

Let's Look Round
the
Culter Paper Mills

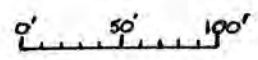
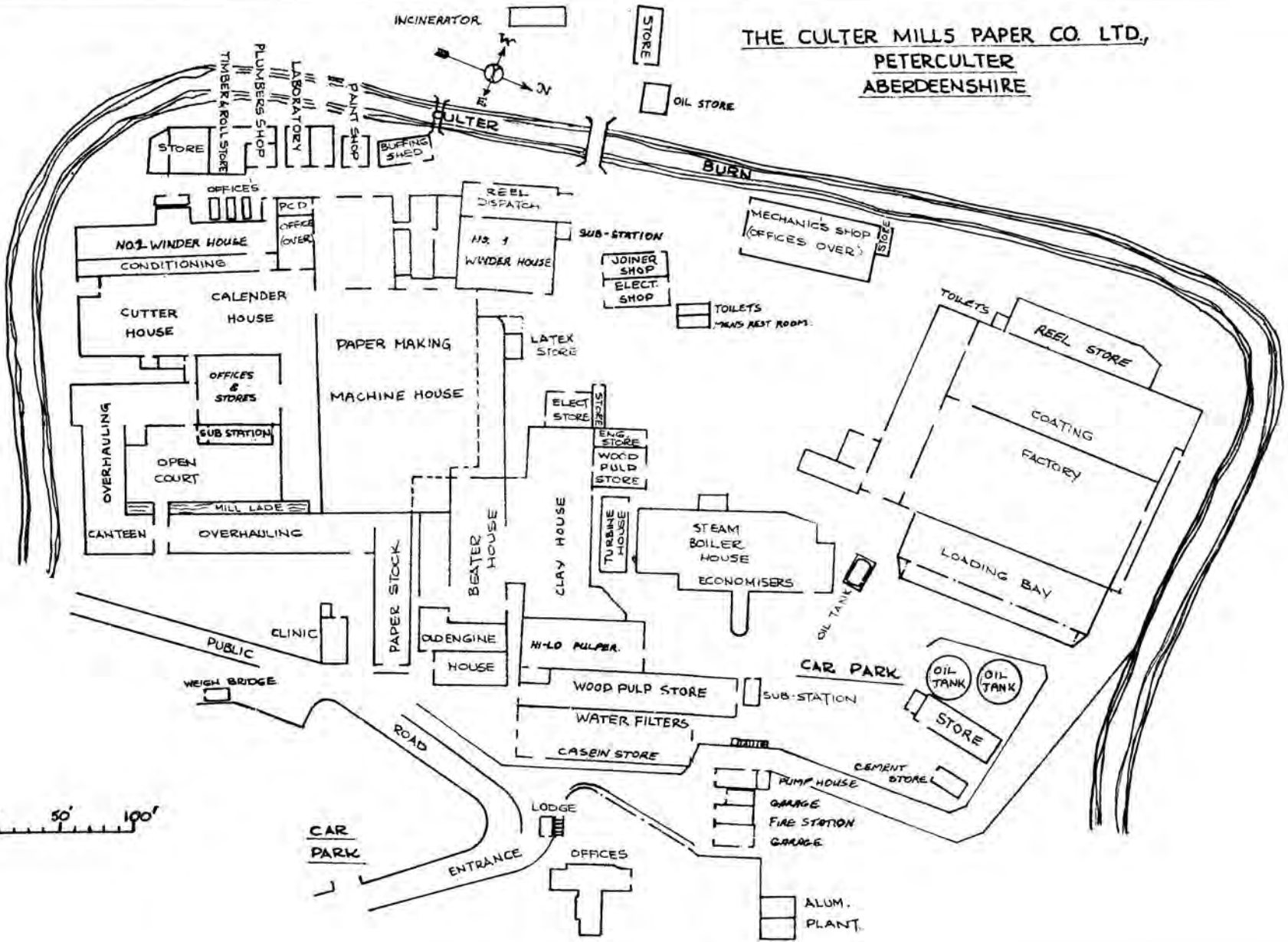
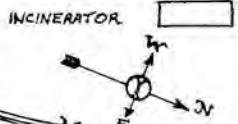


