

GYPSUM.

By R. W. STONE.

CONDITION OF THE INDUSTRY.

The three years 1913-1915 saw no marked fluctuation in the gypsum industry. For some time the annual output has been near 2,500,000 tons of raw material. In 1913 the production was about 2,600,000 tons, and in each of the two following years there was a slight decrease, amounting in all to about 150,000 tons, a decline of less than 0.06 per cent. This decrease was due largely to a falling off in the demand for gypsum wall plaster occasioned by a reduction in the number of buildings constructed. Statistics of building operations in the leading cities of the United States show that 2,500 fewer permits were issued in 1915 than in 1914. This decline was probably due to the increase in cost of supplies and of labor reflected in the same statistics, which show that although the number of operations was less, the cost increased \$22,000,000, or 3.55 per cent. Figures are not yet available (April, 1917) for the gypsum industry in 1916, but it is believed that the year was one of increased production. Prices of all supplies have increased, but bigger business requires and can pay for more building, and this condition has been favorable to the gypsum industry.

This particular industry could not suffer from restraint of ocean traffic, because the imports, which come wholly from New Brunswick and Nova Scotia, are normally only about one-fifteenth as much as the domestic production, and gypsum is so abundant and widespread in the United States that the nation is easily industrially independent in this respect.

Gypsum is produced in 18 States and Alaska. Most of the deposits are west of Mississippi River, but considerable quantities occur in New York, Virginia, Ohio, and Michigan. New York, in fact, is the largest producer, yielding 500,000 tons annually, or one-fifth of the country's total. Iowa ranks second and Michigan third. The most extensive deposits are in Wyoming, Utah, Texas, and New Mexico, where thick beds of high-grade gypsum crop out for

hundreds of miles. In Wyoming alone gypsum beds from 6 to 20 feet thick are exposed for a thousand miles and constitute a reserve that the world's demands would not exhaust in many decades.

In 1915 there were 77 active mines or quarries which supplied 69 gypsum plants. A number of plants are standing idle. In case of greatly increased demand for gypsum products the idle plants could quickly be put into commission, and the active plants that are working only one or two shifts could be put on a 24-hour schedule, thus making a large increase in the output. The production of gypsum boards probably could not be so quickly increased as that of other products, because they are made on machines which are not on the market.

As the deposits of high-grade gypsum in the United States are widespread, practically inexhaustible, and in many places close to present lines of transportation, and as the milling part of the industry can easily be made to increase its output, the outlook for this popular structural material is fair even in times of worldwide unrest.

USES OF GYPSUM.

The principal uses of gypsum are as structural material and as an ingredient in Portland cement. Gypsum wall plaster is in common use, and gypsum boards, blocks, and tile are fast making a market because of their light weight, convenience, and fire-resistant qualities. Because of the rapidity with which the plaster sets, permitting carpenters to follow the plasterers within a few hours, and because of the size and shape of the gypsum block, tile, and board units, which favor quick construction, these materials are especially adapted to the hurried emergency building operations occasioned by great industrial activity.

At such times as the present, when many manufacturing firms, particularly those engaged in making munitions, are called upon to expand their plants in the shortest possible time, and when high fire-resistant qualities are demanded in the new buildings, gypsum products are used extensively, according to information of the United States Geological Survey. For quickly constructed one-story buildings which shall be warm in winter, cool in summer, and non-inflammable a light steel frame with inner walls, roof deck, and partitions of gypsum block and slabs should be satisfactory. Gypsum should not be used for exterior construction in a moist climate but has been so used successfully in some of the arid portions of the United States. In steel-frame buildings several stories high the use of gypsum blocks for partitions and for fillers in concrete floors not only gives fire-resistant quality to the building and hastens construction but decreases appreciably the strength required in the frame. Furthermore, because gypsum dries rapidly, a building

plastered with it can be occupied very soon after plastering is completed. In a number of buildings recently constructed at our navy yards gypsum slabs have been used for the roof decks because of their light weight and noncondensing quality.

Other uses of gypsum in time of war may be mentioned briefly. Gypsum is a constituent of the Portland cement used in the foundations and frames of buildings, in the construction of bridges, in fortifications, in the emplacement of heavy artillery, and for numerous other purposes in the maintenance and operation of the Army and Navy. It is suggested that for light-artillery emplacements a hard-setting gypsum plaster might be used. Gypsum is used advantageously as a fertilizer on some soils and with some crops and doubtless will be used in greater quantity under the present stress for a large yield from our farms. Calcined gypsum in the form of plaster of Paris is used for making casts around broken limbs and so has an important function in the surgical wards of hospitals, especially during war. Bandages for orthopedic surgery, used very extensively in hospitals, are made of gauze filled with plaster of Paris.

