city of consuming more than one million cords of wood per annum.

Canada's First Factory.

The first plant for the distillation of wood in Canada was not that erected at Fenelon Falls, Ontario, in 1897 as has been repeatedly stated, but was the one built at Anagance, Kings county, New Brunswick, in 1880 and operated until 1886. It consisted of seven iron retorts and manufactured gray acetate of lime, methyl alcohol and charcoal. The retorts and also the first supply of stills, were imported from Scotland.

There are about thirteen factories in Canada engaged in the distillation of wood and these consume about 130-140,000 cords of wood per annum and produce, approximately, 13,000 tons of gray acetate of lime, 60,000 tons of charcoal and 1,000,000 gallons of methyl alcohol. These may be termed the prime products of these factories. In eastern Canada hardwoods are exclusively employed, and the greater percentage being birch, beech and maple. Preference is given hardwoods, for distillation, because the yields of acetic acid and methyl alcohol are higher, compared with that obtained from softwoods, and the distillates are more easily refined. With the increasing demand and higher prices offering for some of the products of the distillation of soft woods, more attention is being directed to the possibility of utilizing these woods in America.

Dry wood is chiefly composed of carbon, hydrogen and oxygen and the quantities of each calculated to ash and nitrogen—free wood, averages about 50 per cent. carbon, 6.2 per cent. hydrogen and 43.8 per cent. oxygen. The nitrogen content of wood varies between 0.05 and 1.5 per cent. Spruce contains 0.05-0.10 per cent.

Cellulose in Wood.

The chief constituents of wood are cellulose, lignin and carbohydrates. The percentage of cellulose, in general, is in the vicinity of 50-60 per cent. There is about 25-28 per cent of lignin in soft woods and 20-26 per cent in hardwoods. The carbohydrates, in the form of pentosanes, vary from 10-13 per cent in soft woods to from 22-26 per cent in hardwoods. The percentage of hexosanes also differs with various kinds of wood. The general composition of wood varies with locality of growth, age and different parts of tree.

The chemical structure of the cellulose molecule, the principal constituent for pulp manufacture, has not as yet been determined. Many theoretical structures have been proposed but all are hypothetical. The average chemical composition of cellulose is 44.4 per cent. carbon, 6.2 per cent. hydrogen and 49.4 per cent. oxygen. It would appear as if cellulose, from different sources, were not a chemically individual compound, but rather a generic application for very similar compounds. This is indicated by the yield of acetic acid obtained, under the same conditions, from the various celluloses.

The following is the respective percentages of acetic acid from the cellulose of cotton, spruce, birch and beech—1.4; 2.8; 3.9 and 3.5 per cent. The structure of the lignin molecule is equally as uncertain as that of cellulose. The composition of socalled lignin varies between 56.-60. per cent. of carbon and approximately 5.8 per cent. hydrogen and 38.0 per cent oxygen, much depending upon the degree of purity. The lignin molecule contains at least four methyl or methoxy groups which are important in the distillation of wood as sources of wood alcohol, while cellulose and carbohydrates are members of what is known as the aliphatic series, lignin is generally accepted as belonging to the cyclic compounds, and possibly containing an aromatic nucleus. There are those, reasoning by analogy and certain degradation products, who view lignin as a condensation product of coniferyl alcohol, a substance found combined with glucose in the form of the glucoside coniferin, in the cambial sap of trees. Others entertain the opinion that it is a cyclic hexenone united through acetyl residues with a pyrone ring compound containing methoxy-groups. This latter contention has some experimental evidence supporting it, but does not explain the many degradation reactions of lignin.

A great deal more is known of the