	1.09	103	115	0.90	98.0	110	0.89	10.6	14	0.75	8.0	16.2	0.49
25% Rag 50	32.4	30.2	1.07	20.3	15.9	1.28	10.6	8.6	1.23	130	118	1.10	130	148	.88	26.8	55.8	.48	19.6	17.8	1.10
75% Sul, 25% GW	32.8	31.0	1.06	22.4	18.5	1.21	10.6	9.3	1.14	82	106	.77	114	120	.95	29.8	44.6	.67	12.8	17.8	.72

TABLE 2

Grade	Mullen 50%	Mullen 65%	Mullen Ratio	Tensile Machine Direction 50%	Tensile Machine Direction 65%	Tensile Machine Direction Ratio	Tensile Cross Direction 50%	Tensile Cross Direction 65%	Tensile Cross Direction Ratio	Tear Machine Direction 50%	Tear Machine Direction 65%	Tear Machine Direction Ratio	Tear Cross Direction 50%	Tear Cross Direction 65%	Tear Cross Direction Ratio	Fold Machine Direction 50%	Fold Machine Direction 65%	Fold Machine Direction Ratio	Fold Cross Direction 50%	Fold Cross Direction 65%	Fold Cross Direction Ratio
Bond 20 lb. folio																					
70% Rag	41.8	39.6	1.05	19.4	18.3	1.06	11.7	10.8	1.08	62.0	53.5	1.16	66.0	63.0	1.05	218	452	.48	111	255	0.44
50% Rag	42.8	42.2	1.02	21.0	19.1	1.10	11.8	9.8	1.21	53.0	49.5	1.07	55.0	61.0	.90	385	964	.40	220	169	1.00
40% Rag	39.8	41.8	.95	19.3	16.4	1.17	11.5	10.9	1.05	62.0	62.5	.99	62.0	65.0	.95	159	716	.22	145	259	.56
25% Rag	35.0	34.4	1.02	22.8	16.9	1.35	12.2	8.5	1.43	39.0	55.5	.70	72.0	57.0	1.26	217	451	.48	123	120	1.03
35% Rag	35.2	34.8	1.01	19.9	17.4	1.14	9.5	9.0	1.05	64.0	48.0	1.33	62.5	61.0	1.03	129	198	.65	61	70	.87
100% Sul	24.4	25.2	.97	16.3	16.7	.98	6.9	5.6	1.23	40.0	34.0	1.18	35.0	40.5	.86	42	65	.65	23	14	1.64
90% Sul	23.8	24.6	.97	15.3	14.4	1.06	8.7	9.1	.96	46.0	34.5	1.33	41.0	39.0	1.05	18.9	23	.81	31	69	.45
10% Soda	...	...	...	...	...	...	...	...	...												
Ledger 28 lb. folio																					
100% Rag	...	64.6	...	...	26.4	...	...	15.2	...	...	121	...	...	124	...	...	...	...	...	556	...
80% Rag	...	50.4	...	...	23.4	...	...	13.3	...	...	111	...	...	115	...	...	1,279	...	...	364	...
60% Rag	57.2	56.8	1.01	26.5	23.6	1.12	15.0	14.3	1.05	95.0	91.5	1.04	97.5	102	.95	453	1,068	.43	300	409	0.73
40% Rag	...	37.6	...	...	17.5	...	...	10.0	...	...	65.0	...	...	64.5	...	...	38	.43	...	51	...
25% Rag	35.6	36.2	.98	21.5	19.9	1.08	13.4	12.3	1.09	74.5	78.0	.95	79.0	89.5	.88	50	170	.30	59	158	.37
100% Sul	38.6	39.6	.98	21.9	21.6	1.02	13.1	12.4	1.06	88.0	82.0	1.07	89.0	86.5	1.03	99	285	.35	154	241	.64
Writing 24 lb. folio																					
65% Rag	25.2	23.8	1.06	13.9	12.6	1.10	8.6	7.7	1.12	53.5	55.5	.96	64.0	54.5	1.17	8.0	8.8	.91	8.2	12.2	0.67
50% Rag	26.8	27.2	.99	13.3	12.9	1.03	9.3	8.3	1.12	59.5	59.0	1.01	59.5	58.0	1.03	13.8	18.6	.74	14.4	24.4	.59
15% Rag	26.8	25.2	1.06	16.8	15.6	1.08	9.3	7.3	1.28	46.0	55.0	.84	52.0	59.0	.88	20.2	51.8	.39	28.8	31.2	.92
90% Sul	24.8	24.6	1.01	16.4	14.6	1.12	8.5	6.4	1.32	46.0	53.0	.87	51.5	54.5	.94	14.0	26.2	.53	14.4	15.4	.93
10% Soda	...	...	...	...	...	...	...	...	...												
Book 80 lb. folio																					
100% Sul	27.4	31.4	.88	18.6	19.0	.98	8.2	7.7	1.07	86.0	102.5	.84	83	111	.76	159	246	.65	50	25	2.0
35% Rag, 65% Sul	21.0	20.0	1.05	13.3	12.4	1.07	6.2	5.1	1.22	77.0	81.0	.95	79	85.5	.92	13.6	15.8	.86	5.2	5.4	.96
30% Soda, 70% Sul	18.4	18.0	1.02	12.0	10.7	1.12	7.6	5.5	1.29	55.0	50.0	1.10	65	57.0	1.14	2.6	3.2	.81	2.6	3.6	.72
Cover lb. folio																					
25% Rag 100	54.2	50.2	1.09	32.0	27.0	1.19	21.7	18.5	1.17	202	266	.76	234	226	1.04	38.4	87.0	.44	63.4	73.6	0.87
25% Rag 65	36.2	32.4	1.12	21.4	17.3	1.23	11.0	9.6	1.15	126	149	.65	157	134	1.17	50.2	50.4	1.0	15.2	16.4	.92
75% Sul, 25% GW	37.0	36.8	1.01	23.7	19.5	1.22	14.5	11.9	1.22	149	180	.83	168	167	1.01	59.2	70.8	.84	41.4	30.0	1.38

favor of 50 per cent relative humidity where the paper itself and not the glue is folded. For determining the brittleness of paper by means of the folding test it would seem that 50 per cent relative humidity would be most suitable.

Taking the test individually and comparing 50 per cent with 65 per cent relative humidity, the results are as follows.

MULLEN TEST. As a means of comparison of the result of change in humidity from 50 to 65 per cent relative humidity the ratio of the average of five tests at 50 per cent to the average of five tests at 65 per cent was figured for each sample of paper tested. (Table 4.)

TABLE 4

Average of Ratio 50%/63%, Mullen

Wt. lb.*	Bonds	Ledgers	Covers	Books	Writings
16	1.03	....	....	....	....
20	1.00	....	....	....	.97
24	1.02	1.01	....	....	1.03
28	....	.99	....	....	....
32	....	.99	....	....	....
50	....	....	1.07	....	....
60	....	....	1.07	....	....
65	....	....	1.00	1.06	....
80	....	....	1.09	.98	....
100	....	....	....	....	....

*Note—Bonds, Ledgers and Writings—size of sheet based on 17 x 22. Covers, 20 x 26. Books, 25 x 38.

The average ratio for seven grades of bonds of three different weights; three grades of covers of two weights; three grades of books of two weights and four grades of writings of two weights, is given in the tabulation for each weight. (Table 4.) From these results it will be seen that the average ratios vary from 1.00 in the case of the bonds, ledgers and writings to 1.08 in the case of covers, indicating a maximum increase of 8 per cent of the value of the test in the case of covers. Inasmuch as the tests, with the exception of the covers, vary between themselves fully as much as any increase obtained we can safely say in general that the change from 65 to 50 per cent relative humidity exerts comparatively no effect.

Average of Five Tests

TENSILE TEST. The ratios of the average of five tests at 50 per cent relative humidity to the average of five tests at 65 per cent relative humidity each ratio representing the average of several grades of each classification of paper are given in Table 5.

TABLE 5

Average of Ratio, 50%/65%, Tensile

Wt. lb*	Machine Direction Bonds	Machine Direction Ledgers	Machine Direction Cover	Machine Direction Book	Machine Direction Writings	Cross Direction Bonds	Cross Direction Ledgers	Cross Direction Cover	Cross Direction Book	Cross Direction Writings
16	1.03	...	...	...	...	1.06	...	...	...	...
20	1.12	...	...	...	1.20	1.14	...	...	...	1.16
24	1.11	1.05	...	...	1.08	1.12	1.11	...	...	1.21
28	...	1.07	...	...	...	...	1.07	...	...	...
32	...	1.04	...	...	...	...	1.07	...	...	...
50	...	...	1.27	...	...	...	...	1.15	...	...
60	...	...	...	...	...	...	...	...	1.25	...
65	...	...	...	1.14	...	...	...	1.18	...	...
80	...	...	1.21	1.06	...	...	...	...	1.19	...
100	...	...	...	...	...	...	...	...	...	...

*Note—Bonds, Ledgers and Writings—size of sheet based on 17 x 22. Covers, 20 x 26. Books, 25 x 38.

TABLE 3

Grade	Mullen 50%	Mullen 65%	Mullen Ratio	Tensile Machine Direction 50%	Tensile Machine Direction 65%	Tensile Machine Direction Ratio	Tensile Cross Direction 50%	Tensile Cross Direction 65%	Tensile Cross Direction Ratio	Tear Machine Direction 50%	Tear Machine Direction 65%	Tear Machine Direction Ratio	Tear Cross Direction 50%	Tear Cross Direction 65%	Tear Cross Direction Ratio	Fold Machine Direction 50%	Fold Machine Direction 65%	Fold Machine Direction Ratio	Fold Cross Direction 50%	Fold Cross Direction 65%	Fold Cross Direction Ratio
Bond 24 lb. folio																					
70% Rag	57.6	54.4	1.05	23.5	21.6	1.09	14.2	13.0	1.09	89.5	88.0	1.02	97.0	95.0	1.02	1,222	1,350	.91	817	596	1.37
50% Rag	47.6	45.6	1.04	23.0	20.5	1.12	14.5	12.6	1.15	72.5	74.5	.98	75.5	78.0	.97	437	649	.67	236	424	.56
40% Rag	44.4	46.0	.97	22.1	19.2	1.15	12.8	12.0	1.07	82.0	83.0	.99	93.0	92.0	1.01	235	444	.53	141	219	.64
25% Rag	43.6	42.6	1.02	22.4	20.6	1.09	11.8	11.3	1.04	63.5	71.5	.89	73.0	75.0	.98	205	504	.41	170	160	1.06
35% Rag	38.0	38.4	.99	22.3	19.8	1.13	11.7	10.3	1.13	62.5	68.5	.91	65.5	68.5	.96	64	169	.38	60	72	.83
100% Sulp.	31.4	29.0	1.08	20.1	18.5	1.09	9.0	7.8	1.15	49.5	41.0	1.20	53.5	44.5	1.20	33	46	.72	28	31	.90
90% Sul, 10% Soda	27.6	28.0	.99	17.2	16.0	1.07	11.8	9.8	1.20	64.0	56.5	1.13	57.5	56.0	1.02	12.6	21.4	.59	33.4	44.8	.75
Ledgers 32 lb. folio																					
100% Rag	...	66.0	...	...	28.6	...	...	15.4	...	...	130.0	...	...	129.5	...	...	...	...	...	...	...
80% Rag	...	56.6	...	...	21.4	...	...	14.8	...	...	149.5	...	...	143.5	...	...	847	...	...	483	...
60% Rag	52.0	53.6	.97	26.4	24.1	1.09	15.2	14.9	1.02	82.0	81.0	1.01	91.0	92.0	.99	52	175	.30	84	132	.64
40% Rag	44.6	45.0	.99	21.0	20.4	1.03	13.9	12.3	1.13	73.5	80.0	.92	97.0	86.0	1.13	36.8	112	.33	112	61	1.83
25% Rag	35.4	35.2	1.01	21.2	21.0	1.01	14.2	13.4	1.06	85.0	89.0	.95	95.5	82.0	1.16	21	54	.39	42	67	.63

The tensile tests at 50 per cent relative humidity show an appreciable increase in both machine and cross directions, ranging from 3 to 27 per cent of the value of the test, the higher values being obtained in most cases on book, cover and writing papers.

TEARING TEST. Similar ratios, each representing the average of several grades of paper in each classification, were worked out for the tearing tests with the following results. (Table 6.)

TABLE 6
Average of Ratio, 50%/65%, Tear

	Machine Direction					Cross Direction				
Wt.lb*	Bonds	Ledgers	Cover	Book	Writings	Bonds	Ledgers	Cover	Book	Writings
16	1.29	...	...	...	...	1.23	...	...	...	...
20	1.11	...	...	...	0.98	.97	...	...	...	1.10
24	1.02	1.07	...	...	.92	1.02	1.00	...	...	1.00
28	...	1.02	...	...	...	...	.95	...	...	...
32	...	0.96	...	...	...	...	1.09	...	...	...
50	...	...	1.00	...	...	...	...	...	...	...
60	...	...	...	...	...	...	...	...	...	...
65	...	...	0.75	0.97	...	...	...	0.91	0.99	...
80	...	...	...	.96	...	...	...	1.07	1.03	...
100	...	...	...	...	...	...	...	...	...	...

*Note—Bonds, Ledgers and Writings—size 17 x 22. Covers, 20 x 26. Books, 25 x 38.

The agreement here between different papers is not so good, the ratios varying from 1.29 in the case of 16 pound bonds to 0.75 in 75 pound covers. The cross direction tear, however, with the single exception of the 16 pound bonds shows a maximum variation of only 10 per cent of the value of the tests. Due to the fact that some of the papers are lower in tear at 65 per cent relative humidity than at 50 per cent relative humidity and some higher, no conclusion can be drawn and consequently a change in humidity of from 65 to 50 per cent could not be recommended as far as the tearing test is concerned.

FOLDING TEST. The folding tests, as was expected from previous work along this line, show a decided lowering with decreasing relative humidity, the ratio varying over a range of 0.34 to 1.25. (Table 7).

TABLE 7
Average of Ratio 50%/65%, Fold

	Machine direction					Cross direction				
Wt.lb*	Bonds	Ledgers	Covers	Book	Writings	Bonds	Ledgers	Covers	Book	Writings
16	0.68	...	...	...	...	0.96	...	...	...	...
20	.53	...	...	...	.42	.70	...	...	...	0.70
24	.60	.81	...	...	.64	.87	.87	...	...	.78
28	...	.36	...	...	...	...	.58	...	...	...
32	...	.34	...	...	...	...	.64	...	...	...
50	...	...	0.63	...	...	...	...	...	...	...
60	...	...	...	...	...	...	...	...	...	...
65	...	...	.76	.78	...	...	...	.77	1.25	...
80	...	...	...	.77	...	...	...	.89	.84	...
100	...	...	...	...	...	...	...	...	...	...

*Note—Bonds, Ledgers and Writings—size 17 x 22. Covers, 20 x 26. Books, 25 x 38.

In the majority of tests the folding was higher at 65 per cent relative humidity than at 50 per cent, the increase being greater in paper tub sized with glue than papers engine sized or tub sized with starch.

As previously stated, the increase in fold of papers tub sized with glue at 65 per cent as compared with those of 50 per cent is due to the glue which becomes more flexible with the increased moisture present and, consequently, the fold of the glue, rather than the paper itself, is obtained; the lower the per cent moisture present the less value given to the glue. Of all the physical tests made the fold is the only test that would warrant a change from 65 to 50 per cent relative humidity.

Found Unsatisfactory in Trade

Instances have occurred in the American Writing Paper Company laboratory where two papers have been tested at both 50 and 65 per cent relative humidity and passed, yet have been unsatisfactory when used in the trade. One example recently was with some envelope paper that was cracking on the folding machines. The envelope folding machines were not operated under constant humidity controlled conditions for twenty-four hours and when the relative humidity went down below 40 per cent the paper cracked. Testing the paper at both 50 and 65 per cent relative humidity showed a fold very nearly the same on both the satisfactory and unsatisfactory paper, averaging around 50 folds at 50 per cent relative humidity. Upon testing this same paper at 35 per cent relative humidity a sharp line could be drawn between the two lots, the unsatisfactory folding around 5X while the satisfactory was 40. Testing this papes at 35 per cent relative humidity showed very quickly when the paper might give trouble. The source of this trouble lay in the fact that the brittleness increased rapidly with decreasing humidity and that both 50 and 65 per cent relative humidities were too high to show any difference that could not be taken for an experimental error in testing the unsatisfactory and satisfactory paper.

A Time Saver

Contrary to recent articles we have never found a paper that we would pass at 65 per cent relative humidity and condemn at 50 per cent relative humidity. It is true that the values are much lower at 50 per cent and the differences between machine and cross directions not so marked but the grading of several papers would be in the same ratio. Having lower results at 50 per cent relative humidity is a time saver, as more tests can be made in a given time. The length of time required to make tests on the folding machine has always been a disadvantage in the test.

From work done in our laboratory, it does not seem to make any material difference whether the paper is tested at 50 per cent or 65 per cent relative humidity on the folding machine. If a definite fold specification is to be met a definite fold has to be determined for the engine sized paper. When this figure has been determined, whether at 50 or 65 per cent, it makes little difference as the increase through the tub will be the same and the paper wil. more than meet the desired specifications if the engine size fola has been properly determined. Work on engine size folds on high grade papers has proved that this figure must be determined for each grade of rags and for each grade and amount of tub sized used. We are convinced that the real value of the folding test is found in these figures so that the manufacturer is not concerned whether paper is finally tested at 50 of 65 per cent relative humidity.

The average ratios for all grades were averaged for all weights and the resulting averages classified acording to the types of papers with the result shown in Table 8.

TABLE 8
Average Ratios, 50%/65%, of all Grades and Weights

		Tensile		Tear		Fold	
	Mullen	M	C	M	C	M	C
Bonds	1.02	1.09	1.11	1.14	1.07	0.60	0.84
Ledgers	1.00	1.05	1.08	1.02	1.01	.50	.70
Book	1.02	1.10	1.22	.97	1.01	.77	1.04
Writing	1.00	1.14	1.18	.95	1.05	.53	.74
Covers	1.13	1.24	1.17	.87	.99	.70	.83
Blueprint	...	...	...	...	...	.47	.63

These figures are a grand average compiled from the following number of tests.

	Grades	Weights	Number Tests per Grade	Total Number Tests
Bonds	7	3	5	105
Ledgers	4	3	5	60
Book	3	2	5	30
Writings	4	2	5	40
Covers	3	2	5	30
Blueprint	3	2	15	180

Further data on folding tests made at 50 and 65 per cent relative humidity on three grades of blueprint are given in Table 9.

Average of Fifteen Tests

The grades of blueprint paper were tested for folding endurance at 50 per cent and 65 per cent, and the ratio of the 50 to the 65 per cent was figured in Table 9. These data represent the average of fifteen tests in each direction.

A much closer agreement between individual results was obtained on this blueprint paper than in the case of the other papers tested, the averages of the cross direction tests of 0.63, 0.66, and 0.59 being particularly close. This closer agreement is doubtless due to the

larger number of tests which were made on these papers and the closer manufacturing control maintained on blueprint papers.

It must be borne in mind that these figures were averaged without regard for the principles of precision in order to avoid any suggestion of hand picked results and to present the figures in their worst light. Any general conclusions drawn from these figures would, therefore, be applicable to the average case.

TABLE 9—COMPARISON OF FOLDING TEST DATA ON BLUE-PRINT PAPER

		Tests Run at 50% Relative Humidity				Tests Run at 65% Relative Humidity			
		Mach.	Cross	Standard at 50%	Ratio M	Mach.	Cross	Standard at 65%	Ratio C
100% Rag 16 lb.—Sample	1	424	339	300	0.30	1440	554	300	0.77
	2	430	382	...	0.55	790	611	...	0.63
	3	400	270	...	0.40	1009	479	...	0.56
	4	560	272	...	0.60	928	500	...	0.54
					Av. 0.46				Av. 0.63
100% Rag 24 lb.—Sample	1	504	447	400	0.67	750	660	500	0.68
	2	186	244	...	0.35	536	496	...	0.49
	3	548	404	...	0.54	1020	502	...	0.80
	4	544	354	...	0.60	916	538	...	0.66
					Av. 0.54				Av. 0.66
50% Rag 24 lb.—Sample	1	147	164	100	0.35	418	259	150	0.63
	2	72	115	...	0.43	167	155	...	0.74
	3	82	128	...	0.50	165	192	...	0.67
	4	87	89	...	0.29	306	192	...	0.46
	5	70	90	...	0.41	170	145	...	0.62
	6	72	169	...	0.33	213	226	...	0.75
	7	38	75	...	0.23	168	129	...	0.58
	8	23	58	...	0.30	76	119	...	0.49
	9	40	45	...	0.21	190	135	...	0.34
	10	77	75	...	0.34	225	121	...	0.62
					Av. 0.34				Av. 0.59

NOTE.—This data represents the average of 15 tests in each direction.

Summary

MULLEN TEST. The Mullen test changes but slightly with increase in relative humidity from 50 to 65 per cent tending to increase very slightly with decreased humidity.

TENSILE TEST. The tensile test shows a general increase of about 15 per cent on all grades of paper on decreasing the relative humidity from 65 to 50 per cent.

The machine tear shows an increase in the case of bonds and ledgers of 8 per cent and a decrease in the case of books, covers and writings of about 10 per cent.

FOLDING TEST. The folding test shows a decrease varying from 0 to 50 per cent, most of the figures, however, falling within the range of 20 to 30 per cent on the cross direction fold.

Still an Open Question

From these results, there does not seem to be any decided advantage in 50 over 65 per cent relative humidity except as a time saver in the folding test when 50 per cent relative humidity is used. Whether this is a sufficient reason for changing our present standard is still an open question. From our own experience we have found our most worth while results at 35 per cent relative humidity. At the latter humidity we have the amount of moisture in the paper as it is most commonly shipped from the paper mill and these figures would give the manufacturer a clear idea of his product. For control purposes the manufacturer prefers low humidities.

Effect of Acetic Acid On Animal Glue

By G. W. Sullivan*

One of the many questions which comes up before the manufacturer of gummed kraft sealingtape, is the acquisition of some ingredient to add to the regular glue, which will improve its quick adhering quality. Due to market conditions in this branch of the paper industry, the manufacturers find it necessary to use the cheaper grades of glue, that is, those of lower jelly strength.

The usual grade for sealing-tape tests, between 1¾ and 2 by Peter Cooper's standards, usually very close to 1⅞. The glue used is almost invariably bone glue, made from beef, horse, sheep, and chicken bones. The better grades are fairly free from odor, but many of the socalled green bone glues have a very characteristic odor. These glues are in general quicker than the sweeter glues, made from bleached bones, sometimes for the reason that the sweeter glues are offered at a low price, due to some slip in manufacturing, or to the process or glue stock itself.

Glues Vary Greatly

The glue of different manufacturers varies greatly in working qualities, and even from the same source, the variation in the bones themselves. For this reason, it is particularly hard to lay down any hard and fast rules, as to procedure. It is generally recognized that the amount of acid present has a decided effect on the working qualities of the glue. There is always some acid present, due to the manufacturing process of the glue itself. This may be present as sulphuric, sulphurous or possibly other acids.

Probably the greatest changes of the glue occur between Ph = 1½ and P_h = 4 on the acid side. The P_h value is obtained by taking pure water as having a P_h value of 7 and obtain by logarithms a value that represents the number of times greater the acidity is than that of water. For example, an acidity 1000 times greater than water would $C_h = 1000 \times 107 = 3-7 = -4$ or H = 4 where C_h is the Hydrogen ion concentration. Accordingly

P_h Value	
1............	1,000,000 times the H (or OH) concentration of pure water
2............	100,000
3............	10,000
4............	1,000
5............	100
6............	10
7............	0 pure water.

Now, since the greatest changes are noted between P_h = 1½ and P_h = 4, let us convert this into terms of normality of the acid to be added which in this case is to be Acetic.

(1) Normality of Acetic Acid	Equivalent P_h Value.
1.0	2.37
0.1	2.87
0.01	3.37
0.001	3.87

(1) According to Michaelis.

Of course Acetic Acid is relatively slightly dissociated and to obtain a P_h value of 1.87, it would be necessary to use n/10 acetic acid. To use as much as this seemed to me impractical from the standpoint of cost, odor, etc., so for these tests comparisons were made using n/1, n/10, n/100 and water.

Ten Grades of Glue Used

Ten different grades of glue were used from different manufacturers, who regularly supply the gummed tape trade. The effect of the different concentrations on the water taking or swelling qualities of the glue, viscosity, jelly and general observations were taken. The proceedure was carried out to nearly as possible to mill practice, and the machine trials were made under regular mill conditions. . Three different samples were tried on the machines.

By noting the amount of acid required for the different solutions, it will be readily seen that even to obtain a Ph 2.37 requires 60.04 grams of Acetic Acid to the liter, the other concentrations in the same ratio.

*Member TAPPI. Holyoke Paper Products Co., Holyoke, Mass.

The method employed was to make up solutions n/1, n/10 and n/100, soak the glue two hours and bring gradually in a water bath with constant stirring to 150° F, holding it there until the glue was thoroughly cooked. Since the glue is run on the machines at between 130° and 140° F, the viscosity readings were taken in the same range. The concentrations were all the same, that is, 50 grams of glue to 50 grams solvent.

Our mill practice is to make the glue about 50 per cent depending entirely of course on the jelly strength of the glue, so as to keep the viscosity constant, for the same grade, and weight of paper; varying, of course somewhat according to the paper and also as to whether the coat is to be applied by running the paper between the gumming rolls, or over the top roll. We use both methods. Below is a representative formula.

Glue........................	140 lb.
Glucose.....................	10 lb.
Water.......................	125 lb.

The glue is soaked 2 hours in water, about 65° F until it has taken as much water as it will. The kettles are copper water jacketed, heated by steam with temperature control set at 150° F, to prevent overheating. The machine itself is equipped with a heater to keep the glue in the pan at a uniform temperature, and therefore a uniform viscosity, since any change in viscosity is immediately shown in a variation in the cost. Too heavy a coat not only means a monetary loss but makes the paper more brittle, slows down production, while too light a coat may mean an unsatisfactory sealing medium.

With glue costing 8¼ cents and paper 6 cents per pound and since a 35 pound gummed kraft is about ⅓ glue, it is very essential that the coat remain as uniform as possible.

I am mentioning this phase because from the few tests I made, the addition of the acid has an effect of making the cooked glue a little less susceptible to temperature than the straight water glue. I will give here only the very apparent facts which I learned from these tests as I realize I have only scratched the surface, so as to speak.

The solvent containing the Acetic acid had a very decided effect on the amount of water the glue would take in swelling, also that the lower the jelly strength the more marked this difference was. It also in the same way affected the speed in which the glue takes the water. This was particularly noticeable in the machine runs. Of course, only relative small quantities were run in each machine trial.

The viscosity change is very apparent in the low test glues, and in no case did I notice an increase in viscosity even with a 1½ test glue, while with a regular 1⅞ test glue, the decrease was very apparent.

The jelly test was affected exactly the same as the viscosity.

There is no doubt but that the acid adds a great deal to the keeping qualities of the glue. With one particular glue which spoiled in water in four (4) days, an n/10 product kept nine (9) days before any strong odor was noticeable.

The presence of the acid in the mix in my opinion adds considerable to the quick adhering qualities of the tape. A sample of tape three months old had apparently not changed any. There is a possibility that this will enable us to use glues containing more grease than otherwise. The value of this of course will depend on the ratio in value of the grease and glue markets.

It is very difficult to make comprehensive comparisons, because of the lack of standards in the trade. For instance, one consumer uses as a standard test that the glue shall adhere to a container in 20 seconds, but apparently does not take into consideration the amount of water applied to the gum, the temperature of the water, hardness of the water or the great variation in finish and sizing of the board that the tape is to be used on.

While I have been dealing entirely here with tape glues, this same thing holds good to a more marked degree in stay paper. In the manufacture of stay paper, a higher grade of glue is used, and consequently a better product is the result. But there are no terms in our line whereby a large consumer can order by a particular designation, exactly what is most satisfactory to meet his particular conditions, and it is costing our branch of the paper industry, good money every year because we cannot say that a certain delivery is up to the standard ordered, and therefore the only recourse is for the chemist or mill man to go into that particular factory if he can get in, and determine the trouble.

The paper manufacturer has his pop test, stretch, tear, etc., all with a definite value, but the tape manufacturer has nothing to measure the efficiency of his contribution of the finished product.

Report of Heat, Light and Power Committee

By Wm. Cronkite, Chairman

The Committee on Heat, Light and Power feel that it has gotten together a very interesting report which consists of papers on "The Burning of Wood Refuse." "Moisture Meter and Water Removal." "Steam, Prime Movers for the Paper Mill."

These papers will be presented by the authors accompanied by lantern slides and we hope that all members who are interested in these three vital questions will make it a point to be in attendance at the sectional meetings and take part in the discussion.

The papers show that a great amount of care has been exercised in compiling them and I am sure that all of the members would benefit materially by attending the meetings for a great many pertinent questions are asked and answered in the discussion relative to these papers that do not show in the printed report.

I hardly believe it necessary to emphasize the importance of the Heat, Light and Power Committee to the members. I know of no three things that are more vital in the paper industry than heat, light and power, and the men who have given time and thought to prepare these three papers should have the courtesy of a full attendance when the papers are delivered.

Perhaps it would not be amiss at this time to mention to the members some of the developments that have taken place during the past year that are of interest to the industry.

The generation of steam at high pressures and the use of high pressure turbines which will give a back pressure of 100 pounds or more for cooking, and other process work.

The steam accumulator and the use of dry stack gases for preheating the air to the furnaces or for drying bark and other refuse.

The use of antifriction bearings on different machines used in the industry.

The acceptance by the industry of the electric steam boiler as an outlet for surplus hydroelectric energy.

The application of direct electric heat for paper drying.

The use of economizers of different manufacture for recovery of heat in the machine room.

The great interest that is shown in the moisture meter or some similar device that will record and control the amount of moisture in the sheet of paper as it passes over the machine without the necessity of breaking down the sheet.

The greater interest in power factor correction among paper mill engineers is probably worthy of mention and with it the increasing demand for synchronous type of motors on jordans and beaters where heretofore squirrel cage or slip ring motors were thought necessary.

Analysis of Bureau of Standards' Brittleness Tester

By H. U. Kiely[1] and C. E. Apelgren[2]

In April, 1923, the Bureau of Standards brought out an instrument for determining the brittleness of paper (See A Quick Test to Determine the Brittleness of Paper, by P. L. Houston, Tech. Asso. Papers Series VI, 1923). This consisted of a Mullen Paper Tester and a miniature calender stack of two steel rolls, 9¾ inches long and 2 inches in diameter. The bottom roll of the calender was motor driven. The top roll weighed 7.8 pounds.

For the test, each sheet of paper was creased in both machine and cross directions by the miniature calender stack, then burst on the crease by the Mullen Tester. The decrease in the strength of the paper is taken as the per cent brittleness.

Comparison on Several Grades of Bonds

A comparison was made on several grades of bond paper, ranging from 100 per cent rag to 100 per cent wood. For the first test the paper was run once through the miniature calender stack in both machine and cross directions, using a 5 pound roll, a 10 pound roll and a 15 pound roll. In the second test the paper was run twice through the miniature calender stack using the 5, 10 and 15 pound rolls.

After this work had been completed a standard procedure was adopted for further testing and various grades of ledgers, writings, index bristols and envelope papers were tested. It was the intention to cover as many grades of paper as possible so that the value of the instrument could be found from conclusions not based on any one grade.

PER CENT DECREASE IN BURSTING STRENGTH OF BOND PAPER DUE TO CREASING WITH VARIOUS WEIGHT CALENDER STACKS

	Wt. Roll	Mullen Test	Single Crease Mach. Dir.	Single Crease Cross Dir.	Double Crease Cross Dir.	Creased 5X: M	Creased 5X: C	Creased 25X M	Creased 25X C
Grade	lb.	pts.	%	%	%				
100% Rag	5	60.0	0.8	3.8	6.2				
	10	59.6	1.7	4.5	5.2				
	15	59.8	0.0	4.7	8.0				
50% Rag	5	36.4	4.1	32.4	36.8				
	10	35.6	10.1	36.5	37.1				
	15	37.8	4.4	33.8	34.1				
25% Rag	5	30.7	2.9	26.4	23.8				
	10	30.9	3.9	27.8	25.9				
	15	30.8	2.3	31.5	34.8	2.6	31.5	7.0	34.7

These percentages represent the average of 10 tests taken at a relative humidity of 65 per cent.

Largest Loss After First Folding

It was found that the per cent loss in the machine direction was so low in comparison with the per cent loss in the cross direction that it would not be necessary to test the paper in both directions. As shown in P. L. Houston's report and checked in this laboratory, the per cent loss in the machine direction was usually less than 5 per cent. It did not seem materially to lower the per cent brittleness by increasing the number of times the paper was run through the miniature calenders. The largest loss came after the first folding under the roll.

As regards the weight of the miniature calender roll, there does not seem to be a very large increase in the percentage loss whether a 5, 10 or 15 pound calender roll were used. For the additional work done on this method of determining brittleness, the 5 pound roll was used and the paper given a double crease in the cross direction. This procedure has been adopted as standard for this laboratory. This test has been designated as Pop Fold loss.

From these tables it is obvious that brittleness, as measured by the Pop Fold test, does not tie in with our Schopper Folding tests.

[1]Member TAPPI. In charge Department of Technical Control American Writing Paper Co., Holyoke, Mass.
[2]Junior member TAPPI. Chemist American Writing Paper Company, Holyoke, Mass.

COMPARISON OF MULLEN, RAG CONTENT, CROSS FOLD AND POP FOLD ON VARIOUS GRADES OF BOND PAPERS AT 65% RELATIVE HUMIDITY

Rag %	Mullen pts.	Loss (Pop Fold) %	Schopper Fold Cross Dir.
90	60	3.8	1680
75	53	14.3	665
85	50	9.8	618
85	48	13.7	874
100	45	9.9	1611
85	44	11.1	801
60	44	22.9	430
65	40	13.2	480
75	38	6.3	704
50	37	24.2	96
85	37	11.2	425
25	34	32.6	61
35	31	26.4	54
None	29	32.7	31
None	29	32.2	68
35	28	35.2	14
None	27	26.8	196
30	27	27.1	30
25	25	40.7	15
None	20	26.0	15

Only a general statement can be made from this data. All high grade bonds should show a brittleness test of less than 15 per cent, medium grade bonds around 25 per cent loss and sulphite bonds around 30 per cent. Bond papers could not be graded on this test. It seems to give a new method for comparing papers of the same grade.

Loss in Ledger Papers

The following data shows the per cent loss on creasing or pop fold Ledger Papers.

Rag %	Mullen pts.	Loss (Pop Fold) %	Schopper Fold Cross Dir.
100	57	16	1100
80	48	22	400
60	45	34	200
40	35	35	90
25	33	42	50
0	29	34	40

The following data shows the per cent loss on creasing on the same grade of paper.

Rag %	Mullen pts.	Loss (Pop Fold) %	Schopper Fold Cross Dir.
50	37	29	36
	39	31	49
	44	28	46
	43	29	48
	39	28	82

No Relation Between Fold and Brittleness

These tests seem to show that there is no relation between fold and brittleness. A paper may have a good fold and a low brittleness and vice versa.

COMPARISON OF MULLEN, FOLD AND POP FOLD ON ENVELOPE PAPERS

Rag %	Mullen pts.	Loss (Pop Fold) %	Schopper Fold Cross Div.
None	34.4	23.0	21
	22.9	34.0	6
	29.2	34.0	26
	31.3	34.8	28
	26.6	35.4	30
	39.9	37.8	34
	24.6	38.6	11

COMPARISON OF MULLEN FOLD AND POP FOLD ON INDEX BRISTOLS

Rag %	Mullen pts.	Loss (Pop Fold) %	Schopper Fold Cross Div.
80	90	40.2	1000
None	58	50.2	25

Contrary to the work by P. L. Houston, (loc. cit.) there does not seem from these tests to be a relation between the Pop Fold test or Mullen after creasing and any of the other physical tests. Paper could not be corerctly graded upon this alone. A high Pop

Fold loss may indicate a short well closed sheet or it may indicate an over sized and, therefore, a brittle sheet. On high grade Bonds and Ledgers the difference between Mullen readings before and after creasing is so small that the accuracy of the test is questioned. The loss may be due to the formation of the sheet or to the tester itself and not to any brittleness in the sheet. We have proved that papers which to all outward appearances were widely different in brittleness did not show this difference on this tester.

It may be possible that more interesting results might be obtained at a lower humidity. These tests were all run at 65 per cent relative humidity.

The weight of the roll does not seem to materially change the per cent loss on creasing. From this work it is recommended that either a 5 or a 10 pound roller be used and the paper creased twice in the cross direction. After the surface has been broken by one creasing, further creasing has little or no effect on the test.

Economy of Lime Reburning

By G. K. Spence*

Since it is the unanimous conclusion of all pulp manufacturers, who have given the question any study, that the most feasible method of reclaiming lime sludge from the alkali room, is to reburn and use it over again in the system, the writer has considered this phase only.

