Papermaking at Oxford

Oxford Paper Company

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Papermaking at Oxford
A Brief History of Papermaking

Papermaking is one of the oldest skills known to mankind. The ancient Egyptians made a crude paper from the stems of papyrus plants growing along the Nile River and it is from their word "papyrus" that our word "paper" is derived.

The Egyptians were not the only ancient papermakers. A good quality paper was made by the Chinese about 2,000 years ago and it was from China that the secret of papermaking spread westward across Asia and eventually into Europe and America. By the year 1150 papermaking was being practiced in Spain, by 1189 in France, by 1320 in Germany, and by 1494 in England. In 1690 the first paper mill was built in America. It was established by William Rittenhouse outside the city of Philadelphia.

In the early days of papermaking, both in Europe and in our own country, stock or fibres for making paper was made from rags. This stock, mixed with water, was poured on a wire screen. When the water drained off, the layer of fibres remaining on the screen was removed and then rolled and pressed into a fairly smooth sheet of paper. Since each sheet had to be made by hand the method was slow and laborious. As a result, paper was scarce and expensive.

It was not until the introduction of the Fourdrinier papermaking machine, shortly after 1800, that papermaking began to grow into a large-scale industry. The Fourdrinier machine enabled papermakers to run a continuous sheet of paper in rolls.

Methods of making pulp from wood were developed in the second half of the 19th Century. This new technology applied to the Fourdrinier machine triggered a boom in the pulp and paper industry. Today, the industry is the fifth largest in the United States.
The Beginning

The story of Oxford Paper Company really begins with a man named Hugh J. Chisholm. Without him, there would be no story to tell.

HUGH J. CHISHOLM

He was born in 1847 in Chippewa, Ontario, of Scotch immigrant parents. As a youngster he sold newspapers and magazines on trains running between Detroit and Toronto. Working the same job on alternate runs was another boy who became Hugh’s lifelong friend. His name was Thomas A. Edison.
Young Mr. Chisholm became an American citizen in 1872 and settled in Portland, Maine. He soon became interested in pulp and papermaking and secured an early patent for making wood fibre ware. In 1882 he made his first trip to what is now Rumford. This visit set in motion the chain of events that would result in the building of a prosperous town and a successful industrial enterprise.

THE RUMFORD FALLS — 1892

Few outsiders had ever seen this turbulent stretch of river where the Androscoggin drops more than 162 feet in less than a mile. Indians and hunters had passed this way, but only a few scattered farms occupied the valley. Hugh Chisholm visualized the tremendous power potential of the falls. He also saw in the endless forests the availability of raw material for making paper. Mr. Chisholm and his associates spent the next eight years acquiring land that would assure them the use of the falls and adjacent water rights. The stage was set for a boom.
On The Move

Mr. Chisholm and his associates organized the Rumford Falls Power Company in 1890, and progress from then on became fast and furious. By 1892 the first dam and canal had been completed and the first train of the Rumford Falls Railroad chugged into Rumford. The line, later to become an important part of the Maine Central Railroad, was another enterprise of Hugh Chisholm. Rumford got its first electric power from the new generating facilities in 1893, the same year that the first paper was produced by the Rumford Falls Paper Company. Hugh Chisholm founded Oxford Paper Company in 1899, the year that International Paper Company and Continental Paper and Bag Company established plants in Rumford.

Construction of the Oxford mill started in 1900 and the original mill—containing two paper machines—was completed the following year. The first shipment of Oxford Paper left Rumford in December, 1901. In 1902 there were four paper machines producing about 44 tons a day. An exclusive contract to manufacture all postal cards used by the United States Post Office was a big help to the new company in its early years, and Oxford produced 3,000,000 of them every day.

By 1906 Oxford had six paper machines producing 125 tons a day and 900 employees with an annual payroll of about $520,000. Rumford’s population was 6,500.

Rapid Expansion

Hugh J. Chisholm, Senior, died in 1912 and his son, also named Hugh J., was elected President of the company. Rapid
expansion continued under the new president, and by 1917 there were eight paper machines making nearly 70,000 tons per year. Another paper machine went on the line in 1920 and No. 11 Machine began operating in 1924. By its 30th birthday, Oxford was the largest book paper mill under one roof in the world and one of the country’s leading producers of book, magazine, business and specialty papers. A new production record of 101,931 tons was set that year. The Rumford mill operated throughout the Great Depression and emerged in sound shape. The property and water rights of the Continental Paper and Bag Company mill were purchased in 1936 to become Oxford’s Island Division.

During World War Two, Oxford produced, in addition to its standard grades, many tons of map paper and other specialty
grades for the military. When the war ended, the company moved forward with major expansion programs. No. 11 Paper Machine was rebuilt in 1946 and converted into our first on-machine coater. Two years later, No. 12 Machine, also a coater, began operating, and many other expansion and modernization projects were carried out.