With the compliments of

THE CULTER MILLS PAPER COMPANY LIMITED

A Member of Culter Guardbridge Holdings

THE CULTER MILLS PAPER CO. LTD.,
 PETERCULTER
 ABERDEENSHIRE





CULTER MILLS IN 1850

FOCUS ON CULTER

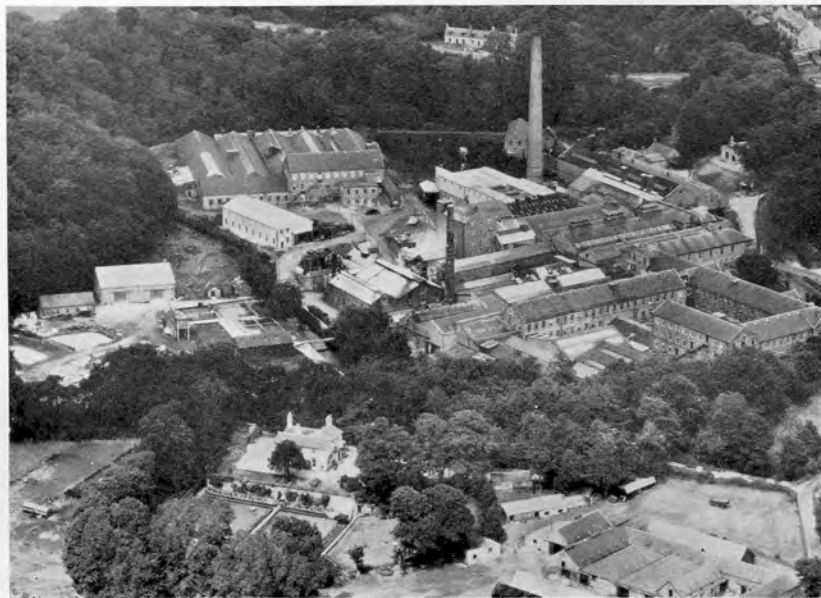
INTRODUCTION

With five mills producing a wide variety of quality papers, papermaking is one of the most important industries in the Aberdeen area. Whilst four of these mills are on the Don, only one is situated on the Royal Dee. The mill on the Dee is at Culter, eight miles west of Aberdeen. Paper has been produced here since 1751, when Bartholomew Smith set up the first mill. The work-force then was only four; himself, his wife and two sons. When he died in 1758, his son Richard took over the lease, the payroll increased to six (plus a number of his own considerable family of sixteen) and he began to supply paper for notes issued by Aberdeen Bank.

Richard's son, Lewis, succeeded to the mill on the death of his father in 1803 and soon had installed "patent machinery by which paper is made like a web". This machinery, the fore-runner of the modern paper machine, was the first to be used in Scotland, and the employment of fifty workers was now necessary.

The mill went through difficult times and changed hands fairly regularly in the early nineteenth century. The present Company was formed in 1884 and has expanded and improved until, today, four large machines, together with the most modern ancillary equipment, turn out in excess of 400 tons of paper weekly.

A Coating Factory, with plant of revolutionary design treats a large proportion of this output to produce high class art papers.



CULTER MILLS TODAY

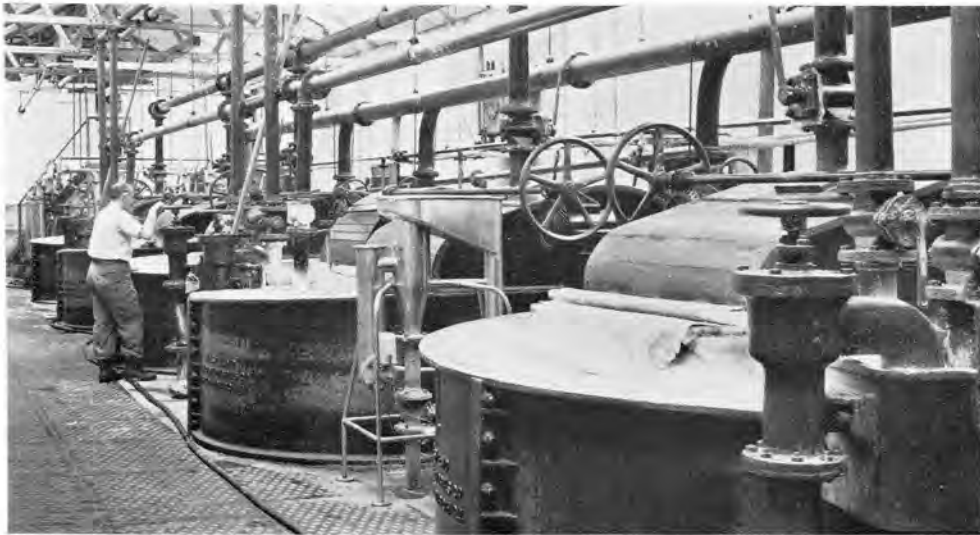
It is difficult to describe in a brochure such as this, all that is involved in the manufacture of a sheet of paper, but we have endeavoured to highlight the salient features in its production.