Lime reburning has been considered by pulp manufacturers from time to time for a number of years, but it has not been worked out successfully until in the past six years.

Hammond Lime Reclaimer Introduced in 1890

As early as 1890 the Hammond Lime Reclaimer was introduced. This consisted of two inclined rotaries, each 40 feet long and 4½ feet in diameter. The lime sludge was fed to the upper rotary by means of a screw and this rotary was heated by the hot gases from the lower rotary which hot gases also surrounded the jacketed screw before passing up the stack. The dry lime from the upper rotary dropped into the lower one through which it passed in the opposite direction and the burned lime was discharged at the firebox end. This lime was conveyed to the alkali room and used to causticize more soda. The capacity of this outfit was only about 5 or 6 tons of recovered lime per day.

About 1908 two different engineers were advocating propositions for reburning lime and while they differed somewhat in minor details the ideas were essentially the same. It was recommended to use a rotary 100 feet long and 7 feet in diameter which was heated by means of producer gas. The sludge was taken directly from the alkali pans to the rotary, without first going to a filter press to remove the excess moisture. Even when lime cost a little less than $4 per ton at the mill, the figures given by the advocates of the process showed a profit of $1.80 per ton of lime burned. These figures were based on an installation cost of $30,000 including building, a coal cost of $1.60 per ton, a gas producer efficiency of 86 per cent, and a burning efficiency of 2.5 tons of lime per ton of coal. When presented with these figures some mills attempted lime reburning, but it was later considered unprofitable and discontinued. The reason for this failure to produce profitable results was due to the fact that the gas producers were considerably under 86 per cent efficient, the total installation cost was considerably over $30,000, and due to handling very wet sludge the burning efficiency was nearer 1.5 tons of lime per ton of coal. At this time lime was delivered at the mill for $3.91 per ton, and when everything was considered it was found that the reburning cost was considerably more than this amount.

Taken Up Again in 1918

It was not until 1918 that lime reburning was again taken up and it has made rapid progress during the past six years. At the present time lime reburning is being carried on very successfully by a number of soda and sulphate pulp mills. The method employed, while the details differ some at different plants, is essentially the same wherever it has been introduced.

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The lime sludge in the alkali pans is given three washes by decantation and discharged through a perforated plate into the agitated supply tank for the filter. This supply tank should be sumped if necessary, in order to receive the sludge dumps by gravity. The object of the perforated plate is to remove any stones from the sludge and prevent them from passing to the pump supplying the filter. It is not advisable to wash the sludge less than three times by decantation, due to the fact that if the soda is not well removed, it will have a tendency to fuse with the silica in the lime or brick lining and form rings in the rotary. Some manufacturers, who have ample capacity make as many as four washes by decantation to avoid this trouble.

The sludge is pumped to the continuous filter where the moisture content is reduced to about 40 per cent. The washings from the filter are either used to wash the stack gases, or returned to the alkali room to be used as make-up or sludge washes. The continuous filter is located directly behind the rotary and the sludge cake is fed, by means of a screw, through a water jacketed chute.

Continuous Filter Should Be Used

Owing to the fact that the rotary should have a continuous feed it is essential that a continuous filter be used, as when this equipment is properly installed it requires very little attention. The filter is generally covered with 14 ounce duck filter cloth, but in some mills fine mesh monel metal wire covering is used. The advantage derived from the use of monel wire covering is to eliminate changing of cloths which is necessary at least once each month when using duck covering. When using monel metal covering it is necessary to wash occasionally with weak hydrochloric acid to prevent plugging of the wire cloth and perforations in backing plates with calcium carbonate.

Continuous filters should be selected with ample capacity to do the required amount of work. A 6 x 6 foot filter is large enough for the production of 20 tons of reburned lime, and one 8 x 8 foot is ample for production of 40 tons of reburned lime from a soda pulp mill, but when reburning 40 tons of lime from a sulphate pulp mill it is advisable to use a filter 8 foot diameter and 10 foot face, as the sludge from a sulphate mill will not give up its water as rapidly as that from a soda pulp mill.

Should Furnish Proper Amount of Sluge

For economical burning results a rotary should be selected of such size that the proper amount of sludge can be furnished to it continuously for 24 hours. The most economical results are obtained when the rotary is crowded to its burning capacity at all times. At some mills oversized rotaries have been installed and it has been found advisable to only operate 16 hours out of 24, even when considering the loss of heat due to shutting down and starting up. A rotary 90 feet long and 6 feet in diameter is ample for reburning 20 tons of lime per day, and one 125 feet long and 7 feet in diameter will reburn 40 tons of lime per day.

The rotary is lined with fire brick, the lining being 9 inches thick at the hot end and 6 inches thick at the rear end. It is customary to spray the stack gasses, and return the washings to the

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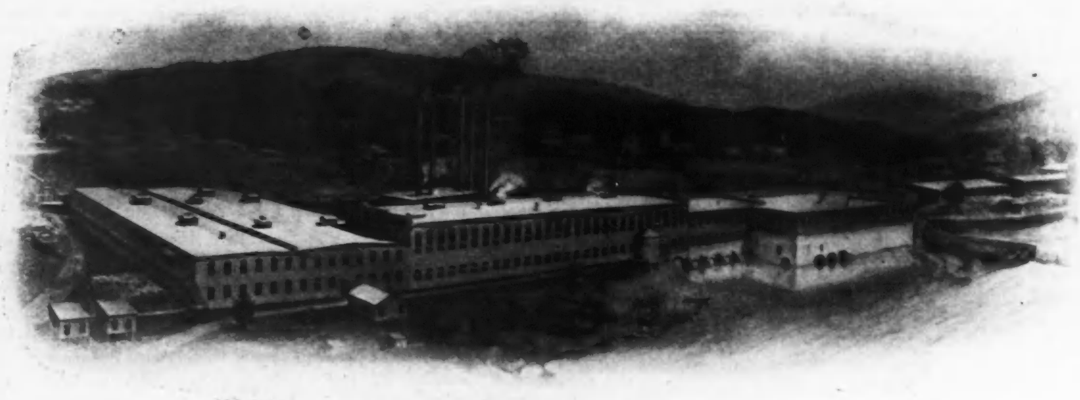

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filter supply tank, otherwise there will be considerable loss of lime up the stack, in addition to a nuisance in the immediate vicinity of the mill.

The temperature of the stack gases varies from 600 to 800 degrees and the draught gauge usually shows from 0.2 to 0.3 inches of water as representing the pull on the rotary.

Proper Fuel for Economical Burning

The most important problem facing the operator of a lime reburning plant today is the proper fuel to use in order to procure the most economical burning results. Most plants at the present time are using producer gas, but as they have, in many cases, been obtaining poor burning economy, other methods of firing are being tried out. Some manufacturers have considered it advisable to discontinue the use of producers and are at present firing with fuel oil. At least two plants are operating successfully with powdered coal, while on the other hand some who tried out powdered coal have discontinued its use and reverted to the producer gas or fuel oil installations. The use of either fuel oil or powdered coal will make a material saving in the installation cost. In addition to this either one of these installations will save labor, as they require very little attention, while with producers it will be necessary to have at least one more man on each tour.

It is the opinion of the writer that the most economical results can be obtained with an installation using powdered coal as a fuel.

From observation of results obtained when burning producer gas it has been found that while a burning efficiency as high as 2 tons of lime per ton of coal has been obtained, there have been figures as low as 1.5 tons of lime per ton of coal, and we cannot safely assume to get better than 1.8 tons of lime per ton of coal.

Fuel oil on a coal basis, figuring 4½ barrels of oil per ton of coal has shown a burning efficiency of from 2½ to 2¾ tons of lime per ton of coal equivalent. When using powdered coal 3 tons of lime can be burned per ton of coal, and results have been obtained some better than this figure. When every step pertaining to the manufacture of pulp is considered, if fuel oil could be obtained at a cost comparable with that of coal, it would be the desirable fuel to use for lime reburning, but there are very few pulp mills so situated that this can be accomplished.

Disadvantages of Certain Fuels

When reburning lime better results are obtained if the flame is carried back into the rotary, and the rotary not heated too much at the firing end. An oil flame is very hot and results in heating the rotary too much at the front end, necessitating relining it more often at this point than when using either producer gas or powdered coal. This is the one apparent disadvantage in the use of fuel oil. On the other hand powdered coal carries the flame back into the rotary distributing the heat more uniformly, and in this respect it is of advantage to use this fuel.

The main disadvantage found in the use of powdered coal is the accumulation of ballast in the burned lime, which very much retards the settling when causticizing soda and washing the sludges in the alkali room. This can be cut down to some extent by passing the sludge through baffled tanks before going to the filter and also by having the slowly moving wings of the agitator shaft in the causticizing tank about 18 inches from the bottom and washing this tank out occasionally. When all is done that can be done there is still a greater accumulation of ballast in the recovered lime when burning powdered coal than by either of the other methods, however, the burning economy is so much better that it will pay to discard some of the washed sludges to keep down this accumulation.

Comparisons

For comparison the following can be considered for different fuel burning installations when using 40 tons of lime in a soda or sulphate mill.

Using powdered coal as fuel and discharging 15 per cent of the sludge from the alkali room into the sedimentation basin in order to keep down the accumulation of ballast:

Lime used in the alkali room		80,000 lb.
Lime sent to the recovery plant		68,000 lb.
Reclaimed lime (90% recovery)		61,200 lb.
Coal consumed (burning efficiency 3 lb. lime per lb. of coal)		20,400 lb.
Cost of coal used at $5 per ton	$51	
Cost of fresh lime used 9.4 tons at $10 per ton	94	
Total cost of the fuel and fresh lime	$145	

Using fuel oil as fuel and discarding no sludge from the alkali room:

Lime used in the alkali room		80,000 lb.
Reclaimed lime (90% recovery)		72,000 lb.
Coal equivalent (highest efficiency) 2.75 lb. of lime per lb. coal		13.1 tons
Cost of oil used at 4.5c per gal. (figuring 4½ bbls. per ton coal)	$111.42	
Cost of fresh lime used, 4 tons at $10 per ton	40.00	
Total cost of fuel and fresh lime	$151.42	

Assuming the same burning conditions with fuel oil at 6c per gal., the total cost of fuel and fresh lime would be $188.55 per day.

Using producer gas as fuel and discarding no sludge from the alkali room:

Lime used in the alkali room		80,000 lb.
Reclaimed lime (90% recovery)		72,000 lb.
Coal consumed (burning efficiency 1.8 lb. per lb. of coal)		20 tons
Cost of fuel at $5 per ton	$100	
Cost of fresh lime used, at $10 per ton	40	
Extra labor cost, 3 men, at $5	15	
Interest and depreciation on extra installation cost	7	
Total cost of fuel and fresh lime, considering extra labor and installation cost	$162	

If the burning efficiency were only 1.5 lb. of lime per pound of coal the above cost would be increased to $182 per day.

It does not seem advisable to pay more than 4½ cents per gallon for fuel oil as against $5 per ton for coal when using a powdered coal installation. With a producer gas installation showing a burning efficiency of 1.8 lb. of lime per pound of coal if the coal cost $5 per ton, equally as economical results could be obtained by the use of fuel oil at 5 cents per gallon, but if the producer gas installation only shows a burning efficiency of 1.5 lb. of lime per pound of coal, 5¾ cents per gallon could be paid for the fuel oil.

Using the Discarded Lime Sludge

When burning powdered coal as fuel at a plant where a sedimentation basin had previously been used, the discarded lime sludge could be passed to the basin and the flow so arranged that it passes to and deposits on one side. Lime could then be reclaimed from the other side and reburned in place of purchasing new lime, as the capacity of the rotary will be ample to take care of this additional lime sludge. If this were done the results would show a more decided advantage in favor of powdered coal as fuel.

Black ash from the leachers has been mixed with the lime sludge when reburning it in the rotary. As yet the value of this procedure is more or less problematic, but from some of the advantages derived it is advisable to make every effort to dispose of the black ash in this manner.

At almost every lime reburning plant there is a different method of handling the reburned lime. Some convey it to the alkali room where it is discharged into a bin and used the same as fresh lime when causticizing pans of liquor, at others the reburned lime is elevated into cars and when the cars are full they are moved by men on a track to the alkali room and dumped into the pan of liquor to be causticized and some use a continuous causticizing system, the lime being discharged from the rotaries into an agitated tank through which carbonate liquor is circulating until properly causticized, when it is pumped from the circulating tank to settling tanks. The Mount Continuous Causticizer which has been described in trade papers is also used in connection with lime reburning.

The whole installation for reclaiming lime including power necessary to convey the lime sludge to the reburning plant and reburned lime back to the alkali room, consumes less than 75 hp.

Lime reburning has been a big step toward the elimination of stream polution, and at the same time has proven a profitable investment.

Report of the Committee on Waste

By R. B. Wolf, Chairman; G. D. Bearce, Vice Chairman

The study of many technical porblems of the pulp and paper industry was in the process of development about 10 years ago, and waste elimination was one of them. A few of the most progressive pulp and paper mills were giving some attention to the saving of stock, and there were in use and being manufactured one or two stock savers of different types. The utilization of wet bark was hardly thought of and the problems allied to heat losses were given but little attention.

Shortly after the report given by the Hoover Committee on the "Elimination of Waste in Industry" the Waste Committee of the Technical Association was appointed. The Hoover Committee treated the problem of "Elimination of Waste in Industry" from a broad management viewpoint, whereas the Technical Association selected several definite material wastes to study. A number of reports were presented upon these problems and suggestions made regarding the reduction of these wastes in the paper industry.

Stock Savers or Saveall

The principal stock saver 10 years ago was manfactured by one concern or by the mills themselves, and was the revolving cone type. Several other companies were developing similar saveall during that period, and a number of mills used special settling tanks or old drainers to assist in reclaiming the fiber and filler. The use of both the screen saveall and settling tanks was very limited and the majority of mills lost large quantities of stock in the effluent going away from the mills. In England and any European countries, stock saving equipment was in more common use probably because materials going into the manufacture of paper were more valuable.

The use of stock saving equipment was gradually developed and about three years ago it was given a special impetus due to the interest of the mills in this problem stimulated by the work of the Waste Committee. The revolving cone type of saveall had been improved and efficient sedimentation tank stock savers had been installed by several pulp and paper companies in the industry. Moreover, the interest in this particular problem had sufficiently increased so that the majority of mills used savers of some type.

At the present time almost every mill realizes the importance of reclaiming the stock in its effluent and the principal study is regarding the efficiency and adaptability of stock saving equipment. During the past three or four years decided improvements have been made in screen saveall. An efficiency of 40 to 50 per cent was averaged eight or ten years ago, while at the present time, properly functioning screen saveall will show an efficiency of approximately 85 to 90 per cent.

The settling and classifying of materials is common in many industries and several types of machines have been developed by the manufacturers of sedimentation machines, to meet the particular needs of the paper industry.

The sedimentation type of stock saver recovers 90 to 96 per cent of the material going to it, and is very satisfactory. Improved operating conditions have also been made possible by the study and development of chemical coagulant. The elimination of slime has also been assisted through chemical means.

The Sub-Committee on White Water Losses is making a detailed study of this problem, and Messrs. Rue, Wells, and Edwardes of the Forest Product Laboratory are planning to give more detailed information regarding this problem. They also expect that a considerable number of pulp and paper mills will participate in the exchange of white water losses as outlined in the "Saveall Performance Code" recently developed.

Stream Pollution

Closely allied to the problem of white water losses is the question of stream pollution which a number of years ago was hardly considered by the various state and federal authorities, although a few states had some laws pertaining to stream pollution.

There was considerable agitation about three years ago in regard to the pollution of streams by pulp and paper mills, and at the present time there is considerable activity in regard to this problem.

The following states have passed legislation regarding stream pollution or have, through their health departments, supervision over this particular problem.

Connecticut, Delaware, Indiana, Maine, Maryland, Missouri, Massachusetts, Michigan, Ohio, Pennsylvania, Texas, West Virginia, Wisconsin.

Massachusetts has had, for a number of years, restrictions upon polluting certain streams and at the present time the authorities of the states of Michigan and Ohio are making a special drive against polluting streams. In addition the Federal Government has made some studies of this problem and it is one that is becoming increasingly important. A logical method of treating this problem is for the paper mills to provide adequate equipment that will avoid any excessive waste thereby making unnecessary action by the various states or federal governments.

The Dewatering and Utilization of Bark and Wood Refuse

Since the advent of the barking drum, the problem of the disposal of the wet bark has been a serious one with mills using large quantities of rough pulpwood. Because of the very wet condition of the bark, no fuel value was placed on drum barker waste. Since the early tests of the Waste Committee on Bark Pressing Equipment, much improvement has been made so that it is now possible to prepare bark so that it contains only 50 to 55 per cent moisture. This burns in a satisfactory manner either alone or with coal or hog fuel, and each pound of bark contains approximately 3,500 B.t.u. at 50 per cent moisture.

The study of this problem in European countries is far ahead of us and the recent information upon bark drying equipment[1] indicates that we can adopt the methods used in Scandinavian mills with very good success. Appreciable savings can doubtless be made with this type of bark drying equipment, and the adoption by American mills is only a question of time. Better results will probably be obtained by pressing all bark whether it goes to the bark drier or to the furnace.

Heat Losses

Much attention has been paid during the past few years to heat losses in the pulp and paper industry. Probably the two greatest preventable wastes in the loss of heat occur in the production of steam and its utilization in the paper mill.

The operation of the boiler house of the average paper mill is still quite low and 10 years ago was probably under 50 per cent efficiency. During the past few years important developments have been made in furnace design and stoker equipment as well as in burning oil and powdered fuel.

The large central stations in the country are a good criterion upon which to base the effectiveness of any new combustion equipment. Recent tests at the Hell Gate station of the United Electric Light and Power Company indicate that it is possible to operate

[1]The Drying of Wood Refuse and Its Importance to Industry by A. J. T. Taylor and Otto Nordston. Paper Trade Journal, Vol 80, No. 1, Jan. 1, 1925.

large 1,800 h.p. boilers at an efficiency of approximately 90 per cent using the latest type of underfeed stoker. In actual operation this plant is probably maintaining an operating efficiency of 84 per cent.

One of the outstanding developments in the powdered coal field is at the Lakeside Station of the Milwaukee Light and Power Company. This plant is able to maintain over extended periods of time efficiencies ranging between 82 and 85 per cent. Many oil burning plants in the industrial field show efficiencies ranging between 80 and 85 per cent.

The development in furnace design has been very important during the last three or four years and the new "Fin Hube" water cooled walls now being installed in some modern central stations not only assist in increasing the efficiency, but also appreciably reduce the cost of furnace maintenance. Marked improvements have been made both in economizers and superheaters which have both been important factors in the effective operation of boiler houses. The developments in the air preheater and the steam accumulator have also been of importance in the problems of better utilization of fuel.

The developments in the combustion field appear to indicate that there is a leaning towards the use of powdered fuel, especially the "unit system" which is combined with proper furnace design and water cooled walls and can be used on small boilers.

The cost of steam and power in the paper industry represents 30 to 40 per cent of the manufacturing or conversion cost, and consequently is a very important item. More efficient steam generation and utilization will appreciably decrease this cost.

Heat losses in the machine room of the paper mill have received more attention during the past three or four years and the conditions have been much improved due to better drying systems, heating and ventilating equipment, more effective hoods and insulated roofs, and by better building design.

The heat lost through the monitors in the form of vapor is an important preventable loss, and the vapor economizers now on the market will greatly reduce this waste. Quite recent developments in vacuum and electric drying may also be of assistance in reducing the cost of steam per ton of paper.

Conclusion

The various problems connected with the elimination of waste in the paper industry are apparently being studied with effectiveness. Much is yet to be done in regard to a design of the equipment itself, and its application to any particular mill or condition. The greatest gain is to be made by increasing the availability of recorded information in each plant and by developing comparative standards for interchange of information between the various plants within the industry.

Report of the Paper Testing Committee

By F. A. Curtis, Chairman

Carefully arranged statistics, obtained from a complete bibliography of published reports on paper testing, might be of considerable academic interest; but to those that have been actively connected with paper testing, certain tendencies and accomplishments are obvious without such statistics.

Due chiefly to the support and encouragement of the Technical Association, a considerable amount of data has been published and new methods of, and apparatus for, testing have been developed which will permit of a more intimate knowledge of paper characteristics and qualities. Such methods and apparatus may in general be considered as manufacturing control "tools," and with such "tools" it has been possible to understand the variations of paper manufacture to a greater extent.

The tendencies apparent during the past ten years are:

1. The increased use of paper testing by the mills as a means of control.

2. The increased use of paper testing by the converter as a check on his raw material.

3. The specialization of tests to determine characteristics otherwise unmeasurable.

4. The emphasis laid on the accuracy of the apparatus and methods used.

5. The apreciation that no one physical test measures the quality of a sheet of paper.

6. The increased interest in moisture content as a factor in testing paper.

7. The growing appreciation of the necessity of properly interpretating test data.

The accomplishments of the industry in connection with paper testing have been manifold, some quite intangible but all reflecting to a greater or less degree on the increased understanding of paper characteristics. The more tangible results of 10 years of the TAPPI in regard to paper testing are:

1. A considerable literature, consisting of reports, bibliographies, etc., of an increasingly high scientific nature.

2. A carefully prepared pamphlet, frequently revised, of the various paper testing methods.

3. An active standing committee, which with the aid of various government and mill laboratories has been largely responsible for the stimulated interest in the subject.

As it appears to the present chairman of this Committee, there are two outstanding problems ahead of the Committee which need immediate attention and which are to a considerable extent interdependent. Both of these problems have also in common two phases, first, the collection of data and secondly, the dissemination and promotion of the principles involved.

The first problem is that of the further specialization of paper testing. By this is meant, the development or use of methods, particularly in relation to physical qualities of paper, whereby single, rather than composite, qualities of paper are measured. Most of the common physical tests, such as folding, bursting and tensile tests, indicate resultants of two or more factors. And in many cases, the tests generally made bear little, if any, relation to the strains and stresses under which the paper is placed during the converting operations. Numerous examples will readily occur to you, as you picture the large number of commodities in the manufacture of which paper plays an important part as a raw material.

The second problem is one which has been referred to a number of times by the chairman of this present Committee as a definite need for the proper interpretation of test data. An examination of the test data, connected with the various published papers and reports on paper testing, shows that greater benefit could be derived from these researches, if the data could be interpreted in terms of the various manufacturing factors. Folding test data are one of the best illustrations of the need of such interpretation. A series of bond, book and wrapping papers are tested at various humidities on the Schopper folding tester. What factors are involved? Some of these factors are: original fiber used, its slowness or freeness, length of fiber, engine sizing, filler, tub sizing, stretch, brittleness, moisture content, etc. Again, a waterleaf jute sheet is required in a converting operation where discs are impregnated with paraffin and severely molded and the finished product must be stiff and rigid without being brittle. How would complete physical test data on such a sheet be interpreted?

The technical control of the manufacture of paper is progressing; in some mills quite rapidly. Such technical control results in not only more uniform product but also better qualities and lower costs.

But paper testing methods, which are mere "tools" for the mill man, are of really little research or constructive value, unless the results can be interpreted into factors, helpful alike to the mill and to the converter.

The Technical Association has been keenly interested in the development of methods of determining the porportionate amounts of the various fibers of which a sheet of paper is made. Comparative studies by various laboratories have been made in the past and several methods have been recommended.

1. Chemical Stains for use in Microscopical Analysis of Paper.

As a contribution to this subject, H. N. Lee of the Hammermill Paper Company presents to the Association suggestions as to modified reagents for staining fibers for examination. "Formulas are given using magnesium, calcium, zinc or barium chlorides with iodine and potassium iodide, for identification of paper making fibers."

2. Pulp Weight Factors.

At the sectional meeting on paper testing held last April, the Committee was requested to study the determination of weight factors to be used for the analysis of fiber mixtures in papers. Dr. Jessie Minor and John H. Graff were appointed as a subcommittee to undertake this work. A report on this subject is being presented at this meeting and it is believed that it will be found very helpful by those using the Spence and Krauss, or any other similar method of fiber analysis.

The subcommittee on the testing of coarse boards, consisting of A. R. Harvey, L. W. Mahle and M. E. Walsh, reports as follows:

"A complete system of testing boxboard for routine laboratory work, including among other things such as thickness, count, mullen test, etc., the folowing:

(a). A sizing test.
(b). A folding test.
(c). A test for printing properties.
(d.). A numerical expression for fuzziness.
(e). A definite way of determining finish."

The subcommittee believes that satisfactory progress in the development of such test methods will not be made until either the producers or converters demand them. It is their opinion, therefore, that the proper way to make work of their committee of greatest value to the industry, or at least to that portion of the industry engaged in the manufacture of coarse boards, is to get an expression of opinion from a representative number of mills as to what tests are most urgently in need of development. It is to be hoped that such a survey will be made and that the Paper Testing Committee may be of service in assisting the development of methods that are needed.

Considerable interest has been indicated in the development of methods of numerically evaluating these two characteristics of paper. Papers have been presented to this Association in regard to both of these subjects. Two additional papers are being given at this meeting.

1. The Eastman Colorimeter.

A study has been made by H. L. Peckham, of the use of the Eastman Colorimeter. The full report will be presented later. These data are of interest at the present time because of studies made at the Bureau of Standards where the Pfund Colorimeter is used. There is no question but that the mills are anxious to obtain an apparatus to assist in maintaining color uniformities.

2. The Glarimeter and the Measurement of the Finish of Paper.

Just as in the case of color, it is very desirable to have an apparatus for measuring the finish of paper, for control purposes in manufacture. Recently, the Bureau of Standards completed an investigation to determine the accuracy of five Ingersoll Glarimeters. The idea in making the study was to determine whether each of the instruments would check the others, and whether different observers would check one another, in measuring the gloss of paper. The results of this investigation appear in a paper being presented to the Association by R. E. Lofton. These results were very satisfactory, as far as the study was carried out, but it is to be hoped that further data will be collected to indicate the relation, if any, between gloss or finish and printing qualities.

The development of physical or mechanical tests for paper, as opposed to chemical or microscopical test, has received the most attention of the Committee in the past. Studies have been made of the data obtained by the ordinary methods, such as bursting, tearing, tensile, folding, etc. The tendency at present is to investigate special tests or to develope refinements of old methods.

1. Effect of the Clamping Device of the Mullen Paper Tester on Test Results.

The use of the Mullen tester for determining the strength of paper is very common and, in general, the results are reasonably accurate, when a sufficiently large number of tests are made. There has been investigated at the Bureau of Standards, however, by L. W. Snyder and S. Henderson, the effect of the clamping device on the test results. With the clamping device in common use, there is often noted a creeping of the paper under test, which necessarily causes variable results. In order to determine this point and possibly find how this defect may be remedied, a study was made of different kinds of clamping devices. The clamping device which showed the least creeping also gave results which were 5 to 15 per cent lower than the clamp generally used.

2. Testing Paper for Permeability to Liquids.

The increased use of paper, converted into containers for liquids, has forced the development of methods of measuring the penetration of paper by these liquids. F. T. Carson has prepared a paper to be presented at this meeting which is "a discussion of some new methods and procedures developed at the Bureau of Standards." The paper includes an elaboration of the "ground-glass" method for water resistance, the development of a new and very sensitive indicator for use with this method and procedure outlined for making test with the use of organic liquids, such as oil, etc. The further study of sizing quality is reserved for future investigation.

3. Brittleness of Paper.

There are few types of paper converted or used where the presence of brittleness is not objectionable. And yet it has been most difficult to measure this quality and to grade papers according to this feature. The usual methods of test do not indicate the quality satisfactorily. Two reports have been prepared of investigations made in the laboratory of the American Writing Paper Co.

(a). Analysis of Bureau of Standards Brittleness Tester.

Comparative tests were made by C. E. Apelgren and H. U. Kiely, on various grades of bond, ledger and envelope papers, using the device suggested by the Bureau of Standards and the Schopper folding tester. The Bureau of Standards method gives the loss in Mullen strength after passing the sheet through miniature calendar rolls. The results of this investigation seem to indicate that there is no relation between this test and any others and that papers graded by this method do not correspond with a grading using the Schopper folding tester.

(b). Analysis of Weller Brittleness Tester.

Due to the necessity of having, for control purposes, a method for measuring the brittleness of paper, a device to attach to a tensile testing machine was developed and data collected on several grades of paper at several different relative humidities. The results of this research appear in a paper submitted by A. E. Bachmann. In this test method, a metal tag was placed in the lower jaw of the Schopper tensile tester, through which the paper is looped and both ends clamped in the upper jaw. The brittleness is expressed as the per cent loss and is figured by dividing the difference between twice the tensile test and tensile result taken with the metal tag, by twice the tensile test. This method used at 35 per cent relative

humidity has indicated brittleness which has been borne out in practice. "This method has been in use in the laboratory of the American Writing Paper Company for same time, for control work and is found to give a more true indication of the condition of the paper than either personal judgment or the Bureau of Standards method."

At the last several sectional meetings on paper testing, the question of the best relative humidity at which to test paper has been discussed to a considerable extent. The committee had expected to have a considerable amount of data and information to present at this time. These data and reports are not as yet available and the complete information, on which a final decision must rely, has not been collected. The committee therefore regrets that it has but one new report to present on this subject.

This report, "A Comparison of Paper Tests Made at Various Relative Humidities" by Helen U. Kiely, includes test data, obtained at 50 and 65 per cent relative humidity on 59 different sets of samples, by means of bursting, tensile and folding testers. The general conclusions as indicated by this report are as follows:—

"From these results, there does not seem to be any decided advantage of 50 over 65 per cent relative humidities, except as a time saver in the folding test when 50 per cent relative humidity is used. Whether this is a sufficient reason for changing our present standard is still an open question. From our own experience, we have found our most worth while results at 35 per cent relative humidity. At the latter humidity, we have the amount of moisture in the paper as it is most commonly shipped from the paper mill and these figures would give the manufacturer a clearer idea of his product. For control purposes, the manufacturer prefers low humidities."

In view of the fact that the Committee has not as yet had sufficient time to collect all the information it believes to be necessary in order to make a definite recommendation of a change from the present standard, it is believed desirable that the Association take no definite action at this time on the question of changing the standard relative humidity at which to test paper.

Report of Materials Testing Committee

By H. U. Kiely, Chairman

Since the annual meeting last year the publication entitled "Standard Methods of Testing Raw Materials" has appeared and has been very favorably received. The committee asked for comments and criticisms of the methods but to date none have been received. It is hoped that this is not due to the fact that the mehods have not been used but rather to the fact that they are so accurately compiled that correction could not be offered. The compiling of these thirty methods represents the main work of the various sub-committees on Materials Testing since the committee was appointed.

Many of the more common methods were presented to the Association as tentative methods for a year and on the following year formally adopted. Considerable difficulty was found in getting the proper cooperation from the various laboratories. A standard method to be of any value must give accurate results with the ordinary trained worker yet it was found almost impossible to obtain check results on samples sent to the various laboratories due either to the condition of the sample upon receipt; to the condition of standard solution used; to the lack of standard apparatus; to the manipulation of chemists, or to the lack of time available for their work. The Committee, therefore, found it advisable not to send samples to various laboratories for analysis but to have various chemists try out and check these standard methods against the method they were accustomed to use. On the approval of a method by six chemists it was offered to the Association as a standard method.

During the year 1924 attention of the committee has been directed to methods of testings rags and wood pulp. There has been very little published on rag testing, in fact it has never been thought advisable to test them. However, some recent work done on the possibility of testing rags has lead the committee to write up a method that has proved satisfactory.

Moisture may be determined in the usual manner of sampling 10 per cent of the shipment, weighing and drying at 212° F.

Oils, Fats and Greases may be determined by cooking an adequate portion with carbon tetrachloride for four to five hours under a reflux washing with carbon tetrachloride, distilling off the solvent and weighing the residue. This figure has been of great value in cooking such rags as it has shown when to increase or decrease the amount of alkali charged to the rotary.

Shrinkage. The shrinkage of the rags from the rotary to the beaters has always been problematical. Recent work has proved that a laboratory test on a 5 lb. sample of rags will check mill operations within 5 per cent. This has given a definite figure for the cost man to use and also the beaterman for maintaining uniform furnishes. A comparison is given of the three laboratory ways of determining shrinkage. An open beaker cook; a 1 lb. autoclave cook and a 10 lb. rotary boiler cook. A constant amount of alkali should be used whichever method is followed; 8 per cent lime and 2 per cent soda ash have proved satisfactory for the ordinary grades of rags. Care must be taken in washing so that all traces of lime, filler and other impurities are thoroughly removed. After washing the rags are dried and weighed. Surprisingly large shrinkage figures have been found on certain grades of rags.

Bleaching. The rags after cooking may be bleached with 3 per cent bleach and their bleaching properties determined. 1 per cent alum solution is added as an accelerator. This test will only show how the colors may be removed and may not be taken as the ultimate color that may be produced in large washers.

The Forest Products Laboratory is working on a standard method for the testing of wood pulp. The committee is always ready to assist in any way and has, therefore, refrained from very active work along this line.

A comparison of ballmill strength tests and beater strength tests of wood pulp was investigated and a short report covering this will be given at the Sectional Meeting. An effort is being made to discover what the strength of pulp is in the beaters. It seems that the ballmill strength tests are too high and such strength is never obtained in practice. Possibily it would be better to reduce the ballmill time to more nearly approximate mill conditions.

Rosin Size. A new method for determining the color of rosin size milk has been written up and its value tested for over a year. This method gives a quick and easy method for controlling the color on rosin size shipments. It consists in precipitating the rosin with acetic acid, drying the precipitate and comparing this color with standard or in dissolving the precipitate in water white toluene and comparing solutions.

Since the Materials Testing Committee and Paper Testing Committee have published pamphlets covering the most common methods used by both it would seem advisable to discontinue the Materials Testing Committee and appoint one member of the Paper Testing Committee to investigate and check up on all new methods for raw materials during the year. There does not seem to be opportunity for the Raw Material Committee to do investigational work along these lines and the various committee members might be employing their time on other sub-committees that would develop bigger things for the industry. The people interested in Materials Testing are also interested in paper testing and at the close of the tenth year of the Association it seems the most suitable time for rearranging the existing committees. It is the recommendation of this committee that this be given serious consideration by the Association.

THOSE WHO ATTENDED THE CONVENTION

A

G. G. Abernethy, International Paper Co., New York.
Frank O. Agner, Bemis Bro. Bag Co.
T. F. Agnew, International Paper Co., New York.
J. E. Alexander, Nekoosa-Edwards Paper Co.
Jerome Alexander, Consulting Chemist, 50 East 41st St., New York.
L. M. Alexander, Nekoosa-Edwards Paper Co.
A. C. Allen, A. C. Allen Paper Co., Chicago.
A. F. Allen, Tidewater Paper Co., New York.
A. L. Allen, General Electric Co.
Elliott A. Allen, Timken-Roller Bearing Co.
F. L. Allen, Tidewater Paper Co.
L. C. Anderson, W. B. Oglesby Paper Co.
Chas. T. Andrews, Andrews Bros. Paper Co.
W. H. Artz, Westinghouse Electric and Manufacturing Co.
F. C. Ash, Oswego Falls Corp., Fulton, N. Y.
Henry Atwater, A. M. Collins Manufacturing Co.
Edward H. Austin, Bulkley, Dunton Co., New York.
A. C. M. Azoy, The Berwind White Co.

B

Chas. B. Bacon, Write, Inc., 405 Lexington Ave., New York.
Edward B. Bagg, Parsons Paper Co.
J. L. Bagg, Millers Falls Paper Co.
W. E. Byron Baker, Continental Paper and Bag Mills Corp., New York.
C. W. Baker, Bedford Pulp and Paper Co.
W. Noyes Baker, International Paper Co.
H. R. Baldwin, Hammermill Paper Co., Erie, Pa.
J. V. Baron, Sherman Paper Co., Watertown, N. Y.
C. H. Barr, Crocker-McElwain Co., Holyoke, Mass.
L. F. Barsaloux, Union Bag and Paper Corp.
F. L. Barstow, Falulah Paper Co.
D. K. Bartlett, Jr., Chemical Paper Manufacturing Co., 179 West 79th street, New York.
Hunter Beaty, Yellow Pine Paper Mill Co.
F. K. Becker, Bird Machine Co.
N. Folke, Becker, New York.
Clarence Beebe, Neumeyer & Dimond, New York.
E. H. Benson, Regal Paper Co.
Theobald C. Bentzen, Whiting-Plover Paper Co.
O. L. Berger, G. D. Jenssen Co., New York.
E. A. Bergholtz, American Telegraph and Telephone Co.
W. Bersch, Hartman Co.
R. D. Bertschy, Miamisburg Paper Co.
Ward E. Black, Hoberg Paper & Fibre Co., Green Bay, Wis.
Gordon Blanchard, Crocker-McElwain Co., Holyoke, Mass.
H. E. Blatch, Canadian Westinghouse Co.
B. F. Bond, B. F. Bond Co.
L. M. Booth, Booth Chemical Co.
H. R. Boston, Stevens & Thompson Paper Co.
Ralph L. Bosworth, Crocker-McElwain Co., Holyoke, Mass.
Vincent Tait Botting, International Paper Co., New York.
Leo W. Bowker, St. Regis Paper Co.
N. J. Bowker, Pettebone-Cataract Paper Co.
Chas. W. Boyce, U. S. Forest Service.
S. F. Boyd, St. Regis Paper Co.
F. E. Bragg, Orono Pulp and Paper Co., Bangor, Me.
J. Branna, North End Paper Co.
W. E. Brawn, Pejepscot Paper Co.
J. Spencer Brock, International Paper Co., Philadelphia.
W. F. Bromley, Hammermill Paper Co.
H. C. Brown, Nashua Gummed and Coated Paper Co.
W. F. Brunner, Paterson Parchment Paper Co.
W. T. Brust, Hammermill Paper Co.
E. S. Bryant, Boston, Mass.
J. O. Bulkley, Bulkley, Dunton Co., New York.
J. G. Bullard, Huron Milling Co.
Alfred Bunge, 501 Fifth avenue, New York.
Kendrick Burns, S. D. Warren Co.
Arthur M. Burr, Edwin T. Garrett Co.
A. A. Burrows, Burrows Paper Co.
E. H. Burton, A. P. W. Paper Co.
M. O. Byrne, Whitney Bros.

