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REVIEWS

Report on the Building and Decorative Stones of Maryland. By
GEORGE P. MERRILL and EDWARD B. MATHEWS. Part II,
Vol. II, Geol. Survey of Maryland.

The first 75 pages of the Building Stone Report of the Maryland Geological Survey are written by George P. Merrill, and comprise a discussion of the physical, chemical, and economic properties of building stones. The following 116 pages are written by Edward B. Mathews, and are an account of the character and distribution of Maryland building stone.

In the first part Merrill classifies the rocks of Maryland, which are available for constructive and ornamental purposes, into (1) granites and gneisses; (2) common limestones and dolomites; (3) the marbles (crystalline limestones and dolomites); (4) sandstones and conglomerates; and (5) the argyllites and slates. The three great classes of rocks, eruptive, clastic sedimentary, and metamorphic; the diversity of the geological resources of Maryland; the method of formation, present position, and the conditions under which the sedimentary and igneous rocks formed; and the way in which mountain-building forces have since modified them, are successively discussed.

The author explains how several grades, and often kinds, of sedimentary rocks may occur in a single quarry. The effect which the position of the strata, horizontal or tilted, has upon the cost of quarrying; the size and shape of the blocks resulting from jointing and bedding; the manner in which river erosion, weathering, and glaciers influence the accessibility of the stone in the quarry; and the misleading nature of dry seams and superficial induration, are clearly explained.

Following a discussion of the general distribution of Maryland building stones in reference to the physiographic regions of the state, Merrill considers the methods of quarrying and the more important kinds of machinery now employed. The important part which competition plays in the development of the stone industry has led to a

brief discussion of the quarrying industry of each of the Atlantic coast states. In this the author briefly describes the kinds of rocks quarried and reviews the character of the output and the facilities for successful development. It is concluded from these observations that the future of the quarrying industry of Maryland must depend not so much upon the kinds of materials as upon the ability to compete in prices.

After treating the subject of weathering in general, Merrill refers more particularly to the effects of alternating temperatures and the freezing of included water. The danger of laying stone on edge, on account of the freezing of water which may collect along the sedimentary planes, as well as the results of water freezing in the pores of the rock, are emphasized. In this connection the author concludes that "other things being equal, a stone possessing low absorptive power will be more durable . . . than one that will absorb a large amount;" "granites and gneisses, possessing low ratios of absorption, and being made up so largely of silica and silicate minerals, are very little affected by freezing and solution;" and that "a ratio of absorption of more than 4 per cent. by weight (in sandstones) must be regarded as unfavorable."

In a discussion of the physical tests Merrill describes in an interesting manner the more important methods employed by different experimenters in performing the various durability and strength tests. In the discussion of the freezing and thawing tests the observation is made that "the results obtained on coarse and fine varieties of Portland sandstone suggest at least that water would freeze out of coarse stone, and therefore create less havoc than in those of finer grain." In the discussion of the specific gravity the conclusion is reached that "of two stones having the same mineral nature, the one having the highest specific gravity, that is, the greatest weight bulk for bulk, will be the least absorptive, and hence, as a rule, the most durable." The method suggested for determining the weight per cubic foot of stone is to multiply the weight of a cubic foot of water by the specific gravity of the stone. The method suggested for obtaining the absorptiveness of the rock is the one commonly employed, of soaking the sample in water for three or four days and determining the percentage gained in weight thereby.

In speaking of the crushing strength of stones, the author believes that to continue making these tests is unnecessary, except in "extreme cases."

Since the first of the century the quarrying industry of Maryland has received attention incidentally from many different students of geology. The various publications which have resulted from these studies are summarized by Mathews in the first pages of the second part of the report. Mathews considers the more important quarry areas under the heads of (1) granite and gneiss; (2) marbles, serpentines, and limestones; (3) quartzite and sandstones; and (4) slates and flags. This classification is somewhat different from that followed by Merrill in the first part of the report.

In the treatment of each area the author gives a brief historical sketch of the development of the industry, and a discussion of the rocks as they occur in the quarry. In some instances the microscopical and chemical analyses are given, and also the results of physical tests, including a determination of the crushing strength, ratio of absorption, specific gravity, and weight per cubic foot. The rock as it occurs in the quarries and natural exposures; the mineralogical composition and texture; and the colors of the granite, limestone, marble, serpentine, and sandstone, are well illustrated by cuts, photomicrographs, and colored lithographic plates.

The granites of Maryland are shown to be ordinarily schistose, and mainly of a gray color. The granite from one or two of the quarries is described as having a reddish or pinkish color, but possessing a porphyritic texture. In the case of the rock known as gneiss, occurring in the vicinity of Baltimore, the color and texture vary with the alternation of layers. In all cases the dimensions are controlled by jointing planes, which strike in various directions, owing to which the stone can often be used only for the smaller constructional purposes.

The marbles and limestones of Maryland are the most widely distributed of all the building stones, and occur in most of the formations from the Algonkian to the Triassic. The Cockeysville marble is exploited the most largely, and is probably the best known of Maryland limestones or marbles. The Potomac marble is a conglomerate with a striking color and texture, and is the only stone of this character used to any extent in the United States.

Serpentine has been quarried in several places, mainly for decorative purposes. Dry seams have seriously interfered with the successful development of this stone, and the quarries have been temporarily abandoned.

Sandstone is quarried extensively in only one locality, Seneca. The

best stone in the quarries is interstratified with beds of unsalable material, which naturally interfere with the economy of working.

Slate has been quarried in two different areas in Maryland, known as the Peach Bottom district and Ijamsville. The former district is the only one in which quarrying is now actively carried on. From this district a good quality of slate is obtained. The output has shown a slight decrease since 1894, when it reached its maximum importance.

E. R. BUCKLEY.

Fifteenth Annual Report of the State Geologist (New York) for the Year 1895, Vol. I. JAMES HALL, State Geologist, Albany, 1898.

THIS report, published in a ponderous volume of 738 pages with broad margins, large type and heavy paper, is particularly unwieldy, and would be far more convenient for the student were it issued in a size and form conformable with the preceding reports of the survey. It is particularly aggravating to the librarian to have a continuous series of reports which should be kept together upon his shelves vary so greatly in size. The 1894 report and those preceding it are convenient sized octavo volumes, while this 1895 report is a great book standing fourteen inches high, although the matter contained, page for page, is about equivalent to that in the earlier reports. The edition of the report, issued as a part of the regents' report of the New York State Museum, is printed upon thinner paper, and has the margins trimmed down so that it is a more convenient size, but even that is considerably larger than the preceding reports of the survey.

The criticism upon the style of publication, however, cannot be extended to the contents of the volume as each one of the papers communicated is a valuable addition to the literature of New York geology, and many of them are of more than local interest. Each of the papers will be briefly noticed, much of what follows being taken from the "Synopsis of Results" by the state geologist upon pages 11-26 of the report.

Two paleontologic papers, both by James Hall, (1) "A Discussion of *Streptelasma* and Allied Genera of Rugosa Corals," and (2) "The Paleozoic Hexactinellid Sponges Constituting the Family Dictyospongidae," are announced in the synopsis of the report but do not appear. However, since this volume is marked Volume I on the title-