RAW MATERIAL

Aberdeen is a convenient shipping port for the basic raw materials used in papermaking, and motor transport regularly conveys to the mills, large tonnages of pulp and China Clay. Paper is essentially a fibrous product and plant life, from common grasses to the tallest trees, can provide raw material for its production, though from the economic point of view it becomes necessary to restrict the sources. Of the grasses, Esparto grown in Spain and North Africa, is incorporated in many papers in varying proportions. In common with many Scottish mills, Culter processed its own pulp from raw esparto, but now this comes to the Mill in the form of sheets of pulp ready to use. Esparto has, in large measure, been superseded by the use of woodpulp which are available in a wide range of qualities prepared from softwoods, such as pine and spruce, and hardwoods, which include poplar, beech and eucalyptus. By choosing suitable woods and varying cooking conditions, pulp producers can supply a diversity of products, which can be used singly or blended together to give the desired end product. Other materials play an important part in the production of paper, and worthy of note is Rosin Size which is added to ensure that the paper is resistant to writing ink. Closely allied to this is Aluminium Sulphate ("alum") which precipitates the Rosin on to the fibres. New materials are now being developed to take the place of the present Rosin-alum sizing method. China Clay serves the purpose of "filling" the sheet to give a closer surface for printing, while starch strengthens the paper by bonding the fibres together. Dyes are added to produce tinted papers.

PREPARING THE WOODPULP

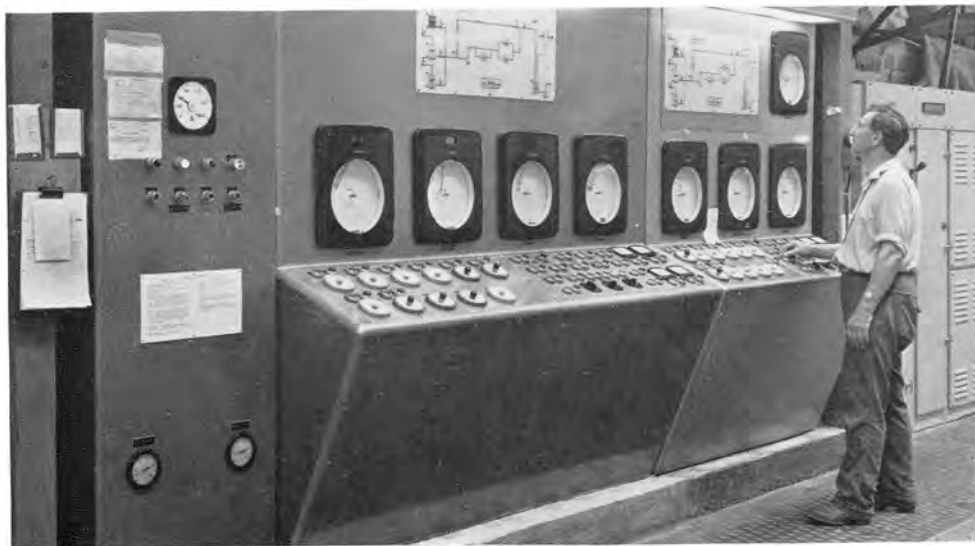
The pulp in sheet form, comes to the Mill in closely packed wire-bound bales. These are placed on a slatted conveyor and the wires removed. The conveyor leads to a "Hi-lo" pulper in which high speed propellers break up the sheets of pulp in water producing a "slush pulp" at a consistency suitable for processing. Each cycle of this operation is automatically controlled. Each stage is timed, from the addition of the requisite volume of water, to the emptying of the batch into storage chests which are available to carry stocks of disintegrated Esparto, Hardwood and Softwood pulps ready for making into paper.