C

Geo. J. Cadwell, American Writing Paper Co.
E. P. Cameron, Forest Products Laboratory, Montreal.
R. S. Carraway, Daily Mill Stock Reporter.
John F. Carroll, Gouverneur, N. Y.
H. B. Carruth, Mead Pulp and Paper Co.
Emmett Carter, Barrett Co., New York.
George H. Carter, Public Printer, Government Printing Office.
Edgar S. Catlin, Pejepscot Paper Co.
M. L. Caust, Tileston & Hollingsworth Co.
C. W. Chabot, Hammermill Paper Co.
E. C. Chadwick, L. L. Brown Co.
Philip S. Chadwick, Chapin & Gould Paper Co.
O. T. Chalon, Kuttroff & Pickhardt.
R. F. Chapin, Millers Falls Paper Co.
E. A. Charlton, De Grasse Paper Co.
P. S. Church, G. H. Mead Co., 277 Park avenue, New York.
H. L. Churchill, Finch, Pruyn & Co.
A. B. Clark, J. O. Ross Engineering Corp., 30 E. 42nd street, New York.
M. Cline, International Paper Co., Glens Falls, N. Y.
Samuel Clayman, A. M. Collins Manufacturing Co.
P. W. Codwise, Beaver Products Co., Buffalo, N. Y.
A. D. Coffin, C. H. Dexter & Sons, Inc.
Dexter D. Coffin, C. H. Dexter & Sons, Inc.
Herbert R. Coffin, C. H. Dexter & Sons, Inc.
G. N. Collins, Dill & Collins Co., Philadelphia.
H. B. Collins, Dill & Collins Co., Philadelphia.
L. T. Condon, Continental Paper & Bag Mills Corp.
H. H. Conklin, Newton Falls Paper Co., Newton Falls, N. Y.
O. L. Cook, Lehigh Lime Co.
P. T. Coolidge, Bangor, Me.
I. H. Copeland, Tidewater Paper Mills.
S. B. Copeland, Eastern Manufacturing Co.
H. J. Corwin, Ajax Paper Mills.
A. S. Cosler, Texas Gulf Sulphur Co.
F. N. Countiss, Martin Cantine Co., Saugerties, N. Y.
J. B. Cowie, Orono Pulp and Paper Co.
E. B. Cowles, American Engineering Co., Philadelphia.
Chas. H. Coy, C. H. Dexter & Sons.
J. H. Coy, Flambeau Paper Co.
Geo. E. Crafts, Orono Pulp & Paper Co.
H. J. Craig, Bingham, Me.
W. M. Crane, Crane & Co.
W. W. Cronkhite, General Electric Co.
T. L. Crossley, Institute of Domestic and Industrial Arts, Montreal.
L. W. Crouse, Arabol Manufacturing Co.
F. E. Cuddeback, General Electric Co.
C. E. Curran, Forest Products Laboratory Madison, Wis.
F. A. Curtis, American Writing Paper Co., Holyoke, Mass.
H. H. Curtis, Consolidated Water Power & Paper Co.

D

C. E. Daley, Port Huron Sulphite and Paper Co.
S. T. Dana, W. S. Forest Service.
A. B. Daniels, L. L. Brown Paper Co.
Samuel Dauman, M. Gottesman & Co., New York.
John F. Davis, Cambridge, Mass.
S. R. Davis, Dells Paper and Pulp Co.
J. A. DeCew, Process Engineers.
P. Dennett, Bird Machine Co.
C. E. Devonshire, Dennison Manufacturing Corp.
W. F. Dewey B. D. Rising Paper Co.
Philip De Wolf, Mathieson Alkali Works.
O. H. Dickinson, Fisk Paper Co.
M. L. Dinkelspiel, National Paper Products Co., Carthage, N. Y.
C. E. Dobson, Southern Kraft Manufacturers Association.
Thomson Douglas, Lake Champlain Pulp and Paper Co.
Pierre Drewsen, Barrett Co., New York.
A. E. Dubey, Stevens & Thompson Paper Co., 270 Madison avenue, New York.
A. C. Duncan, Western Paper Makers Chemical Co.
A. C. Dunham, Supply and Equipment Association, 33 Rector street, New York.
J. F. Dunifer, Miami Pulp Co.
G. J. Dunphy Babcock, Kelly Co., Bellows Falls. Vt.
A. G. Durgin, Spanish River Pulp and Paper Co.
A. H. Dwight, Hawthorne Paper Co.

E

W. L. Edmonds, Wausau Paper Mills Co.
V. P. Edwards, Forest Products Laboratory, Madison, Wis.
T. D. Earle, Michigan Paper Co.
E. B. Eddy, National Paper Products Company.
Stanley J. Eisner, Newark Paraffin and Parchment Paper Co., New York.
W. J. Eisner, Newark Paraffin and Parchment Paper Co., New York.
Ivar Ekholm, National Aniline and Chemical Co., New York.
H. D. Eliason, Minnesota & Ontario Paper Co.
H. W. Ellerson, Albemarle Paper Co.
W. S. Epply, Hammermill Paper Co., Erie, Pa.
Jacob Erichsen, Atterbury & McKelvey, New York.
Irving N. Esleeck Esleeck Mfg. Co.
J. M. S. Ewing, Cherry River Paper Co.
R. D. W. Ewing, American Writing Paper Co., 41 Park Row, New York.

F

F. C. Farnsworth, Farnsworth Co.
J. L. Fearing, International Paper Co., New York.
Herman H. Fish, Jr., Great Western Paper Co.
Paul S. Fiske, Parker-Young Co.
S. W. Fletcher, J. O. Ross Engineering Corp.
W. L. Forsythe, Victoria Paper Mills.
Norman N. Fowler, Hampden Glazed Paper and Card Co., 501 Fifth avenue, New York.
W. S. Fowler, Hampden Glazed Paper and Card Co.
E. V. Fox Hummel-Ross Fibre Corp.
James Foxgrover, Western Paper Makers Chemical Co.
Col. B. A. Franklin, Strathmore Paper Co.

G

Harvey Garrett, Edwin T. Garrett Co., Lansdowne, Pa.
C. J. George, Harmon Paper Co.
Geo. K. Gibson, Wausau Sulphite Fibre Co.
G. M. Gilbert, Gilbert Paper Co.
A. G. Gilman, Allied Paper Mills Co.
P. H. Glatfelter, P. H. Glatfelter Co.
E. P. Gleason, Nekoosa-Edwards Paper Co.
G. H. Gleason, Boston, Mass.
L. H. Goebel, Wallace & Tiernan.
J. D. Goldberg, Hamersley Manufacturing Co.
A. B. Goodrich, Riverside Paper Manufacturing Co.
W. A. Goodwin, International Paper Co.
I. Gordon Times Square.
V. H. Gottschalk, Bureau of Standards, Washington, D. C.
P. W. Gridley, Crocker-McElwain Co.
Martin L. Griffin, Mount Hope Finishing Co.
Thos. Goulard, Mars Paper Corp., Westfield, Mass.
C. A. Gravatt, Western Union Tel. Co.
H. B. Green, Niagara Paper Mills.
W. W. Greenwood, Norton Co.
W. D. Gregor, Newton Falls Paper Co.
H. G. Gross, International Paper Co.
A. S. Guggenheimer, United Manufacturing Co.

H

Ralph H. Hall, Angier Corp., 383 Lafayette street, New York.
C. H. Hamersley Hamersley Mfg. Co., Garfield, N. J.
H. H. Hanson, Eastern Manufacturing Co.
R. B. Harbison, International Paper Co.
R. O. Harper, B. D. Rising Paper Co.
Herman R. Harrigan, American Writing Paper Co.
H. L. Harrington, Berkshire Hills Paper Co.
Harrington, T. W., Crocker-McElwain Co.
H. H. Harrison, Crystal Tissue Co.
M. T. Hartley, Paul A. Sorg Paper Co.
A. R. Harvey, Gardner & Harvey Co.
R. S. Hatch, Peerless Paper Co.
E. A. Haynes, Port Huron Sulphite Paper Co.
R. A. Hayward, Kalamazoo Vegetable Parchment Co.
W. L. Heath, H. G. Craig & Co., New York.
Fred E. Hegeman, Bulkley, Dunton Co., New York.
Raymond P. Hill, Pulp Bleaching Corp., New York.
A. K. Hinds, Carthage Machine Co.
Harold W. Hixon, Chapin & Gould Paper Co.
C. C. Hockley, American Lakes Paper Co.
H. H. Holden, Vera Chemical Corp.
G. S. Holmes, Brown Paper Mill Co.
J. E. Holmes, Crocker-McElwain Co.
A. H. Hooker, Jr., Hooker Electrochemical Co.
Phil A. Howard, Paper, Inc.
Wm. H. Howe, Mumford Paper Mills.
J. C. Howell, Brookmire Economic Service, New York.
W. H. Howell Jr., New York and Pennsylvania Co., Willsboro, Pa.
Willis Howes, Knowlton Bros.
Frederick W. Hume, National Publishers Assn.
J. P. Hummel, Hummel-Ross Fibre Corp., Hopewell, Va.
W. W. Hunt, Fletcher Paper Co.
D. C. Hulbut, Bennington Waxed Paper Co.
J. W. Hurlbut, Bennington Waxed Paper Co.
C. W. Hurtubis, Hammermill Paper Co.
J. E. A. Hussey, International Paper Co.

I

Nathan D. Isen, Enterprise Paper Co.

J

S. W. Jacobs, Electro Bleaching Gas Co., New York.
Arthur L. James Holyoke Card and Paper Co.
L. C. Jeffress, Wortendyke Manufacturing Co.
C. T. Jewell, St. Regis Paper Co.
R. C. Johnson, International Paper Co.
E. J. Johnston, Papermakers Chemical Co.
H. H. Jones, Kalamazoo Vegetable Parchment Co.
W. D. Judd, Hampshire Paper Co.

(*Continued on page 241*)

THOSE WHO ATTENDED THE CONVENTION

(*Continued from page 239*)

K

S. E. Kay, DeGrass Paper Co.
T. J. Keenan, Paper, Inc., New York.
H. T. Kehew, Carso Paper Co.
R. S. Kellogg, News Print Service Bureau, New York.
J. Kelly, International Paper Co.
A. J. Kennedy, Sandy Hill Iron and Brass Works.
T. F. Kennedy, S. Walter Inc.
G. S. Kephart, Orono Pulp & Paper Co.
J. R. Kessler, Dill & Collins Co.
E. W. Kiefer, Port Huron Sulphite and Paper Co.
Miss Helen U. Kiely, American Writing Paper Co.
K. T. King, E. I. Du Pont de Nemours & Co., Inc.
C. E. Kinney, Hercules Powder Co.
Max Kirchheimer, Kirchheimer Bros.
Arthur F. Klein, Hammermill Paper Co.
Harold Knight, Bulkley, Dunton & Co.
S. C. Knode, Albemarle Paper Mfg. Co.
K. H. W. Knudsen, 104 John street, New York.
P. Koenig, Continental Paper & Bag Mills New York.
E. E. Kolk, Stevens & Thompson Paper Co., 270 Madison avenue, New York.
M. A. Krimmel, Hammermill Paper Co.

L

F. C. Ladd, Byron Weston Co.
R. H. Laftman, Bogalusa Paper Co., Bogalusa, La.
G. J. Lane, Barrett Co., Elizabeth, N. J.
J. J. Lane, The Barrett Co., Elizabeth, N. J.
D. E. Lauderbarn, Consulting Forest Engineer.
C. J. Laur Parker-Young Co.
W. J. Lawrence, Western Papermakers Chemical Co.
W. W. Laymon, Mead Pulp and Paper Company.
John J. Leary, Thomas Barrett & Son, New York.
R. W. Leeper, H. S. Taylor.
Frederick Leonard, Fisk Paper Co.
A. W. Leslie, John Leslie Paper Co.
Ezra Levin, Kalamazoo Vegetable Parchment Co.
Ralph J. Levy, Bedford Pulp and Paper Co.
A. J. Lewthwaite, Crown, Willamette Paper Co.
Harry Liebeck, Scott Paper Co.
H. E. Lindquist, Chemical Paper Manufacturing Co.
J. H. Lingenfelder, Brownville Paper Co.
E. G. Lloyd, Bulkley, Dunton Co., New York City.
H. H. Lockey, B. D. Rising Paper Co.
R. E. Lofton, Bureau of Standards.
L. E. Longstreth, Gardner & Harvey Co.
E. R. Low, Beaver Products Co.
D. W. Lowe, Lowe Paper Co.
M. B. Lowe, Lowe Paper Co.
Geo. A. Lutz, New York.
J. O. Lynch, Lincoln Pulpwood Co.

M

M. D. McAlpin, Briner, Smith & Co.
A. A. McAlvain, Columbia Paper Bag Co.
B. T. McBain, Columbia River Paper Mills.
I. R. McCall, Detroit Graphite Co.
W. S. McClellan, P. H. Glatfelter Co.
Chas. McDowell, McDowell Paper Mills.
H. G. McDowell, Pusey & Jones Co.
J. N. McDowell, Fox River Paper Co.
R. F. McElwain, Crocker-McElwain Co.
John McEwan, American Tissue Mills.
Miss Louise McGrath, Booth Chemical Co.
W. E. McIntyre, McIntyre Brothers Paper Co.
Dr. R. H. McKee, Columbia University, New York.
Chas. McKernon, B. D. Rising Paper Co.
James McNamara, International Paper Co.
A. A. MacDiarmid, Price Bros.
R. G. Macdonald, Oxford Paper Co.
J. H. MacMahon, Mathieson Alkali Works.
W. G. MacNaughton, Secretary, Technical Association of the Pulp and Paper Industry.
Russell S. Madden, American Writing Paper Co.
Carl Magnus, Standard Paper Manufacturing Co.
F. W. Main, Worthy Paper Co. Association.
Ralph Mair, Dill & Collins Co., Philadelphia.
Chas. L. Mansfield, American Writing Paper Co.
E. K. Mansfield, Robert Gair Co.
L. E. Mansfield International Paper Co.
W. E. Mansfield, International Paper Co.
M. E. Marcuse, Bedford Pulp & Paper Co., Richmond, Va.
Clark Marion, Champion Coated Paper Co.
C. B. Martin, St. Regis Paper Co.
J. O. Mason, Laurentide Co.
Karl Mathie, Wausau Sulphite Fibre Co.
John Matthews, Jr., Department of Commerce, Washington, D. C.
W. R. Maull, Dill & Collins Co., Philadelphia.
Chas. F. Medberry, Canadian Westinghouse Electric Co., Montreal, Can.
A. Y. Meeker, Alberene Stone Co.
A. R. Melker, Ajax Paper Mills, J. P. Lewis Co., Unity Paper Mills.
G. Frank Merriam, Holyoke Card and Paper Co.
S. C. Merrill, Timken Roller Bearing Co.
W. R. Merrill, General Electric Co.
A. F. Meyer, Consulting Engineer, Minneapolis, Minn.
Albert M. Miller, Central Ohio Paper Co.
R. N. Miller, Forest Products Laboratory, Madison, Wis.
W. H. Millspaugh, Paper and Textile Machinery Co., Sandusky, Ohio.
Jessie Minor, Collins Manufacturing Co.
Ogden Minton, Greenwich, Conn.
Don H. Montville, Shartle Brothers Machine Co.
W. D. Mooney, International Paper Co.
F. L. Moore, Westfield River Paper Co.
Geo. W. More, Geo. W. Millar Paper Co.
A. W. Moore, Shawmut Waxed Paper Co.
Ben. C. Morris, Kalamazoo Vegetable Parchment Co.
H. A. Morrison, Oliver Filter Co.
H. A. Moses, Strathmore Paper Co.
D. W. R. Mulford, Crane & Co.
T. R. H. Murphy, New York.

N

E. H. Naylor, Secretary, Writing Paper Manufacturers' Association, Springfield, Mass.
Leon L. Nelson, Bedford Pulp and Paper Co.
Herbert B. Newton, Newton Paper Co.
A. W. Nickerson, Process Engineers, 501 Fifth avenue, New York.
W. A. Nivling, The Huron Milling Co.
W. L. Nixon, American Writing Paper Co.
H. P. G. Nostrand, Saranac Pulp and Paper Co.

O

A. Oatman, Cliff Paper Co.
H. F. Obermanns, Hammermill Paper Co.
E. A. Oberweiser, Whiting-Plover Paper Co.
A. Olafsen, Valter Falls Paper Co.
E. Olsson, Chesapeake Corp.
Maurice O'Meara, President, Mars Paper Corp. 450 Pearl street, New York.

P

L. J. Parant, St. Croix Paper Co.
R. J. Parham, St. Regis Paper Co.
John L. Parsons, Hammermill Paper Co.
C. Patch, Orono Pulp and Paper Co.
Harold J. Payne. New York.
R. Q. Pease, Nashua River Paper Co.
Edwin D. Peck, Reading Paper Mills.
Harold L. Peckham, Hammermill Paper Co.
Walter E. Perry, Chemical Paper Mfg. Co.
J. S. Peters, American Writing Paper Co.
B. M. Petrie, Eastern Manufacturing Co.
C. H. Phipps, Watab Paper Co.
R. C. Pierce, Crane & Co.
W. A. Pitts, York Haven Paper Co.
Jos. E. Plumstead, Jessup & Moore Paper Co.
Theodore M. Pomeroy, Z. & W. M. Crane & Co., Inc.
J. E. Power, Jr., U. S. Rubber Co.
R. W. Prior, Jr., Pulp Bleaching Corp., New York.

Q

Daniel L. Quirk, Jr., Peninsular Paper Co.

R

R. M. Radsch, Thilmany Pulp & Paper Co.
A. P. Ramage, Missisquoi Pulp and Paper Co.
Z. W. Ranck, Crystal Tissue Co.
A. T. Randall, Westinghouse Mfg. and Electric Co.
Walter D. Randall, Champion Coated Paper Co.
Endicott Rantoul, Wausau Sulphate Fibre Co.
W. J. Raybold, B. D. Rising Paper Co.
G. F. Reale, Hooker Electrochemical Co., New York.
E. O. Reed, Government Printing Office, Washington, D. C.
E. A. Rees, F. Huyck & Sons, Albany, N. Y.
R. W. Remont, International Paper Co.
H. H. Reynolds, B. D. Rising Paper Co.
Chas. F. Rhodes, International Paper Co.
C. E. Rice, International Paper Co.
A. F. Richter, Stebbins Engineering and Manufacturing Co.
J. B. Rieg, Irving Paper Mill.
R. B. Rising, B. D. Rising Paper Co.
E. B. Roberts, Bemis Bro. Bag Co.
J. R. Roberts, E. I. DuPont de Nemours Co., Wilmington, Del.
G. C. Robertson, Geo. Roberts & Co.
Chester M. Robbins, St. Regis Paper Co.
Roger S. Robbins, Crystal Tissue Co.
C. P. Robinson, The Borregaard Co., Inc.
H. W. Rogers, General Electric Co.
P. H. Rogers, Carolina Fibre Co.
S. S. Rogers, Chemical Paper Manufacturing Co.
W. F. Robertson, The Robertson Co.
Fred J. Rooney, The Upson Co., Lockport, N. Y.
R. P. Rose, U. S. Rubber Co., 1790 Broadway, New York.
J. O. Ross, J. O. Ross Engineering Corp., New York.
F. C. Rowley, International Paper Co.
H. J. Rowley, Arthur D. Little, Inc.
John D. Rue, Forest Products Laboratory.
J. R. Russell, Marathon Paper Mills Co.

S

C. F. Sammet, Crane & Co.
A. L. Satterthwaite, E. I. DuPont de Nemours Co.
F. H Savage, International Paper Co.
Thos. H. Savery, Nash Engineering Co.
Wm. H. Savery, Harpers Ferry Paper Co.
A. F. Schenkelberger, Safepack Mills.
W. C. Schilling, Paper Novelty Co.
Henry J. Schmidt, Schmidt & Ault Paper Co.
C. C. Schneider, Knowlton Bros.
H. Z. Schniewind, Foreign Paper Mills, New York.
H. H. Schoen, Barrett Co., New York.
E. J. Schreider, Oxford Paper Co.
J. S. Schumaker, Parker-Young Co.
F. L. Scott, Stevens & Thompson Paper Co.
T. Q. Scott, Columbia Paper Bag Co.
W. C. Scott, Dill & Collins Co.
B. W. Scribner, Bureau of Standards, Washington, D. C.
R. T. Scully, General Electric Co., 120 Broadway, New York.
S. E. Seaman, Southern Cotton Paper Co.
P. C. Servaas, Bryant Paper Co.
E. D. Sewall, Arthur D. Little & Co.
Merle B. Shaw, Bureau of Standards, Washington, D. C.
John B. Shepherd, Peninsular Paper Co.
H. B. Shepard, Consulting Forester.
J. D. Shuart, Springfield Glazed Paper Co.
Wm. H. Shuart, Springfield Glazed Paper Co.
Arthur J. Sigel, M. Gottesman Co.
Geo. W. Sisson, Jr., Racquette River Paper Co.
Geo. W. Sisson, 3rd, Racquette River Paper Co.
Lewis H. Sisson, Racquette River Paper Co., Cincinnati, Ohio.
Rufus L. Sisson, Racquette River Paper Co.
H. J. Skinner, Skinner, Sherman & Esselen.
R. E. Skinner, Harmon Paper Co.
C. Skioldebrand, Spruce Falls Co., Ltd.
A. F. Smith, General Electric Co.
A. R. Smith, Keith Paper Co.
Carlton Smith, American Envelope Co.
D. A. Smith, District of Columbia Paper Manufacturing Co.
F. L. Smith, New York.
H. A. Smith, Hamersley Manufacturing Co.
Richard W. Smith, Bird Machine Co.
Roger D. Smith, S. D. Warren Co.
Alfred Southon, Kalamazoo Vegetable Parchment Co.
M. D. Southworth, Southworth Co.
C. L. Spangler, Fox Paper Co.
Spurgeon Spangler, Schmidt & Ault Paper Co.
Geo. K. Spence, New York and Pennsylvania Co.
G. H. Spencer, S. K. F. Industries, Inc.
H. M. Spencer, The Upson Co., Lockport, N. Y.
S. A. Staege, Westinghouse Electric & Mfg. Co.
Elmer Staub, Bayless Manufacturing Corp.
J. N. Stephenson, Pulp and Paper Magazine, Montreal, Que.
F. L. Stevens, Stevens & Thompson Paper Co.
A. J. Stewartson, Wrapping Paper Manufacturing Service Bureau.
V. M. Stouck, New York and Pennsylvania Co.
R. I. Straus, American Paper Co.
E. P. Strong, The Munising Paper Co., Munising, Mich.
Kimberly Stuart, Neenah Paper Co.
Stanley O. Styles, Martin Cantine Co.
B. S. Summers, Port Huron, Mich.
R. Summerville, Knowlton Bros.
H. W. Suter, Champion Coatel Paper Co.
E. Sutermeister, S. D. Warren Co., Cumberland Mills, Me.
R. C. Swan, Peshtigo Paper Co.

T

A. J. T. Taylor.
H. S. Taylor, Dayton, Ohio.
Job Taylor, Halifax Paper Corp., Roanoke Rapids, N. C.
Morgan H. Thomas, Garrett, Buchanan Co.
Exel Thomee, E. M. Sergeant Co., New York.
H. B. Thompson, Stevens & Thompson Paper Co.
C. B. Thorne, Riordon Co., Ltd.
John Traquair, Mead Pulp and Paper Co.
R. C. Tilden, International Paper Co., New York.
E. F. Troop, P. H. Glatfelter Co.

(*Continued on page 243*)

THOSE WHO ATTENDED THE CONVENTION

(*Continued from page* 241)

E. C. Tucker, Chemical Paper Manufacturing Co.
P. Y. Tumy, General Electric Co.

U

Burt F. Upham, Z. & W. W. Crane Co.
Chas. Upson, The Upson Co., Lockport, N. Y.

V

I. O. Van Duzer, Louis DeJonge & Co.
J. B. Van Horn, Holyoke Card & Paper Co.
E. Van Roden, International Paper Co.
Chas. D. Viergiver, Stecher Lithographing Co.
C. D. Volkhardt, Barrett Co., New York.

W

J. M. Wade, General Electric Co.
Chas. K. Wadham, Z. & W. M. Crane & Co.
C. L. Wagner, J. O. Ross Engineering Co.
H. E. Walker, Reading Paper Mills.
J. J. Wall, General Electric Co.
T. C. Walsh, Hollingsworth & Vose Co.
Sigmund Wang, Riordon Co., Ltd.
A. N. Waring, Bayless Manufacturing Co.
A. E. Warren, Harmon Paper Co.
D. F. Warren, Harmon Paper Co.
R. S. Watson, Allis-Chalmers Manufacturing Co.
W. T. Webster, Dill & Collins Co.
W. M. Weeks, Oswego Falls Corp.
P. F. Wehmer, Electrical Testing Laboratories.
M. A. Wellington, Fletcher Paper Co.
J. A. Wesley, Peshtigo Paper Co.
Rolf G. Westad, Borregaard Co., Inc., New York.
J. Westergaard, Atterbury & McKelvey.
Philip Weston, Byron-Weston Co.
Arvid Wetterfors.
Bion D. Wheeler, E. Butterworth & Co.
W. A. Wheeler, A. P. W. Paper Co.
F. B. Whiting, Geo. A. Whiting Paper Co.
George A. Whiting, George A. Whiting Paper Co.
R. H. Whitney, B. F. Goodrich Rubber Co.
A. Wiberg, Gilbert Paper Co.
A. F. Wilcox, U. S. Rubber Co.
A. H. Wilcox, Phoenix Paper Co.
C. H. Wilkinson, Foreign Paper Mills, New York.
W. N. Wilkinson, Union Sulphur Co.
J. E. Willert, American Paper Specialties Assn.
F. M. Williams, Williams Apparatus Co.
W. V. Williams, Beckett Paper Co.
George E. Williamson, Strathmore Paper Co.
S. L. Willson, American Writing Paper Co.
E. J. Wilson, F. C. Huyck & Sons, Albany, N. Y.
Norman W. Wilson, Hammermill Paper Co., Erie, Pa.
Herbert A. Wingate, C. H. Dexter & Sons, Inc.
Edgar Winne, Individual Drinking Cup Co.
F. E. Winslow, General Electric Co.
C. L. Winter, Claremont Paper Co., Groveton Paper Co.
Fred L. Wood, U. S. Envelope Co.
I. Worthman, Universal Crepe and Tissue Mill, New York.
C. R. Wright, Waterproof Paper and Board Co.
Edward Wright, High Falls Pulp and Paper Co.

Y

Leon M. Yoerg, American Writing Paper Co.
D. C. York, Oxford Paper Co.
E. F. Yulke, Continental Paper and Bag Mills.

WRAPPING MEN MEET IN CHICAGO

Eight merchants from down state were guests of the Middle States Wrapping Paper Association at its meeting in Chicago, January 29. Mr. C. R. McMillan, vice-president of the Union Bag and Paper Corporation was the speaker of the day. His talk was on paper in general and bags in particular. Efforts are being made to simplify the present methods of pricing bags on a discount basis and the matter will be reported on at the April meeting. He told his audience that too many merchants spent too much time and effort shopping for bargains and not enough in intensive merchandising of their wares. The advisability of increasing the size of counter rolls was discussed at this meeting. It was found by demonstration of various rolls that an increase in size, especially in the water finishes, make the rolls too unwieldy and the idea of changing the size of rolls has been dropped for the present. The down state merchants got together in the office of C. K. Higgins after the meeting. They were unanimous in the opinion that the talk by Mr. McMillan was the most constructive that they had ever listened to.

JAMES E. MARINER DIES SUDDENLY

The sudden death of James E. Mariner was a tragic occurrence of convention week. Mr. Mariner, who was manager of the Sulphite Pulp Sales Division of the Brown Company, arrived in New York City Sunday evening to attend the convention. He registered at the Waldorf-Astoria but on Monday failed to answer calls which were made to his room.

Monday night the door to his room was forced and Mr. Mariner was found dead in bed, the end apparently having come peacefully as he slept. He was apparently in good health when he arrived in New York Monday night and it is believed that death was due to heart trouble.

The home of the deceased was in Portland, Me., where he was born. He is survived by his widow, a son and a daughter. He became associated with the Brown Company in 1893 at which time it was known as the Burgess-Sulphite Fibre Company. He had been with them continuously ever since.

MR. THOMSON TALKS ABOUT PAPER

At the request of C. C. Whinnery of R. R. Donnelly & Sons Company, Alexander Thomson, vice-president and manager of sales and E. K. Hunt, advertising director, of the Champion Coated Paper Company came to Chicago and gave a talk to the members of the Donnelly organization on what Champion has been doing to modernize the manufacture of paper and eliminate, by co-operative effort the various troubles with which the printers, from Gutenberg to Donnelly, have been afflicted. The talk was illustrated and showed graphically how the Champion organization is what the Germans would call a vertical trust, which is their way of designating a concern which controls all the elements entering into the manufacture of its product. Champion has invested millions and employes 5,500 people to turn out economically and expertly 800,000 pounds of paper daily, and it is Champion all the way from the forests in North Carolina to the perfect sheet on the printers press.

THE CHICAGO PAPER MARKET

The paper situation in Chicago is without notable change in the fine and coarse divisions. Dealers report very satisfactory business, in some quarters, where sales figures were available for the month of January, gratifying increases over the same period a year ago are in evidence. The New Year advances made by a few mills in rag bond and ledgers are now practically general and the new prices have had no noticeable bad effect on consumption. Further weakness developed in the old paper market last week. One mill shut down for extensive alterations and another had on hand such a supply of pulp that it was compelled to place an embargo against raw material. A bad fire at the National Biscuit Company is said to have made unfit for use some seven hundred tons of finished containers which were salvaged back to the mills as waste paper. Values in mixed and news have consequently suffered to from five to ten cents in extent.

TEXAS GULF SULPHUR EARNS $7.58 SHARE

Through curtailment of expenses, the Texas Gulf Sulphur Company in 1924 was able to turn lower gross revenue into somewhat increased net income. Net earnings, after taxes and charges for the year ended December 31, last, amounted to $4,814,016, as compared with $4,737,020 in 1923, which was equivalent to $7.58 a share on the outstanding 635,000 shares of $10 par stock, against $7.45 a share in the preceding year.

The income account for the year, just issued, shows gross income of $9,814,976, as compared with $10,746,160 in 1923. Expenses, Federal taxes, etc., amounted to $5,000,960, as compared with $6,009,140 in 1923.

After payment of dividends the company had a surplus at the end of 1924 of $51,516, as compared with a surplus of $768,270 at the end of the preceding year. Profit and loss surplus stood at $7,107,284, as compared with $7,055,767 at the end of 1923.

Tomahawk Kraft Paper Co. Ideally Located

Mill Started in June of Last Year Is Situated in One of the Richest Pulpwood Producing Sections of the State of Wisconsin—Company Operates Its Own Hydro-Electric Power Stations at Grandmother Falls on the Wisconsin River—Plant Consists of Sulphate Wood Pulp Mill Equipped With Up-to-Date Machinery and Paper Mill With One 133-Inch Moore & White Fourdrinier Paper Machine.

Written Especially for the Annual Number of the Paper Trade Journal.

The Tomahawk Kraft Paper Company mill, recently completed, is very favorably situated on the Wisconsin River about two miles south of the city of Tomahawk, Wis., in one of the richest pulpwood producing sections of the state of Wisconsin.

Tomahawk is a city of 4,000 inhabitants in the "Land O Lakes," the great summer playground of Wisconsin. The river is here enlarged by the waters of the Tomahawk and Somo rivers, while two miles below the city the Spirit River flows in. Along the shores of these rivers and on the shores of numerous lakes around the city are summer cottages occupied during the season by owners from many different states.

Started Operating in June

The Tomahawk Kraft Paper Company's plant was put in operation in June, 1924, and has been running to capacity since that time, its product No. 1 Kraft having found favor with the trade. The mill has shipping connections with the Chicago, Milwaukee & St. Paul, the Soo Line and the Chicago and North Western railroads. It is served by the Marinette, Tomahawk and Western Ry.

The Power House

The company owns its own hydro-electric power station at Grandmother Falls on the Wisconsin River for the operation of its machinery. It is also connected with the Wisconsin Valley Electric Company's system of power lines for the exchange of electric power.

The power house is situated about five miles below the mill and is reached from Tomahawk by two highways, one a County Trunk and the other State Highway 91. The beautiful pond and power station may be very easily viewed by tourists using Highway 91.

The power station has three Allis-Chalmers Nagler type waterwheels direct connected to 1,500 H. P. General Electric Vertical Generators and is equipped with full automatic switching control and is the first power station on the river so equipped.

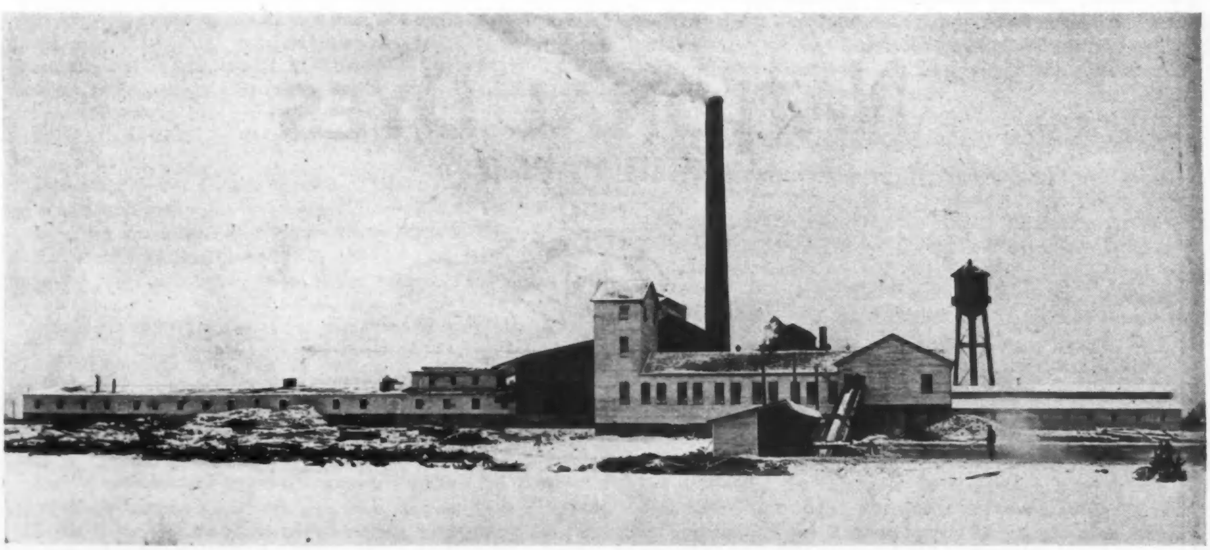
The paper plant itself consists of wood yard, sulphate pulp mill, boiler house, paper mill, repair shop and warehouses for raw and finished goods.

The Wood Pulp Mill

The pulp wood arrives at the mill partly by rail, also to a large extent by the compayn's tractors and team haul from the surrounding forests. The wood is unloaded into the hotpond by means of a locomotive crane. The hotpond has sufficient capacity and temperature to thaw out the frozen wood in the most severe winter weather. The wood is conveyed from the hotpond to saw; to an American Barking drum, thence to chipper and digester loft.

Worthy of special mention is the chipper, the latest development in its class. The chipper spout is of special design and the shaft has large ball radial and thrust bearings. The machine is built by D. J. Murray Manufacturing Company of Wausau, Wis. The three Digesters are of the revolving type and riveted. They are built by Manitowoc Engineering Works, Manitowoc, Wis.

Of the other pulp mill machinery may be mentioned—one Buffalo



NEW PLANT OF THE TOMAHAWK KRAFT PAPER CO.

Evaporator, one Oliver Continuous Filter, four screens and three deckers by Improved Paper Machinery Company. The deckered pulp is pumped from decker chest to two Valley Iron Works Niagara Beaters and finished on three Jones Imperial Jordans.

