A mammoth paper-making machine which at one end receives liquid pulp and at the other delivers newsprint paper at 600 feet a minute. The liquid mass of fibres is flowed over wires and by suction, heat and pressure is reduced to a broad ribbon of paper.

How Paper Is Made

(With acknowledgement to J. Newell Stephenson)

THE sheet on which this article has been printed was, just a few months ago, folded up in the fibres of a spruce tree growing in some corner of Northwestern Ontario. Indeed almost everything we do in Canada has a starting point in the growing forest, whether agriculture, coal mining, fisheries, etc., but the making of a sheet of paper, particularly what is called 'newsprint' paper for the daily and weekly press, is, in a very special way, a forest process. Few of us realize how the modern newspaper has changed our methods of life, or how the ability of an advertiser to broadcast his message through the printed page, has wrought an unbelievable change in the location and management of tens of thousands of industries. If the newspaper were suddenly taken away from us civilization would be thrown into chaos.

An Avalanche of Paper.

The presses of the United States and Canada each week-day run off over 30,000,000 copies of newspapers. One New York Sunday paper requires the spruce and balsam fir crop on over 50 acres of Canadian woodland for a single edition. It has been roughly estimated that the Canadian newspaper of largest circulation will devour, in a day's run, from 220 to 250 average-size trees. It is not difficult to understand, therefore, that to meet the demand each day for 40,000,000 newspapers the forest storehouse must be enormous in area, and well stocked.

When the logs arrive at the mill, either by floating down the river or hauled by rail, they are sawed into blocks from two to four feet long and the bark is removed by tumbling the blocks in huge barrels made of steel angle iron. The violence of the tumbling completely cleans away all signs of bark and the wood comes rolling out all white and clean and ready for the first process. Part of the barked blocks go to the groundwood mill and the rest to the sulphite mill. The finished product, newsprint paper, you see, contains about 80% of ground-wood pulp and 20% of sulphite pulp.

Making Pulp on a Grindstone.

In the groundwood mill the blocks are held by hydraulic pressure flat against a revolving grindstone, and the fibres are rubbed off. Everything that was in the wood — and often other things besides, remains in the pulp. The pulp from the grinders is mixed with water and forced through strainers to remove big slivers, knots, etc., and most of the water is then removed to make less material to handle. In some plants the thick pulp is pumped directly to huge storage tanks in the paper mill or further dewatered and formed into sheets which are folded into bundles or "laps" containing about 35% fibre.

How Wood is Cooked.

The first operation in the sulphite mill is to chip the blocks into small pieces to facilitate the penetration of the cooking liquor. The liquor is prepared by burning sulphur and dissolving gas in lime water or in water which is trickling over limestone in a tower. The solution is "bi-sulphite of calcium," hence the name "sulphite" for this kind of pulp.

The chips and cooking liquor are fed into huge boilers or digesters. The cooking is done by steam for about eight to ten hours. By this process about one-half the solid matter in the wood is removed, leaving only the comparatively pure cellulose fibre. A cord of wood yields approximately one-half ton of sulphite pulp, while the same cord would yield about a ton of groundwood pulp.

When the cooking is complete the chips are blown from the digester to a blow-pit where they strike a plate and are broken down to a pulp form. The pulp is washed to free it from residues of the cooking liquor, and the non-cellulose constituents of the wood. After being washed, the processes of thickening, etc., are practically the same as for ground wood pulp.

One would hesitate to believe that the milky-looking liquid pasisng the paper machine screens, through slats only ten thousandths of an inch wide,