PREPARATION — OLD STYLE

MAKING THE PAPER

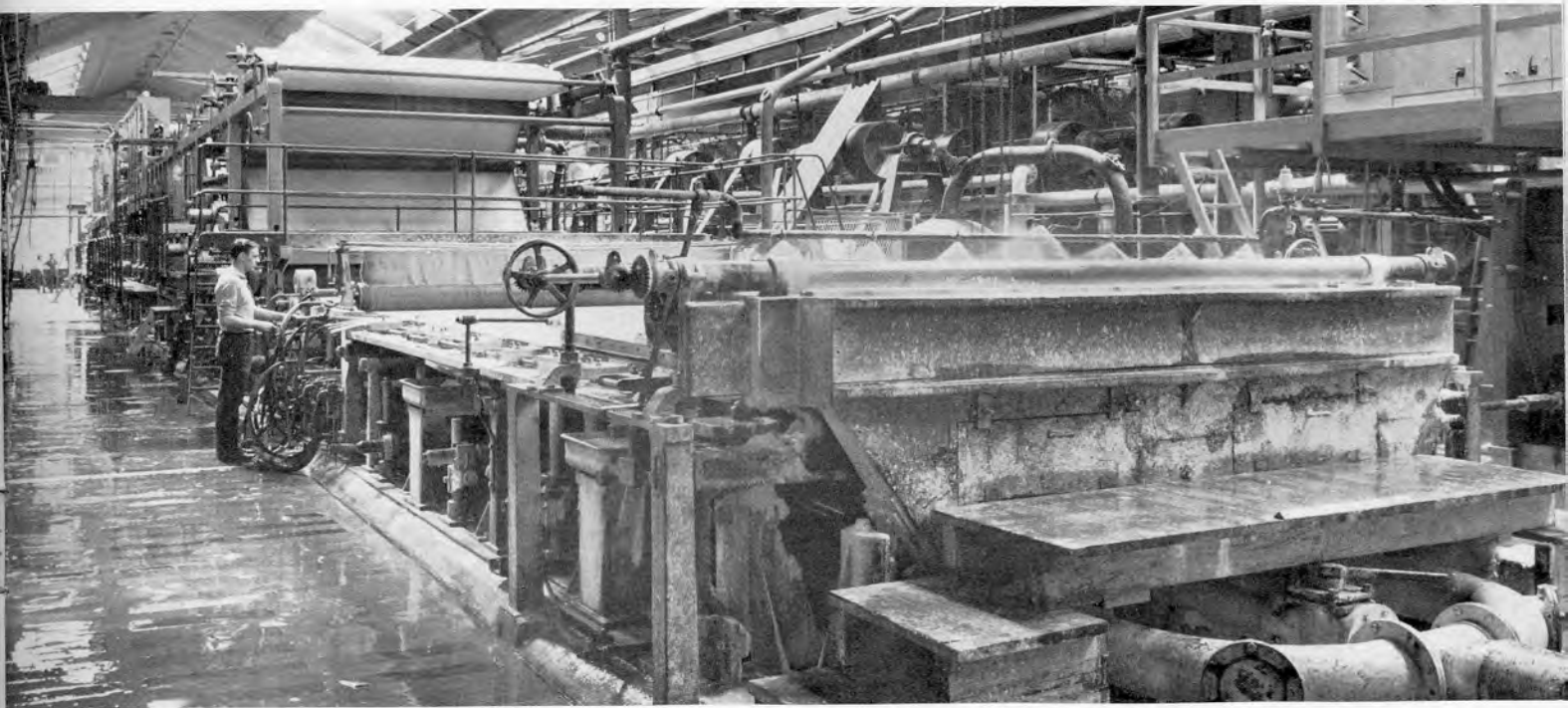
Let us see how paper is made. We must realise first of all that paper is a blend of several or all of the materials mentioned. The traditional method of so doing is to add the necessary materials to a machine called the Beater. This consists of an oval shaped trough partially divided by a partition, on one side of which a heavy roll fitted with bars revolves over a fixed plate, similarly fitted with bars. Into this vessel are introduced the Esparto and Wood Pulps in the desired proportion as required for the grade of paper programmed.



