

jack pine. The barked and cleaned wood is held by hydraulic pressure against the surface of a revolving grindstone, the sticks lying with their length parallel to the width of the stone. The stone is constantly washed by water, which carries away the pulp in suspension. Mechanically prepared pulp or "groundwood" is used only for the cheaper grades of paper and board which are required only for a comparatively short time. It contains all the wood substance, a large proportion of which is not durable. Mixed with chemical pulp, it is used for news, wall, cheap book, manila, tissue, wrapping, bag and building papers, and for box boards, container boards and wall boards.

There are three methods of producing chemical fibre in use in Canada — the sulphite, sulphate (or kraft) and the soda processes, so-called because of the chemicals used in each case to dissolve out the non-fibrous or non-cellulose components of wood substance. Cellulose, which forms about 50 p.c. of wood substance, is the ideal paper-making material. It is a singularly inert substance, largely unaffected by ordinary chemical agents, atmospheric conditions, bacteria and fungi. High grade paper, being almost pure cellulose, will remain in perfect condition for centuries. Not only do the chemicals used separate out the cellulose, but they remove the fats and resins so troublesome in paper-making, and break down the substance which holds the cellulose fibres together, so that they can be later felted together into a strong sheet of paper.

The previously barked and cleaned pulpwood is chipped in a machine which reduces the wood to particles about an inch long and a quarter of an inch thick, or smaller. These chips are screened, crushed and fed into digesters, where they are cooked in the presence of the various chemicals referred to. The cooked chips are then "blown" into pits below the digesters and washed in preparation for screening.

The sulphite process, which is the most important in use in Canada, depends on the action of a bisulphite liquor (a comparatively weak acid solution of a calcium and magnesium bisulphite) on the non-cellulose wood component.

The woods used in this process in Canada are all coniferous. Spruce forms 72 p.c., balsam 20 p.c. and hemlock 8 p.c.

Sulphite fibre is used in the manufacture of newsprint paper, in which it forms about 20 p.c. of the pulp used, adding strength to the remaining 80 p.c. of groundwood pulp. It is used for the better classes of white paper and boards, either pure or in mixture with other fibres.

The soda process is the oldest chemical process, and depends on the action of an alkaline solvent, caustic soda, on the non-fibrous components.

The resultant fibre is used in the manufacture of the best class of book, magazine and writing papers, as a filler mixed with stronger pulp. The result is a paper which lacks strength but can be readily finished to a good surface.

The manufacture of sulphate or kraft pulp is a comparatively recent modification of the soda process. It was first used in America by the Brompton Pulp and Paper Co., at East Angus, Quebec, in 1907. The process was first introduced with the intention of reducing the manufacturing cost of soda pulp by substituting salt cake (sodium sulphate) for the more expensive soda ash (sodium carbonate). Subsequent developments showed that, by an adaptation of this process, the superior strength of coniferous wood fibre could be taken advantage of, and at the present time the woods used are almost exclusively coniferous. Spruce heads the list with about 63 p.c. of the total, followed by jack pine with about 20 p.c., balsam with about 12 p.c., and other conifers in smaller proportions. The fibres so obtained are