The Paper Mill

The 133-inch paper machine built by Moore & White Company is equipped with three Bird Screens, two Milspaugh Suction Rolls and a new Beloit Winder. The machine is driven by an Allis-Chalmers steam engine, the exhaust from same being used for drying.

Steam is furnished by four Wickes boilers equipped with type E Stokers. There is a large concrete storage bin for coal with an overhead crane for unloading of cars and conveying the coal to the bunkers.

The output of the mill is forty-five tons of finished paper per twenty-four hours.

The officers of the company are: A. L. Kreutzer, president; John F. Ross, 1st vice-president; S. B. Bugge, 2d vice-president and manager; D. C. Everest, secretary and treasurer; W. H. Knoedler, assistant secretary and treasurer. Directors: S. B. Bugge, F. H. Camphausen, D. C. Everest, A. L. Kreutzer, Willits Pollock, John F. Ross, F. P. Stone, H. M. Thompson, C. C. Yawkey.

LIEUT.-COL. THOMAS A. GIBSON DEAD

The death of Lieut.-Col. Thomas A. Gibson at his home in Toronto on Saturday night occasioned a shock to his many friends in legal, military and pulp and paper circles. He had been in poor health for some time but it was not supposed that any danger existed. Col. Gibson was Vice-President of the Spanish River Pulp and Paper Mills and president of the Fort William Paper Company, Fort William, and was widely known and highly esteemed by the members of the industry througthout Canada. He was born in Ingersoll, Ont., in 1875 and, after obtaining his education at the University of Toronto and Osgoode Hall, he began the practice of law in which he enjoyed a successful career. Before the war broke out he formed a partnership with his brother, Joseph G. Gibson, who is secretary of the Spanish River Pulp and Paper Mills, and carried on under the name of Gibson & Gibson.

Just ten years ago, Col. Gibson resigned from the presidency of the Lake Superior Corporation of which he had previously been secretary-treasurer. He went overseas during the Great War and was largely instrumental in raising the 168th (Oxford) battalion, going across the water as senior major. He was mentioned in despatches and awarded the D. S. O. in 1918. Returning to the Old Country he became assistant deputy minister of militia overseas and for his efficient services was awarded the C. M. G. While in England he adjusted most of the war claims between Great Britain and the Colonies.

On coming back to Canada he resumed his work as general counsel of the Lake Superior Corporation and later became connected with pulp and paper companies. He is survived by his wife and five children. His funeral was largely attended and many prominent pulp and paper men were present at the last sad rites.

QUEBEC FARMERS ASK PULPWOOD EMBARGO

Dominion legislation placing an embargo on the export of pulpwood from Canada was favored in a resolution adopted at Montreal Wednesday by the United Farmers of Quebec in convention, the argument being that it would force Americans to manufacture their pulp in Canada.

Linked with this resolution was a protest against the invasion of Quebec markets by California and New England truck produce, and the farmers urged high tariff dues that would leave the Canadian market free to Canadian growers.

The question of the pulpwood embargo came up through a resolution offered proposing that export of all raw materials from Canada be prohibited. Pulpwood, nickel, asbestos and tobacco were specifically mentioned and the motion added that forcing greater manufactures in the Dominion would provide a greater urban market for Canadian farm products.

John W. Ward of Winnipeg, Secretary of the Canadian Council of Agriculture and member of the United Farmers of Manitoba, reminded the farmers that if they cut off the American demand for pulpwood, the Canadian mills, having the market at their mercy, would cut the price per cord, settlers generally would suffer, and the farmers would feel the restricted market.

"The policy you are favoring," the speaker went on, "might well be applied to wheat. If you forbade the export of wheat and said that flour alone should go out of the country, where would your market go? Europe would get wheat elsewhere because Europe wants wheat, not flour."

The majority of the farmer delegates, however, spoke of the harm American vegetables were doing to them, stating that open air cultivated produce from the United States could more than compete with Canadian glass-grown articles, and they passed both resolutions.

HOWARD-HINES NUPTIALS

In a setting of splendor and costliness unequalled in all Chicago's society history, Miss Loretta Hines, daughter of a millionaire lumberman, Saturday, January 24, became the bride of Howell Howard, treasurer of the Aetna Paper Company of Dayton, Ohio, and treasurer of the Howard Paper Company of Urbana, Ohio.

The wedding was held in the Holy Name Cathedral.

A prince of the church, George Cardinal Mundelein, read the service; a Rosary from Pope Pius XI was carried by the bride and 2,000 guests heard Tito Schipa, tenor of the Chicago Opera sing to the accompaniment of musicians from the Chicago Symphony orchestra.

Mr. and Mrs. Howard will sail in a few days for England, where they have taken a house at Warwickshire for the hunting season. They will remain abroad for six months and will be at home in Dayton on July 1 at Maxwellton, the groom's country place, near the Miami Valley Hunt and Polo club.

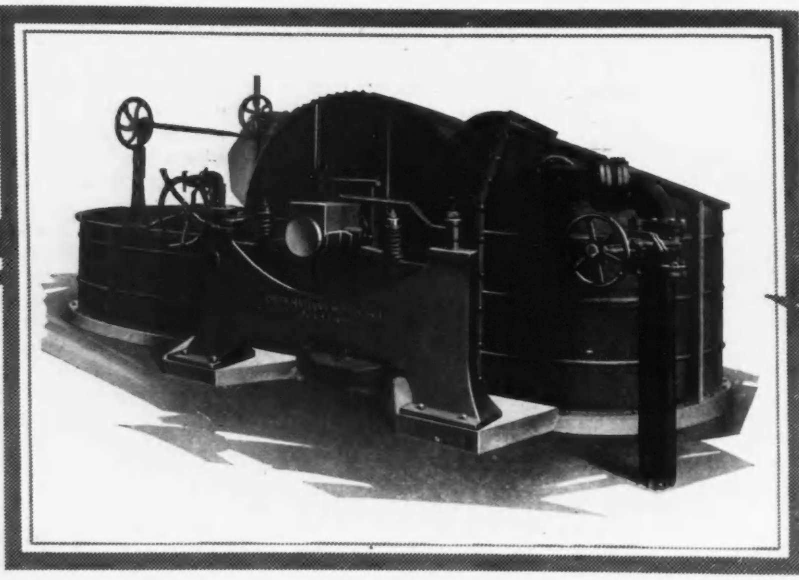
The bride is a graduate of Bennet's school, Millbrook, N. Y., and later went abroad, where she was tutored by Mlle. DeMauray in Paris. She is an "out-of-doors girl," fond of horse back riding and hunting. Mr. Howard is a graduate of Yale and after a post graduate course there, attended Oxford church college, Oxford England, where he won the famous Oxford steeplechase, an honor rarely captured by an American. Mr. Howard is also a skillful horseman and plays on the Dayton polo team.

PAPER COMPANIES ELECT NEW OFFICERS

At the annual meeting of the Garden City Paper Mills Company, which was held recently at St. Catharines, Charles V. Syrett, of Toronto, former secretary-treasurer of the company, was elected president, succeeding the late L. H. Gardner. Leo. E. Charles, of Toronto, was appointed secretary-treasurer. The annual meeting of the Canadian Vegetable Parchment Company, Merritton, was also held lately. Charles V. Syrett was re-appointed president and Lea E. Charles, secretary-treasurer. The prospects in business were reported brighter and both firms anticipate a much better year than last.

NOW WATERFALLS PAPER MILLS

The Poland Paper Company of Mechanics Falls, Maine, has just announced the change in its corporation title to that of the Waterfalls Paper Mills. The change does not affect the personnel of the organization and is made largely to link the name of the mill with that of the products. The New York office of the company is located at 200 Fifth avenue.



Canada's Pulpwood Embargo Problem Unsolved

After a Year of Energetic Controversy Matter Is Still in the Air and There Seems Little Likelihood of Sufficient Agreement to Justify the Federal Government in Putting Embargo in Force—High Spots in Report of Royal Commission on Pulpwood Presented to Parliament—What Canadian Pulp and Paper Association Says in Explaining Its Policy Favoring an Embargo—Possible Retaliation.

Written Especially for the Annual Number of The Paper Trade Journal by C. L. Sibley

The most important question agitating the pulp and paper industry in Canada during the past year has been the question of the proposed embargo on the export of pulpwood. This question has been the subject of a bitter controversy throughout the whole year. The Royal Commission on Pulpwood, which was appointed by the Federal Government to study the question, made a most exhaustive investigation covering all parts of the Dominion.

After the investigation had been proceeding for about 12 months, the Government learned that the members had gone to Washington to take evidence and at once peremptorily ordered them to return to Canada, the Minister of Finance intimating that it was about time they presented a report and got off the payroll. This incident serves to indicate the public impatience in the matter.

Report of the Royal Commission

The report of the Commission was duly presented to Parliament. It comprised a Blue Book of about 300 pages and gave an exhaustive report of the question, dealing with it both in a general manner and from the point of view of each of the provinces throughout the Dominion. The report also dealt exhaustively with the fundamental principles underlying forest conservation in Canada. In their conclusion the Commission made no recommendation as regards an embargo but made the following statements:

"There is a great difference of opinion as between the officials of various governments, as to whether an embargo, or an export tax, or neither of them should be applied. It may definitely be stated, however, that should an export tax be adopted, the only basis upon which it could possibly be construed as serving the purposes of conservation would be that all revenue to be derived through the operation of the tax should be applied in forest protection through the federal and provincial services. In the present state of our forest conditions and forest industries, the application of any export tax, ostensibly as a measure of conservation, but actually for the purpose of securing revenue to apply in other directions, would be literally 'adding insult to injury.' For generations, our forest capital has carried far more than its proper burden in supporting public expenditures. If, therefore, an export tax were to be applied, its only justification lies in the application of the funds derived therefrom directly to the work of maintaining and developing the forest resource."

The Commission added that:

"Owing to the many intricacies involved in the pulpwood export question; in the complications as between forest conservation and trade relations; in view of the fact that the character and extent of the restrictions would necessarily depend upon the extent to which the Government might otherwise go in conservation; finally, as the facts have been very plainly and fully laid before the Government, the Commission takes the view that the actual determination of a policy must rest with the Government."

The leading advocate of an embargo on pulpwood is Frank J. Barnjum, who has secured unprecedented publicity in the newspapers for his various articles on the subject. He has also secured a good deal of editorial support in the newspapers, but during the latter part of the year he announced that he had become so disgusted at the fact that the Government had taken no action in the matter that he had decided to sell out all his interests in Canada and migrate to another country.

Canadian Pulp and Paper Association

The policy of an embargo has also found a champion in the Canadian Pulp and Paper Association, whose membership comprises most of the leading pulp and paper companies in the country. The principal point made by this Association is that none of the great American pulp concerns which import raw pulpwood from Canada have participated in any of the concerted efforts towards conservation which have been carried on by the owners who have mills in Canada; and also that many American concerns possessing large timber limits in the United States are conserving them by cutting as little as possible, while they fill their requirements by importing wood from Canada. On this point the Association says:

"Their attitude towards Canada is naturally and necessariy that of getting what they can while the getting is good; a tree saved in the United States, where they can always get at it, is easily worth two trees chopped down in Canada, between which and their mills there may at any time arise the barrier of an export or an import duty, an embargo, or a sharp increase in the cost of transportation."

The Association claims that the paper manufacturers in the United States have been drawing over a million cords of wood from Canada for the past 15 years, although they use a total of less than 6,000,000 cords a year. The Association claims that if an embargo went into effect there would be a sharp reduction in the Canadian cut for a time but that American companies would immediately proceed to build pulp mills in Canada and that once established on a close and permanent relation with other Canadian sources of raw materials, these new mills would have as keen an incentive for the preservation of the forests as any plan now operating in Canada; and the practice of "mining" or recklessly impairing areas of wood pulp timber would cease to be profitable to any owners of such areas in Canada, while the amount of capital and labor in Canada directly concerned in conservation would be increased by immense additions.

The Association has discussed two alternatives to an embargo; one is an export tax and the second is negotiations with the United States for further tariff concessions in the shape of free admission of papers other than news print. The Association does not favor an export tax, on the ground that if it once became a source of revenue to the Government, it is likely that it would thereafter be encouraged rather than repressed. As to the question of tariff concessions by the United States, it says:

"Certainly the claim of the United States to unrestricted exploitation of Canada's raw paper making material would rest on sounder ground if that country were willing to accord duty free entry to the finished products made from such raw materials."

DORR SAVE-ALLS, installed within the last eighteen months, are RECOVERING OVER 25,000 POUNDS OF STOCK FROM WHITE WATER WASTE. —EVERY DAY!

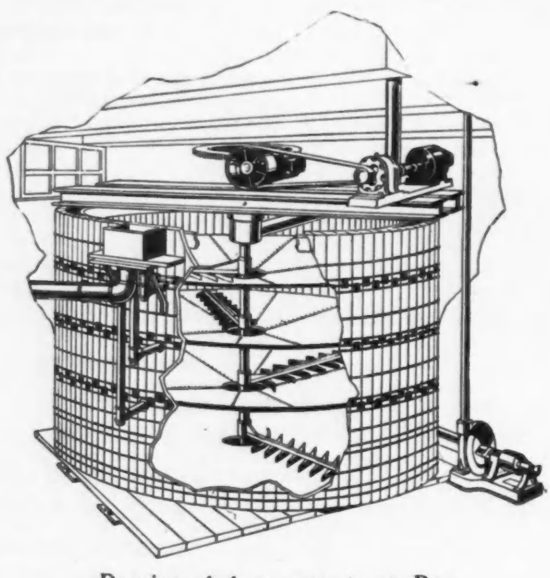
—When new installations, now under construction are completed this figure will be more than doubled. ***This represents a recovery of 90% to 98% of good clean stock from the waste white water flow, which is sent back directly to the paper machines.***

SELDOM has a machine sold itself as completely as the Dorr Save-all has done. The first installation made after the Dorr Company had developed the machine by months of testing and with the experience of years in just this type of problem, was in a mill in Maine. So profitable did this investment prove to be, that the company ordered four more for its other mills.

The next company to try the Dorr Save-all was one in Pennsylvania. Again, the surprising economy effected led to a repeat order for another unit.

Similarly in Minnesota, when a four-compartment Dorr Save-all actually started saving $100 per day, the company immediately ordered another with five compartments. On the basis of results from these and other installations, there are seven Dorr Save-alls being erected at the present time.

Do these results not prove that the Dorr Save-all has a very definite contribution to make to paper mill economy and efficiency? Let us send you the data collected from tests on Dorr Save-alls in operation. They will be interesting and very valuable.



Drawing of four compartment Dorr Save-all showing the mechanism for collecting and removing the settled fibre and overflowing the clarified water.

THE DORR COMPANY

ENGINEERS

247 Park Avenue New York City

Denver, 1009 17th St. Chicago, 38 South Dearborn St. Los Angeles, 108 West 6th St. London, 16 South St. E. C. 2

RESEARCH TESTS DORRCO DESIGN EQUIPMENT

Provincial Premiers Against Embargo

As against the proposed embargo, a surprisingly strong opposition has developed. The Provincial Governments of Quebec and Nova Scotia appear to be definitely in opposition to an embargo, on the ground that it would be an invasion of civil rights, which are vested exclusively in the provinces.

Premier Taschereau, speaking in the Quebec legislature, expressed himself as being unalterably opposed to a policy of embargo on the export of pulpwood from Canada. Each province, he said, should handle the matter of their respective forests, and he suggested a "hands-off" policy for Ottawa. The Premier said he did not see the wisdom of Federal legislation for only a small percentage of the lumber supply. There was talk of conserving the forest resources of Canada for Canada industry, but it was well to remember that fires did 18 times as much amount of damage to the forests as was done by the woodsman. Destruction of the forests was mainly due to the fire fiend, while insects came second in the amount of damage done, and the lumbering operations were third. As regards cutting, the Government intended to introduce legislation that would deal with the matter, and he hoped that the fire problem would be handled with the co-operation of the Federal Government and the interested timber limit holders, while as for the insect pest the intention was to spend $30,000 this year in combating this scourge.

Mr. Taschereau said that in his opinion it was for each province to protect its own forests, since in each province the forest constituted a great source of wealth, and each province should study the best means of fire protection.

Limit Holders in Strong Opposition

Meanwhile a strong organization of limit holders in Eastern Canada has been formed, known as the Canadian Pulpwood Association, and this Association is carrying on an active campaign against an embargo. The Association holds that an embargo would be futile as a measure of conservation, its view being that:

"It is neither exporting nor cutting which is threatening the forests of Canada. It is estimated by advocates of the embargo that cutting accounts for only 10 per cent of our annual wood consumption, and that the remaining 90 per cent is destroyed by fire, wind, bugs, fungi, etc. Of this 10 per cent which is cut, one-twentieth is pulpwood which is exported. This means that under the mask of 'Conservation,' it is proposed to stop the export of one two-hundredth, or one-half of one per cent, of our total wood consumed, and the burden of this spasm of conservation is to fall exclusively on wood which happens to have been manufactured in a rossing drum instead of by a circular saw. Conservation thus limited is a misnomer."

The Association suggests that in order to conserve the forests of the Dominion, the Government should dedicate absolute forest land to the production of timber; encourage the practice of forestry of private lands; increase fire protection; regulate cutting; carry on a constant educational campaign; protect and encourage reproduction by natural seeding; and cooperate with representative Forestry Associations.

Possible U. S. Retaliation

The Association also deprecates an embargo on the ground that it might provoke retaliatory action by the United States, and in this connection it quotes from the United States Statutes of 1923, page 347, paragraph 1301, the following:—

"The duty on printing paper not specifically provided for shall be one-fourth of one cent per pound, and ten per cent ad valorem, with a provision that if any country, etc., forbids or restricts or imposes any export duty, etc., on printing paper, wood pulp or wood for use in the manufacture of wood pulp, the President may enter into negotiations with such country for the removal of such prohibition, etc., and if not removed he may, by proclamation, declare the failure of the negotiations. Thereupon until the removal of such prohibition, etc., printing paper imported directly or indirectly from such country, etc., shall pay an additional duty of ten per cent ad valorem, and in addition thereto an amount equal to the highest export duty imposed by such country, etc., upon either an equal amount of pulpwood or wood for use in the manufacture of pulpwood, necessary to manufacture such printing paper."

Opposition of American Manufacturers

Active opposition to the embargo has also been carried on by Aime Geoffrion, one of the most eminent attorneys in Canada, on behalf of a number of pulp and paper manufacturers in the United States. He has put on record, for the information of the Government, particulars in regard to various companies which have investments in timber lands in Canada, and he maintains that these companies have not been "mining" timber but have carefully conserved their property. He sums up his argument against the embargo as follows:

"The foregoing shows the condition of a few of the United States companies operating in Canada and is sufficient to show the tremendous investment of United States capital both in leases and in freehold lands and in the improvements of lands and rivers in Canada. The greater proportion of the investments were made long prior to the talk of any embargo and as far as twenty years back, in good faith, and the operation has been in co-operation with the Government, and in accordance with the best interests of the forests and the operation of the mills.

"While it is conceded that the Canadian Government, either Provincial or Dominion, has the absolute power to make such regulations as it sees fit with reference to its natural resources, it is confidently submitted that no such drastic action would be taken by either the Dominion or Provincial Government as an embargo on the exportation of pulpwood from freehold lands.

"Such an embargo would only effect a small portion of the forest area of Canada, namely ten or less than ten per cent of the total forest area.

"If the farmers were exempted as promised by the Premier it would affect less than 1 7/10 per cent of the total amount of lumber cut in Canada.

"It would amount to a practical confiscation of the property and contract rights of freehold owners of lands and leases, the purchases and improvements on which were made in good faith long before action of this kind was taken; and

"So far as leases from the Government of Nova Scotia to any of the American companies, approved by the Legislature, are concerned, would amount to the same thing as the repudiation of a bond issued by Act of the said Legislature."

No Likelihood of Agreement on Embargo

It will be gathered from the above that the question of a pulpwood embargo is a highly controversial one on which there is hardly any likelihood of sufficient agreement to justify the Federal Government in believing that it has a mandate to put such an embargo in force. It is possible, however, that the result will be a much stricter supervision of pulpwood cutting for export and also that the campaign will awaken a demand for negotiations with the United States with a view to further concessions in the matter of duties on paper superior in quality to news print.

In this connection much capital has been made of the fact that Chicago interests have erected at Tonawanda, N. Y., a mill for the manufacture of paper for the new publication "Liberty," the raw material for which mill, it is understood, will come entirely from Canada.

It also seems evident that the campaign will result in a greatly awakened interest in the whole subject of conservation, both by the Federal Government and the various Provincial Governments.

It is probable that at the forthcoming session of the Dominion Parliament, the subject will come up for discussion and that legislation of some character in connection with it will be introduced by the Government.

Awards Made for Government Paper

Joint Congressional Committee on Printing Meets at Washington, D. C., on Monday of This Week and Makes Awards for Supplying Numerous Varieties of Paper to the Public Printer for Both the Six Months and the Yearly Period Beginning March 1, 1925—Contract is Awarded to Mathers-Lamm Paper Co. for Furnishing 500,000 Lbs. of Plant Fiber Paper—Complete List of Concerns Getting Awards.

Specially Reported for the Paper Trade Journal

Pursuant to announcement made at the opening of proposals, the Joint Committee on Printing met at Washington, D. C., Monday for consideration of awards and with respect to the supplies of paper for the government printing office for six months and a year from March 1, 1925, as follows:

Standard News Print

Lot No. 1. 40,000 lbs., News Print Paper, 24 x 36 inch, rolls, 32 lb., 19 inches wide, 3 inch cores, International Paper Company, New York City, 3.805 cents, six months.

2. 3,000,000 lbs., 24 x 36, 32 lb., rolls 48 inch, 3 inch cores, International Paper Company, 3.805 cents, six months.

Machine Finished Book

3. 300,000 lbs., 25 x 38 inch, 35 lb., flat, 24 x 32, 28 x 38, and 31¼ x 45½, P. H. Glatfelter Company, 5.74 cents, each six months and one year.

4. 1,000,000 lbs., 25 x 38 inches, 35 lb., flat, 24 x 38 and 38 x 48, P. H. Glatfelter Company, 5.74 cents each six months and one year.

5. 1,000,000 lbs., 25 x 38 inch, 35 lb., flat, 24 x 38 and 38 x 48 inches, P. H. Glatfelter Company, 5.74 cents, each six months and a year.

6. 1,500,000 lbs., 25 x 38 inch, 35 lb. rolls, 18 x 19, 21, and 23 inches wide, 3 inch cores. The Whitaker Paper Company, Baltimore, 6.09 cents, each six months and one year.

7. 1,200,000 lbs., 25 x 38 inches, 35 lb., rolls, 18 inch 3 inch cores, P. H. Glatfelter Company, 5.62 cents, each six months and one year.

8. 1,200,000 lbs., 25 x 38 inch, 35 lb., rolls, 38 inches wide, 3 inch cores, P. H. Glatfelter Company, 5.62 cents, each six months and one year.

9. 600,000 lbs., 25 x 38 inch, 35 lb., rolls, 48 inches, 3 inch cores, P. H. Glatfelter Company, 5.62 cents, each six months and one year.

10. 400,000 lbs., 25 x 38 inch, 40 lb., rolls, 36¾ and 38 inches wide, 3 inch cores, P. H. Glatfelter Company, 5.62 cents each six months and one year.

11. 800,000 lbs., 25 x 38 inch, 40 lb., flat, 24 x 38, 34¾ x 64, and 38 x 48 inches, P. H. Glatfelter Company 5.62 cents, each six months and one year.

12. 40,000 lbs., 25 x 38 inch, 50 lb., rolls, 33¾ inches, 3 inch cores, P. H. Glatfelter Company, 5.62 cents, each six months and one year.

13. 40,000 lbs., 25 x 38 inch, 50 lb., flat, 24 x 38, 32 x 42, and 38 x 48, and 41 x 52, P. H. Glatfelter Company, 5.74 cents, each six months and one year.

14. 100,000 lbs., 25 x 38 inch, 60 and 70 lbs., flat, 29 x 41 and 38 x 48, P. H. Glatfelter Company, 5.74 cents, each six months and one year.

15. 15,000 lbs., colored, no bids.

Machine Finished Book End Paper

16. 200,000 lbs., flat, 28 x 38, book end paper for waste leaves, 80 lb., grain to run 38 inch way, R. P. Andrews Paper Company, Washington, D. C., 6.59 cents, one year.

17. 500,000 lbs., Plant Fiber, Machine Finished Book Paper 25 x 38 40 lb., rolls, 19, 38, and 48 inches, Mathers-Lamm Paper Company, Washington, D. C., 11.90 cents, each six months and a year.

18. 500,000 lbs., Plant Fiber, Machine Finished Book Paper, all bids rejected.

Antique Book

19. 80,000 lbs., 25 x 38 inch, 50 lb., flat, 25 x 38, 29 x 41, and 38 x 50 inches, P. H. Glatfelter Company, 5.74 cents, six months.

Lightweight Machine Finished Book

20. 100,000 lbs., Lightweight, basis 25 x 38 inches, 30 lb. all bids rejected.

50% Rag Light Weight Machine-Finish Book

21. 50,000 lbs., 50%, 25 x 38 inch, 30 lb., flat, 32 x 48, and 38 x 48 inches, Bryant Paper Company, 12.40 cents, one year.

50% Rag Machine Finish Book

22. 80,000 lbs., 25 x 38 inch, 40 lb., flat, 32 x 48 inches, all bids rejected.

23. 350,000 lbs., 25 x 38 inch, cut 38 x 48 inches, all bids rejected.

24. 80,000 lbs., 25 x 38 inch, 40 and 45 lb., flat, all bids rejected.

Supercalendered Book

25. 30,000 lbs., 25 x 38 inch, 45 lb., flat, 24 x 32, and 32 x 48, P. H. Glatfelter Company, 6.22 cents, each six months and one year.

26. 500,000 lbs., 25 x 38 inch, 45 lb., flat, 31¼ x 45½ inches, P. H. Glatfelter Company, 6.22 cents, six months and one year.

27. 700,000 lbs., 25 x 38 inch, 45 lb., flat, 24 x 38 inch, and 38 x 48 inches, P. H. Glatfelter Company, 6.22 cents, each six months and a year.

28. 700,000 lbs., 25 x 38 inch, 45 lb., rolls, 38 inches wide, 3 inch cores, R. P. Andrews Company, 6.18 cents, one year.

29. 700,000 lbs., 25 x 38 inch, 45 lb., rolls, 38 inch, 3 inch cores, R. P. Andrews Paper Company, 6.18 cents, one year.

30. 40,000 lbs., 25 x 38, 45 and 50 lbs., flat, minimum, 24 inches, maximum, 42 inches, P. H. Glatfelter Company, 6.22 cents, six months and one year.

50% Rag Supercalenedered Book

31. 20,000 lbs. 25 x 38 inches, 40 and 45 lbs., flat, cut 32 x 48 inches, Lindemeyer & Harker, Baltimore, Md., 11.75 cents, one year.

Half-Tone Paper

32. 200,000 lbs., 25 x 38 inch, 70 lbs., flat, cut 24 x 38 and 38 x 48, P. H. Glatfelter Company, 6.38 cents, one year.

White Sulphite Ledger Paper

33. 150,000 lbs., 25 x 38, 70 lbs., flat, 29 x 41, 38 x 48, and 41 x 52 inch, The Whitaker Paper Company, 8.13 cents, one year.

DOUBLE COATED BOOK

34. 150,000 lbs., basis 25 x 38 in., 70 and 80 lb., flat, cut 24 x 32, 24 x 38, and 38 x 48 inches. The Whitaker Paper Company, 8.59 cents, one year.

50% RAG DOUBLE COATED BOOK

35. 35,000 lbs., basis, 25 x 38, 70 and 80 lb., flat, cut 24 x 38 and 38 x 48. Allied Paper Mills, 11.75 cents, six months.

MIMEOGRAPH

36. 1,200,000 lbs., 25 x 38, 50 lbs., flat, cut, 21½ x 32½, 25½ x 32½, and 25½ x 41½ inches. P. H. Glatfelter Company, 5.62 cents, one year; 5.99 cents, in one ream wrapped packages, one year.

50% RAG MIMEOGRAPH

37. 1,000,000 lbs., 25 x 38 inches, 50 lbs., flat, 21½ x 32½, 25½ x 32½, and 25½ x 44½. The Old Dominion Paper Company, Norfolk, Va., 7.874 cents, one year. Bids on one ream packages wrapped rejected.

RULE U. S. M. O. SAFETY WRITING, SAFETY OR SENSITIVE DESIGN

51. 500,000 lbs., No. 16, rolls, 11 and 22 inches wide, 3 inch cores, Perfect Safety Paper Company, 13.69 cents, one year.

U. S. M. O. WRITING, WHITE AND BLUE

52. 8,000 No. 16, rolls 8½ inches, 3 inch cores, R. P. Andrews Company, 11 cents, one year.

SAFETY WRITING, COLORED

53. 4,000 lbs., Blue, Grey, Pink, Salmon and Yellow, No. 20, flat, 17 x 28, 21 x 32, and 22 x 34, Perfect Safety Paper Company, 20 cents, one year.

SULPHITE WRITING, WHITE AND COLORED

54. 25,000 lbs., Sulphite writing, White, No. 13, flat, cut, 21 x 32, and 23 x 32, Whitaker Paper Company, 7.73 cents, each six months and one year.

55. 150,000 lbs., White No. 16, flat, cut, 21 x 32, 22 x 34, 24 x 38, and 26 x 34½ inches, Whitaker Paper Company, 7.38 cents, each six months and one year.

56. 700,000 lbs., White, No. 20, flat, 17 x 28, 21 x 32, 22 x 34, and 24 x 38, Whitaker Paper Company, 7.18 cents, each six months and one year.

57. 150,000 lbs., White, No. 13, rolls, min., 16 inches, max., 24 in. 2 in. cores, Whitaker Paper Company, 6.79 cents, each six months and one year

58. 40,000 lbs., White, No. 16, rolls, min., 16, max., 24 in., 3 inch cores, The Whitaker Paper Company, 6.34 cents, each six months and one year.

59. 300,000 lbs., White, No. 20, rolls, min., 16, max., 24, in., 3 inch cores, The Whitaker Paper Company, 6.24 cents, each six months and one year.

60. 50,000 lbs., colored, blue, buff, green, pink, salmon and yellow, No. 13, flat, cut 17 x 28, 21 x 32, 22 x 34, and 24 x 38 inches, The Whitaker Paper Company, 8.83 cents, each six months and one year.

61. 3,000,000 lbs., colored as above, No. 16 and 20, flat, cut, 17 x 28, 21 x 32, 22 x 34, and 24 x 38 inches, The Whitaker Paper Company, 8.28 cents, each six months and one year.

100% RAG WHITE WRITING, TUB-SIZED, AIR-DRIED

62. 5,000 lbs., No. 28, flat, cut, 21 x 32 inches, Mathers-Lamm Paper Company, 23.90, one year.

LITHOGRAPH-FINISH MAP

63. 10,000 Nos. 16 and 20, flat, 24 x 38, 30 x 40, 32 x 48, 36 x 52, and 38 x 48, Sidney L. Willson, Receiver, American Writing Paper Company, 11.66 cents, one year.

50% LITHOGRAPH-FINISH MAP, TUB-SIZED, AIR-DRIED

64. 200,000 lbs., Nos. 20, 24 and 28, flat, cut, 36 x 52, 38 x 48, 40 x 52 and 44 x 64, grain to run lengthwise of the sheet, Barton, Duer & Koch Paper Company, Washington, D. C., 13.95 cents, one year.

75% RAG LITHOGRAPH-FINISH MAP, TUB-SIZED, AIR-DRIED

65. 100,000 lbs., Nos. 16 and 20, flat, cut, 24 x 38, 30 x 40, 32 x 48, 36 x 52, 38 x 48, 40 x 52 and 44 x 64, grain to run lengthwise of the sheet, Mathers-Lamm Paper Company, 16.40 cents, one year.

66. 40,000 lbs., Nos., 24 and 28, flat, cut, 38 x 44, 41 x 50, and 44 x 64, grain to run lengthwise of the sheet, Mathers-Lamm Paper Company, 16.00 cents, one year.

MANIFOLD PAPER

67. 100,000 White sulphite, No. 9, flat, cut, 17 x 28, 19 x 24, 21 x 32, 22 x 34, R. P. Andrews Paper Company, 10.84 cents, one year.

68. 100,000 lbs., Colored Sulphite, blue, buff, green, pink, salmon, and yellow, No. 9, flat, cut, 17 x 28, 19 x 24, 21 x 32, and 22 x 34, R. P. Andrews Paper Company, 11.84 cents, one year.

50% RAG MANIFOLD WHITE AND COLORED

69. 30,000 lbs., White, No. 7, flat, 17 x 28, 19 x 24, 21 x 32, and 22 x 34, Sidney L. Willson, Receiver, 21.56 cents, one year.

70. 250,000 lbs., White, No. 9, flat, cut, 17 x 28, 21 x 32, 22 x 34, and 24 x 38, Dobler & Midge, Baltimore, 20.46 cents, one year.

71. 40,000 lbs., Colored, blue, buff, green, pink, salmon and yellow, No. 7, flat, cut, 17 x 28, 19 x 24, 21 x 32, and 22 x 34, Sidney L. Willson, Receiver, 24.24 cents, one year.

72. 50,000 lbs., Colored, as above, No. 9, flat, cut, 17 x 28, 21 x 32, 22 x 34, and 24 x 38 inches, Sidney L. Willson, Receiver, 22.46 cents, one year.

100% RAG WHITE MANIFOLD, TUB-SIZED, AIR-DRIED

73. 20,000 lbs., No. 7—All bids rejected.

74. 20,000 lbs., Ditto, No. 9—All bids rejected.

MANIFOLD PAPER—ONION SKIN

75. 50,000 lbs., No. 8, flat, cut, 19 x 24, and 21 x 32, all bids rejected.

SULPHITE BOND PAPER, WHITE AND COLORED

101. 600,000 lbs., No. 16 and 20, flat, cut any size, Min., 17 inches, Max., 32 inches, R. P. Andrews Paper Company, 7.72 cents first six months;Old Dominion Paper Company, 8.223 cents last six months.

102. 50,000 lbs., Colored, blue, buff, green, pink, salmon and yellow, Nos. 16 and 20, flat, cut any size, min. 17 inches, max., 32 inches, Barton, Duer & Koch Paper Company, 9.85 cents, one year.

30% RAG BOND PAPER, WHITE AND COLORED, TUB-SIZED, AIR-DRIED

103. 100,000 lbs., White, No. 13, flat, cut 21 x 32, 23 x 36, 24 x 38, and 28 x 34, R. P. Andrews Paper Company, 13.90 cents one year.

104. 600,000 lbs., White, No. 16, flat, cut any size, min. 17, max. 32 inches, The Aetna Paper Company, 11.32 cents, one year.

105. 70,000 lbs., White, No. 16, flat, cut 22¾ x 31½. All bids rejected.

106. 900,000 lbs., No. 20, flat, cut any size, min. 17, max. 32 inches, Aetna Paper Company, 11.32 cents, one year.

107. 900,000 lbs., White, No. 20, flat, cut any size, min. 17, max. 32 inches, The Aetna Paper Company, 11.32 cents, one year.

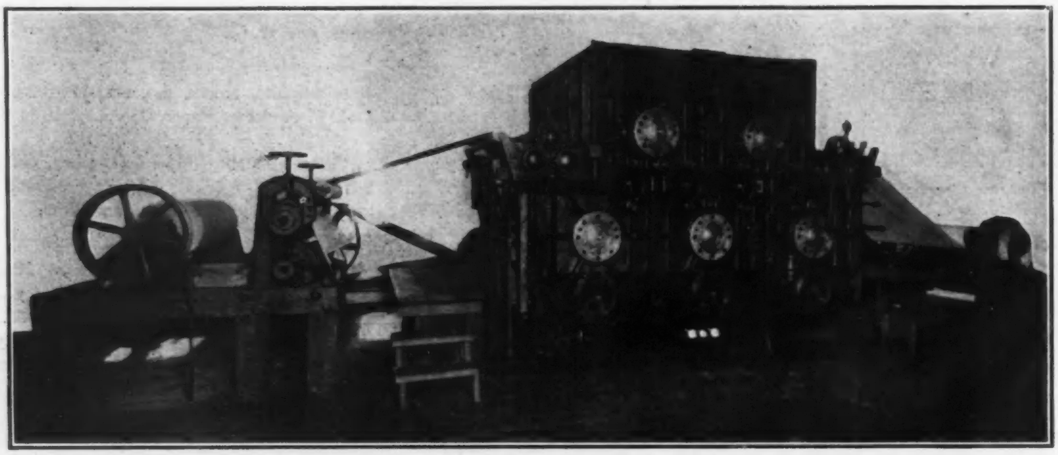
108. 800,000 lbs., White, No. 24, flat, cut any size, min. 17, max. 32 inches, The Aetna Paper Company, 11.32 cents, one year.

109. 20,000 lbs., Colored, blue, buff, green, pink, salmon and yellow, No. 13, flat, cut any size, min. 17, max. 32 inches, The Mathers-Lamm Paper Company, 16.80 cents, one year.