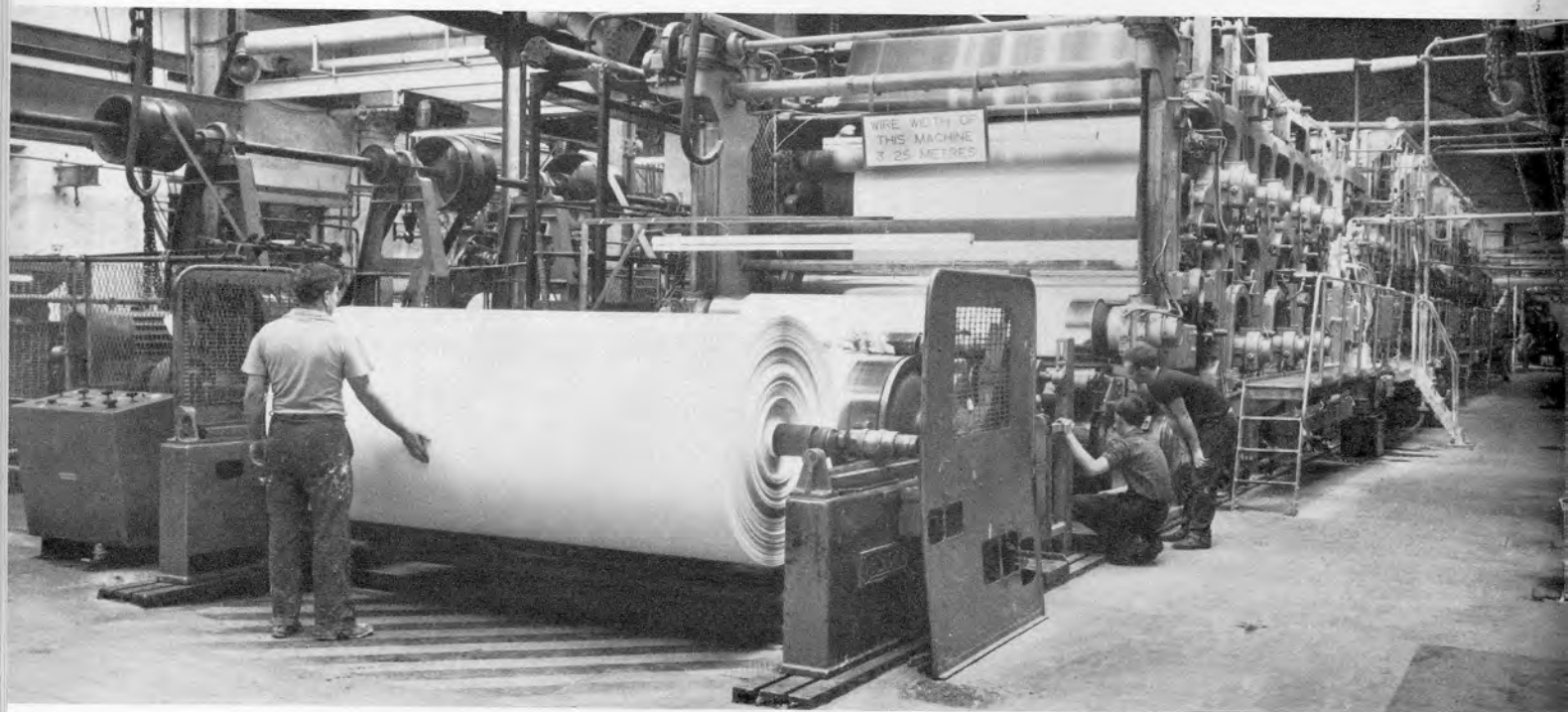
PREPARATION — NEW STYLE

The pulp at this stage may consist of 6% fibre and 94% water and this mixture is circulated by the paddle effect of the roll, and as the pulp passes continually between the bars of the roll and those on the fixed bed-plates, the fibres are softened, bruised and cut to the desired condition. In the meantime, such ingredients as Rosin Size, Aluminium Sulphate, China Clay, Starch and any necessary dyes are added and, at the end of the cycle, the batch is completely blended and ready to flow on to the actual papermaking machine.

This type of preparation plant has been superseded by more modern automatic equipment, and at Culter there has been considerable development along these lines. Instead of a series of beating engines being filled manually in successive batches, the operator now stands before a panel fitted with a number of meters, recorders and time clocks. When in operation, the correct proportions of Esparto and Wood Pulps are drawn from stock containers, and these materials are passed continuously through a series of refiners until the end of the cycle, the duration of which is pre-determined by a time clock. A refiner consists of a cone fitted with longitudinal bars, similar to a beater roll, revolving in a conical shelf having similar bars. The refiner, in fact, does the same job as a beater.



PAPERMAKING MACHINE — WET END



PAPERMAKING MACHINE — DRY END

Simultaneously the requisite amounts of Size, Alum and dyestuffs are added. Signal lamps indicate the stage of the operation, and the operative has before him a complete "picture" of the processing at any stage. When completed, the contents of the stock container are automatically transferred to a blending chest where further mixing takes place before the stock flows to feed the paper machines.

THE PAPER MACHINES

The material, known as "stuff", flowing on to the machines, normally passes through a final stage of refining, whence it is pumped to a mixing manifold in a controlled quantity, and brought to the required consistency by a regulated flow of backwater. The dilution, now consisting of less than 1% fibre, is finally passed through a centrifugal strainer to remove any larger particles of dirt. It will be evident that water plays an important part in paper production, and in fact, about 70,000 gallons are required to make one ton of paper; two-thirds of this amount is reclaimed to be used again. The suspension of fibre and water now flows on to the machine wire. This is an endless fine wire or plastic cloth, supported by tube rolls or foils and running on a frame to which is imparted a lateral shake. The object of this shake is to disturb the positions of the fibres so that they may be lying in all directions in the finished paper, and to help weld the fibres. These factors add materially to the strength of the sheet.

As the pulp travels along the wire, aided by the shake motion, the excess of water falls through the meshes and is caught in a shallow tray. This backwater is pumped away to be re-used for diluting the beaten pulp as already described. The pulp then passes over suction boxes, which remove more water, and at this point a watermark may be added by a wire roll (a dandy roll) revolving on the wet web. The pulp then passes over another vacuum box, and, just before leaving the endless wire, it is consolidated by a felt covered roll called the coucher, or its counterpart, in the form of a special suction unit.

