

The exportation of raw pulpwood, as shown in the accompanying table, has increased only 56 p.c. since 1912, while the quantity consumed in Canadian pulp-mills has increased more than five-fold during the same period. In 1908, almost two-thirds of the pulpwood cut in Canada was exported in the raw or unmanufactured form. In 1928, with an increase of over 377 p.c. in total production, the proportion exported has fallen to less than one-fourth.

The manufacture of pulp forms the second stage in this industry. This is carried on by mills producing pulp alone and also by paper manufacturers operating pulp-mills in conjunction with paper-mills for the purpose of providing their own raw material. Such mills usually manufacture a surplus of pulp for sale in Canada or for export.

The supply of rags for paper making is distinctly limited and the material too expensive for the manufacture of cheap paper. Early paper makers experimented with fibres from the stems, leaves and other parts of numerous annual plants, but the small proportion of paper-making material recoverable from such sources led to experiments in the use of wood. Different species were tried, and finally spruce and balsam fir were found to be the most suitable for the production of all but the best classes of paper.

The preliminary preparation of pulpwood is frequently carried on at the pulp-mill, but there are in Canada a number of "cutting-up" and "rossing" mills operating on an independent basis, chiefly for the purpose of saving freight on material cut at a distance from the mill or on material intended for exportation. Pulp logs are measured in board feet but the shorter material is measured by the cord (4' by 4' by 8' of piled material), which is approximately equivalent to 500 feet board measure or to 90 cubic feet of solid wood.

There are in Canada four methods of preparing wood pulp, one of which is mechanical and three chemical. In the mechanical method, green coniferous woods are preferred; spruce forms about 75 p.c. of the total, with balsam fir, hemlock and 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 axis 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