110. 300,000 lbs., Colored, as above, No. 16, flat, cut any size, min. 17, max. 32 inches, The Aetna Paper Company, 12.72 cents, one year.

111. 400,000 lbs., Colored, as above, No. 20, flat, cut any size,

MINTON VACUUM PAPER MACHINE DRYER



A new and improved method of drying paper of ALL KINDS in which paper is dried under a high vacuum (28″ Mercury) with the following results:

1. Very low drying temperature—100° F.
2. Stronger and better paper with higher pop-test.
3. Requires less than half the floor space.
4. Uses approximately half as much steam.
5. No vapors set free in machine room.
6. No heat set free in machine room.
7. Drying independent of weather conditions.
8. Control of drying improved.
9. Less power required.
10. Cost no greater than standard set of dryers of same capacity.
11. Paper passes through machine automatically.
12. Less broke.
13. Improved working conditions.
14. Lowered cost of paper made.

Tub sized paper can be dried in a Vacuum Paper Machine Dryer and paper the equivalent of festoon or loft dried paper produced in reels with little broke, thus saving the cost of loft drying and sheet calendering.

We will gladly dry sample wet rolls of your paper or we will dry rolls of rewetted news to demonstrate possibilities of this process of drying. Demonstrating machine located at South Norwalk, Conn. Demonstrations by appointment only.

Savings can be shown sufficient to warrant discarding your present system of drying. On any new installation there can be no question about the advisability of installing a Vacuum Paper Machine Dryer.

Inquiries solicited

OGDEN MINTON,

Smith Building, Greenwich, Conn.

min. 17, max. 32 inches, The Aetna Paper Company, 12.72 cents, one year.

112. 250,000 lbs., Colored, blue, buff, green, dark pink, light pink, salmon and yellow, No. 24, flat, cut any size, min. 17, max. 32 inches, The Aetna Paper Company, 12.72 cents, one year.

50% Rag Bond, White and Colored, Tub-Sized, Air-Dried

113. 25,000 lbs., White, No. 13, flat. All bids rejected.

114. 25,000 lbs., White, No. 16, flat. All bids rejected.

115. 600,000 lbs., White, No. 20, flat, cut any size, min. 17, max. 32 inches, The Mathers-Lamm Paper Company, 14.80 cents, one year.

116. 15,000 lbs., Colored, blue, buff, green, pink, salmon and yellow, Nos. 16 and 20, flat, cut any size, min. 17, max. 32 inches, The Mathers-Lamm Paper Company, 15.90 cents, one year.

75% Rag, White Bond, Tub-Sized, Air-Dried

117. 5,000 lbs., 75% Rag White Bond Paper, No. 13, flat, cut any size min. 17, max. 32 inches, Reese & Reese, 22.39 cents, six months.

118. 10,000 lbs., White, No. 16, 20 and 24, flat, cut any size, min. 17, max. 32 inches, Reese & Reese, 22.39 cents, six months.

100% Rag White Bond, Tub-Sized, Air-Dried

119. 10,000 lbs., No. 16, 20 and 24, flat, cut any size, min. 17, max. 32 inches, Reese & Co., 28.32 cents, six months.

Declaration Bond, Tub-Sized, Air-Dried

120. 7,000 lbs., Nos. 16 and 20, flat, cut 17 x 22, and 22 x 25½, Reese & Reese, 29.31 cents, six months.

Parchment Deed, Tub-Sized, Air-Dried

121. 4,000 lbs., No. 32, flat, cut 33 x 34 inches, Barton, Duer & Koch, 32.0 cents, one year.

White Sulphite Ledger Paper

151. 50,000 lbs., Nos. 28 and 32, flat, cut any size, min. 17, max. 32 inches, Sidney L. Willson, Receiver, 8.34 cents, one year.

152. 50,000 lbs., Nos. 40 and 48, flat, cut any size, min. 17, max. 32 inches, Sidney L. Willson, 8.34 cents, one year.

50% Rag Ledger, White and Colored, Tub-Sized, Air-Dried.

153. 50,000 lbs., White, Nos., 24 and 28, flat, cut 18½ x 36, 18½ x 40¼, 20 x 28, 21 x 32, 24 x 38, 28 x 38, 28 x 29, and 28 x 34, Barton, Duer & Koch Paper Company, 14.70 cents, one year.

154. 40,000 lbs., White, No. 32, flat, cut 21 x 32, and 23 x 36, Barton, Duer & Koch Paper Company, 14.70 cents, one year.

155. 90,000 lbs., White, Nos. 36 and 40, flat, cut 20 x 28, 21 x 32, 24 x 28 and 28 x 34, Barton, Duer & Koch Paper Company, 14.70 cents, one year.

156. 40,000 lbs., White, No. 48, flat, cut 21 x 32½, Dobler & Mudge, 17.14 cents, one year.

157. 15,000 lbs., White, No. 60, flat, cut 21 x 32½ inches, Dobler & Mudge, 17.14 cents, one year.

158. 40,000 lbs., Colored, blue, buff, green, pink, salmon and yellow, Nos. 28, 32 and 36, flat, cut 17 x 28, 18½ x 36, 18½ x 40¼, 19 x 24, 21 x 32, and 23 x 36 inches, Virginia Paper Company, Inc., Richmond, Va., 17.81 cents, one year.

159. 20,000 lbs., Colored, blue, buff, fawn, green, pink, salmon and yellow, flat, cut 21 x 32½ inches. Virginia Paper Company, Inc., 17.81 cents, one year.

160. 10,000 lbs., ditto, colored as above, No. 60, flat, cut 21 x 32½ inches, Carew Manufacturing Company, 23.00 cents, one year.

75% Rag Ledger, White and Colored, Tub-Sized, Air-Dried.

161. 40,000 lbs., White, Nos. 24 and 28, flat, cut 18½ x 36, 18½ x 40¼, 21 x 32, 24 x 38, 28 x 29, and 28 x 34 inches, Barton, Duer & Koch Paper Company, 19.45 cents, one year.

162. 40,000 lbs., White, No. 32, flat, cut 21 x 32, 23 x 36, 24 x 38, and 28 x 34, Barton, Duer & Koch Paper Company, 19.45 cents, one year.

163. 90,000 lbs., White, Nos. 36 and 40, flat, cut 20 x 28, 21 x 32, 24 x 38, and 28 x 34, Barton, Duer & Koch Paper Company, 19.45 cents, one year.

164. 40,000 lbs., White, No. 48, flat, cut 21 x 32½, R. P. Andrews Paper Company, 20.60 cents, one year.

165. 15,000 lbs., White, No. 60, flat, cut 21 x 32½ inches, Dobler & Mudge, 20.57, one year.

166. 40,000 lbs., Colored, blue, buff, green, pink, salmon and yellow, Nos. 28, 32 and 36, flat, cut 17 x 28, 18½ x 36, 18½ x 40¼, 19 x 24, 21 x 32, and 23 x 36 inches, Dobler & Mudge, 22.77 cents, one year.

167. 20,000 lbs., Colored, blue, buff, fawn, green, pink, salmon and yellow, No. 48, flat, cut 21 x 32½ inches, Dobler & Mudge, 22.77 cents, one year.

168. 10,000 lbs., Colored, as above, No. 60, flat, cut 21 x 32½, Carew Manufacturing Company, 27 cents, one year.

100% White Ledger, Tub-Sized, Air-Dried

169. 40,000 lbs., No. 24, flat, cut 21 x 32, 22¾ x 31½, 23 x 36, 24 x 38 and 28 x 34 inches, R. P. Andrews Paper Company, 30.0 cents, one year.

170. 40,000 lbs., No. 28, flat, cut 20 x 28, 21 x 32, 23 x 36, 24 x 38, and 28 x 34, R. P. Andrews Paper Company, 30.0 cents, one year.

171. 25,000 lbs., No. 32, flat, cut 17 x 28, 18½ x 42, 21 x 32, and 23 x 36 inches, R. P. Andrews Paper Company, 30.0 cents, one year.

172. 20,000 lbs., No. 36, flat, cut 17 x 28, 20 x 28, 21 x 32, and 24 x 38, Dobler & Mudge, 30.19 cents, one year.

173. 15,000 lbs., No. 40, flat, cut 21 x 32½, and 21 x 42, Dobler & Mudge, 30.19, one year.

174. 20,000 lbs., No. 48, flat, cut 20½ x 20¾, 21 x 32½, and 22¾ x 31½, Dobler & Mudge, 30.19 cents, one year.

100% Rag White Heavy Ledger, Single-Ply, Tub-Sized, Air-Dried

175. 80,000 lbs., No. 60, flat, cut 20½ x 30½ and 21 x 32½, Carew Manufacturing Company, 29.70 cents, one year.

Tissue Paper—White

176. 5,000 lbs., flat, 21 x 32, 9 lbs., Mathers-Lamm Paper Company, 12.60 cents, one year.

Facing Stereo Tissue

177. 700 lbs., Flat, 19 x 24 inches; 4½ lbs., R. A. Cauthorne Paper Company, 71.45 cents, one year.

Coated Cover Paper, Colored

201. 150,000 lbs., india tint, light green, and primrose, flat, 26½ x 41, 104 lbs., Whitaker Paper Company, 8.48 cents, one year.

Sulphite Machine-Finish Cover Paper, Colored

202. 50,000 lbs., blue, brown, granite, green, tea, and yellow; basis 20 x 26 inches, 50 lbs., flat, cut 20 x 25 and 33 x 46, in wrapped bundles with projecting colored paper marker between reams, R. P. Andrews Paper Company, 7.98 cents, one year.

25% Rag Machine-Finish Cover, Colored

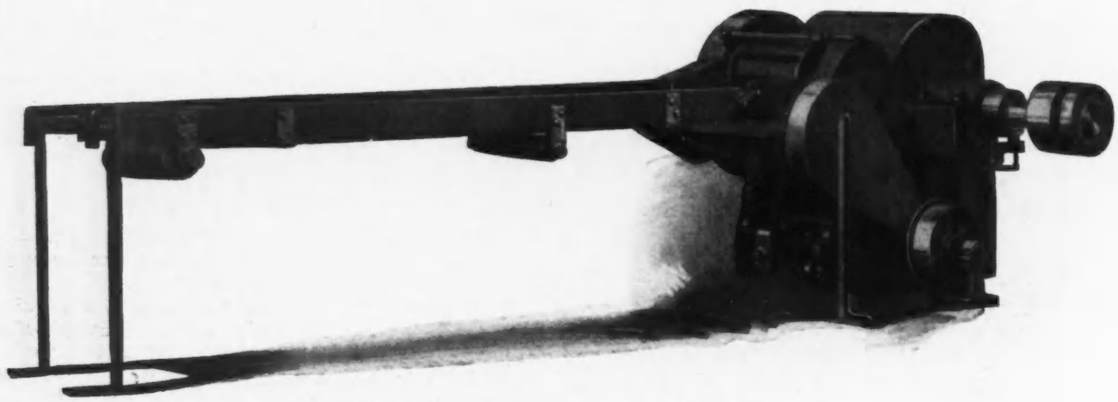
203. 25,000 lbs., Antique, quaker, drab, robin's egg, and terra cotta, flat, 20 x 25, 48 lbs., in wrapped bundles with projecting colored paper marker between reams, R. P. Andrews Paper Company, 8.24 cents, one year.

204. 75,000 lbs., Smooth, dark blue, light blue, brown, granite, green, pink, tea and yellow, basis 20 x 26 inches, 50 lbs., flat, cut 20 x 25 and 33 x 46 inches, in wrapped bundles with projecting colored paper marker between reams, R. P. Andrews Paper Company, 8.24 cents, one year.

50% Rag Antique Cover, Colored

205. 80,000 lbs., dawn, sage, goblin blue, suede, khaki and moss green, flat, 20 x 25 inches, 48 lbs, in wrapped bundles, with pro-

RAG CUTTERS



No. 20 MULTIPLEX "GIANT" CUTTER
FOR DIRECT CONNECTION TO MOTOR

Capacity—All You Can Feed To It

Easily Cuts 5 Tons Per Hour

Stock Can Be Cut as Fine as Desired

Automatic Apron Feed

Easy of Adjustment

Economical of Power

Built to Last a Lifetime

Pulp Shredders

Disc Choppers

Little "Giant" Paper Shredders

Rag Cutter Knives

Roll Bars

Bed Plates

TAYLOR, STILES & COMPANY, Riegelsville, N. J., U.S.A.

Waterous Engine Works Co., Ltd.
Brantford, Ontario, Canada
Canadian Representative

R. J. Marx
133-139 Finsbury Pavement, London, E. C.
Sole Agents for Europe

jecting colored paper marker between reams, R. P. Andrews Paper Company, 8.24 cents per lb., one year.

Cloth Lined Cover Paper

206. 1,000 sheets brown, quaker drab, russet and white, basis 20 x 26 inches, 65 lbs., flat, cut 20 x 25 inches, Mathers-Lamm Paper Company, $77.00 per thousand, six months.

207. 1,000 sheets brown, and as above, 20 x 26, 65 lbs., flat, cut 21 x 32 inches, Mathers-Lamm Paper Company, $125.00 per M sheets, six months.

208. 2,000 sheets, colors as above, basis 20 x 26, 65 lbs., flat, cut 24 x 36 inches, Mathers-Lamm Paper Company, $140.00 per M sheets, six months.

Wood Manila Wrapping Paper

209. 150,000 lbs., basis 24 x 36 inches, 30 to 60 lbs., flat, cut 21 x 32 inches, and 25 x 38 inches, in wrapped bundles, with projecting colored paper marker between reams, R. P. Andrews Paper Company, 4.34 cents per lb, one year.

210. 400,000 lbs., basis 24 x 36 inches, 30 to 60 lbs., rolls, 9, 18, 21 and 27½ inches wide, 3-inch cores, except 9-inch rolls, which are to be wound on wooden plugs 1½-inch hole, R. P. Andrews Paper Company, 4.34 cents, one year.

Sulphite Manila Wrapping Paper

211. 120,000 lbs., basis 24 x 36 inches, 50 to 80 lbs., flat, cut any size, in wrapped bundles, with projecting colored paper markers between reams, R. P. Andrews Paper Company, 6.80 cents per lb., one year.

212. 12,000 lbs., basis 24 x 36 inches, 70-lb. rolls, 11½ inches, wound on wooden plugs, 1½-inch hole, R. P. Andrews Paper Company, 6.80 cents per lb., one year.

Kraft Wrapping Paper

213. 500,000 lbs., basis 24 x 36, 30 to 80 lbs., flat, cut any size, in wrapped bundles, with projecting colored paper marker between reams, Whitaker Paper Company, 6.03 cents per lb., one year.

214. 100,000 lbs., basis 24 x 36 inches, 30 to 80 lbs., rolls 24 and 36 inches wide, wound on wooden plugs, 1½-inch hole, Whitaker Paper Company, 6.03 cents per lb., one year.

Rope Manila Wrapping Paper

215. 10,000 lbs., basis 24 x 36 inches, 60-lbs., flat, cut 24 x 36, 24 x 38, 27 x 38, 36 x 48 and 40 x 42, in wrapped bundles with projecting colored paper marker between reams, Reese & Reese, 11.499 cents per lb., one year.

216. 15,000 lbs., basis 24 x 36 inches, 70 lbs., flat, cut 24 x 36, 24 x 38 and 36 x 48 inches, wrapped as above, Reese & Reese, 11.499 cents per lb., one year.

217. 25,000 lbs., basis 24 x 36, 80 lbs., flat, cut 24 x 36, 27 x 38, 33 x 33, 36 x 48 and 38 x 38, wrapped as above, Reese & Reese, 11.499 cents, one year.

218. 40,000 lbs., basis 24 x 36, 140 lbs., flat, cut 24 x 36 and 24 x 38 inches, wrapped as above, Reese & Reese, 11.499 cents per lb., one year.

High-Finish Sulphite Manila Tag Board

219. 200,000 lbs., basis, 24 x 36 inches, 100 to 140 lbs., flat, cut any size, min. 24, max. 38 inches, in wrapped bundles with projecting colored paper marker between reams, Port Huron Sulphite and Paper Company, 6.49 cents, one year.

220. 60,000 lbs., basis, 24 x 36 inches, 80 lbs., rolls, 18 inches wide, 3-inch cores, Port Huron Sulphite and Paper Company, 6.34 cents, one year.

Wood Manila Tag Board

221. 40,000 lbs., basis 22½x 28½, 75 lbs, rolls, 21¾ inches, 6-inch core, Dobler & Mudge, 4.41 cents, one year.

Manila and Colored Calendered Tag Board

222. 100,000 lbs., basis 22½ x 28½, 75 lbs., rolls, 24 and 26¾ inches, 10-inch cores, R. P. Andrews Paper Company, 7.25 cents, one year.

223. 10,000 lbs., blue, brown, green, pink and salmon, basis, 22½ x 28½, 75 lbs., R. P. Andrews Paper Company, 8.10 cents, one year.

Jute Tag Board

224. 40,000 lbs., basis 22½ x 28½, 100 to 140 lbs., flat, cut any size, min. 22 inches, max. 32 inches, wrapped, Reese & Reese, 10.045 cents, one year.

Manila Cardboard

301. 15,000 lbs., Manila Cardboard, basis 22 x 28 inches, 116, 134, and 196 lbs., flat, cut 17 x 28, 21 x 32, and 22½ x 28½, in one-ream wrapped bundles, Dobler & Mudge, 5.29 cents per lb.

White and Colored Railroad Board

302. 75,000 sheets White, flat, 22 x 28 inches, 4-ply, packed in wooden cases, Dobler & Mudge, $29.39 per M sheets, one year.

303. 5,000 sheets, White, flat, 22 x 28 inches, 8-ply, Dobler & Mudge, $45.09 per M sheets.

304. 15,000 sheets, White, flat, 22 x 28 inches, 14-ply. Bids rejected.

305. 75,000 sheets Ash gray, blue, buff, green, lemon, and orange, flat, 22 x 28 inches, 4-ply, Dobler & Mudge, $34.29 per M, one year.

Colored Wood Bristol Board

306. 300,000 lbs., buff, blue, gray, green, melon, pink, quaker drab, and yellow, flat, 21 x 31 inches, 102 lbs., wrapped, Reese & Reese, 4.747 cents per lb., one year.

307. 250,000 lbs., blue, brown, buff, gray, green, mellon, pink and yellow, basis 22½ x 28½, 100 lbs., rolls, 20 inches wide, 6-inch cores. Reese & Reese, 4.707 cents per lb., one year.

308. 250,000 lbs., colors as above, basis 22½ x 28½, 100 lbs., rolls 20 inches wide, 6-inch cores, Reese & Reese, 4.707 cents per lb., one year.

U. S. Postal Card Bristol Board

309. 7,500,000 lbs., basis, 22½ x 28½, 104 lbs., rolls 44½ inches, not exceeding 32 inches in diameter, Whitaker Paper Company, 6.08 cents, one year.

310. 7,500,000 lbs., basis, 22½ x 28½, 94 lbs., rolls 33 inches, not exceeding 36 inches in diameter, Whitaker Paper Company, 6.08 cents, one year.

Index Bristol Board, White and Colored

311. 50,000 lbs., White, flat, 22½ x 28½, 91 and 115 lbs., in one ream wrapped bundles, Sidney L. Willson, receiver, 11.28 cents, one year.

312, 313, 314, no bidders.

315, 316, 317 and 318, all bids rejected.

351. 6,000 lbs., White Paraffin Paper, flat, 24 x 38 inches, 16 lbs., Mathers-Lamm Paper Company, 13.0 cents, one year.

352. 3,000 lbs., White Gummed Paper, flat, 17 x 22, 23 lbs., and 20 x 25 inches, 30 lbs., R. P. Andrews Paper Company, 15.45 cents, one year.

353. 250 lbs., Colored Gummed Paper, blue, and pink, flat, 17 x 22 inches, 23 lbs., and 20 x 25 inches, 30 lbs., Mathers-Lamm Paper Company, 20.90 cents, one year.

White and Colored Blotting-Paper

354. 20,000 lbs. White, flat, 19 x 24 inches, 80-lbs., in wrapped bundles, R. P. Andrews Paper Company, 7.46 cents, one year.

355. 30,000 lbs., Colored, buff and salmon, flat, 19 x 24 inches, 80-lb., wrapped, R. P. Andrews Paper Company, 7.46 cents, one year.

25% Rag White and Colored Blotting-Paper

356. 20,000 lbs., White, flat, 19 x 24, 80-lbs., wrapped, R. P. Andrews Paper Company, 8.74 cents, one year.

357. 30,000 lbs., Colored, buff and salmon, flat, 19 x 24 inches, 80-lb., wrapped, R. P. Andrews Paper Company, 8.74 cents, one year.

DESK BLOTTING, COLORED

358. 20,000 lbs., blue and buff, flat, 19 x 24, 100 lbs., Virginia Paper Company, 7.87 cents, one year.

359. 40,000 lbs., moss green, flat, 19 x 24, 100 lbs., wrapped, R. P. Andrews Paper Company, 8.49 cents, one year.

360. 3,000 lbs., White stereotyle Molding Paper, The Cauthorne Paper Company, 11.07 cents, one year.

361. 2,500 lbs., Red ditto, for paper process, flat, 19 x 24, 20 lbs., in wrapped bundles. No bids.

362. 20,000 lbs., Offset Paper for Web Presses, basis 24 x 36 inches, 30 lbs., rolls, 39 inches wide, 3-inch cores, R. P. Andrews Paper Company, 7.10 cents per lb., one year.

363. 20,000 lbs., Oiled Manila Tympan Paper, basis 24 x 36 inches, 86 lbs., rolls, 38, 48 and 55 inches, maximum weight 150 lbs., wound on wooden plugs, 1½-inch hole, Mathers-Lamm Paper Company, 8.90 cents per lb., one year.

364. 3,500 lbs., Plate-wiping Paper for Embossing Presses, basis 24 x 36 inches, 50 lbs., rolls 24 inches wide, wound on wooden plugs, 1½-inch hole, Coy, Hunt & Co., 7.46 cents per lb., one year.

365. 6,000 lbs., Back-Lining Paper for Case-making machines, basis 24 x 36 inches, etc. Bids rejected.

366. 4,000 sheets Red Press Board, flat, 24 x 32 inches, Carter Rice & Co., Corp., $14.25 per M., one year.

367. 15,000 lbs., Gray Pressboard, flat, 30 x 36 inches, Carter Rice & Co., Corp., $14.75 per M., one year.

401. 500 lbs., News Board, 26 x 38 inches, Nos. 100 and 120, Barton, Duer & Koch Paper Company, 2.67 cents per lb., one year.

402. 500,000 lbs., Chip or straw board, 26 x 38 inches, No. 50, 21¼ x 32½, 26 x 38 and 28½ x 34½. Chip Board: Barton, Duer & Koch Paper Company, 2.30 cents, one year. Strawboard: R. P. Andrews Paper Company, 2.235 cents, one year.

403. 40,000 lbs., Strawboard, no bid.

404. 10,000 lbs. Strawboard, Lined, 26 x 38 inches, No. 50, R. P. Andrews Paper Company, 2.95 cents per lb., one year.

405. 60,000 lbs. Box Board, all bids rejected.

406. 500,000 lbs., Binders' Board, No. 2, Whitaker Paper Company, C.L., 3.375 cents; L.C.L., 3.645 cents, one year.

407. 40,000 lbs., Binders' Board, No 1, Whitaker Paper Company, 3.625 cents, C.L.; 3.89 cents, L.C.L., one year.

408. 90,000 Binders' Boards, no award.

409. 20,000 Trunk Boards, Whitaker Paper Company, 3.74 cents per lb., one year.

TO EXPORT PAPER TO SOUTH AMERICA

The great paper markets in the southern half of the Western Hemisphere—in Mexico and Central and South America—hitherto virtually monopolized by German Mills and German distributors, are vigorously to be invaded by a new organization constituted of two others which have had some experience in this domain through the organization on February 1 of this year of Considine & Co., of Philadelphia. Shortly before the beginning of February, one of the chief factors in the new organization, Norbert A. Considine, president of the Paper House of Pennsylvania and head of the new export company, left the Quaker City for an extended trip to Havana and perhaps other points in the territory to be invaded, in order to attend to the details of the opening in Havana of the sales headquarters for the big field to be catered to.

The New Organization

The new organization, Considine & Co., is virtually the combination and consolidation of the export departments maintained for a number of years past by the Paper House of Pennsylvania and by the J. L. N. Smythe Company. Both these departments covered fields which they developed from a small beginning and which had grown considerably. To the executives of the two companies, the Paper House of Pennsylvania and the J. L. N. Smythe Company, there had come visions of the great opportunity in South America for an American export business, and after conferences the conclusion was reached that the effective way in which to take advantage of the opportunity was a consolidation and the organization of a new company which should concentrate its efforts on the new field. And so there came about the new corporation temporarily to be known as Considine & Co., and which for the present will maintain offices in the Considine building, home of the Paper House of Pennsylvania at 28 North Sixth street. Officers of the new concern are: President, Norbert A. Considine; vice-president, Raymond J. Considine, and secretary and treasurer, Thomas E. Sheehan, with J. P. Cooper, assistant treasurer. The sales manager located at Presidente Zayas (O'Reilly), 52, Departmento 402, Havana, Cuba, is C. T. Guerrero, for some years the Cuba representative of the J. L. N. Smythe Company. Mr. Guerrero accompanied President Considine on the trip.

To Broaden Field

In a general way Mr. Considine's attention will be given to the situation in Cuba but studies will also be made to develop the most practical methods of reaching a market which rather long experience has indicated to be a most promising one and covering Central America, West Indies and South America. All those interested in the new organization are convinced that the field at the present time offers a most inviting opportunity for the wider introduction of the entire line of paper manufacturers in the United States both coarse and fine and that all is ripe for putting America in the position of dominance so long enjoyed by Germany. The new organization, therefore, proposes to concentrate on the introduction and the development of a wider market for goods of American manufacture.

While temporary quarters are located at 28 North Sixth street, there will upon completion of the new Public Ledger building be taken over a suite of offices in that structure. This newly consolidated company is the only concern in this section engaged exclusively in the exporting of papers on such an extensive scale as that proposed.

MACSIMBAR PAPER CO. HAS GOOD YEAR

An unusually satisfactory showing was made during 1924 by the MacSimBar Paper Company, according to reports presented at the annual meeting of the corporation, held recently in the general offices at Kalamazoo, Mich. There was a substantial increase in the 1923 earnings, though the board market is still unsatisfactory. Work is progressing steadily in the erection of the new power plant and pump house and both units will soon be ready for the installation of machinery and equipment.

All directors and officers were re-elected for the current year as follows: Directors, W. S. Thompson, Detroit; George D. Cobb, S. G. Earl, W. E. Kidder, S. B. Monroe, Kalamazoo; C. E. Nelson, S. W. Simpson, Florence E. Bardeen, Otsego; Fred C. Hall, Grand Rapids; E. W. Stone, Allegan and Edward Vanderveen, Holland; president, C. E. Nelson; vice-president, S. W. Simpson; secretary-treasurer, S. B. Monroe; assistant secretary-treasurer, George D. Cobb.

SUTHERLAND PAPER CO. ELECTS OFFICERS

KALAMAZOO, Mich., January 26, 1925.—All officers and directors of the Sutherland Paper Company were re-elected at the annual meeting of the corporation, held Monday afternoon. The holdovers are: Directors, L. W. Sutherland, F. W. Sutherland, O. F. Miller, Frank B. Eilers, F. M. Hodge, Walter L. Otis, Fred Appeldcorn, Edmund W. Chase, Kalamazoo and A. M. Meincke, Chicago; president, L. W. Sutherland; vice-president, O. F. Miller; treasurer, Walter L. Otis; secretary, F. W. Sutherland.

CANADIAN ASSOCIATION'S ANNUAL

Pulp and Paper Association Acts on Several Important Matters at Largely Attended Session Held at Montreal the Past Week

Report of Mechanical Pulp Section Adopted Recommending a Demand for an Embargo or an Export Tax on Pulpwood—Resolution Also Adopted Demanding a Graded Export Tax on Pulpwood—Final Adoption Asked of a Cooperative Plan for Staffing, Control and Administration of Pulp and Paper Division of Forest Products Laboratories — F. W. Clarke Is Elected President of the Association.

MONTREAL, Que., January 30, 1925.—The annual meeting of the Canadian Pulp and Paper Association at the Ritz-Carlton Hotel was held here today, the attendance being one of the largest in the history of the Association, according to Edward Beck, the Secretary. The meeting was presided over by the President, George Carruthers. The two decisions of outstanding importance arrived at by the members were:

1.—The Association adopted a report of the Mechanical Pulp Section recommending a demand either for an embargo on pulpwood or an export tax on the same; and followed this up by adoption of a resolution demanding a graded export tax on pulpwood.

2.—The approval of a report by the Committee on Industrial research, recommending final adoption of a co-operation plan between the Dominion Government and the Association for the staffing, control and administration of the Pulp and Paper Division of the Forest Products Laboratories, established in Montreal some years ago by the Dominion Government, this plant to obligate the Association to an amount not exceeding $20,000 a year for five years.

F. W. Clarke, president of the Gulf Pulp and Paper Company, of Quebec, was elected president of the Association for the ensuing year.

Advocates Embargo or Export Tax

Frank W. Clarke, in presenting the report of the Mechanical Pulp Section, urged the Association to demand either an embargo or an effective export tax on pulpwood. He dealt at some length with the depressed condition of the pulpwood industry. The plentiful water conditions in the Scandinavian countries had enabled those countries to export 100,000 tons more of pulp in the first eleven months of last year than in the corresponding period of the previous year, and this pulp had entered into serious competition with Canadian pulp. There had also been a plentiful water supply in the principal grinding districts in the United States, and consequently imports into that country had declined 37,000 tons. He proceeded:

"The question arises as to what can be done to remedy the situation. We began the year with our eyes wide open, knowing exactly what was going to happen, and we did nothing to forestall conditions. Yet there is a remedy if we are willing to get together and work for it. I refer to the desirability of this Association formulating a definite policy with regard to the use and conservation of our pulpwood supplies, the foundation upon which our industry rests.

"There are two good reasons why we should support an embargo or an effective export tax on pulpwood: first, as a means of extending the life of the available supply of wood and of assuring the survival and the future development of the industry; second, as a protection for the industry under existing conditions.

"Governments are the servants of the public and in this matter, quite naturally they are reluctant to take the initiative unless and until convinced that the people are aroused to its vital importance to the industrial progress of the country.

"While, therefore, the campaign for conservation merits the strongest support, I am afraid that we have missed the psychology of the situation in not putting clearly before the public the economic factors involved in the exportation of pulpwood and its effect upon our industry today.

Whole Industry in Critical Position

"Aside from the news print companies, which are having their own difficulties at the present time, all other branches of the industry—sulphite, mechanical and kraft pulps, fine papers, wrappings and boards—are, with very few exceptions, in a more or less critical state. It has been claimed that the high American tariff is responsible for this situation. This may be true to some extent, but there is no tariff operating against our wood pulp. I think the real reason for the situation is more fundamental. So long as pulpwood can be purchased in large volume in this country and shipped across the line, just so long shall we have competition to force the price of our finished products down to a point that makes production here unprofitable and which results in driving our mills into liquidation. We are supplying our competitors with raw material to our undoing.

"The mills in the United States which operate on Canadian wood have none of the overhead charges in connection with their wood supply that we have to carry and, consequently enjoy an undue advantage over us in the cost of their raw material. When our mills are operating on reduced schedules or are entirely shut down, these heavy overhead charges have still to be carried; an American mill in similar circumstances is relieved of such charges. Are we not at least entitled to protection up to the extent of our overhead? An adequate export tax on pulpwood shipped out of the country would provide funds for the protection of our forests and to that extent would relieve our mills of some of the heavy expenditures that they are now called upon to meet. A straightout embargo would be even more effective.

Dependence on Water Power

"The pulp and paper industry uses more than one-fourth of the total developed water power of the Dominion. Over 50 per cent of this amount is used in the Province of Quebec. It was stated recently in the Quebec Legislature that 750,000 cords of pulpwood were exported in one year from this province and the records show this to be about the average for the past twenty years. This represents an equivalent of 500,000 tons of news print paper. The wood may have brought into the province as much as $7,500,000. Kept here and manufactured into paper its value would have been, at last year's selling price, in the neighborhood of $35,000,000. The

difference between the two values is made up largely of conversion costs, which, in other words, means wages for labor. In addition to this, however, its manufacture here would have entailed the development and utilization, of an additional 170,000 H. P. of electrical energy, or an increase of 46 per cent over present consumption. The additional labor required would have given employment to some 8,000 men in the pulp and paper mills.

"Granted that the interests of the settlers and other private owners of pulpwood are involved to some extent in the problem of how best to deal with our diminishing wood supply, I submit that it ought not to be very difficult for the Government, acting in co-operation with our industry, to devise ways and means whereby exportation may be reduced to a minimum or stopped entirely without sacrificing these interests. We cannot, of course, expect to take away theiir present market without providing another equally as good or betteer.

"My conclusion, therefore,—and I strongly recommend it to the consideration of our membership—is that the Association at this meeting should take a firm and determined stand upon this question, upon both industrial and economic grounds, and that every

F. W. Clarke, President

influence at our command should be brought into action immediately to bring about its proper and equitable solution."

Decides to Demand Export Tax on Pulpwood

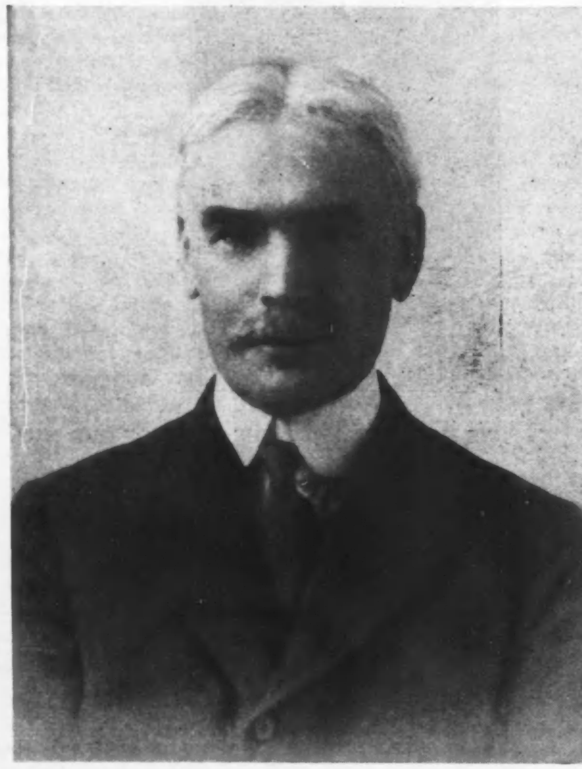
After the adoption of the report, the following resolution was unanimcasly adopted:

"Whereas, the forests of Canada have reached a stage of depletion, by reason of the demands made upon them by wood-using industries and from other causes, such as to occasion grave concern to the country, and seriously to menace the welfare of the pulp and paper and other industries dependent upon them for existence; and,

"Whereas, the unrestricted exportation of pulpwood and logs from freehold land seriously aggravates this situation, without affording the country any return commensurate with their real value or such as our economic situation demands; and,

"Whereas, this association, although vitally interested in the conversion of the raw material upon which one of Canada's greatest industries depends, has hitherto refrained from putting its view officially on record; and,

"Whereas, it cannot be denied that the exportation of the products



Edward Beck, Secretary

of our forests in an unmanufactured condition is economically unsound and can only result in the dissipation of our natural resources without building up the industries of our country or securing proper returns in any other form;

"Be it therefore resolved, That until some more efficient means of control can be agreed upon as practical, that an adquate export duty should be imposed upon logs and pulpwood exported from Canada.

"That such duty should be imposed upon a graded basis, increasing annually, so that the various interests involved may have due opportunity to make any necessary adjustments.

"That the proceeds of such duty should be devoted as far as possible to the work of conservation and protection of our forests.

"That this association desires to give its assurance to the Governments, federal and provincial, that it will extend its fullest cooperation to all necessary measures to provide an adequate market for farmers' and settlers' wood should any surplus supply develop.

"That the continued study of the all important question be urged upon the several authorities to the end that our forest resources be conserved as far as possible and ultimately utilized for the development of home industries."

News Print Capacity Ahead of Demand

George Chahoon, Jr., in reporting on behalf of the News Print Section said that while the Canadian news print mills established a

new high record for production during the past year, the situation, generally speaking, was not so satisfactory as in the previous year. Considerable expansion took place in the news print industry during 1923 and the full effect of this increase in the productive capacity of the mills was experienced in the year just passed. Additions to the capacity also took place in 1924 with the result, that while the total output of all the mills was greater than it had ever been, the demand did not show sufficient increase to keep our mills running as fully as was desired. In other words the industry suffered from a lack of adjustment between supply and demand.

The productive capacity of the mills at the beginning of 1925 would be 615 tons greater than it was at the beginning of 1924, with a further increase of 100 tons scheduled for April and two new machines at the International Paper Company's mill at Three Rivers due in the Fall.

The total production of news print in 1924 amounted to 1,353,000 tons which was an increase of 87,000 tons or 7 per cent over the production for the previous year.