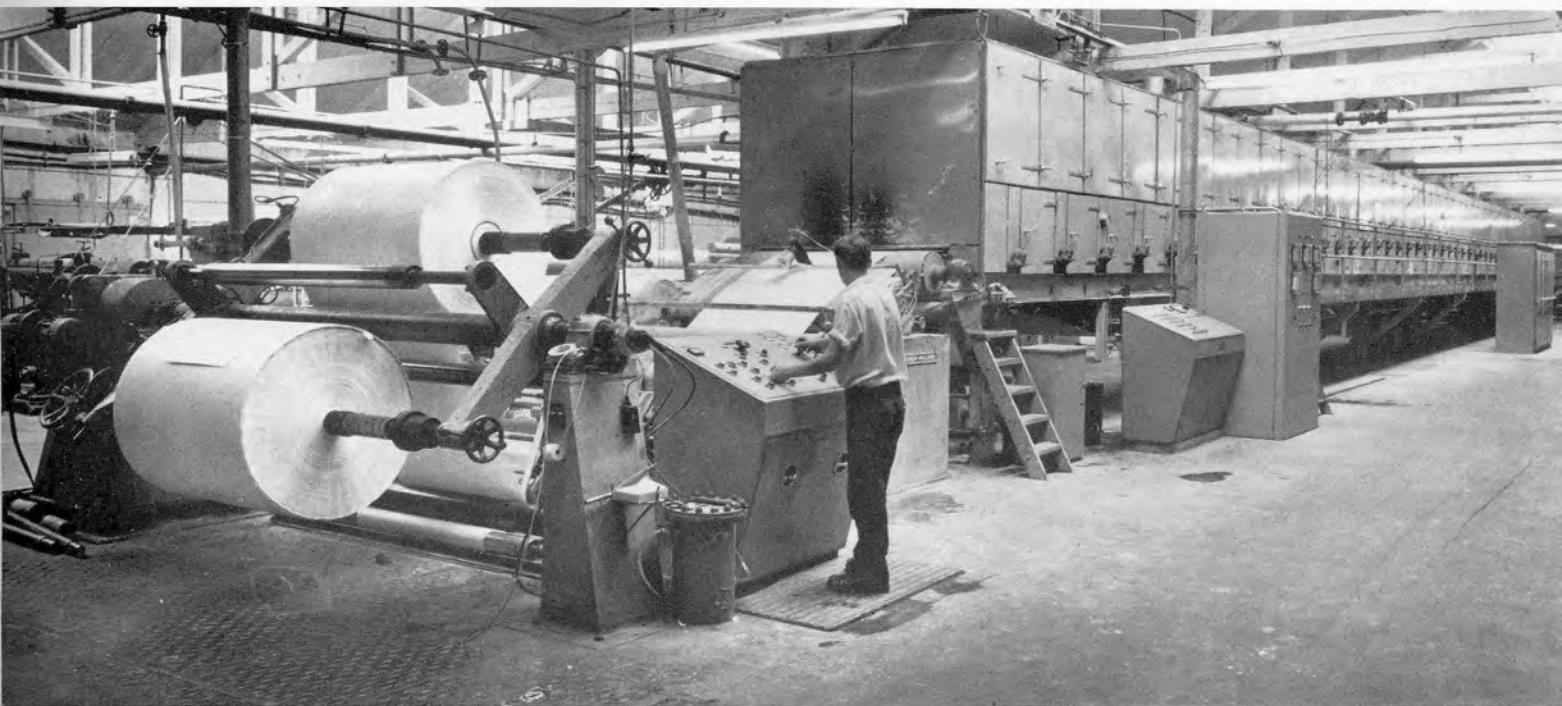
The pulp, now in the form of a wet sheet of paper, is transferred to an endless felt and pressed on the top side by a heavy roll. It is then taken up by another felt, reversed, and again pressed by similar rolls, this time on the underside. The sheet is then carried by endless felts through a series of steam heated drying cylinders, and finally, just before being reeled up, it passed through calenders with chilled steel rolls, which impart the degree of finish required.

As the paper web travels along the machine, it may pass through a Size Press which applies a film of starch or gelatine to impart special printing properties to the paper surface. At Culter a very important application is that of "Blade Coating" in order to produce their well-known Machine Coated Papers. The coating is a mixture of very fine China Clay with certain binders or adhesives, and this is transferred to the paper surface at the "Bill-blade". Culter was the first mill in the country to use this revolutionary process which produces coated paper with extremely good printing properties on both sides of the sheet.

Special apparatus incorporated in the machine serves to dry the coating rapidly so that the paper will not stick to the machine rolls and drying cylinders.

OFF-MACHINE COATING

Culter Mills were pioneers in the manufacture of high-class coated papers and a large proportion of the output of the papermaking machines is base paper suitable for coating on other machines, hence the term "off-machine Coating". The coating mix is similar to that used in the on-machine application—China Clay with a suitable adhesive. In this case, coating having been applied to the moving paper web, smoothing is carried out by means of air knives or brushes, and drying takes place in festoon driers, in the case of the older machines, and in air tunnels in the most modern machines. These new machines are a feature of the Coating Department and a part of the recent developments which have made Culter one of the most up-to-date mills in the country.