William H. Chisholm was elected President of Oxford in 1956, succeeding his father, and the growth of the company continued without interruption. Among the major additions in the late 1950's and early 1960's were the revolutionary new North Star, an off-machine coater utilizing the trailing blade process, a new Hardwood Kraft plant and Kamyr continuous softwood digester, a recovery plant and lime kiln.
On the heels of all these additions and improvements came a five-year, $40-million expansion and modernization program that would result in a 30 percent production increase at the Rumford mill by 1967. The keystone of this program was a giant new coated paper machine, No. 10, and a number of supporting facilities to handle the additional tonnage. As that program neared completion, production reached 1,000 tons per day. Thus Oxford,—in its sixth decade of growth—remains among the leaders of the nation’s huge pulp and paper industry and a major producer of fine quality book, magazine, business and specialty papers.
From Wood To Paper

Among the first sights greeting a visitor to Rumford are the huge pulpwood piles. Four-foot logs—up to 8,000 cords to a pile—are stored in this manner until they are trucked to the mill to be converted into paper. The mill uses more than 1,000 cords of wood per day in the papermaking process. This amounts to 360,000 cords per year of which about 280,000 cords is in stick form and 80,000 cords come as chips. Bark and dirt are removed from the sticks in our wood room before they are reduced to chips, screened and blown to storage bins near the digesters.
Making Pulp

Digesters are actually oversized “pressure cookers” in which the chips are cooked in an alkaline liquid under steam pressure to remove resins and dissolve the lignin that bonds the wood fibres.

Oxford has six hardwood digesters 42 feet high and 10 feet in diameter. Each digester cooks a 12-cord batch of chips in three hours. Total hardwood pulp production is about 370 tons per day.

Softwood chips are cooked in a 90-foot high continuous flow
digester which produces more than 200 tons of softwood kraft pulp per day.

An additional source of stock for making paper is Oxford’s modern Island Division Groundwood Mill with a daily output of about 125 tons a day. As the name implies, this operation grinds wood into pulp rather than cooking it. Because pulp produced in this manner has shorter fibres it is mixed with some of the chemically processed pulps to increase the opacity and printability of many Oxford quality coated paper grades.

Stock Preparation

Pulp coming from the digesters is a dark brown mushy substance which must be washed, screened and bleached before
FLOW CHART depicting pulp and paper making processes
being made into paper. A three-stage washing operation removes the cooking "liquors", and screening eliminates other foreign matter. The four-stage bleaching process subjects the pulp to chlorination in the first stage, caustic extraction in the second, hypochlorite in the third and chlorine dioxide in the fourth. By now the pulp has become bright and white and ready for the final stages of preparation before going to the paper machines.

Dyes, filler material and sizing agents (such as clay, alum and resin) are now metered into the stock flow or mixed in huge open vats called beaters. The number and volume of these additives determine what the body, weight, strength, color and opacity of the particular grade of paper will be. Just before the stock goes to the paper machines it is put through a refining device known as a Jordan. The stock is forced past the blades of a revolving cylinder which cuts or brushes the tiny fibres to produce the desired stock characteristics. Now it is ready for the paper machines.

The Paper Machine

Stock from the Jordans is pumped through a fine screen into a "headbox" at the "wet end" of the paper machine. The screen removes tangled fibres which would mar the perfection of the finished paper. The headbox builds up a volume of watery pulp much like a dam builds up a head of water in a river.

The pulp then is spread evenly across an endless moving wire screen called the "wire", which vibrates to mat the fibres
together and drain off some of the water. A roll called a "dandy" then presses the rapidly-forming sheet of pulp fibres, and the sheet is passed along an endless section of moist felt to a series of "press rolls" which squeeze out more water and smooth the surface of the paper.

With 65% of its moisture remaining, the paper now goes through a series of steam-filled rotating cylinders that make up the dryer section. When the drying is completed the sheet passes between heavy rolls of a "calender" which gives a smooth surface to the paper.
Uncoated and Coated

Production on Oxford's paper machines falls into two categories. Eight of our machines make uncoated paper which is used in the printing of books and for business forms, envelopes, writing pads and labels. Oxford is the biggest producer of book papers in the world. The machines also make the basic sheet to which other equipment applies coating for high grade publication and specialty papers. The uncoated paper machines run at speeds varying from 400 to 1,000 feet per minute.

Our three newest paper machines are on-machine coaters, that is they not only make paper but apply the coating to it.
These newest units produce blade coated rolls up to 170 inches wide, 84 inches in diameter and weighing up to 14 tons. They are capable of operating at speeds of 1,000 up to 2,000 feet per minute in the production of high quality magazine and publication grades.

Adding substantially to our coated tonnage is the North Star Coater which applies the coating to paper manufactured on other machines. National Geographic and other publications using high gloss sheets are printed on paper coated on the North Star.

Approximately half of Oxford’s tonnage is uncoated paper and half is coated.
The Finishing Touches

Much of our paper, particularly the coated magazine and publication grades, goes from the paper machines to the "supercalenders". A supercalender is a vertical alignment of alternate steel and pressed cotton fibre rolls. When the paper goes between the rolls, hydraulic pressure is applied to buff and polish it to a high gloss. The newer supercalenders are capable of speeds up to 2,500 feet per minute.