Production figures for the past five years are as follows:

Year	Tons
1920	875,696
1921	805,134
1922	1,081,364
1923	1,266,000
1924	1,353,000

Consumption in the United States was greater than in 1923, but did not show such a large increase as took place in the two previous years. The smaller increase in consumption coupled with a considerable increase in productive capacity resulted in the mills running on reduced schedules.

The Sulphite Pulp Situation

F. G. Robinson, reporting for the Sulphite Pulp Section, said the most important factor in the sulphite market during the past year has been the increased importation of European bleached and unbleached sulphite by the United States. Imports of unbleached during the ten months to October increased 24 per cent and those of bleached, 7 per cent. European producers, Swedish in particular, have again demonstrated their ability to increase production to record levels, and have found their most profitable market in the United States.

The demand in the United States was maintained throughout the year with a fair degree of uniformity, but the steady inflow of European sulphite, favored as some of it was by advantageous money exchange conditions, served to keep prices down to a level that yielded but narrow margins to those United States and Canadian makers favored with minimum costs of production. In the face of this, Canadian exports of sulphite to the United States had been well maintained.

The consumption of sulphite pulp in Europe had not materially increased during the year, but there were evidences of an increase in the near future, and it was reasonable to assume that this would favorably affect the market in the United States.

Over-Production of Book Paper

H. B. Donovan, reporting for the Book and Writing Section, stated that the book and writing mills are still confronted with difficulties occasioned by over-production and a restricted market both at home and abroad.

Production in 1924, compared with 1923, was as follows:

	1923	1924
Book	35,079 tons	28,542 tons
Writing	18,113 tons	22,072 tons
Total	53,192 tons	50,614 tons

Exports of these grades of paper amounted in 1924 to 42,813 cwts., as compared with 72,540 cwts. for the previous year, showing a decrease of 41 per cent for the year. Against this the year's trade returns show corresponding imports of 61,556 cwts. in 1924 and 56,196 cwts. in 1923.

Mr. Donovan added: "Our Section has been advised that it is the intention of the Canadian magazine publishers and of those engaged in carrying on the printing trade to apply to Parliament for a protective tariff against foreign competition. The extent to which importations of printed matter brought into Canada free of duty is now carried on constitutes a serious hardship to these industries and is reflected in a decreased demand for Canadian paper. This Section would respectfully suggest that the support of the Association, as a whole, be accorded to the movement for an adequate tariff on printed matter."

Competition from U. S. Board Mills

D. F. Robertson, reporting on behalf of the Board Section, said that the demand for board during the past year had been affected by the general dullness which had characterized business in most lines, so that while demand was fairly steady the volume had not been as large as they hoped for at the beginning of the year. Canadian mills had also to face severe competition from the United States where the board mills experienced a decline in the demand and shipped their surplus product to Canada at extremely low prices.

Production was slightly above the output for last year, while shipments were practically the same, the increase in Canadian shipments being offset by a decline in exports.

Figures on production and shipments were given as below:

	Production	Canadian Shipments	Export Shipments
1924	98,036	84,543	13,606
1923	97,959	83,432	14,715
1922	90,889	78,203	12,514

Poor Year for Coated Paper

F. H. Gage, in his report on behalf of the Coated Paper Section, said the coated paper industry in Canada had not had a very prosperous year, on account of manufacturers not issuing catalogs printed on Coated Paper, and substitutes such as off-set paper, art paper and No. 1 super-calender and patent boxboard being used by several manufacturers, to replace coated stock. The export trade was very small in comparison with normal years.

The present conditions warranted a continuation of the close cooperation of all the mills that manufacture the various raw materials for the Coated Paper Mills in Canada, and if they wished to encourage this industry it would be well for them not to increase any of their present prices.

Competition in Wrapping Paper

F. J. Campbell, on behalf of the Wrapping Paper Section, reported that a fair volume of business was enjoyed during the past year. While the extent of this business had not been as great as might have been desired, prices had been fairly steady, which had been advantageous to the manufacturers and satisfactory to buyers.

Foreign competition had made an impression at some points, there having been considerable imports of wrappings from the United States, Sweden and Germany. It appeared probable that this competition would be increased by the lowering of the tariff on paper from Finland. While legislative action in this direction had been averted for the immediate present, it did not look as if the industry had much to hope for in the way of protection.

It was felt by many members of the Section that it would be of mutual advantage if amalgamation with the Kraft Section could be brought about.

Unfair Competition on Tissues

George Carruthers, reporting for the Tissue Paper Section, said the demand throughout 1924 for Canadian-made Tissue was inter-

fered with, to a considerable extent, by the importation of European tissue. The mills, however, while kept going, were not running to full capacity. While prices were readjusted, they did not offset the effect of the lowering of duties by the Government to countries which came under the favored nation treaty. This resulted in unfair and extreme competition on tissues and other light weight papers.

Canadian tissue manufacturers are obliged to pay very much higher wages than are paid by their European competitors and in addition to this the difference in exchange has been in favor of foreign tissues.

The Canadian production of tissue paper in 1924 was 3,621 tons, as compared with a total of 3,365 tons in 1923.

One new Canadian tissue mill came into operation in 1924.

Handicap in Waxed Paper

E. A. Bradshaw, in his report on the Waxed Paper Section, said the past year which from a purely selling point of view, opened in good style, slumped very badly in the early Spring and, in spite of a fairly strong rally in the Fall, sales were little if anything in advance of previous years. Demand for bread wrappings was slightly heavier, although not appreciably so, and confectionery tissues sold in about their usual volume. Krafts were called for more frequently than in previous years, but at the low prices prevailing, small profit, if any, was shown on this class of product.

The greatest handicap of the year was the steady advance in wax prices, which are at the present time almost 100 per cent higher than they were a year ago.

In common with others, the members of the Waxed Paper Section looked for a brighter year in 1925, but, as foreign competition almost eliminated possibilities of export trade, unless their own paper mills could co-operate with waxed paper makers to secure increased business, rested entirely upon domestic consumption which, in its turn, depended upon legislation and popular approval of sanitary food-stuff wrappings.

The Use of Rotten Wood

Ellwood Wilson, reporting for the Woodlands Section, dealt largely with the work done in the study of making paper from rotten wood and with the work of the committee on wood measurements.

In regard to the former he said it had been shown that just as good sulphite could be made as from sound wood, and with very little loss. He added: "Studies of the amount lost by sinkage in the various classes of rotten wood are under way by the Laurentide Company, and when these are finished we shall be able to say definitely just how much of this material can be salvaged.

Arrangement with Government for Technical Research

The most important subject before the meeting was a proposal for a joint plan of co-operation between the association and the Dominion Government for industrial research through the medium of the Pulp and Paper Division of the Government-owned Forest Products Laboratories in Montreal. At the last annual meeting a report was submitted by the Committee on Industrial Research asking for authority to approach the Dominion Government with a proposal to participate in the staffing, control and administration of the Pulp and Paper Division of the Forest Products Laboratories, and to obligate the Association to an amount not to exceed $20,000 during the first year and not to exceed $20,000 a year for each of four successive years should a satisfactory arrangement be arrived at. The Association adopted the Committee's Report and passed a resolution approving of the proposal and empowering the Committee to enter into the negotiations suggested.

The Committee now reported that it had negotiated with the Government, and had secured consent to such a plan, and it asked for the confirmation and final approval of the Association. After considerable discussion this final approval was given.

The Annual Luncheon

E. W. Beatty, K. C., president of the Canadian Pacific Railway Company, was the guest of honor at the annual luncheon of the Association, which followed immediately after the annual meeting. In the course of an address on "Canadian Citizenship," Mr. Beatty maintained that Canada, with all her railway problems, enjoyed the lowest transportation rates of any country in the world. He dwelt at length upon the railway situation in the Dominion and among a number of other subjects spoke about natural resources of the country. He said it is unthinkable that Canada should ever reach its full stature except as an integral part of the British Empire and any other sentiment would reflect upon the vitality and self-reliance of our own people.

He spoke about the detrimental effects of sectionalism in Canada and the need of fostering a real national spirit. "The fact that Canada's great difficulty lies in the wide distances that separate the various parts of the country has inevitably led," he said, "to great differences in point of view and in the attitude of the people toward public problems. It has been my privilege to travel extensively in Western Canada and the surest means of understanding the Western problem is to go there and find out for oneself how great an asset to Canada the Westerners are and how different from the pictures of them painted in many quarters.

Population Statistics

"During the four years ending December 31st last, 399,550 people entered Canada and during the same period it is estimated that 335,000 left the country. This is a disappointing record and its only bright spot is that from April 1st to November 30 in last year's official figures indicate that 34,000 Canadians returned to Canada from the United States.

"There are approximately 25,000,000 acres of vacant land in the three prairie provinces within fifteen miles of existing railways. If these were divided into 320 acre farms it would mean 78,125 new farms suitable for immediate cultivation. If on each half section there were four colonists, the total would be 312,500. Government statistics estimate the value of each colonist in the purchase of good at $1,362.25 net per annum, so the value of this settlement to the country would be $122,105,000 per annum.

"There is nothing that will hold our people and invite others so much as national prosperity and here I would touch upon the burden of taxation, which is a disturbing circumstance to all those in business and which is not becoming appreciably lighter. In 1922 with a population of 8,700,000 Canadians paid in taxes approximately $561,000,000, of which Dominion taxes took $335,000,000. This total was 19 per cent of the year's total net production of all Canadian industries, including fishing and agriculture. It was almost half the the net agricultural production and exceeded the combined gross production of Canadian forests and mines. It was 50 per cent of the net manufacturing production of that year."

The Annual Banquet

As a final to a busy day, the members of the Association attended the annual banquet. Frank W. Clarke, the newly-elected President, was in the chair, and those at the head table included Col. W. E. Haskell, vice president of the International Paper Company; R. S. Kellogg, secretary of the News Print Service Bureau; Carl Riordon of the Riordon Pulp and Paper Company; Louis Block of San Francisco; J. H. Weldon, president of the Provincial Paper Mills, Toronto; H. F. S. Kent, a past president of the association; George Carruthers, retiring president; Hon. Richard B. Bennett, K. C.; Percy B. Wilson, vice president Spanish River Mills, Sault St. Marie; R. S. Kellogg, of the News Print Service Bureau; J. A. Bothwell, general manager Brompton Paper Company, East Angus, P. Q.; George M. McKee, president of the Algonquin Paper Mills, Ogdensburg, New York; Albert Halstead, consul for the United States, and Edward Beck, manager and secretary of the Association.

It was decided to have no speeches whatever at the banquet, and the evening was devoted to entertainment.

Meetings of the Sections

Th various Sections of the Association held their annual meetings prior to the annual meeting of the Association proper. A lengthy report on the year's work was presented by the Chairman of each Section.

Much interest centered in the meeting of the Technical Section, because of the various authoritative papers and reports on technical processes which were presented. The papers included the following: "White Water Coagulation," by Miss Louise E. McGrath, of the Booth Chemical Company; "Continuous Grinding of Wood Pulp, being the history and development of the Voith Caterpillar Grinder," by C. A. Waterous, of the Waterous Engine Works Co., Brantford, Ont.; 'Study of the Failure of Cotton Drier Felts," by E. D. Walen, of the Cosmos Imperial Mills, Ltd.; "Press Rolls and Water Removal," by A. E. Rees, of the Research Laboratory of F. C. Huyck & Sons, Kenwood Mills, Albany, N. Y.; "The Forest Products Laboratories of Canada," by E. P. Cameron, Chief of the Division of Pulp and Paper, Montreal; and "Drying Wood-Room Refuse for Fuel," by Alfred J. T. Taylor, president of Vickers and Combustion Engineering, Limited, Toronto.

The Training of Workers

In the report of the Education Committee, presented to the Technical Section by J. N. Stephenson, considerable space was devoted to the work of the Joint Committee on Vocational Education of the Pulp and Paper Industry in Canada and the United States, which committee was formed in 1918. A sum of $55,000, it was stated, had been contributed to this committee by the industry for the preparation and publication of a set of authoritative text books to be used for correspondence or class instruction and reference work. These books, it was reported, have been received with great appreciation by the industry, and their publication has resulted in a quickened sense of the need for instructional work. In the place of the one school, that of the University of Maine, there are now five Universities and two special schools wherein instructional work is given in the technology of pulp and paper.

The reports of the various schools showed, that probably 1,200 men have taken up study of the pulp and paper industry in the two countries. As there are probably 150,000 men employed in the mills it would appear that less than one per cent of the employees have undertaken work on the material provided in the text books. Presuming that as many are working on other courses outside our jurisdiction, it would appear that only about two per cent are taking up work to add to their earning power. The National Industrial Conference Board estimates that between seven and eight per cent of the positions in the industry are important or executive. Apparently stated the Committee, only two per cent of the men in the industry are striving to prepare themselves for seven per cent of the positions.

The Question of Apprenticeship

The question of apprenticeship, which is condemned root and branch by the committee appointed by the American Pulp and Paper Mills Superintendent's Association, is still left in the air by the Committee on Apprenticeship appointed by the Association. It reported that certain mills in Canada were putting forth efforts to solve the problem and were training certain of their employees along lines most suitable to their own mills. The Committee were watching these developments carefully, but had not so far arrived at any definite conclusions.

The Committee believed that the industry in Canada would be able to attract any reasonable number of young men who were trained as apprentices, and it suggested the convenience of a meeting of mill managers at an early date to give the committee a clear idea on the question of apprenticeship.

The Testing of Pulp

The Committee of Chemical and Physical Standards presented a tentative method for the determination of the strength of unbeaten pulp. It reported that an apparatus had been constructed at the Forest Products Laboratories in Montreal on the principle and following the general form of the Green Freeness Apparatus, and a standardized Freeness Test was now ready for adoption by all who wished to take advantage of it. The Committee requested that trial and criticism of this method be made, so that they might be in a position to bring it forward for adoption as a Standard Method at the next annual meeting.

Wood Measurements

At the last Annual Meeting of the Technical Section the Committee on Wood Measurements presented a report in which the Cubic Foot Solid Wood was recommended as a more precise unit of measurement than either the Cord or the Foot Board Measure,—the two units commonly employed. Weighing was also noted as being a method of value which had been suggested, but it was the opinion of the committee that the Solid-Volume method would be of much simpler and wider application. A description was proven of investigations and experiments during the year, but the Committee reported that the data so far obtained was not sufficient to make a comprehensive and definite report, and therefore recommended that this important work be continued.

TORONTO JOTTINGS OF THE INDUSTRY

M. F. Montague of the Standard Paper Mfg. Company, Richmond, Va., was a caller upon the trade in Toronto during the past week.

A. G. Ponsford, of Port Arthur, Ont., general manager of the Port Arthur plant of the Provincial Paper Mills Company, spent a few days in Toronto lately.

At the fifth annual meeting of the Allen Paper Company, Toronto, a satisfactory report, considering the state of trade in the wholesale paper line during a large portion of last year, was presented. C. E. Allen was re-elected president and H. G. French, secretary-treasurer.

The sulphite plant of the Lincoln Paper Mills, Merritton, Ont., is running to capacity on both bleached and unbleached pulp for export and is booked up for some weeks ahead.

The Toronto section of the Canadian Paper Trade Association held a dinner meeting at the King Edward hotel recently, Fred W. Halls, presiding. The dinner was followed by a conference on various matters of trade importance.

I. H. Weldon, president of the Provincial Paper Mills Company, Toronto, was among the many business men from Ontario who visited Quebec city last week on a mission of good-will and closer fellowship between the provinces of Ontario and Quebec.

E. Newell, general manager of the Dominion Envelope and Carton Co., Toronto, who has been ill, is now convalescent.

The paper mill of the Backus-Brooks Company, at Kenora, Ont., is running steadily and plans are being made for doubling the capacity during the coming year. The company's stock of pulpwood on hand is somewhat less than it was twelve months ago. It is cutting some of its pulpwood in its own camps and purchasing about forty per cent from the settlers.

The annual financial statement of the American Sales Book Company, of which S. J. Moore, of Toronto, is president, is now in course of preparation. It is understood that the dividend, as has always been the case, has been earned with a margin to spare. It is not expected that any change will be made in the current dividend rate, this being at the rate of four dollars per annum on the twenty dollar par value shares.

Much pulpwood is now being shipped on the railways and considerable activity exists in Northern Ontario. The cut will be reduced this season from thirty to forty per cent.

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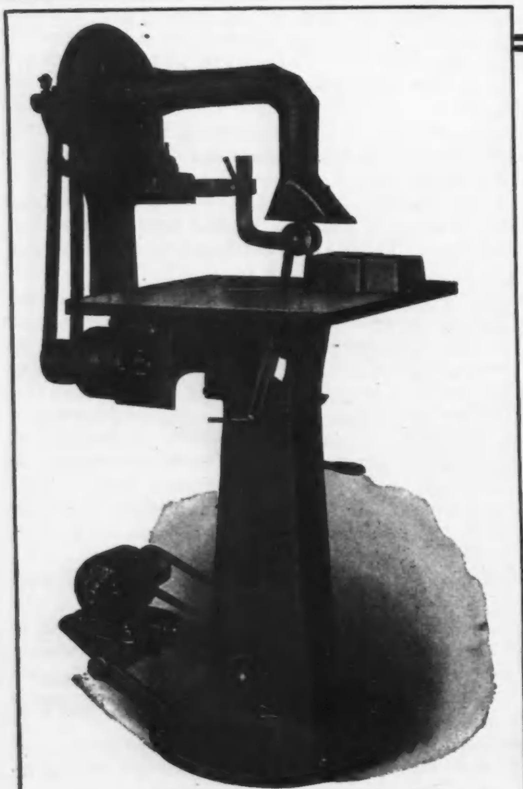

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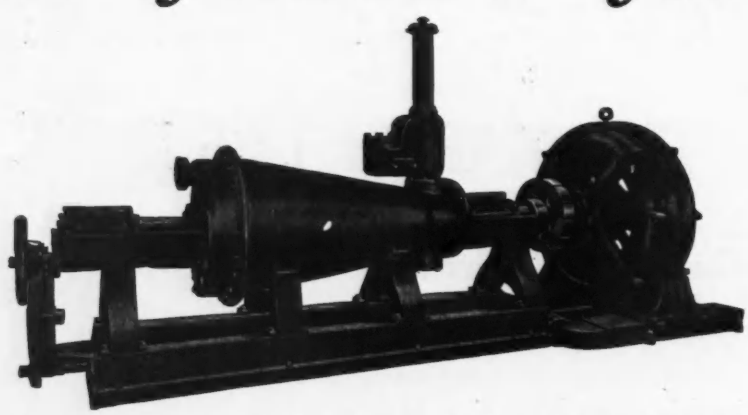
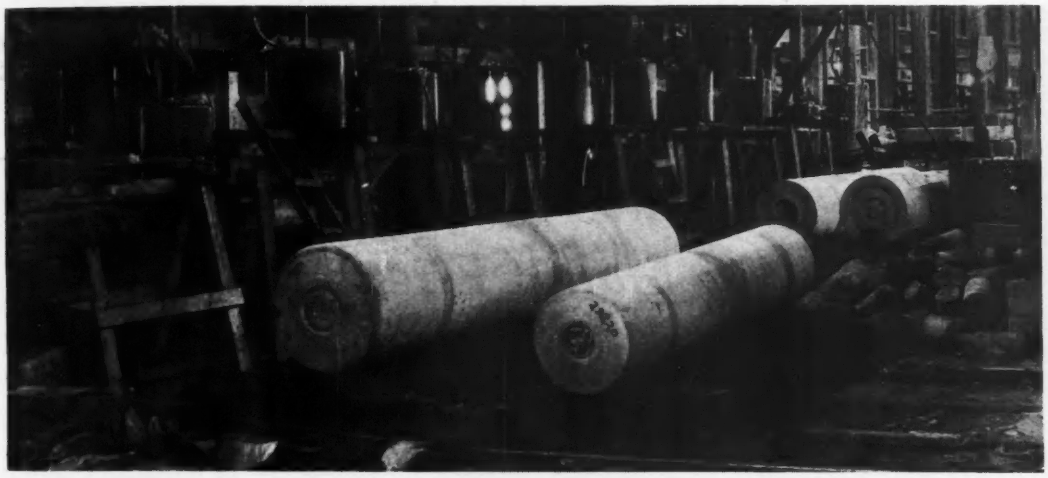




Imports of Paper and Paper Stock

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING JANUARY 31, 1925

SUMMARY

Printing paper	152 cs., 40 bls., 236 rolls
Cigarette paper	2,178 cs.
Wall paper	60 rolls, 68 bls., 7 cs.
Hangings	1,134 bls., 3 cs.
Packing paper	101 bls.
Wrapping paper	22 bdls., 536 bls., 296 rolls, 6 cs.
Colored paper	14 cs., 7 pgs.
Writing paper	54 cs.
Filter paper	11 cs.
Cardboard paper	50 bls.
Cellophane paper	2 cs.
Envelopes	4 cs.
News print	447 rolls, 973 bls.
Printed paper	10 cs.
Printed cards	6 cs.
Surface coated paper	98 cs.
Baryta coated paper	31 cs.
Metal coated paper	7 cs.
Gold coated paper	2 cs.
Miscellaneous paper	136 cs., 431 rolls, 202 bls.

CIGARETTE PAPER

American Tobacco Company, Zarembo, Bordeaux, 800 cs.
R. J. Reynolds Tobacco Company, Zarembo, St. Nazaire, 930 cs.
De Manduit Paper Corp., by same, 338 cs.
Standard Products Corp., Indep. Hall, Havre, 60 cs.
P. J. Schweitzer, France, Havre, 25 cs.
Zorro Tobacco Company, G. Verdi, Genoa, 25 cs.

WALL PAPER

The Prager Company, Pittsburgh, Antwerp, 50 rolls.
F. J. Emmerich Company, by same, 4 bls.
F. J. Emmerich Company, A. Ballin, Hamburg, 33 bls.
Bendix Paper Company, by same, 7 cs.
E. F. Downing & Co., Inc., Minnetonka, London, 31 bls.

PAPER HANGINGS

W. H. S. Lloyd & Co., Minnetonka, London, 3 cs., 34 bls.
A. C. Dodman, Jr., Inc., Laconia, Liverpool, 6 bls.
J. W. Hampton, Jr., & Co., Montauk, London, 504 bls.
J. W. Hampton, Jr., & Co., Pittsburgh, Antwerp, 301 bls.
The Prager Company, by same, 289 bls.

FILTER PAPER

H. Reeve Angel & Co., Inc., Minnetonka, London, 9 cs.
H. Reeve Angel & Co., Inc., Maryland, London, 2 cs.

COLORED PAPER

Borden Riley Paper Company, Pittsburgh, Antwerp, 14 cs.
Atlantic Forwarding Company, A. Ballin, Hamburg, 7 pgs.

WRITING PAPER

Old Master Paper & Pulp Corp., Pr. Wilson, Trieste, 30 cs.
Japan Paper Company, Arden Hall, Marseilles, 17 cs.
Coenca Morrison Company, Pittsburgh, Havre, 7 cs.

CELLOPHANE PAPER

DuPont Cellophane Company, France, Havre, 2 cs.

CARDBOARD

Old Master Paper & Pulp Corp., Pr. Wilson, Trieste, 50 bls.

ENVELOPES

H. Reeve Angel & Co., Inc., Minnetonka, London, 4 cs.

NEWS PRINT

Parsons & Whittemore, Muenchen, Bremen, 286 rolls.
Janeway & Carpender, by same, 161 rolls.
J. P. Heffernan Paper Company, Pr. Wilson, Trieste, 973 bls.

PRINTING PAPER

F. C. Strype, N. Amsterdam, Rotterdam, 6 cs.
H. Reeve Angel & Co., Inc., Minnetonka, London, 1 cs.
Drinhausen Hollkott Paper Corp., A. Ballin, Hamburg, 40 bls.
Perry, Ryer & Co., Cameronia, Glasgow, 32 cs.
L. Schulman, Muenchen, Bremen, 214 rolls.
A. G. Nelson, by same, 22 rolls, 113 cs.

PRINTED PAPER

E. Dietzgen & Co., A. Ballin, Hamburg, 10 cs.

PRINTED CARDS

Japan Paper Company, American Farmer, London, 6 cs.

WRAPPING PAPER

Blauvelt Wiley Paper Manufacturing Company, Cameronia, Glasgow, 22 bdls.
Republic Bag & Paper Company, Belfast Maru, Hamburg, 405 bls.
Wilkinson Bros. & Co., Inc., Idefjord, Trondhjem, 295 rolls, 131 bls.
F. C. Strype, Pittsburgh, Antwerp, 6 cs., 1 roll.

PACKING PAPER

J. P. Heffernan Paper Company, Pr. Wilson, Trieste, 101 bls.

SURFACE COATED PAPER

P. C. Zuhlke, Pittsburgh, Antwerp, 51 cs.
P. Puttmann, by same, 32 cs.
Gevaert Co. of America, by same, 15 cs.

BARYTA COATED PAPER

Globe Shipping Company, Muenchen, Bremen, 31 cs.

METAL COATED PAPER

Perry Ryer & Co., Muenchen, Bremen, 7 cs.

GOLD COATED PAPER

C. B. Richard & Co., America, Bremen, 2 cs.

PAPER

Coenca, Morrison & Co., Pr. Wilson, Trieste, 32 cs.
G. W. Sheldon & Co., Minnetonka, London, 3 cs.
P. H. Petry & Co., A. Ballin, Hamburg, 4 cs.
J. P. Heffernan Paper Company, by same, 136 bls.
R. W. Bratney Company, Incemore, Belfast, 1 cs.
P. C. Zuhlke, Montauk, Antwerp, 76 cs.
T. G. Prager Company, by same, 5 cs.
J. Kennedy, Virginie, Bordeaux, 2 cs.
National Rubbon Company, N. Amsterdam, Rotterdam, 3 bls.
Bank of N. Y. & Trust Company, Idefjord Kristiania, 431 rolls.
Irving Bank Columbia Trust Company, Menapier, Antwerp, 63 bls.
Whiting & Patterson, Inc., France, Havre, 12 cs.
C. Grummers Sons, by same, 1 cs.

RAGS, BAGGINGS, ETC.

E. J. Keller Company, Inc., Zarembo, Bordeaux, 212 bls. rags.
W. Barnet & Son, by same, 10 bls. rags.
Albion Trading Company, by same, 26 bls. rags.
A. W. Fenton, Inc., by same, 253 bls. rags.
Katzenstein & Keene, Inc., by same, 150 bls. rags.
Atterbury Bros., Inc., Zarembo, St. Nazaire, 272 bls. rags.
Goldman, Sachs & Co., by same, 165 bls. rags.
E. J. Keller Company, Inc., by same, 66 bls. jute strings.
New England Waste Company, Virginie, Havre, 17 bls. cotton waste.
National City Bank, by same, 54 bls. cotton waste.
The Stone Bros. Company, Inc., by same, 124 bls. cotton waste.
Ayres W. C. Jones, Inc., by same, 17 bls. rags.
D. M. Hicks, Inc., by same, 107 bls. bagging.
Seaboard National Bank, Virginie, Bordeaux, 83 bls. rags.
E. J. Keller Company, Inc., Zarembo, St. Nazaire, 39 bls. rags.
E. J. Keller Company, Inc., Scotland Maru, Como, 81 bls. colored thread.
E. J. Keller Company, Inc., Scotland, Genoa, 46 bls. hemp thread.
Royal Manufacturing Co., by same, 111 bls. cotton waste.
Castle & Overton, Inc., by same, 29 bls. rags.
Castle & Overton, Bankdale, Barcelona, 155 bls. bagging.
Chemical National Bank, Republic, Bremen, 61 bls. rags.
State Bank, by same, 70 bls. bagging.
National City Bank, by same, 243 bls. rags.
Garfield National Bank, by same, 65 bls. rags.
National City Bank, by same, 52 bls. jute waste.
The Stone Bros. Company, Inc., Bankdale, Marseilles, 77 bls. rags.
S. Birkenstein Sons, by same, 24 bls. rags.
Maurice O'Meara Company, Indian Prince, Rio, 311 bls. rags.
J. B. Moors & Co., Marengo, Newcastle, 127 bls. rags.
Amsinck, Sonne & Co., Inc., by same, 62 bls. rags.
E. J. Keller Company, Inc., Marengo, Manchester, 49 bls. rags.
The Stone Bros. Company, Inc., Fenchurch, Marseilles, 92 bls. rags.
E. J. Keller Company, Inc., by same, 121 bls. rags.
American Exchange National Bank, by same, 79 bls. rags.
Amsinck, Sonne & Co., Inc., Fenchurch, Alexandria, 125 bls. rags.
E. Butterworth & Co., Inc., Fenchurch, Barcelona, 51 bls. paper stock.
E. J. Keller Company, Inc., by same, 130 bls. rags.
Basch & Greenfield, Laconia, Liverpool, 7 bls. rags.
W. Barnett & Co., by same, 45 bls. rags.
Castle & Overton, Inc., Cameronia, Glasgow, 18 bls. rags.
Equitable Trust Company, Belfast Maru, Hamburg, 55 bls. rags.
Garfield National Bank, by same, 175 bls. rags.
Belgian Bank, by same, 17 bls. rags.
National City Bank, by same, 295 bls. rags.
International Acceptance Bank, by same, 65 bls. rags.
Castle & Overton, Inc., by same, 10 bls. rags, 70 bls. bagging.
State Bank, Mercier, Antwerp, 221 bls. rags.
Amsinck, Sonne & Co., Inc., Arden Hall, Marseilles, 59 bls. rags.
E. Butterworth & Co., Inc., by same, 53 bls. rags.
Chase National Bank, by same, 230 bls. rags.
American Exchange National Bank, by same, 132 bls. rags.
L. H. Abenheimer, by same, 38 bls. rags.
E. J. Keller Company, Inc., by same, 68 bls. rags.
E. Butterworth & Co., Inc., Arden Hall, Barcelona, 82 bls. rags.
L. H. Abenheimer, by same, 104 bls. rags.
R. Blank, N. Amsterdam, Rotterdam, 50 bls. rags.
E. Butterworth & Co., Inc., by same, 110 bls. bagging.
Darmstadt, Scott & Co., by same, 40 bls. rags.
G. M. Graves & Co., Inc., by same, 245 bls. rags.
D. M. Hicks, Inc., by same, 117 bls. rags.
S. Silberman, by same, 60 bls. rags.
Atlas Waste Manufacturing Company, by same, 92 bls. rags.
Paul Berlowitz, by same, 21 bls. rags, 61 bls. bagging.
E. J. Keller Company, Inc., by same, 59 bls. bagging, 235 bls. rags.
American Trading Company, by same, 84 bls. rags, 44 bls. bagging.
Paul Berlowitz, Independence Hall, Havre, 123 bls. rags.
Lashner Paperstock Company, by same, 72 bls. bagging.
V. Galaup Company, Inc., by same, 165 bls. rags.
The Stone Bros. Company, Inc., by same, 82 bls. rags.
Atterbury Bros., Inc., by same, 5 bls. rags.
A. W. Fenton, Inc., Independence Hall, Dunkirk, 109 bls. rags.
E. J. Keller Company, Inc., by same, 59 bls. rags.
R. Bishop Manufacturing Company, by same, 160 bls. rags.

(*Continued on page 283*)

Imports of Paper and Paper Stock

(*Continued from page 281*)

Capital National Bank, Muenchen, Bremen, 157 bls. rags.
American Exchange National Bank, by same, 130 bls. rags.
E. J. Keller Company, Inc., by same, 81 bls. bagging.
L. H. Abenheimer, A. Ballin, Hamburg, 67 bls rags.
Ladenburg, Thalman & Co., by same, 31 bls. rags.
Guaranty Trust Company, by same, 22 bls. rags.
E. J. Keller Company, Inc., by same, 99 bls. rags, 66 bls. bagging.
E. J. Keller Company, Inc., A. Ballin, Stockholm, 69 bls. rags.
J. Cohen & Josephy, A. Ballin, Hamburg, 21 bls. rags.
J. B. Moors & Co., Andalusier, Antwerp, 23 bls. rags.
American Exchange National Bank, by same, 140 bls. rags.
Katzenstein & Keene, Inc., by same, 377 bls. rags.
Paul Berlowitz, by same, 300 bls. rags.
Belgian Bank, by same, 40 bls. rags.
The Stone Bros. Company, Inc., Incemore, Barrow, 360 bls. rags.
International Acceptance Bank, by same, 26 bls. rags.
Equitable Trust Company, Saucon, Naples, 73 bls. rags.
Bankers' Trust Company, by same, 63 bls. rags.
National City Bank, by same, 29 bls. rags.
E. J. Keller Company, Inc., Montauk, Antwerp, 198 bls. flax waste.
Equitable Trust Company, by same, 122 bls. flax waste.
Second National Bank of Boston, Francisco, Antwerp, 68 bls rags.
Maurice O'Meara Company, Coaxet, Antwerp, 42 bls. burlap.
International Acceptance Bank, by same, 164 bls. rags.
Brown Brothers & Co., by same, 183 bls. rags.
The Stone Bros. Company, Inc., by same, 96 bls. rags.
A. Hurst & Co., Inc., by same, 27 bls. rags
Castle & Overton, Inc., by same, 47 bls. rags, 74 bls. bagging.
Reis & Co., Eastern Victor, Rotterdam, 39 bls. thread waste.
J. J. Patricof, by same, 37 bls. rags.
E. J. Keller Company, Inc., by same, 205 bls. rags.
American Woolstock Corp., by same, 142 bls. rags.
S. Birkenstein Sons, by same, 245 bls. rags.
R. Blank, by same, 121 bls. rags.
Mechanics & Metals National Bank, by same, 147 bls. rags.
Garfield National Bank, by same, 154 bls. rags.
Castle & Overton, Inc., by same, 46 bls. rags.
Castle & Overton, Inc., America, Bremen, 52 bls. rags.
S. Birkenstein Sons, by same, 47 bls. rags.
R. Blank, by same, 330 bls. rags.
American Woolstock Corp., by same, 112 bls. rags.
W. Schall & Co., Pittsburgh, Antwerp, 100 bls. bagging.

OLD ROPE

Brown Bros. & Co., Pittsburgh, Antwerp, 97 coils.
Brown Bros. & Co., Francisco, Hull, 138 coils.
Brown Bros. & Co., Montauk, Antwerp, 139 coils.
W. Schall & Co., A. Ballin, Hamburg, 29 coils.
American Exchange National Bank, Marengo, Newcastle, 248 coils.
Brown Bros. & Co., Maryland, London, 106 coils, 32 bls.
G. M. Graves & Co., Inc., by same, 84 bls.
Brown Bros. & Co., N. Amsterdam, Rotterdam, 68 coils.

MANILA ROPE

Ellermans Wilson Line, Minnetonka, London, 219 coils.
Mechanics & Metals National Bank, Andalusier, Antwerp, 245 coils.

WOOD PULP

Scandinavian Pulp Agency, Inc., Carlsholm, Norrkoping, 625 bls. sulphate pulp.
Hartig Pulp Co., Inc., Carlsholm, Gevle, 2,000 bls. sulphite pulp
Bulkley, Dunton & Co., by same, 6,050 bls. sulphite pulp.
Scandinavian Pulp Agency, Inc., by same, 500 bls. sulphite pulp.
M. Gottesman & Co., Inc., Kolsnaren, Norrkoping, 2,500 bls. sulphate pulp.
M. Gottesman & Co., Inc., West Maximus, Finland, 1,060 bls. wood pulp.
M. Gottesman & Co., Inc., Mongolia, Trieste, 832 bls. wood pulp.
M. Gottesman & Co., Inc., Muenchen, Bremen, 600 bls. sulphite pulp.
E. M. Sergeant & Co., Inc., by same, 1,625 bls. dry chemical pulp.
Johaneson, Wales & Sparre, Inc., by same, 1,200 bls. sulphite pulp.
Castle & Overton, Inc., A. Ballin, Hamburg, 1,510 bls. wood pulp.
National City Bank, Belfast Maru, Hamburg, 309 bls., 50 tons, chemical pulp.
E. J. Keller Company, Inc., by same, 398 bls., 60 tons, sulphite pulp.
Central Union Trust Company, by same, 800 bls., 121 tons, sulphite pulp.
W. Hartman Co., Inc., by same, 400 bls., 61 tons, wood pulp.
Atterbury & McKelvey, Idefjord, Kristiania, 300 bls. sulphite pulp.
J. Anderson & Co., by same, 1,958 bls. sulphite pulp.
Lagerloef Trading Co., West. Maximus, 2,160 bls. chemical pulp.
Central Union Trust Company, by same, 1,535 bls. sulphite pulp.

WOOD FLOUR

Castle & Overton, Inc., Eastern Victor, Rotterdam, 900 bags, 51,630 kilos.
The Bakelite Corp., by same, 631 bags, 45,390 kilos.
B. L. Soberski, Idefjord, Fredericksstad, 2,400 bags.
A. Kramer & Co., Idefjord, Flekkefjord, 1,000 bags.

CASEIN

Atterbury Bros., Inc., Cavour, Buenos Aires, 834 bags.
Bank of America, by same, 417 bags.