MODERN COATING MACHINE

FINISHING

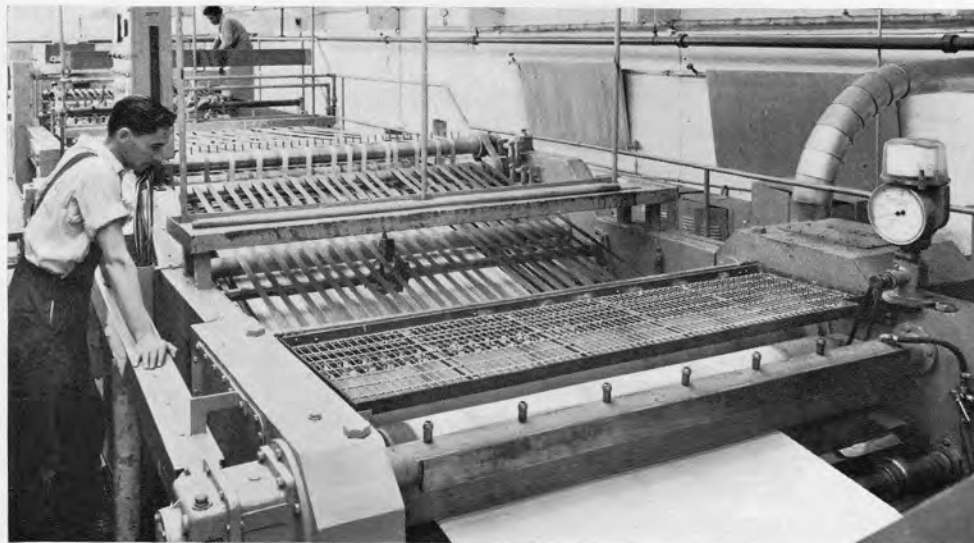
Super Calenders play an important part in producing the high gloss papers so much in demand for catalogues, brochures and periodicals. The surface of coated papers is initially quite dull, and there is a remarkable transformation when the paper has been damped and passed through the Super Calender which consists of alternate rolls of highly polished steel and compressed paper or cotton. Under the pressure and friction of these, high polish is imparted to the paper surface.

SUPER CALENDER



CUTTING

A high proportion of the output is dispatched as sheets, and in order to convert the reels to sheet form, cutting machines of the most modern design are in operation. One of these not only cuts the paper to the required size, but also electronically rejects any faulty sheets.



ELECTRONICALLY OPERATED CUTTER/SORTER

OVERHAULING



SLITTING

An increasing tonnage of paper is being required in reels, and for domestic needs in the Coating Factory, so base paper must be provided in this form. Accordingly large wide reels are split into two or more on a Slitting or Ripping Machine.

SORTING AND COUNTING

This is done by a staff of girls working in large rooms called "Salles". These Overhaulers, as they are known, are most proficient, and one girl can sort 35-45 reams, each of 500 sheets, per day.

Every faulty sheet must be rejected in order to ensure that perfect reproductions are obtained in the subsequent printing processes.

