

of flax and some cotton, in Persia, and later in Europe out of rags.

That which revolutionized the manufacture of paper cheapened it, and put it within the reach of every one, was the invention of a machine for grinding wood to reduce it to pulp fibres. This was patented in Germany by Voelter in 1844, and later in the United States in 1858.

When paper made largely from wood fibre was introduced, the publishers would not use it. Pearson C. Chenney, who was governor of New Hampshire from 1875 to 1877, testified before the Senate Committee of Education and Labor about fifty years ago that when the pulp mill was built at Franklin, the paper manufacturers predicted ruin to the owner. As a last resort when no publisher would use it, this wood paper was substituted by the manufacture on a Boston paper order unknown to them. When the Boston paper sent in another order, the old regular paper was sent and immediately the publisher complained and requested the wood paper, though at that time knowing it was wood. This paper was used six months before they knew its constituents. Since the publishers found that wood papers worked better in the presses, from then on it had established itself.

In addition to the grinding of wood, there is another very important and essential process which helped to bring paper within the reach of all. Its principle was discovered by accident. One day a tramp papermaker was crossing the country. The sun was high in the heavens and the day was torrid. The heat became intense and so he sat down to rest in the first shady grove he reached. While he was cooling off he noticed a hornet's nest in the tree above, presently a piece of the nest fell down. He picked it up and found it to be composed of very tough fine fibres. His curiosity was aroused and he watched the hornet go to an old fence rail. He then went to investigate. He soon found the hornet was getting the strong fibre from the old rail. His papermaking instinct brought him to the thought that it would be possible to reduce the new green fibre in trees by chemicals in a short time as nature had done by years of oxidation. This, then, gave the world the chemical pulps.

PRESERVING ROOF TIMBERS.

Roof timbers in buildings where high humidity is the rule have been a source of trouble

to operators of paper and cotton mills, and other industries, because of their tendency to decay rapidly. In order to determine the best means for preserving such timbers, the Forest Products Laboratory at Madison, Wis., has conducted a series of tests of the various treatments. As a result, it was recently announced that the pressure method, with either creosote or a zinc-chloride solution, will give better results than steeping, dipping, or painting. Twenty years may be added to the life of the wood by this treatment, it is declared, though it is admitted to be the most expensive. Each cubic foot of timber should receive 8 to 12 pounds of creosote, or half-pound of zinc chloride, if the latter is used.

WOODEN SHIP 46 YEARS ON DUTY.

In view of the discussions that have taken place during the last year or two with regard to the seaworthiness and durability of wooden ships it is interesting to note the case of the famous old revenue cutter *Bear*, belonging to the United States coast and Geodetic service, which recently completed its thirty-third annual cruise to the Arctic. This vessel was built on the Clyde, Scotland, in 1874, as a steam whaler, but was soon acquired by the United States Navy Department, and first came into public notice through being used by Commander (later Rear Admiral) W. S. Schley on the Greeley relief expedition in 1884, as a steam tug. The name of the old vessel has frequently appeared in print in connection with its various voyages to the Arctic and other strenuous service. It seems almost unnecessary to argue the durability and seaworthiness of properly built wooden vessels in view of the proud record of clipper ships before the days of steel construction and steam navigation.

They made stout wood ships forty-five years ago and they still make stout wood ships. When someone pipes in with a slur upon wood ships and their alleged unseaworthiness it might be well to mention the old *Bear*, now in its 46th year and not out of the hale and hearty class, despite her years of bucking Arctic ice and gales.