PHILADELPHIA IMPORTS

WEEK ENDING JANUARY 31, 1925

N. Y. Hanseatic Corp., Naperian, Hamburg, 20 rolls wrapping paper.
C. W Williams & Co., Naperian, Antwerp, 24 cs. colored paper.
The Stone Bros. Company, Inc., Abron, Naples, 94 bls. rags.
The Stone Bros. Company, Inc., Abron, Leghorn, 265 bls. rags.
Chase National Bank, by same, 116 bls. rags.
G. M. Graves & Co., Inc., Coaxet, Antwerp, 182 bls. rags.
M. Friedman, by same, 56 bls. rags.
Castle & Overton, Inc., by same, 148 bls. rags, 66 bls. bagging.
A. W. Fenton, Inc., by same, 45 bls. rags.
G. Mathes & Co., by same, 100 bls. rags.
J. A. Steer & Co., by same, 1,001 bls. rags.
D. I. Murphy, Eastern Victor, Rotterdam, 304 bls. rags.
Union National Bank, by same, 253 bls. rags, 62 bls. fustians.
American Exchange National Bank, by same, 48 bls. rags.
Chase National Bank, by same, 80 bls. rags.
Brown Bros. & Co., by same, 65 bls. rags.
Castle & Overton, Inc., by same, 57 bls. rags.
Castle & Overton, Inc., Hameln, Hamburg, 98 bls. rags.
Castle & Overton, Inc., Caledonian, London, 90 bls. rags.
Castle & Overton, Inc., Vardulia, London, 280 bls. rags.
Castle & Overton, Inc., Cabo Torres, Italy, 327 bls. rags.
Castle & Overton, Inc., West Campgaw, Germany, 193 bls. rags.
The Stone Bros. Company, Inc., Fenchurch, Marseilles, 467 bls. rags.
Guaranty Trust Company, by same, 75 bls. rags.
Chase National Bank, by same, 216 bls. rags.
Katzenstein & Keene, Inc., by same, 173 bls. rags.
Philadelphia National Bank, by same, 119 bls. rags.
The Stone Bros. Company, Inc., Fenchurch, Barcelona, 133 bls. rags.
Leshner Paperstock Company, Incemore, Barrow, 140 bls. paperstock.
J. A. Steer & Co., Incemore, Belfast, 62 bls. rags.
Castle & Overton, Inc., by same, 73 bls. waste paper.
H. Atkinson, Maryland, London, 237 bls. waste paper.
Anglo South American Trust Company, by same, 80 bls. rags.
Equitable Trust Company, by same, 109 bls. waste paper.
The Stone Bros. Company, Inc., Saucon, Leghorn; 483 bls. rags.
The Stone Bros. Company, Inc., Zarembo, St. Nazaire, 392 bls. rags.
Philadelphia National Bank, by same, 160 bls. rags.
E. J. Keller Company, Inc., by same, 88 bls. rags.
Brown Bros. & Company, Sagoporack, London, 92 bls. rags.
Philadelphia National Bank, Belfast Maru, Hamburg, 21 bls. rags.
National Bank of Commerce, by same, 121 bls. rags.
National City Bank, by same, 106 bls. rags.
Equitable Trust Company, by same, 93 bls. rags.
Bulkley, Dunton & Co., Braheholm, ——, 500 bls. wood pulp.
H. Atkinson, Maryland, London, 124 coils old rope.
Equitable Trust Company, Saucon, Marseilles, 127 coils old rope.
Price & Pierce, Ltd., Trump, Skutskar, etc., 3,222 bls. sulphite pulp.
Scandinavian Pulp Agency, Inc., by same, 1,250 bls. sulphate pulp, 1,500 bls. wood pulp.
M. Gottesman & Co., Inc., Trump, Stockholm, 4,000 bls. sulphate pulp.
National City Bank, Belfast Maru, Hamburg, 310 bls., 50 tons, chemical pulp.
Castle & Overton, Inc., Germany, 330 bls. wood pulp.

PORTLAND, ME., IMPORTS

WEEK ENDING JANUARY 31, 1925

Scandinavian Pulp Agency, Inc., Kolsnaren, Westerwarf, 6,955 bls. sulphate pulp.
Poland Paper Company, Kolsnaren, Gothenburg, 1,942 bls. dry pulp.
The Borregaard Co., Inc., by same, 1,250 bls. dry pulp.

NEW ORLEANS IMPORTS

WEEK ENDING JANUARY 31, 1925

Castle & Overton, Inc., West Erral, France, 101 bls. rags.
Lagerloef Trading Co., Janelew, 2,130 bls. chemical wood pulp.
E. J. Keller Company, Inc., Karl Hans, Rotterdam, 171 bls. bagging.

CHARLESTON IMPORTS

WEEK ENDING JANUARY 31, 1925

E. J. Keller Co., Inc., Jessie Bremen, 97 bls. bagging.

BALTIMORE IMPORTS

WEEK ENDING JANUARY 31, 1925

E. J. Keller Company, Inc., Monticello, Hamburg, 123 bls. rag pulp.

(*Continued on page 285*)

Imports of Paper and Paper Stock

(*Continued from page 283*)

The Congoleum Company, Indep. Hall, Dunkirk, 176 bls. rags.

Chase National Bank, by same, 97 bls. rags.

National City Bank, by same, 162 bls. rags.

H. Masson, Indep. Hall, Havre, 40 bls. rags.

National City Bank, by same, 601 bls. rags, 97 bls. bagging.

Union Bank of Baltimore, Belfast Maru, Hamburg, 72 bls. rags.

Union National Bank, by same, 868 bls. rags.

W. Hartman & Co., Inc., by same, 300 bls., 46 tons, wood pulp.

National City Bank, by same, 5,899 bls. chemical pulp.

M. Gottesman & Co., Inc., by same, 700 bls., 106 tons, wood pulp.

M. Gottesman & Co., Inc., Wert Maximum, Kotka, 1,114 bls. wood pulp.

M. Gottesman & Co., Inc., Olsen, Stockholm, 990 bls. wood pulp.

M. Gottesman & Co., Inc., Braheholm, Stockholm, 2,010 bls. wood pulp.

M. Gottesman & Co., Inc., Stureholm, Stockholm, 2,500 bls. wood pulp.

M. Gottesman & Co., Inc., Trump, Stockholm, 5,000 bls. wood pulp.

M. Gottesman & Co., Inc., Hornefels, Stockholm, 1,500 bls. wood pulp.

Castle & Overton, Inc., ———, Germany, 550 bls. wood pulp.

Johaneson, Wales & Sparre, Inc., Braheholm, Sundswall, 1,360 bls. sulphite.

Johaneson, Wales & Sparre, Inc., Ivar, Gothenburg, 1,000 bls. sulphite, 500 bls. sulphate.

Johaneson, Wales & Sparre, Inc., Ivar, Oslo, 1,000 bls. sulphite.

Johaneson, Wales & Sparre, Inc., Monticello, Hamburg, 384 bls. sulphite.

Bulkley, Dunton & Co., Thyra, 6,500 bls. wood pulp.

Bulkley, Dunton & Co., Trump, 250 bls. wood pulp.

Bulkley, Dunton & Co., Braheholm, 750 bls. wood pulp.

Bulkley, Dunton & Co., Sveajarl, 1,500 bls. wood pulp.

BOSTON IMPORTS

WEEK ENDING JANUARY 31, 1925

C. F. Malcolm, Caledonian, Liverpool, 13 cs. tissue paper.

C. F. Malcolm, Aurania, Liverpool, 14 cs. tissue paper.

Foreign Paper Mills, Inc., Talisman, Hamburg, 5 rolls wrapping paper.

Drinhausen Hollkott Paper Company, by same, 23 rolls printing paper.

J. T. Lodge, Caledonian, Liverpool, 25 bls. rags.

Burmon & Bolonsky, Westlake, Liverpool, 6 bls. rags.

Baring Bros. & Co., Ltd., Maryland, London, 136 bls. rags.

Crocker, Burbank Company, Sagoporack, London, 73 bls. waste paper.

G. S. Graves, Hoosac, Glasgow, 75 bls. rags.

T. D. Downing & Co., Inc., Barbadian, London, 20 bls. paper stock.

Salter & Sons, by same, 27 bls. rags.

Second National Bank, by same, 20 bls. rags.

F. Leyland & Co., by same, 44 bls. rags.

F. W. Bird & Co., by same, 155 bls. rags.

Crocker, Burbank Company, by same, 299 bls. waste paper.

Second National Bank, Barbadian, Antwerp, 42 bls. rags.

Andrews & Cook, by same, 126 bls. flax waste.

T. D. Downing & Co., Inc., by same, 250 bls. flax waste.

E. Butterworth & Co., Inc., by same, 18 bls. flax waste.

J. Spaulding Sons Co., by same, 348 bls. flax waste.

J. B. Moors & Co., Caledonian, Liverpool, 330 bags hide cuttings.

Bank of America, Cavour, Buenos Aires, 583 bags casein.

First National Bank of Boston, by same, 834 bags casein.

Bulkley, Dunton & Co., Carlholm, Gothenburg, 4,750 bls. sulphite pulp.

Bulkley, Dunton & Co., Olsen, Sundsvall, 950 bls. chemical pulp.

Johaneson, Wales & Sparre, Inc., by same, 180 bls. sulphite pulp.

Price & Pierce, Ltd., Olsen, Walvik, 6,750 bls. sulphite pulp.

National City Bank, Talisman, Hamburg, 1,000 bls. wood pulp.

M. Gottesman & Co., Inc., Kolsnaren, Norkoping, 1,250 bls. sulphate pulp.

M. Gottesman & Co., Inc., Vinland, Stockholm, 750 bls. wood pulp.

M. Gottesman & Co., Inc., Copenhagen, Stockholm, 6,150 bls. wood pulp.

Johaneson, Wales & Sparre, Inc., St. Stephen, Holmsund, 3,500 bls. sulphate pulp.

Bulkley, Dunton & Co., Jethou, ——, 125 bls. wood pulp.

RECEIVERSHIP AGAINST HARTJE PAPER CO.

[FROM OUR REGULAR CORRESPONDENT.]

CINCINNATI, Ohio, January 29, 1925.—Following the hearing of the foreclosure and receivership proceedings filed by the Equitable Trust Company of New York, as trustee of bondholders, against the Hartje Paper Manufacturing Company, of Steubenville, Ohio, in District Court, Judge Hickenlooper appointed George E. Wisenere of Steubenville, receiver, and fixed his bond at $100,000. He was directed to continue the operation of the business.

The suit originally was filed in the Federal Court at Columbus, Ohio, in the receivership proceedings brought by William J. Alexander of Steubenville, an unsecured creditor.

Judge Hickenlooper ordered that the receiver continue the business until the proceedings end or a trustee is appointed.

JOIN BUTLER PAPER CO. IN DETROIT

[FROM OUR REGULAR CORRESPONDENT.]

CHICAGO, January 26, 1925.—Butler Paper Company, Detroit, Mich., a division of Butler Paper Corporation of Chicago, has recently added to its staff John R. Robinson and F. A. Stolberg, vice-president and treasurer, respectively. Mr. Robinson has, for a number of years, done foreign and domestic survey work. Mr. Stolberg has been with J. W. Butler Paper Company, Chicago Division of Butler Paper Corporation, in various capacities for the past fourteen years. Prior to going to Detroit he was out-of-town sales manager. Both gentlemen go to Detroit fully equipped with a thorough knowledge of Butler brands and policies.

H. A. MOSES GIVES MUSEUM TO TICONDEROGA

[FROM OUR REGULAR CORRESPONDENT.]

SPRINGFIELD, Mass., January 27, 1925.—Horace A. Moses, president of the Strathmore Paper Company, has offered to denote to his native town of Ticonderoga, N. Y., a $200,000 museum. It is to take the form of a replica of the famous John Hancock house in Boston. This building was destroyed by fire. Working plans are being prepared by Architect Max H. Westhoof of this city. The contract will be let by April 1. The building will be brick with granite facing, 41 x 56 feet. The location will be on a slope overlooking Moses circle in the center of which stands the heroic Liberty monument given to the town by Mr. Moses last August.

PAPER MEN MADE BANK DIRECTORS

[FROM OUR REGULAR CORRESPONDENT.]

SPRINGFIELD, Mass., January 20, 1925.—Paper mill men are on the directorates of several banks here. At Tuesday's meetings C. A. Crocker of the Crocker McElwain Company, W. O. Day, treasurer of the United States Envelope Company, and G. Frank Merriam, President of the Holyoke Card & Paper Company, were elected directors of the Springfield National Bank. Horace A. Moses, of the Strathmore Paper Company, and Joshua L. Brooks, President of the Brooks Bank Note Company, were elected directors of the Chicopee National Bank. M. D. Southworth of the Southworth Paper Company was elected a director of the Third National Bank.

MR. WILLSON NOT TO AMEND ANSWER

[FROM OUR REGULAR CORRESPONDENT.]

HOLYOKE, Mass., January 27, 1925.—Receiver Sidney L. Willson of the American Writing Paper Company states that he will make no amendment to his answer to meet an amendment allowed by Judge Lowell to the bill for foreclosure brought by the Old Colony Trust Company which inserts a clause wherein the petitioners request that they be allowed "for the exclusive benefit of the first mortgage bondholders" to take over and manage the property, and that the court appoint a manager to act for the bondholders. In the event of a foreclosure sale the bondholders are likely to be the only bidders.

Editorial

Vol. LXXX New York, February 5, 1925 No. 6
HENRY J. BERGER, Editor

WHEN IS THE BEST TIME?

The best time for the annual convention was a subject freely discussed by the paper men in attendance at the forty-eighth annual convention of the American Paper and Pulp Association, held at the Waldorf-Astoria Hotel this week.

Many different opinions were expressed, some of the views favoring the holding of the annual convention in April as was done last year and others favoring February as the meeting time. From such expressions as were heard, however, it seems probable that if a complete poll of the association's membership was taken it would be found that the greater number would advocate the holding of the convention in April or at least later than the first week in February.

There are two outstanding arguments against the holding of the meeting as early as it was held this year. One is that it comes close upon a natural business strain to which business men have been subjected. There is the holiday rush, which is quickly followed by inventory period, and before the paper man has an interval of respite he is called upon to attend a convention. The question is whether or not he can get the same amount of pleasure or benefit out of such a convention at that time as he might later.

February, too, is apt to be a rather inclement month and real February weather is not conducive to the pleasure of one who perhaps has to travel far to attend the convention. There is still another important reason which militates against the February convention. It is that the year is too young for paper men to compare notes as advantageously as they might in April. The year has hardly got down to business in early February and what has happened up to that time is not exactly a proper guide to what is likely to follow.

Further than that it may be said that arranging for a convention at the start of the year entails additional labor upon those who have the preliminary work to do. We have heard no complaint from such a source, but we do know that business men are unusually busy reviewing their year's affairs and making plans for the future at the start of the year and that they cannot be depended upon for the same measure of co-operation that they could give later.

The Paper Trade Journal has no interest one way or another in this question except to see the annual convention held at such a time as will make it the greatest benefit to the greatest number. It would seem as though the matter is of sufficient importance to be dealt with thoroughly with a view to having the proper date determined for the future good of the association.

FOREIGN TRADE IN PAPER

Exports of paper from the United States during December reached a value of only $1,865,450, a decrease of 7 per cent compared with the previous month and of 21 per cent compared with October, says the Paper Division of the Department of Commerce, at Washington, D. C. While a decrease in exports during December is not unexpected compared with the previous months, it is also noteworthy that these shipments were 15 per cent under those of December, 1923. The losses were thoroughly distributed among nearly all classes, including news print paper and paper board and straw board, exports of which during 1924 have consistently surpassed those for corresponding months during 1923. Tissue and crêpe paper, toilet paper, papeteries, sheathing and building papers, paper bags, and boxes and cartons as well as miscellaneous papers represent the only exceptions to the general loss in the December shipments. Exports of sheathing and building paper during December reached the maximum for any one month during the past two years, exceeding the October shipments by 5 per cent, and more than doubling those of December, 1923.

Exports of paper base stocks also were nearly double those of a year ago, and more than double in value. The largest gain was in exports of rags and other paper stock, which represented nearly 70 per cent of the volume and 40 per cent of the value of this class of exports.

Imports of paper and paper products into the United States during December were valued at $10,452,683, of which $9,217,111 represents standard news print, leaving $1,235,572 as representing the total value of the remaining items. News print imports show a gain of 8 per cent in quantity and 5 per cent in value, and receipts of other printing paper, surface-coated paper and writing paper also show substantial increases. On the other hand, imports of cigarette paper and books and of wrapping papers declined nearly 60 per cent, which together with decreases in the receipts of greaseproof and waterproof paper, tissue paper, decalcomania paper, photographic paper, and pulp boards, brought the total value of the December imports, excluding news print, 29 per cent below those of the corresponding month in 1923.

Imports of paper base stocks into the United States during December were valued at $9,703,275, thus exceeding those of the previous December by more than 20 per cent. Increases were registered in nearly all classes, receipts of mechanical ground wood, which dropped off 9 per cent, and of old rope and other paper stock, which declined 23 per cent, forming the only notable exception.

PAPER MILL EMPLOYMENT

December employment figures in the paper, pulp and paper box industries just made public by the Bureau of Labor Statistics, Department of Labor, show that one hundred and eighty-seven paper and pulp plants reported their employment in November at 49,107, decreasing slightly in December to 48,869, a decrease of 0.5 per cent. The payrolls in these plants on the other hand increased from $1,280,333 in November to $1,309,035 in December, an increase of 2.2 per cent.

Replies were also received by the Bureau of Labor Statistics from 150 paper box plants which gave their employment in November at 17,382, decreasing slightly in December to 17,020, a decrease of 2.1 per cent. The payrolls in these plants also decreased from $371,301 in November to $367,479 in December, a decrease of 1 per cent.

The Bureau of Labor Statistics also received replies from 118 paper and pulp plants which gave their employment in December 1923 at 38,297, increasing in December 1924 to 38,780, an increase of 1.3 per cent. The payrolls in these plants also increased from $1,002,696 in December 1923 to $1,037,596 in December 1924, an increase of 3.5 per cent.

One hundred and thirty-nine paper box plants reported their employment in December 1923 at 15,116, decreasing in December 1924 to 14,754, a decrease of 2.3 per cent. The payrolls in these plants also decreased from $317,585 in December 1923 to $314,287 in December 1924, a decrease of 1 per cent.

IMPROVEMENTS AT D. M. BARE PAPER CO.

The construction work that was started over a year ago by the D. M. Bare Paper Co. at Roaring Spring, Pa., is now completed. The design and construction has been carried out by K. A. Hultan, pulp and paper mill engineer. The boiler plant has been equipped with superheaters, a new water softening plant and new feed water pumps.

A modern power-generating plant of steel and brick construction has been erected, containing two turbo-generating units with condensers and switchboards. One of these turbines, generating 1000 K. W. = 440 volt alternating current, is of the bleeding type, and the exhaust steam is used for drying purposes. The other turbine, generating direct current for the electrolytic bleaching plant, is of the straight condensing type.

The entire mill is now operated by electricity and over fifty motors ranging in size from 5 H. P. to 150 H. P. have been installed.

This change has given very steady and reliable operation, and one department is independent from the other as far as motive power is concerned.

All the paper making machinery has been improved and one paper machine completely rebuilt in order to take care of certain grades of paper.

The entire construction program represents a large outlay of money, and has resulted in a considerable saving in coal, increased production and a cleaner sheet of paper.

This company was organized in the early sixties, has operated continuously since and enjoys the highest reputation in the paper trade. The products of the company comprise all classes of machine-finished and super-calendared book papers of the highest qualities.

GRASS FIBRE PULP & PAPER CORP. PLANS

Planning to resume the manufacture of paper as soon as possible, nearly 300 stockholders in the Grass Fibre Pulp and Paper Corporation met in Leesburg, Fla. Over $800,000 worth of stock was presented in person or by proxy and by unanimous vote it was decided to authorize the issuance of $300,000 in bonds on the property and put the plant in operation. Stockholders present subscribed for over ten per cent of the issue. There has never been a bond issued by the company heretofore and the total indebtedness is only approximatly $60,000 but internal differences among the officers prevented working out a successful plan of continuing operations and the plant has been closed since last May.

New officers elected are S. J. Sligh, Orlando, president; F. C. W. Kramer, Jr., Leesburg, vice-president; J. H. McCullough, Orlando, vice-president of the McCrory chain of stores, treasurer, the company secretary to be elected later but B. H. Bickers of Umatilla, was chosen secretary for the board of directors. Other directors are E. S. Brown, of St. Petersburg; H. T. Morrison, Leesburg; A. F. Smith, Arcadia; Charles Mayer, Cincinnati, O; George H. DeVault, Umatilla, and W. S. McClelland, Eustis. Efforts are to be made to dissolve the temporary receivership and pay off all obligations practically at once.

COY, HUNT & CO. IN NEW QUARTERS

One of the interesting happenings of the past month was the removal of Coy, Hunt & Co., from their old location at 392 Lafayette street, to their new building at 77-83 West Houston street, and 481-483 West Broadway, New York City.

In order to take care of their new lines and increased business, the large six-story and basement building was purchased for occupancy entirely by them. The concern had occupied the premises at 392 Lafayette street for the past twenty-three years.

The six-story and basement building purchased by them and which will be used entirely for their business, constitutes one of the largest areas devoted to the distribution of paper in Manhattan. The facilities for handling business in the new building are of the latest design and selected with the idea of getting the greatest amount of efficiency out of its entire organization. An inside loading platform and large elevator capacity furnishes excellent facilities for prompt and efficient handling of merchandise and its distribution to the various floors.

The new location affords convenient access to all transit lines as well as for delivering merchandise to all parts of the city and freight terminals.

The first floor is devoted to shipping and receiving, with a large inside loading and unloading platform. The office occupies the entire second floor, the entrance to which is at 77 West Houston street. As an additional aid to the sales department and customers a large and well equipped sample room has been installed.

This progressive organization enjoys an excellent reputation in the paper trade. The firm was established twenty-seven years ago. At that time it handled coarse papers exclusively. The firm's history has been one of constant progress, the latter being most prominent in the past few years, during which period the company entered the white paper and specialty field on Major Quality Papers representing lines giving the fullest measure of value in their respective grades marketed under intelligent direction, by a specially trained sales force, and backed by a well co-ordinated inside organization.

The result obtained from this policy is well indicated by the success of WHITERWHITE Enameled Book, an outstanding development in the coated paper field. Some of the other Major Quality Papers enjoying a large sale are: Brandywine Bond, Claremont Kraft, Clearfield M. F. and Super, Duane Manila, Jutex, Major Blotting, Major White Bond, No. 66 Tag and Sedroc Kraft.

Coy, Hunt & Co.'s new building is indicative of the success of the policy adopted five years ago, of selling the Major lines of paper comprising the utmost in quality for the price, backed by intelligent and concentrated sales effort.

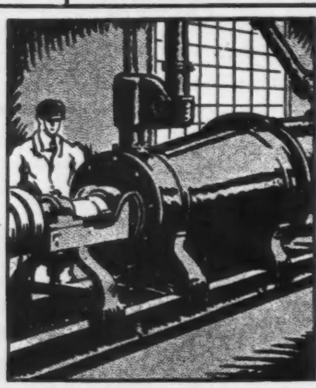
The officers of the company, all of whom are actively engaged in the business, are: President, G. A. Knoche; vice-presidents, J. W. Eginton and W. P. Hawley; secretary, A. E. Beling; treasurer, J. C. Stevens; sales manager, C. C. Fleming, Jr.

NO CHANGE IN ENGLISH CLAY TARIFF

Nothing of any definite nature has yet been done by the Tariff Commission in connection with the application of the domestic clay producers for an increase of the tariff on English clay, although the application was filed some time ago.

While it is not the policy of the Commission to discuss pending applications it is understood that the maximum allowable under the flexible provisions of the Tariff Act have been asked for, namely an increase of 50 per cent.

The application is still pending at the Commission and no official action has yet been taken. Before anything of a definite nature is done it is usual to have a preliminary survey made of the situation. It is understood that this has not yet been done. Information received here is to the effect that the book paper manufacturers will probably take some action in connection with the case if the Commission grants the application to proceed.



It is very much easier to live down to our characters, than up to our reputations.

Having Established A Reputation For Reliability

We are devoting our entire efforts in trying to maintain it.

As a matter of fact, however, it isn't a very hard job, because our friends now realize that if anything goes wrong, it is merely a **mistake** which we are only too glad to rectify.

Whatever is Good in Paper, We Handle

BERMINGHAM & PROSSER COMPANY

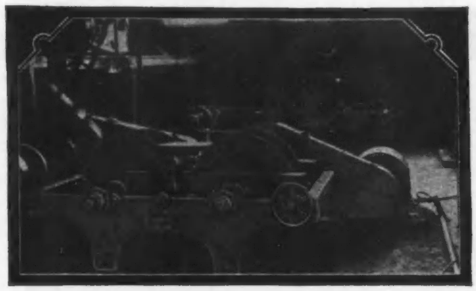
Kalamazoo, Mich.

Chicago Office,
100 North La Salle Street.

New York Office,
105 West 40th Street

Pioneers in Variable Speed Transmission Improvements

[Lewellen Illustrates Only Current Installations.]



"Oil Once A Year"

~Sold this Manufacturer Lewellens

His factory was equipped and his men trained to produce egg case fillers. He chose Lewellens as the variable speed transmissions for the factory because they were the only transmissions guaranteed, under the conditions, to operate one year without oiling. He wanted to know that he did not run 365 chances a year of having an oil hole missed and a resultant burnt-out bearing.

He considered the production time of his men too valuable to make necessary an oil-hole or oiler hunt daily. So he bought Lewellens.

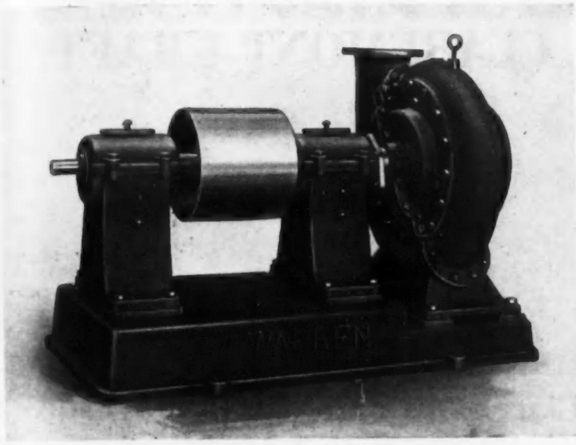
That isn't all—every Lewellen in his plant is "giving perfect satisfaction" according to his statement. He doesn't have to carry a stock of replacement parts either.

Let us tell you more about the Lewellen. Let our Engineering Department furnish you counsel on your power transmission problems.

LEWELLEN
Variable Speed
TRANSMISSION

LEWELLEN MFG. CO. Columbus, Ind.

Pioneers in Variable Speed Transmission Improvements



Dependable

Paper Mill Pumps

WARREN Paper Mill Pumps are designed, built, and tested to insure more dependable service plus lower operating and maintenance cost than you can obtain from pumps ordinarily used for paper mill service.

In the Warren Stuff Pump, designed especially for the efficient handling of stock up to 5 per cent consistency—

And in Warren Single- and Multi-stage Centrifugals for feed water and for every other paper mill pumping requirement—

You will find unusually generous proportions, massive construction, and the high quality of materials and workmanship for which Warren Pumps have been noted for a quarter of a century.

Let us send you more complete information about Warren Paper Mill Pumps.

7589

Warren

Steam Pump Company

Warren, Mass.

Boston Chicago New York
Philadelphia St. Paul San Francisco

Graton & Knight double belts driving stock and water pumps

Better belts for paper mills!

Because a belt will give service under the ordinary dry conditions in a machine shop is no reason why it will stand up under wet work in a paper mill. *The belt must be made for the job.*

You find such belts in the Standardized Series—a grouping of Graton & Knight Leather Belts guarantee you the right belt for the right job.

These Graton & Knight Standardized Belts are made of tough, rugged leather. They are guaranteed water-proof! Won't come apart at laps or plies. Will even run in water without damage!

Each brand in the Standardized Series is made to do its own work best. To grasp the pulleys firmly without slippage. To deliver power with the least loss. Carefully *standardized* so when replacement is finally necessary, another Graton & Knight Belt is waiting to give you the same trouble-free service.

Write for our interesting book 101-E. It tells about Standardized Leather Belting for paper mills.

The Graton & Knight Mfg. Co.

Tanners—Makers of Belts and Other Leather Products

Worcester, Mass.

GRATON & KNIGHT

Standardized

LEATHER BELTING

Nothing takes the place of Leather

GRATON & KNIGHT

Obituary

James B. Thayer

James B. Thayer assistant general manager of the United States Envelope Company died last Friday at the home of his sister Mrs. Maude Hannon, Montgomery, Ala. He was on his way form Springfield, Mass., to the Pacific Coast and his death was sudden and unexpected. He was about to visit the Pacific Coast plant of that Company. He had been associated with the United States Company since 1895 when he entered the office of the Springfield Envelope Company of this city. For many years he traveled as a representative of the company. On April 1, 1914 he was appointed sales manager for the United States Envelope Company. In July, 1924, he was elected to the Board of Directors and Assistant General Manager succeeding the late Louis H. Buckley whose death occurred in May of that year.

Upon assuming the position of sales manager, he took up his residence at 49 Greenacre avenue, Longmeadow, where he lived up to the time of his death. He was a member of the Rotary, Nayasset, Winthrop and Longmeadow Country Clubs.

James Bodfish Thayer was born in Holyoke, December 12, 1877, the son of Mr. and Mrs. George Thayer. His grandfather, James N. Thayer, will be remembered as one of the pioneers in the grocery business in Holyoke. Besides his wife, Mrs. Katherine Louise Thayer, he leaves a daughter, Mrs. Magnus F. Peterson, of 39 Greenacre avenue. Longmeadow, and his sister, Mrs. Maude Thayer Hannon of Montgomery, Ala., and an aunt, Mrs. Rufus H. Chapin of Holyoke.

Joseph Kilgour

The body of Joseph Kilgour, head of Kilgour Brothers, paper bag and box manufacturers, Toronto, was brought home last week from Hampton Springs, Florida. Funeral Services held at his residence Sunnybrook Farm, were largely attended by members of the paper industry and others. The remains were taken to Beauharnois, Quebec, for interment.

The passing of Joseph Kilgour marks a gap in the trade which will be keenly felt. For some years he has spent the cold weather months in the south. Heart failure was the immediate cause of his demise. He was in his seventy-third year and leaves a widow but no family.

Mr. Kilgour was not only the head of Kilgour Brothers, Toronto, but also President of the Canadian Paper Company, Windsor Mills, Que., which has large branches in Toronto and Montreal. The firm built up one of the largest paper box businesses in the Dominion and a year or more ago erected a new paper bag factory at Windsor Mills. The deceased was highly esteemed by all persons and was a keen sportsman, hunter, yachtsman and turfman. He gave liberally to all charitable institutions and belonged to several clubs.

In religion, Mr. Kilgour was a Presbyterian and his relations with his employees was always ideal. His death was entirely unexpected for, on leaving Toronto a few weeks ago, he was in fairly good health.

Thomas Hubbard

The many friends of Thomas Hubbard, of Watertown, Mass., veteran in the paper industry, were grieved to learn this week of his death in St. Petersburg, Florida, where he was spending the Winter.

A pioneer in the business, Mr. Hubbard had friends the country over, particularly in the mill and jobbing branches, where for more than half a century he was an outstanding figure, both as a salesman and organizer. For many years he travelled in a territory which took in cities between Albany and Cleveland and in New York state and Pennsylvania districts.

As agent for the Poland Paper Company he became widely known. His other affiliations included the old concern of Pulsifer, Jordan, Company, J. P. Jordan Paper Company and the Dennison-Pratt Company. A few years ago he retired from active work in the trade and devoted his time to the collection of art work. His collection included rare pieces of work and is said to be of high value.

His friends were legion and his passing removes one more member of the so-called "old school." His son, Roger is a member of the sales force of John Carter & Co., Inc., this city. Funeral services were held in Watertown.

PAPER AT GERMAN IMPORTS EXPOSITION

Paper will be featured in profusion at the German Imports Exposition to be held in Grand Central Palace, June 15-27. These dates were definitely decided upon this week. It will be managed by Edward D. Selden who was manager of the very successful French Exposition held in the Palace last Spring.

This is the first time that such an enterprise has been attempted with German goods and it is designed to afford importers of merchandise from Germany an opportunity to display the various lines collectively in a large exhibition open to the public.

While the full plan and scope of the German Imports Exposition has not been announced to the public as yet, some very interesting features are being arranged and the Exposition Committee will announce more detailed plans at an early date.

Inquiries regarding it may be addressed to Edward D. Selden, Room 1102, Grand Central Palace, New York.

OPTIMISM IN SWEDISH PULP INDUSTRY

WASHINGTON, D. C. February 2, 1925.—Considerable optimism is manifested in Swedish pulp circles concerning the 1925 prospects notwithstanding the fact the prices obtained on advance sales do not show material increases over those of the previous months, says American Consul Dawson at Stockholm reporting to the Paper Division of the Department of Commerce.

The Mills are reported to be working at full capacity says the report, most of them having contracts covering their maximum output up to the end of 1924. Approximately 40 per cent of the 1925 production of sulphate pulp is reported in trade circles to have been sold, nearly all of which was purchased by American buyers at prices ranging from $2.75 to $2.90 per hundred pounds ex dock.

R. H. HAYWARD DISCUSSES PRODUCTION COSTS

KALAMAZOO, Mich., February 2, 1925.—Production costs and numerous problems confronted in the operation of a paper mill were considered by R. H. Hayward, general manager of the Kalamazoo Vegetable Parchment Company, at the Thursday evening meeting of the Kalamazoo local of the Cost Association of the Paper Industry and the Michigan Division of the American Pulp and Paper Mill Superintendents Association. Mr. Hayward brought out many interesting points, mostly drawn from personal experiences. Following his talk there was a round table discussion of mill problems effecting both the superintendent and the cost accountant.

K. V. P. CO. CONDUCTS SCHOOL FOR SALESMEN

KALAMAZCO, Mich., February 2, 1925.—A school for salesmen and general business conference bringing to Kalamazoo prominent representatives from all over the United States, Canada and Mexico, has just closed at Parchment. This annual meeting of the Kalamazoo Vegetable Parchment Company is designed to study new lines and particularly to develop K. V. P. service to the company's customers. Business sessions continued through Monday, Tuesday and Wednesday, closing with a dance Wednesday evening in the community house.

Market Quotations

Quoted by Hepburn & Co., No. 74 Broadway, N. Y. City, to whom all inquiry for quotations on these or any other Securities is referred.