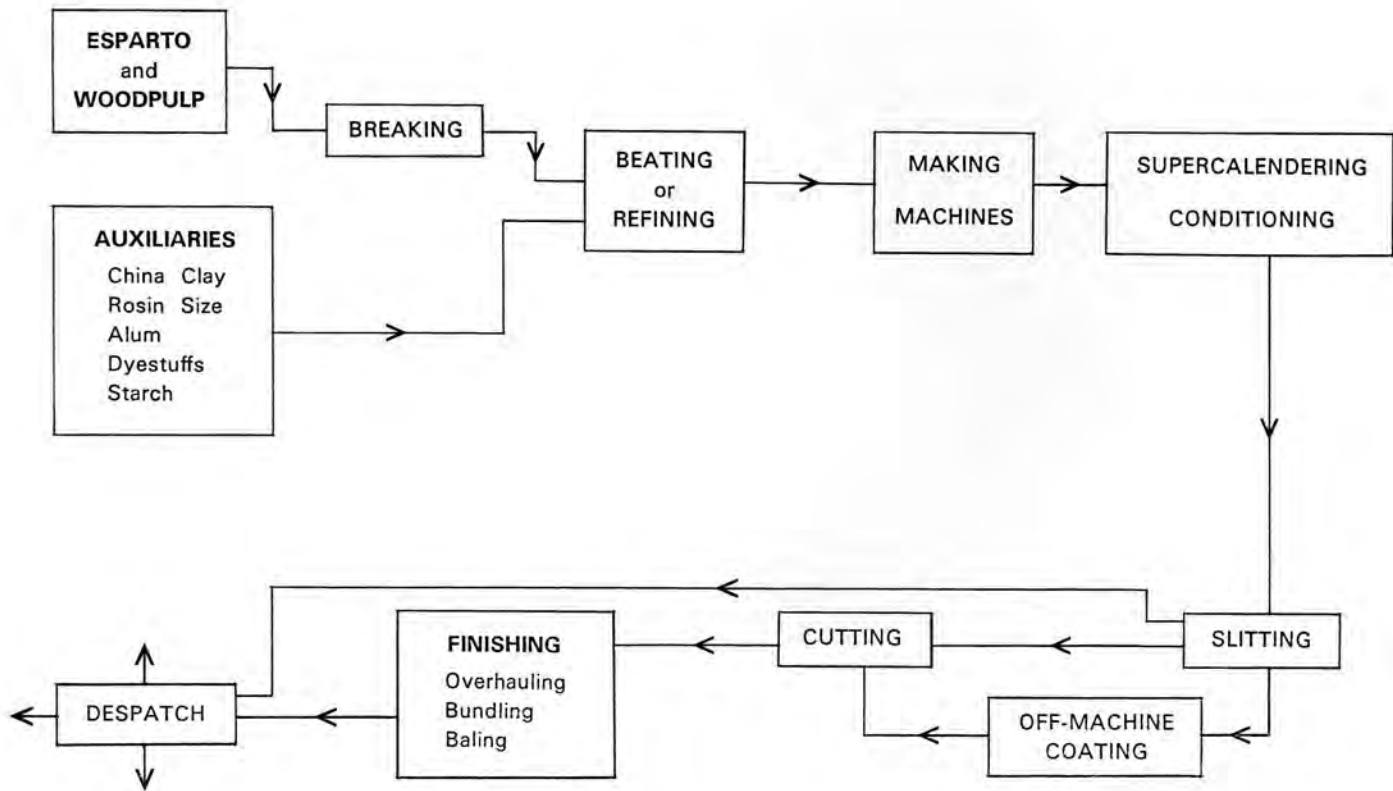
After sorting, the paper is counted either by hand or on an automatic Counting Machine. The reams of paper are trimmed exactly square on guillotines and are wrapped ready for despatch. Export orders are packed in Bales or wooden cases.

VARIETIES OF PAPER

As has been indicated, the major proportion of Culter's output is of the top grade coated variety, but many types of uncoated paper are produced, including cream wove and cream laid writings and printings, litho printings, bond and ledger papers, cartridges, boards, etc.

WATER

The site for the mill was undoubtedly chosen by reason of the availability of an adequate supply of pure water, and in order to provide the mill with water of a consistent quality, there is a water filtration plant capable of dealing with 100,000 gallons per hour.



POWER

Steam is produced in a battery of nine oil-fired boilers and this steam is used to generate the mill's electrical power by means of turbines. A large quantity of steam is used for process work.

ADMINISTRATION

In the Administration Block, the staff is responsible for general correspondence, ordering raw materials, invoicing paper sold, and recording and payment of accounts for incoming goods. The employees' weekly wages are also calculated in, and paid from, this office. Stock records are kept together with production cost analyses.

Within the mill is a comprehensive Production Planning Department which deals with all orders from the Mill Sales Offices in London, Warwick, Manchester and Guard Bridge, as well as those from individual customers. Here the machine programmes are arranged, and by a system of route cards and progress panels, the staff can tell at a glance the production stage of each order.

ENGINEERING DEPARTMENT

This Department is responsible for repairing and maintaining the multiplicity of machines found in an organisation such as this. In addition, new machines are designed and built, and older ones reconstructed to bring them into line with modern development. The electrical section is responsible for extensive equipment for drives, heating and lighting, whilst instrumentation is the responsibility of qualified instrument engineers. Supplementing this staff are joiners, painters, plumbers, masons, etc., who play no small part in the maintenance programme.

TECHNICAL DEPARTMENT

This consists of the main Laboratory which carries the responsibility for testing raw materials and for routine checking during all processes. Here new lines are developed and, in the coating field, new formulations are evolved and new products evaluated. There is also a customer liaison service which promotes better mutual understanding of the problems involved in papermaking and printing. Department Laboratories are sited at convenient points, and in these, the Quality Control staff keep a round-the-clock vigil on every reel of paper produced in order to ensure that it meets the prescribed specification for the particular quality being made.

PERSONNEL AND WELFARE

The Services Department is responsible for the recruitment of labour, and training of mill operatives. Young persons undertake an initial induction course, and an opportunity is afforded to those wishing to improve their knowledge by attendance at courses in the Technical Colleges in Aberdeen.

There is a fully equipped Clinic supervised by a qualified nurse who deals with cases of injury or sickness. A contributory Sick Benefit Fund is in operation, and a non-contributory pension and life insurance scheme makes weekly payments to retired persons who have qualified by reason of their long service.

SOCIAL ACTIVITIES

Extensive recreation grounds situated in the village, comprise bowling and putting greens, tennis courts and a large hall for social functions. There are also well-supported angling, golfing and football clubs.