If the paper is to be shipped in roll form it next goes to a rewinder which gives the roll a final trim and winds it tightly and evenly for wrapping. About two-thirds of the paper produced at Rumford goes out in roll form and the remaining third goes as sheets packed on skids or in boxes. Rolls are converted into sheets on high speed cutters, and many orders are cut precisely to the customer’s specifications on trimmers.
After careful sorting and inspection, the paper is wrapped for maximum protection and packed in boxcars or trucks for shipment to the customer.

Up to 25 boxcars are loaded with Oxford papers every day at our ¼-mile-long shipping platform. There are also loading bays for huge trailer trucks which transport more than ten percent of our tonnage from the mill.

Wood and Water

Oxford spends close to $10-million yearly for the wood it converts into paper. Our Wood Department purchases more than half of its pulpwood from suppliers within fifty miles of the mill. The rest comes from timberlands in Maine and Canada. Oxford owns more than 400,000 acres of woodlands in Maine, New Hampshire and the Province of New Brunswick, Canada. Company foresters practice sound woods management under the multiple use concept. They also help more than 130 small woodlot operators with forest management through a Tree Farm Family program.

Power to operate the big Rumford mill must come from more than one source. Oxford’s wholly-owned subsidiary, the Rumford Falls Power Company, supplies about 55% of our requirements in the form of hydro-electric power when Androscoggin River flow is normal. The company’s Steam Plant generates another 33%, and the remaining 12% is purchased from Central Maine Power Company. The lower the river flow, the more power we must purchase from outside sources.
Research and Development

Oxford places much emphasis on research and development in a never-ending effort to keep ahead in pulp and paper technology and new product development. More than eighty skilled people carry this work forward in the company’s modern Research Building at Rumford. Another group is engaged in research and development of technical specialties products.
Our People

Three generations of skilled papermakers have helped build quality into Oxford papers since 1901. The unique process of papermaking demands special know-how, skills and ability, and Oxford workers have continued to meet those demands through the years.

Off the job, Oxford employees maintain a proud tradition of leadership in the civic, religious and social life of Rumford and the surrounding towns in which they live. The company backs their efforts by giving generous support to a host of civic endeavors.

The length of service attained by many employees serves as ample proof that Oxford is a good place to work. Approximately 1,000 active and retired employees are members of the Rumford chapter of Oxford’s Long Service Clubs which require a minimum of 25 years of service. Nearly 200 of them completed more than 40 years of service.

Nearly 600 Oxford men and women are now retired on company pensions. Many of them belong to the Oxford Retired Employees Club for which the company maintains club-rooms equipped to make their leisure time more pleasant.

For well over sixty years Oxford employees have been proving that it takes good people to make good paper.
Our Paper

Although the end uses of quality Oxford papers are varied, they fall into four major categories. About 39% of our tonnage goes into magazines such as National Geographic, Vogue, Better Homes and Gardens, Cosmopolitan, Good Housekeeping, Seventeen and TV Guide.

Book publishing papers make up about 23% of our production. These are used in a wide variety of school textbooks, novels and such publications as Reader’s Digest Condensed Books. Oxford is the largest supplier of book publishing papers in the world.

More than 19% of our paper ends up in hundreds of types of commercial printing pieces. These would include fine advertising brochures, travel folders and colorful annual reports for some of the nation’s largest firms.

Close behind are Oxford converting and specialty papers which account for more than 18% of our output. Converting papers are those which are put through other processes to create products such as envelopes, business forms, writing tablets, labels, and stickers. Among our specialty papers are paper offset plates and a variety of grades for the reproduction field. Some of our pulp is sold to other companies to be made into paper plates, cups and egg cartons, etc.

Wherever people read, write, conduct business—in fact wherever there are civilized people—there are Oxford papers performing a vital service.
Odds and Ends on Oxford

- Oxford's Rumford mill is the largest of three operated by the company. The plant covers more than 30 acres at a bend in the Androscoggin River, and is one of the largest book paper mills under one roof in the world.

- The Rumford mill is a completely integrated operation in that it performs every operation in the process that converts wood into quality book, magazine, business and specialty papers.

- Approximately 2,800 of Oxford's more than 4,000 employees work at the Rumford mill with a yearly payroll in excess of $20-million.

- Other company mills are located in Lawrence, Massachusetts and West Carrollton, Ohio. Executive offices are at 277 Park Avenue, New York, and sales offices are located in Boston, New York, Chicago, Detroit and Atlanta.

- Oxford pays more than $500,000 yearly in U.S. and foreign income taxes and more than $2½-million in other federal, state and local taxes. Oxford and its wholly-owned subsidiary Rumford Falls Power Company pay about 65% of the total Rumford property tax, or over $1-million a year.

- Oxford annually gives three four-year college scholarships worth $2,800 each to sons of employees.

- More than 4,000 stockholders—many of them employees—own shares of Oxford Paper Company.
THE COVER OF THIS BOOKLET is printed by offset on 100 lb. basis weight Star Sapphire and the text is printed by letterpress on 80 lb. Star Sapphire. This deluxe new grade was added to the top of Oxford's North Star line of fine printing papers in 1966. Base stock for the Oxford Star Sapphire used in this booklet was made at the Rumford Mill on No. 9 paper machine and coated on the North Star Coater.