and a cementing substance was necessary to give wood characteristics to the material; and secondly, a mixture of asbestos fibre with one or two cements (first oxide of magnesium or calcined magnesia, and second calcium silicate and aluminate mixture) seemed more suitable than any other combination.

The author proceeds to describe what he calls asbestos wood made under his patents and developed from the application to mixtures of certain processes of mixing, pressing and curing. It is stated to be practically incombustible, harder than natural woods, to have a transverse strength about two-thirds that of white pine with the grain, and, without being brittle, an elasticity less than that of natural woods; the coefficient of thermal conductivity has been found in English units to be between 50 and 30 B.t.u. per sq. ft. per 24 hours, per 1 deg. Fahr.

The weight of the several grades of asbestos wood 1 in. thick varies from 8 lb. to 13 lb. per sq. ft. White pine 1 in. thick when dry weighs approximately 3 lb. per sq. ft., and oak about twice as much. The transverse strength of boards and the maximum fibre stress is between the limits of 5,000 lb. and 10,000 lb. Test specimens 12 in. wide, 12 in. long and ¼ in. thick, broken by centre load when supported on two edges with 11 in. span, broke on an average at 200 lb. load. Under the same conditions clear white pine broke under a load of 300 lb. with grain and 20 lb. across it. In some cases the equality of strength in both directions is of great advantage.

The tendency of the material to absorb water varies between the limits of 4 per cent. and 20 per cent. This absorption is not of such a nature or amount as to cause disintegration from freezing and the material is not injured by prolonged soaking in fresh water. Sea water tends to disintegrate it after a time, the magnesium salts in the water replacing the calcium of the cement.

The coefficient of expansion varies with the temperature and also with the age of the specimen. It is small, being about 0.00004 at ordinary temperatures, diminishing rapidly at 700 deg. Fahr. and becoming negative at 950 deg. Fahr. where shrinkage occurs.

The operations of boring, sawing and finishing are all somewhat more difficult with asbestos wood than with the natural woods. It withstands scraping and rubbing much better. Floors and stair treads made of the material wear well, but are liable to be slippery when wet.

Many of the common wooden details of modern buildings have been successfully duplicated in asbestos wood, doors usually being hollow to save weight. Wherever there is danger of ignition of wooden framework a lining of the material has been found effective, notably in the vicinity of electric apparatus. It has been found best to mold the sheets while still in a plastic condition so as to form large pipes or ducts, and many locomotive round-houses have been equipped with smoke jackets or ventilating hoods. Shingles which have been in the weather for years have proved durable and this quality seems certain to equal that of fire resistance.

The ability to stand heat makes it available for blocks on friction brakes where a flexible material is not needed. The coefficient of friction of iron is approximately 0.3 to 0.4.

It has also been used as a mold for glass utensils during the process of manufacture, its non-conducting properties making it preferable to iron in some instances.

It is, of course, the fire resistance of the asbestos wood which gives it its greatest interest. There is nothing combustible in it, and on exposure to fire nothing can occur except a gradual dehydration of both fibre and cement. Under prolonged red heat the boards become weakened, but for such exposures as occurs in fires in buildings the resistance is ample. For instance, a sheet of ¼-in. asbestos wood may be placed over the top of an open furnace at 1700 deg. Fahr., the flame impinging directly on the lower surface of the sheet, and at the end of half an hour the sheet may be taken off and while its lower side is still white hot be plunged into cold water and then returned to the furnace for 10 minutes. It may be slightly warped and its strength will probably be diminished 25 per cent. or more, but it will still be sound and whole and free from cracks or serious weakness. Fire tests have shown the ability of the material to withstand much longer exposure, but it is not suitable for linings for furnaces or kilns which are kept constantly at red heat. In some fire tests the paint on the outside of an asbestos wood door 1¼ in. thick was not scorched after the fire inside had been burning at a temperature of 1700 deg. Fahr. for more than an hour.

BRITISH COLUMBIA'S MINERAL PRODUCTION.

An estimate of British Columbia's mineral production has been prepared by Mr. W. F. Robertson, provincial mineralogist, which is really a prelminary review of the progress made in 1911, with an approximate estimate of the quantities and value of the province's several mineral products.

The estimated mineral production is $23,211,816. If the revised statement which is made up after the receipt of all mining returns shows this amount to be approximately correct, it will then be seen the amount was smaller than that of 1910 by $3,165,250, and less by various amounts than that of any year since 1905.

The curtailment of ouput is attributable for the most part, if not entirely, to the effects of the strike of coal mine employees in the Crow's Nest district of South-east Kootenay. The suspension of work at the mines and coke-ovens lasted for practically two-thirds of the year, and prevented the production of coal and coke during that period to an extent that involved a decrease in value from East Kootenay alone of nearly $3,000,000. If to this be added the decrease in value of the production of metals of one copper producing company alone—as compared with 1910, of $1,600,000—which was the direct result of the cutting off of the supply of coke for its blast furnaces, there will be obtained a total decrease of more than $4,500,000, which was an immediate consequence of the labor difficulties at the Crow's Nest collieries.

There were other temporary obstacles to production being maintained at the ordinary rate which also in a lesser degree accounted for a decrease in the output, these either have been overcome or are likely soon to be removed. Meanwhile a settlement has been made of matters that were in dispute between the coal-mine operators and their employees, thus by the end of the year the normal output of coal and coke was being gradually restored.

British Columbia's proportion of the mineral production of Canada is comparatively large. The whole value of the production of this province to the end of 1911 is approximately $397,000,000, since the published official records of the whole Dominion do not include production prior to 1886, the present comparison must be confined to the period of twenty-six years—1886-1911. Placing the aggregate for the whole of Canada at $1,245,000,000 (which allows for 1911 a Dominion total of $115,000,000, an amount $10,000,000 greater than that of 1910), and British Columbia's proportion for the same period at $333,000,000, it follows that this Province has to be credited with nearly 27 per cent. of the value of the mineral production of the whole of Canada in the twenty-six year period under notice.