BONDS	BID	OFFERED
Abitibi Power and Paper, Gen. 6s 1940	99	102*
Advance Bag and Paper, 7s 1943	97	100*
Aroostook Pulp and Paper, 6s 1925	99	...
Bastrop Pulp and Paper, 7½s 1932	102	...
Brompton Pulp and Paper, 6s 1927	93	95
Beaver Board, 8s 1933	87	89
Bedford Pulp and Paper, 6½s 1942	97	...
Berkshire Hills Paper Co., 8s 1941	...	80
Beaver Board, N. Y. Curb, 8s 1933	87	89
Beaver Products Corp., 7½s 1942	102	104
Belgo Canadian Paper, 6s 1943	98	100
Brown Paper Co., 8s 1931	102	105*
Berlin Mills, 5s 1931	99	...
Bryant Paper Co., 6s 1942	97	100
Brown Company Serial, 6s 1925-43	97	100
Central Paper, 6½s 1925-42	90	95
Cape Breton Pulp and Paper, 6s 1932	100	102
Carthage Sulphite Pulp and Paper, 8s 1941	40	50
Champion Coated Paper Co., 6s 1924-34	...	102
Champion Fibre Co. Notes, 8s 1930	102	...
Cherry River Paper, 5s 1929	97	100*
Chicoutimi Pulp Co., 6s 1942	63	...
Donnaconna Paper Co., Ltd., 6s 1940	98	100
Eddy Paper, 7s 1931	96	...
Eagle Paper, 6½s 1932	96	100
Escanaba Paper, 6s 1933	84	88
Fox River Paper, 7s 1931	100	...
Fort Orange Paper Co, 7s 1942	90	...
Eddy Paper Co., 7½s 1931	95	98
Gilbert Paper Co., 7s 1927	97	...
Gilbert Paper Co., 6½s 1923-29	100	102*
Hammermill Paper Co., 6s 1930-39	98	101
Hercule Corp'n, 8s 1936	98	101
Hummell, Ross Film Corp., 7s 1925	90	...
Jessup & Moore Paper Co., 6s 1939	93	97
Kenmore Pulp and Paper Co., 6s 1937	91	...
Lake Superior Pulp and Paper, 6s 1941	102	...
Mattagami Pulp and Paper, Oct. 7, 1949	30	40
Marinette & Menominee, 7½s 1936	103	105
Mead Pulp and Paper, 7s 1925-29	97	...
Mengel Company, 7s 1934	100	103
National Paper and Type, 6s 1947	96	99*
Oswego Falls Corp., 8s 1942	101	105
Orono Pulp and Paper, 5s 1941	93	96*
Orono Pulp and Paper, 6s 1943	97	100*
Oxford Paper Co., 6s 1947	99	101
Paterson Parchment Paper, 5½s 1927-28	...	100
Paterson Parchment, 6s 1938	96	99
Parker, Young Co., 6½s 1944	92	96
Price Bros. & Co., Ltd., 6s 1943	98	100
Provincial Paper Mills, Ltd., 6s 1940	97	...
Riordon Co., Series A, 8s 1940	104	107
Riordan Paper, 6s 1924	91	94
Riordan Pulp and Paper, Ltd., 6s, 1929	24	28
River Raisin Paper, 8s 1936	102	105
St. Regis Paper, 6½s, 1929-35	97	102
Smith (Howard) Paper Mills, 7s 1941	90	93
Smith (Howard) Paper Mills, 6s 1934	94	...
St. Croix Paper, 5s 1923-37	95	...
Stevens & Thomson Paper, 6s 1942	86	90
Spanish River Pulp and Paper, 6s 1931	105	...
Spanish River Pulp and Paper, Gen 8s 1941	107	109
Ticonderoga Pulp and Paper Co., 6s, 1940	91	95
Ticonderoga Pulp & Paper 1-5, 1930	86	91
Whittaker Paper, 1st 7s 1942	94	97
Watab Paper Co., 6½s 1942	98	101
Waterway Paper Products, 7s 1924-27	95	100
Wayagamack Pulp and Paper, Ltd., 6s 1951	84	88*

STOCKS	BID	ASKED
Abitibi Power and Paper, Com	62	63
Abitibi Power and Paper, Pfd	98½	103
Advance Bag and Paper, Com	8	12*
Advance Bag and Paper, Pfd	70	75*
Beaver Board, Com	5	8
Beaver Board, Pfd	38	41
Bryant Paper, Cap	12	...
Bryant Paper, Pfd	9	...
Brompton Pulp and Paper, Cap	29	30
Chicago Mill & Lumber Co., Com	63	...
Chicago Mill & Lumber Co., Pfd	98	101
Crown Williamette, Com	93	98*
Crown Williamette, 7% A, Pfd	98	SW
Donnaconna Paper, Pfd	95	100
Great Northern Paper, Cap	220	250
Howard Smith Paper Co., Com	22	23
Howard Smith Paper Co., Pfd	70	75
Jessup & Moore Paper, Pfd	74	78
International Paper Co., Com	56	57
International Paper Co., Pfd	73	74
Mengel Company, Com	38	40
Mengel Company, Pfd	72*	76
Oxford Paper Co., Pfd	99	...
Provincial Paper Co., Com	87	91
Provincial Paper Co., Pfd	95	98
Price Brothers, Cap	36	38
St. Maurice Paper Co., Cap	83	88
St. Regis Paper Co., Cap	24	27
Smith (Howard) Paper Co., Ltd., Com	...	25
Smith (Howard) Paper Co., Ltd., Pfd	70	...
Spanish River Pulp and Paper, Com	105	110
Spanish River Pulp and Paper, Pfd	120	125
Ticonderoga Pulp and Paper, Cap	145	...
Union Bag and Paper, Cap	48	50
United Paper Board, Cap	52	55*
West Virginia Pulp and Paper, Cap	46	52
West Virginia Pulp & Paper, Pfd	85	..
Whittaker Paper, Com	14	20
Whittaker Paper, Pfd	43	46

*Nominal.

Paper

(F. o. b. Mill)

Ledgers	11.00	@38.00
Bonds	9.00	@45.00
Writings—		
Extra Superfine	14.00	@30.00
Superfine	14.00	@32.00
Tub Sized	10.00	@15.00
Engine Sized	8.00	@11.00
News—		
Rolls, contract	3.50	@ 3.90
Rolls, transit	3.75	@ 4.25
Sheets	4.00	@ 4.25
Side Runs	3.25	@ 4.00
Book, Cased—		
S. & S. C.	7.00	@ 9.75
M. F.	6.25	@ 8.75
Coated and Enamel	8.50	@15.00
Lithograph	9.00	@14.00
Tissues—		
White No. 1	.70	@ .90
Colored	1.00	@ 2.25
White No. 2	.70	@ .80
Anti-Tarnish	1.40	@ 2.30
Kraft	.90	@ 1.00
Manila	.75	@ .80
Kraft—		
No. 1 Domestic	5.50	@ 6.25
No. 2 Domestic	5.00	@ 5.50
Imported	5.50	@ 5.75
Manila—		
No. 1 Jute	9.00	@ 9.25
No. 2 Jute	7.75	@ 8.50
No. 1 Wood	4.75	@ 5.25
No. 2 Wood	4.00	@ 4.50
Butchers	3.75	@ 4.00
Fibre Papers—		
No. 1 Fibre	5.50	@ 6.00
No. 2 Fibre	4.75	@ 5.25
Common Bogus	2.50	@ 2.75
S. Screening	3.25	@ 3.75
Card Middler	4.00	@ 5.00
Boards—per ton—		
News	45.00	@47.50
Straw	50.00	@55.00
Chip	42.50	@45.00
Binders' Boards	75.00	@80.00
Sgl. Mla. Ll. Chip	55.00	@60.00
Wood Pulp	70.00	@75.00
Container	62.50	@67.50
Sulphate Screenings—		
Coarse	.80	@ .90
Refined	1.75	@ 2.00
Ground Wood—		
Screenings	20.00	@25.00
Glassine—		
Bleached, basis 25 lbs.	12.00	@15.00
Bleached, basis 20 lbs.	14.00	@17.00

Mechanical Pulp

(Ex-Dock)

No. 1 Imported	32.00	@38.00
(F. o. b. Mill)		
No. 1 Domestic	30.00	@35.00

Chemical Pulp

(Ex-Dock, Atlantic Ports)

Sulphite (Imported)—		
Bleached	3.85	@ 4.50
Easy Bleaching	2.90	@ 3.20
No. 1 strong unbleached	2.75	@ 3.25
No. 2 strong unbleached	2.60	@ 3.00
No. 1 Kraft	2.75	@ 3.00
Sulphate—		
Bleached	3.50	@ 3.65
(F. o. b. Pulp Mill)		
Sulphite (Domestic)—		
Bleached	3.75	@ 4.50
Easy Bleaching Sulphite	2.75	@ 3.25
News Sulphite	2.45	@ 2.75
Mitscherlich	3.00	@ 3.25
Kraft (Domestic)	2.70	@ 3.50
Soda Bleached	3.90	@ 4.10

Domestic Rags

New Rags

Prices to Mill, f. o. b. N. Y.

Shirt Cuttings—		
New White, No. 1	15.00	@16.00
New White, No. 2	8.50	@10.50
Silesias No. 1	9.50	@10.50
New Unbleached	13.50	@14.50
Washables	6.50	@ 9.25
Fancy	10.00	@10.50
Blue Overall	10.50	@11.50
New Blue Prints	7.50	@ 8.50
New Soft Blacks	5.75	@ 6.20
Mixed Khaki Cuttings	5.50	@ 6.00
Pink Corset Cuttings	10.50	@11.00
Pink Muslin	10.25	@10.75
New Light Seconds	3.25	@ 3.50
O. D. Khaki Cuttings	6.00	@ 7.00
Men's Corduroy	6.00	@ 6.75
New Mixed Blacks	4.00	@ 5.00

Old Rags

White, No. 1—		
Repacked	8.00	@ 9.00
Miscellaneous	6.50	@ 7.00
White, No. 2—		
Repacked	4.75	@ 5.25
Miscellaneous	4.00	@ 4.50
St. Soiled, White	3.25	@ 3.75
Thirds and Blues—		
Repacked	4.00	@ 4.25
Miscellaneous	3.25	@ 3.50
Black Stockings	4.00	@ 4.50
Roofing Rags—		
Cloth Strippings	3.15	@ 3.25
No. 1	3.15	@ 3.25
No. 2	2.85	@ 3.05
No. 3	2.00	@ 2.25
No. 4	2.75	@ 2.85
No. 5A	1.80	@1.50

Foreign Rags

New Light Silesias	9.50	@10.50
Light Flannelettes	11.00	@12.00
Unbl'chd Cottons	13.00	@14.00
New White Cuttings	14.00	@15.00
New Light Oxfords	10.00	@11.00
New Light Prints	9.00	@10.00
New Mixed Cuttings	4.25	@ 4.75
New Dark Cuttings	3.75	@ 4.25
No. 1 White Linens	10.50	@11.50
No. 2 White Linens	7.50	@ 8.50
No. 3 White Linens	6.00	@ 6.50
No. 4 White Linens	4.50	@ 5.50
Old Extra Light Prints	4.75	@ 5.50
Ord. Light Prints	4.25	@ 4.75
Med. Light Prints	3.75	@ 4.25
Dutch Blue Cottons	4.50	@ 5.00
Ger. Blue Cottons	4.25	@ 4.50
Ger. Blue Linens	4.50	@ 5.00
Checks and Blues	3.75	@ 4.00
Linsay Garments	3.25	@ 3.50
Dark Cottons	3.20	@ 3.35
Shoppery	3.05	@ 3.15
French Blues	4.25	@ 4.75

Bagging

Prices to Mill F. o. b. N. Y.

Gunny No. 1—		
Foreign	3.15	@ 3.30
Domestic	3.25	@ 3.40
Wool, Tares, light	2.90	@ 3.00
Wool, Tares, heavy	3.00	@ 3.10
Bright, Bagging	2.75	@ 3.00
Mixed Bagging	2.40	@ 2.50
Sound Bagging	2.50	@ 2.75
Roofing Bagging	2.30	@ 2.40
Manila Rope—		
Foreign	6.50	@ 7.00
Domestic	6.50	@ 7.00
New Bu. Cut	3.50	@ 4.00
Hessian Jute Threads—		
Foreign	4.00	@ 4.25
Domestic	3.25	@ 3.50

Old Waste Papers

(F. o. b. New York)

Shavings—		
Hard, White, No. 1	3.60	@ 3.90
Hard, White, No. 2	3.25	@ 3.50
Soft, White, No. 1	2.90	@ 3.15
Flat Stock—		
Stitchless	1.45	@ 1.55
Overissue Mag.	1.45	@ 1.55
Solid Flat Book	1.40	@ 1.50
Crumpled No. 1	1.25	@ 1.35
Solid Book Ledger	1.80	@ 1.90
Ledger Stock	1.60	@ 1.70
New B. B. Chips	.65	@ .75
Manilas—		
New Env. Cut.	2.45	@ 2.60
New Cut. No. 1	1.75	@ 2.00
Extra No. 1 old	1.40	@ 1.50
Print	1.20	@ 1.30
Container Board	1.00	@ 1.10
Bogus Wrapper	1.00	@ 1.10
Old Krafts Machine compressed bales	2.05	@ 2.15
News—		
No. 1 White News	1.95	@ 2.10
Strictly Overissue	1.05	@ 1.15
Strictly Folded	.95	@ 1.05
No. 1 Mixed Paper	.65	@ .75
Common Paper	.45	@ .55

Twines

Cotton—(F. o. b. Mill)—		
No. 1	.43	@ .48
No. 2	.41	@ .43
No. 3	.40	@ .42
India, No. 6 basis—		
Light	.19	@ .20
Dark	.17	@ .19
R. C., 18 basis	.39	@ .41
A. B. Italian, 18 Basis	.56	@ .61

Finished Jute—
Dark, 18 basis... .30 @ .31
Light, 18 basis... .28 @ .30
Jute Wrapping, 3-6 Ply—
No. 1 .... .20 @ .23
No. 2 .... .18 @ .20
Tube Rope—
4-ply and larger. .15 @ .17
Fine Tube Yarn—
5-ply and larger. .20 @ .28
4-ply .... .21 @ .24
3-ply .... .22 @ .25

Unfinished India—
Basis .... .14 @ .15
Paper Makers' Twine
Balls .... .12 @ .13
Box Twine, 2-3 ply .14 @ .15
Jute Rope .... .20 @ .40
Amer. Hemp, 6.... .30 @ .32
Sisal Hay Rope—
No. 1 Basis...... .14 @ .16
No. 2 Basis...... .10 @ .12
Sisal Lath Yarn—
No. 1 .... .14 @ .15
No. 2 .... .11 @ .13
Manila Rope ..... .18 @ .19

CHICAGO

Paper

F. o. b. Mill

All Rag Bond..... 35 @ 40
No. 1 Rag Bond.. 25 @ 35
No. 2 Rag Bond.. 14 @ 25
Water Marked Sulphite .... 9 @ 12
Sulphite Bond..... 7 @ 10¾
Sulphite Ledger ... 9½ @ 12
Superfine Writing.. 18 @ 24
No. 1 Fine Writing 14 @ 18
No. 2 Fine Writing 12 @ 14
No. 3 Fine Writing 9 @ 12
No. 1 M. F. Book.. 5¼ @ 7½
No. 1 S. & S. C. Book .... 6½ @ 7¾
Coated Book ...... 8 @ 10
Coated Label ..... 8 @ 10
News—Rolls, mill— 3½ @ 4¼
News—Sheets, mill. 3¾ @ 4¾
No. 1 Manila...... 4½ @ 5½
No. 1 Fibre...... 4½ @ 5¼
No. 2 Manila...... 3¾ @ 4¾
Butchers' Manila... 4 @ 4½
No. 1 Kraft....... 5¾ @ 6¼
No. 2 Kraft....... 5.25 @ 5.50
Wood Tag Boards.. 4¼ @ 6
Sulphite Screenings. 3.00 @ 3.25
Manila Tissue, 24x36 sheet .... 7½ @ 8
White Tissue, 20x30 sheet .... 7 @ 7¼
Boards, per ton—
Plain Chip ......50.00 @52.50
Solid News.......52.50 @55.00
Manila Line Chip 62.50 @65.00

Container Lined—
85 Test ....72.50 @75.00
100 Test ....77.50 @80.00

Old Papers

F. o. b. Chicago

Shavings—
No. 1 Hard White 3.50 @ 3.60
White Envel. Cuttings .... 3.50 @ 3.60
No. 1 Soft Shav. 3.20 @ 3.25
No. 1 Mixed..... 1.85 @ 1.90
No. 2 Mixed..... 1.75 @ 1.80
Ledger and Writings .... 1.65 @ 1.70
Solid Books....... 1.55 @ 1.60
No. 1 Light Books. 1.15 @ 1.20
Blanks .... 2.15 @ 2.25
Kraft .... 2.35 @ 2.40
New Kraft Cuts.. 2.60 @ 2.70
Manila Envelope Cuttings....... 2.65 @ —
Ex. No. 1 Manila.. 2.35 @ 2.40
Print Manila....... 1.20 @ 1.25
Folded News (overissue) .... 1.05 @ 1.10
Old Newspapers—
No. 1 .... .90 @ 1.00
No. 2 .... .80 @ .85
Mixed Papers—
No. 1 .... .75 @ .77½
No. 2 .... .70 @ —
Straw Clippings..... .85 @ .90
Binders' Clippings.. .80 @ .85
Roofing Stock, f. o. b. Chicago, Net Cash—
No. 1 .... — @50.00
No. 2 .... — @48.00
No. 3 .... — @46.00
No. 4 .... — @40.00

BOSTON

Paper

Ledgers—
Sulphite .... .08½ @ .18
Rag content .... .18 @ .36½
All Rag .... .38 @ .50
Bonds—
Sulphite .... .08½ @ .14
Rag Content...... .17 @ .45
All Rag .... .36½ @ .51
Writings .... .08½ @ .20
Superfines ...... .20 @ .48
News .... .04 @ .06½
Book, M. F. ...... .06¼ @ .10¾
Book, Super ...... .07½ @ .11
Book, Coated...... .09 @ .20
Coated Litho...... .09½ @ .15
Label .... .09½ @ .15
Jute Manila No. 1. .12 @ .13
Manila, Sul. No. 1. .05 @ .06
Manila, Sul. No. 2. .03¾ @ .04¼
No. 1 Kraft ...... .06¼ @ .06¾
No. 2 Kraft ...... .05¾ @ .05½
Common Bogus .... .03½ @ .04
Straw Board ...... — @50.00
News Board....... — @52.50
Chip Board ...... — @50.00
Single Manila Pulp lined board......60.00 @65.00
Single White, patent coated board ....75.00 @85.00
Wood Pulp Board..80.00 @85.00
Binder Boards ....75.00 @85.00
Tarred Felts—
Regular ....61.00 @63.00
Slaters ....66.00 @68.00
Best Tarred, 1 Ply, roll .... 1.50 @ 1.60
Best Tarred, 2 Ply, roll .... 1.70 @ 1.80
Best Tarred, 3 Ply, roll .... 2.00 @ 2.10

Old Papers

Shavings—
No. 1 Hard White 4.00 @ 4.25
White Blank News. 1.75 @ 2.00
Manila Env. Cuttings .... 2.80 @ 3.00
No. 2 Hard White 3.25 @ 3.50
No. 1 Soft White.. .04¼ @ —
No. 2 Soft White.. .03¼ @ —
No. 1 Mixed...... 1.60 @ 1.75
No. 2 Mixed...... 1.25 @ 1.50
Solid Ledger Stock. 2.00 @ 2.25
Writing Paper .... — @ 1.70
No. 1 Books, Heavy 1.75 @ 1.85
No. 1 Books, Light. — @ 1.50
No. 1 New Manila. 2.50 @ 2.60
No. 1 Old Manila. 1.75 @ 2.00
Print Manila ..... 1.05 @ 1.20
Old Kraft .... 2.00 @ 2.25
Overissue News ... 1.00 @ 1.20
Old Newspapers.... .70 @ .75
No. 1 Mixed Paper.. .60 @ .65
Box Board, Chip.... .60 @ .65

Bagging

Price f. o. b. Boston

Gunny No. 1—
Foreign .... — @ 3.00
Domestic .... — @ 3.00
Manila Rope .... 6.00 @ 6.50
Mixed Rope ..... 1.50 @ 1.62½
Scrap burlaps.... — @ 3.00
Wool Tares, heavy. — @ 3.00
Mixed Strings... — @ 2.25
New Burlap Cuttings — @ 3.75

Domestic Rags (New)

Price f. o. b. Boston

Shirt Cuttings—
New White No. 1 .15½ @ .15¾
Silesias, No. 1.. .11 @ —
New Unbleached. .14¼ @ .14½
Washable .... .07¾ @ .08
Fancy .... .10½ @ —
Cottons—According to Grades—Blue—
Blue overalls.... .12½ @ —
New Black, soft... .07 @ —
Khaki Cuttings.... .07 @ —
Corduroy .... .04 @ .04½
New Canvas....... .12 @ .12½

Domestic Rags (Old)

Price f. o. b. Boston

White No. 1......10.00 @ —
Repacked .... 9.50 @ —
Miscellaneous ..... 8.50 @ —
White No. 2—
Repacked .... 6.50 @ —
Miscellaneous ... 5.25 @ —
Thirds and Blues—
Repacked .... 5.00 @ —
Miscellaneous ... 3.50 @ —
Roofing Stock—
No. 1.......... 3.00 @ —
No. 2.......... 3.00 @ —
No. 3.......... 2.50 @ —
No. 4.......... 2.00 @ —

PHILADELPHIA

Paper

Bonds .... .07 @ .40
Ledgers .... .11 @ .40
Writings—
Superfine .... .13 @ .18
Extra fine....... — @ .22
Fine .... .20 @ .26½
Fine, No. 2...... .16 @ .25
Fine, No. 3...... .12 @ .20
Book, M. F....... .06½ @ .07½
Book, S. S. & C... .06½ @ .08
Book, Coated...... .11½ @ .17
Coated Lithograph.. .09 @ .12
Label .... .09 @ .12
News .... .03¾ @ .04
No. 1 Jute Manila. .09½ @
Manila Sul., No. 1. .04½ @ .06
Manila No. 2...... .04 @ .04½
No. 2 Kraft....... .05¼ @ .05¾
No. 1 Kraft...... .06¼ @
Common Bogus..... .02¾ @
Straw Board.......55.00 @60.00
News Board.......50.00 @
Chip Board........50.00 @
Wood Pulp Board.. 4.50 @ 5.00
(Carload Lots)
Binder Boards—
Per ton ....75.00 @80.00
Carload lots......65.00 @70.00
Tarred Felts—
Regular ....61.00 @63.00
Slaters ....66.00 @68.00
Best Tarred, 1-ply (per roll) ...... 1.70 @ 1.80
Best Tarred, 2-ply (per roll) ...... 1.50 @ 1.60
Best Tarred, 3-ply. 2.00 @ 2.10

Bagging

F. o. b. Phila.

Gunny, No. 1—
Foreign .... 1.75 @ 1.85
Domestic .... 1.65 @ 1.70
Manila Rope..... 5.75 @ 6.00
Sisal Rope .... 2.50 @ —
Mixed Rope .... 1.25 @ —
Scrap Burlaps.... 1.65 @ 1.70
Wool Tares, heavy. 2.00 @ 2.13
Mixed Strings ... 1.00 @ —
No. 1, New Lt. Burlap .... 3.50 @ 3.75
New Burlap Cuttings .... 3.75 @ —

Old Papers

F. o. b. Phila.

Shavings—
No. 1 Hard White .... 3.65 @ 3.70
No. 2 Hard White 3.25 @ 3.40
No. 1 Soft White 2.90 @ 3.00
No. 2 Soft White 2.05 @ 2.25
No. 1 Mixed..... 1.75 @ —
No. 2 Mixed..... 1.25 @ 1.30
Solid Ledger Stock. 1.75 @ 1.90
Writing Paper .... 1.50 @ 1.75
No. 1 Books, heavy. 1.50 @ 1.60
No. 2 Books, light. 1.15 @ 1.25
No. 1 New Manila. 2.40 @ 2.50
No. 1 Old Manila.. 1.50 @ 1.75
Container Manila.. 1.15 @ 1.20
Old Kraft .... 2.00 @ 2.25
Overissue News ... 1.05 @ 1.10
Old Newspaper..... .75 @ .80
No. 1 Mixed Paper. .75 @ .80
Common Paper .... .60 @ .70
Straw Board, Chip. .65 @ .70
Binders Bd., Chip.. .75 @ .80

Domestic Rags—New.

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

Shirt Cuttings—
New White, No. 1 .13 @ .14
New White, No. 2 .07¼ @
Silesias, No. 1... .08 @ .08¾
New Unbleached.. .12 @ .12¾
Washable .... .05½ @ .05¾
Fancy .... .07 @ .07¾
Cottons—according to grades—
Blue Overall .... .08¾ @ .09
New Blue .... .04 @
New Black Soft. .06 @ .06¾
New Light Seconds .... .03½ @ .03¾
Khaki Cuttings... .05½ @ .06
Corduroy .... .04 @ .04½
New Canvas ..... .09 @ .09½
New Black Mixed .05 @ .05¾

Old

White, No. 1—
Repacked .... 7.00 @ 7.25
Miscellaneous ... 6.25 @ 6.50
White, No. 2—
Repacked .... .05½ @ .05¾
Miscellaneous ... .05 @ .05¾
Thirds and Blues—
Repacked .... 3.40 @ 3.60
Miscellaneous ... 3.15 @ 3.25
Black Stockings.. 4.00 @ 4.25
Roofing Stock—
No. 1 .... 2.25 @ 2.35
No. 2 .... 2.15 @ 2.25
No. 3 .... 1.20 @ 1.30
No. 4 .... 2.10 @ 2.20
No. 5A .... 1.40 @ —
B .... 1.25 nominal
C .... 1.15 nominal

TORONTO

Paper

(Mill Prices to Jobbers f. o. b. Mill)

Bond—
Sulphite .... .11½ @ .12½
Light tinted...... .12½ @ .13½
Dark tinted...... .14 @ .15
Ledgers (sulphite).. — @ .13
Ledgers No. 1..... 34 @
Ledgers No. 2..... 26 @
Writing .... .09¼ @
Writing S. C...... .10 @
News, f. o. b. Mills—
Rolls (carloads).. 3.65 @ —
Sheets (carloads). — @ 4.50
Sheets (2 tons or over) .... — @ 4.75
Book—
No. 1 M. F. (carloads) .... 8.25 @ —
No. 2 M. F. (carloads) .... 7.95 @ —
No. 3 M. F. (carloads) .... 7.25 @ —
No. 1 S. C. (carloads) .... 8.75 @ —
No. 2 S. C. (carloads .... 8.25 @ —
No. 3 S. C. (carloads) .... 7.75 @ —
No. 1 Coated and litho ....14.50 @ —
No. 2 Coated and litho ....13.50 @ —
No. 3 Coated and litho ....12.75 @ —
Coated tinted....... .15 @ —
Wrapping—
Rag Brown ...... 4.75 @ —
White Rap .... 5.25 @ —
"B" Manila ...... 5.50 @ —
No. 1 Manila.... 6.50 @ —
Fiber .... 6.50 @ —
Kraft, M. F...... 7.00 @ —
M. G. .... 7.15 @ —

Pulp

(F. o. b. Mill)

Ground wood..... 30.00 @33.00
Sulphite easy bleaching .... 62.50 @65.00
Sulphite news grade 50.00 @55.00
Sulphite, bleached. 78.00 @ —
Sulphate .... 65.00 @67.50

Old Waste Paper

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

Shavings—
White Env. Cut.. 3.60 @ —
Soft White Book shavings ...... 3.25 @ —
White Blk, News 1.90 @ —
Book and Ledger—
Flat Magazine and Book Stock (old) 1.50 @ —
Light and Crumpled Book Stock 1.35 @ —
Ledgers and Writings .... 1.75 @ —
Solid Ledgers.... 1.75 @ —
Manilas—
New Manila Cut. — @ 1.70
Printed Manilas.. 1.20 @ —
Kraft .... 2.15 @ —
News and Scrap—
Strictly Overissue 1.00 @ —
Folded News .... 1.00 @ —
No. 1 Mixed Papers .... .75 @ —
Domestic Rags—
Price to mills, f. o. b. Toronto
Per lb.
No. 1 White shirt cuttings .... .15 @ .15½
No. 2 White shirt cuttings .... .07½ @ .08
Fancy shirt cuttings .... .09¾ @ .10
No. 1 Old Whites. — @ —
Third and blues... .05½ @ .05¾

New York Market Review

OFFICE OF THE PAPER TRADE JOURNAL,
Wednesday, February 4, 1925.

Last week saw the most pronounced betterment in the paper market that has been witnessed since the first of the year. A very general improvement was felt and the tone of the market assumed a most reassuring complection. Prices are at this writing very firm. They have for the most part been standing fixed with only a change here and there for some time but it is apparent that the market is due for many advances and a radical shake-up in the price schedule may be looked forward to at any moment. Sales efforts since the first of the year have been unusually energetic and they have brought results. The salesmen who travel out of New York report that they find their customers in a much more receptive mood than they were during the latter part of the year. They are buying more liberally for the future on most items now and are making numerous inquiries with a view to placing more extensive orders at an early date. Business in general is getting well settled now and business men are beginning to know just where they stand which is rather more than they have known for a long time. This condition cannot help but bring new energy into the paper market and February should develop the best month's business, everything considered, that has been seen for almost a year.

News print progresses at its accustomed pace. The mills are now producing practically at capacity. Contracts for the year are larger than ever from the big newspapers and many of the small papers are buying ahead for the future whereas it is customary for them to buy closely for, perhaps, a month's needs. Even this early in the year the news print situation is so well defined that it promises a year that may shatter all records for production and consumption.

Fine papers are assuming a more spirited course. Actual orders are being placed in good amount and a perfect deluge of inquiries is finding its way to the sales departments. Tissues are in good demand. Some of the trades do their heaviest buying in tissues at this season of the year and their orders this year are proving rather more liberal than is usual.

The demand for board is in a most satisfactory condition and the week brought further improvement. The mills are gradually approaching capacity production. Some of them are booked a long ways ahead and to all outward appearances they have entered upon a very prosperous period.

Mechanical Pulp

The tone of the pulp market is excellent and the demand for mechanical pulp is improving while the prices are very firm. A steady improvement is looked for from now on and an early advance in price seems more than likely.

Chemical Pulp

Some good business is being placed in chemical pulp. There has been no price changes but the market is firm, concessions are not being made and general conditions are wholesome and satisfactory to the pulp men.

Rags

Rags are back where they were before the inventory period put a temporary crimp in the demand. The past two weeks has seen a most creditable betterment and orders are being booked for practically every grade. The weather of the past week was not particularly favorable to collections and the supplies which are finding their way into the market are not up to normal. With milder weather setting in, however, it is expected that this week will begin to see the collections assuming greater proportions. There is no great accumulation of stocks but there does not seem to be at this time any great danger of an immediate shortage as most grades are now obtainable in such amounts as the demand calls for. Prices are firm but the past week saw few changes.

Old Rope and Bagging

Both old rope and bagging are doing very nicely just now and both participated in the market's improvement during the past week. Prices are still holding firm but they are about due for some radical advances which may come at any moment.

Waste Paper

The waste paper market is strong and it is reported that there is some shortage of stocks due to the inclement weather which has curtailed the collections materially. The demand is improving very greatly and if the last part of the winter should be as severe as the first half has been it is probable that a near famine may exist in the waste paper before spring is here.

Twine

Twine is also doing somewhat better although the demand could stand a little more stimulation. Prices are firm but conditions do not yet justify any change in the schedule.

QUEBEC FIRST IN MANY NATURAL RESOURCES

To business men, investors and citizens generally, "The Natural Resources of Quebec," a publication just issued by the Department of the Interior at Ottawa, will prove of very timely interest. Perhaps nowhere else within the covers of a single volume can there be found such a readable and concise description of the principal natural resources of the province as in this booklet of 130 odd pages. The publication, which is well illustrated with photographs and maps, was compiled by M. J. Patton, economist of the Natural Resources Intelligence Service.

Of special interest are the chapters on the pulp and paper industry, water powers, and the agricultural and mineral resources, including the new Rouyn gold fields. The scenic resources and the attractions offered to sportsmen and tourists are treated in detail. The chapter entitled "The Land and the People" is singularly successful in conveying the local atmosphere which imparts to the people and the institutions of the province their quaint attractiveness and peculiar charm.

One of the remarkable things brought out by "The Natural Resources of Quebec" is the number of features in which the province stands first or in which it excels. For example, Quebec produces seven-eighths of the world's asbestos. The first centrifugal cream separator to be used on this continent was operated in Quebec at the village of Ste. Marie de Beauce in 1882. Canada's first paper mill was established in St. Andrew's, Quebec, in 1803. Fifty per cent of the capital invested in Canada in the pulp and paper industry is invested in Quebec, and the province has within its borders over one-third of the water power that can be produced in Canada. It was in Quebec, at the Oka Institute, that the first "frost-resisting" breed of poultry, the Chanteclere, was developed to withstand cold winter weather. More maple products are made in Quebec than in all the other provinces of Canada combined and the only known workable deposits of kaolin or china clay in Canada are found there. Finally, the province boasts the largest water power storage reservoir in the world, the Gouin Dam on the St. Maurice river with 160 billion cubic feet capacity.

The publication is replete with useful information and should do much to make Quebec better known and to stimulate the investment of capital in the development of her natural resources.

A CORRECTION

The bid of the International Paper Company on news print Lot No. 1 in the bids for government paper opened at Washington Monday of last week was incorrectly printed in the PAPER TRADE JOURNAL 3.085 cents per pound. The bid of the International Paper Company was 3.805 cents per pound.

Miscellaneous Markets

OFFICE OF THE PAPER TRADE JOURNAL,
Wednesday, February 4, 1925.

There is little that is new to be said regarding the chemical market. Business is swinging along at this writing at precisely the gait it had manifested the week previously. Chemical men, however, are well satisfied at existing conditions and believe that real progress will continue until the market takes a definite spurt. Everything considered buying is on a little freer basis and supplies of all sorts are being taken out for a considerable period ahead. There is no great accumulation of stock to clog the market, prices are being closely adhered to and there is a more wholesome tone evident than the market has witnessed for a long time. The first month of the year has proved very satisfactory and has made a substantial start on a good year's business for the chemical men.

BLANC FIXE.—Blanc fixe does not rally very rapidly and while it experienced another fair week's business it is not yet where it should be. Consumers of blanc fixe are more or less disgruntled over the price and are continuing to buy only as they have to. For many weeks they have been holding back business and they are continuing to do so. Of course they cannot keep up the fight forever and when the held back orders come through blanc fixe will begin to see the real light. The price holds at from $75 to $80 a ton for the powder and from $55 to $60 for the pulp.

BLEACHING POWDER.—Bleaching powder which slowed off a little a week ago remained quiet during the week. Stock is being taken out in more limited quantities and the price is here seen as a factor in keeping the demand under what it properly should be. The price remains at from 1.90 to 2.15 cents a pound.

CAUSTIC SODA.—The consumers of caustic soda are placing consistent orders and the condition of this commodity is quite satisfactory. The buying is for considerable of a period ahead. The quotation is still from 3.10 to 3.15 cents a pound.

CASEIN.—Casein is doing much better than it has been doing for some time. The demand has been better and continued to grow better during the past week in spite of the jump in price reported a week ago. Argentine casein is not coming in in such quantities as it was awhile ago and this has stimulated buyers with the advisability of buying now particularly as a further advance in price is within reasonable possibility. Casein is now being sold at from 12 to 13 cents a pound.

CHINA CLAY.—The demand for China clay continues excellent, buyers showing a splendid buying spirit and placing good sized orders from day to day. The imported grades are selling at from $16 to $20 a ton and the domestic grades at from $12 to $15.

CHLORINE.—Chlorine is running in parallel columns to bleaching powder. There has been a recent slowing off in demand and the price is again the explanation. There is much chlorine business hanging fire but it is not being placed for some reason or other at this particular time. There has been no change in the price which is from 4.50 to 7.00 cents a pound in tanks.

ROSIN.—Rosin underwent a further advance in price during the week. The market is very strong at the present time, the demand is good and supplies are at low ebb. It is quoted at from $6.15 to $6.35.

SALT CAKE.—Salt cake is showing gratifying improvement. For three weeks now it has been progressing on the right track. Deliveries are being taken out more rapidly and there is greater interest all along the line. The price is from $17 to $20 a ton.

SODA ASH.—Soda ash is forging ahead splendidly. Contract renewals are more general and buying extends further into the future. It is still quoted at 1.38 cents a pound on a flat basis at the works.

SULPHITE OF ALUMINA.—Demand for sulphate of alumina does not slacken. More contracts are being placed on the 1.45 cent schedule and withdrawals are being made with regularity. The outlook for this commodity is excellent. The price is from 1.40 to 1.45 cents a pound for the commercial grade at the Eastern works and from 2.20 to 2.35 cents a pound for the iron free.

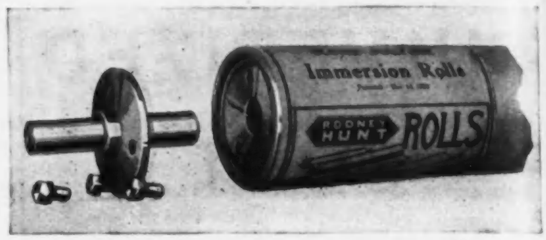
SULPHUR.—There is no change in sulphur, demand remaining fair and the price holding at from $18 to $19 a ton.

TALC.—Talc continues to do well and the price remains fixed at from $16 to $17 a ton.

NEW DESIGN RUBBER COVERED FELT ROLLS

One of the principal causes of rubber felt roll failures has to do with the shaft or bearing supporting the roll. Shafts are liable to wear, especially when lubrication is not sufficient, also shafts frequently work loose in the heads of the rolls and then sometimes the shafts break right off.

For some time, therefore, the life of the rubber covered roll has been determined by the life of the center or the strength of the shaft.



HOW THE RENU JOURNAL CAN BE CHANGED

Of course, it can be no stronger than the weakest part. The result has been that the rubber on the roll has not given anywhere near its maximum service.

In order that the paper mills might get the best of service from these rubber covered rolls the Rodney Hunt Machine Company of Orange, Mass. has brought out a most successful design—one that has been thoroughly tested and is as practical and convenient as the Cord Tire of our modern auto.

The journal of these rolls is quickly renewable. This is the reason for the name, the "Renu-Journal" roll.

The picture will show how simple the Renu-Journal can be changed.

The Renu-Journal roll consists of the usual center portion with heads at each end. Into these heads the demountable or Renu-Journals are carefully recessed and rigidly secured. They are set so strong that there can be no loose shaft.

The Renu-Journals themselves are standardized and produced in quantities. Therefore, all of one kind are interchangeable and new journals can be in a roll in a remarkably short time.

Another advantage is in the fact that any metal can be furnished, including steel, bronze, monel, etc., hence making the improvement widely adaptable to different users.

The manufacture of this new style roll has been thoroughly tested,—the Rodney Hunt Machine Company of Orange, Mass., specialists in Wood, Metal and Rubber Rolls, will give further information to any mill regarding the above roll and how it can apply to their particular requirements.

PROGRESS ON NEW KRAFT MILL

The Continental Wood Products Company, Elsas, Ont., of which L. E. Bliss is vice-president and manager, has about five hundred men in the woods this winter and has skidded about half a million logs which it is now hauling. The company has men at work clearing the location for their new kraft pulp mill, which will be of one hundred tons capacity. Two miles of railway which are necessary to connect the site with the headquarters of the company, have been cleared but progress has been rather slow owing to the very cold weather and deep snow.