

prepared by burning sulphur or pyrites and absorbing the resulting sulphur dioxide gas in a milk-of-lime solution or in water, in the presence of limestone.

The woods used in this process in Canada are all coniferous. Spruce forms 72 p.c., balsam 20 p.c., hemlock 8 p.c. The previously barked and cleaned pulp-wood 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—large steel tanks lined with acid-resisting brick—where they are cooked by steam in the presence of the bisulphite liquor referred to. The cooked chips are then "blown" into pits below the digesters and washed in preparation for screening. Sulphur and lime are the most important chemicals used in this process, and their recovery or the economic utilization of waste sulphite liquor, is still largely an unsolved problem.

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 ground-wood pulp. It is used for the better classes of white paper and boards, either pure or in mixture with the 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. This caustic soda is prepared from soda ash dissolved in water and boiled with lime or is produced electrolytically from brine. Most of the chemicals used in this process are recoverable. The wood of the softer so-called "hardwoods" or broad-leaved trees, such as poplar, basswood, willow, etc., is used almost exclusively in this process. The wood is prepared as in the other chemical processes and the chips are cooked in unlined metal digesters. 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, and was treated as soda pulp in statistical reports up to 1912. 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 chipped wood is treated with the caustic solution in unlined steel digesters. The cooking process is carried on just long enough to obtain fibres that can be easily separated. The fibres so obtained are long, flexible and very strong, and are used in the manufacture of so-called kraft papers used for wrapping, bags, etc.

The pulp or fibre from all four processes leaves the grinders or digester pits in a fluid state, consisting of water with a small proportion of fibre held in suspension. It is first screened and thickened, and may then be piped direct to the paper-mill. For shipping or storing, it is usually dried out sufficiently to allow it to be formed into sheets and folded into bundles or "laps". For export, these "laps" are baled by hydraulic presses. In some cases the pulp is dried for export by converting it into what is practically a coarse form of paper. Groundwood pulp is sold in laps, either wet or pressed. Sulphite pulp is marketed in laps, sheets or rolls, and soda pulp is usually shipped in rolls.