

**THE QUARRY INDUSTRY
IN SOUTHEASTERN NEW
YORK, PP. 143-174**

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THE QUARRY INDUSTRY IN SOUTHEASTERN NEW
YORK

The following paper is purely preliminary in its nature, a more complete discussion of the subject being reserved for a forthcoming museum bulletin on the *Granites and marbles of New York state*, which is to form one of a series on the building stones of the state. The area discussed in the present paper includes the counties of New York, Queens, Westchester, Putnam, Dutchess, Rockland and Orange. A few quarries in the western half of Fairfield county, Ct., are also described.

The data here presented have been collected during the past four years field work in the area under consideration. Descriptions of several of the quarries have been furnished the writer by Mr H. C. Magnus, who spent some time in 1900 on field work for the state museum in central Westchester county, and by Mr B. F. Hill, who was engaged for several field seasons on work in Putnam county. The writer is also indebted to Mr Joseph Morje for valuable assistance in the preparation of the material for publication. Other acknowledgments are made in the course of the paper.

GEOLOGY OF THE AREA

The area discussed in the present paper, though relatively small, contains representatives of all the geologic systems from the pre-Cambrian to the Trias which occur in New York state. The geologic discussion here presented is merely a summary of those facts of importance in connection with the quarry industry of the area. The areal distribution of the various formations is very complicated and can hardly be explained without reference to a geologic map of fairly large scale. The new edition of the geologic map of New York, on a scale of 5 miles to the inch, will be found serviceable in this connection. Westchester and New York counties, with small parts of Rockland, Orange and Putnam, are well shown on the geologic map of a part of southeastern New York by Dr F. J. H. Merrill, published in 1895.

Rockland

For a detailed discussion of the geology of this part of the area, reference must be made to Dr Merrill's paper on the "Crystalline rocks of southeastern New York," published in the 50th annual report of the New York state museum. Reports on Orange and Rockland counties, by Dr Ries and Dr Kümmel respectively, have also been issued. The Devonian outlier extending in Orange county from near Cornwall to Greenwood lake, has been discussed in detail by Mr N. H. Darton.

The oldest formation in the area is a series of gneisses of pre-Cambrian age, forming the mass of the Highlands. To the northwest of this range is the great lowland, based on Cambro-Ordovician limestones and shales. A structural basin lying on the northwest flank of the main body of pre-Cambrian rocks, but separated from the Paleozoic lowland in Orange county by a series of small pre-Cambrian outliers, contains Upper Silurian and Devonian formations. East and southeast of the pre-Cambrian mass, on the western side of the Hudson, is a region in which the sedimentary rocks have been highly metamorphosed, the sandstones, limestones and shales of the normal Cambro-Ordovician appearing here as quartzites, highly crystalline limestones, and schists. As a further result of the forces to which they have been subjected the strata, originally laid down in a nearly horizontal position, now form a series of folds, trending generally northeast and southwest, both Paleozoic and pre-Cambrian beds being involved in these folds. South of the pre-Cambrian, to the west of the Hudson river, these altered Paleozoic rocks are almost entirely overlain by the Newark rocks, which cover most of Rockland county. In addition to the formations noted above, which are parts of a normal succession, igneous rocks occur as intrusives of later date.

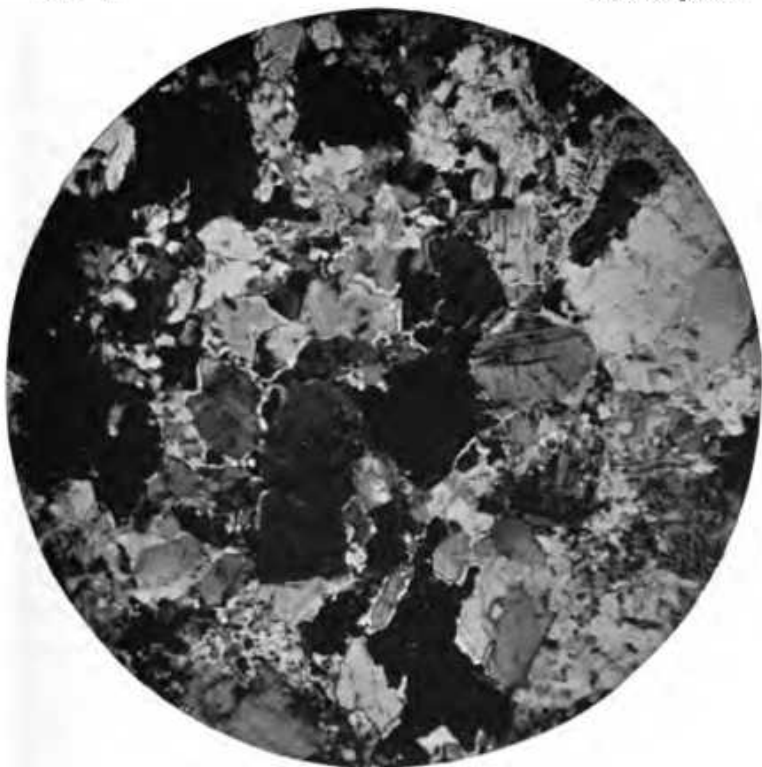
SUCCESSION OF THE FORMATIONS

Pre-Cambrian rocks

The pre-Cambrian rocks of southeastern New York consist of a series of gneissoid granites and gneisses, locally schistose. In Westchester county the more massive (and in general more

Plate 43

To face p. r144



F. J. H. Merrill, photo.

Pre-Cambrian gneiss, Lake Mahopac N. Y.
Photomicrograph in polarized light, enlargement 23 diameters.

M30U

basic) lower gneisses are overlain by a highly foliated gneiss, described by Dr F. J. H. Merrill as the Fordham gneiss. This is a well banded bluish to gray gneiss, consisting of alternating layers of quartz, orthoclase (or microcline) and mica (usually biotite).

Lithologic differences, fairly constant over large areas, have led to a tentative fourfold division of the pre-Fordham gneisses; but the grouping depends on composition rather than on superposition, and has therefore no chronologic significance. The names for these subdivisions have been used, in manuscript only, by the present writer: and the subdivisions will not be discussed in the present connection.

Various authors have included in the pre-Cambrian both the large area of white limestone of Sussex county, N. J. and Orange county, N. Y. and smaller isolated areas which occur in the Highlands of Putnam and Orange counties. Recent field work by the writer in these smaller areas seems to disprove this conclusion, at least so far as some areas are concerned; and it is probable that the entire question may still be considered open. In the present paper, however, these Highland limestones have been discussed separately from the undoubtedly Paleozoic limestones and marbles. Lithologically, these white limestones differ but slightly if at all from the more highly crystalline portions of the Stockbridge, and like the Stockbridge and Barnegat are usually highly magnesian.

Poughquag quartzite

In Dutchess, Orange, Putnam and Westchester counties a relatively thin quartzite usually underlies the Cambro-Silurian limestones. In Stissing mountain and at other points this quartzite has been found to contain Lower Cambrian (Georgian) fossils. It is essentially continuous, stratigraphically, throughout the counties above named, few contacts of the Stockbridge limestone with the pre-Cambrian gneisses failing to show this intervening quartzite. In its lithologic character it is very uniform. Dr Merrill described it in 1896 as the Lowerre quartzite, while the formation names Vermont and Cheshire have been

given it by the New England geologists. The name recently adopted for it is Poughquag quartzite (Dana 1872) in recognition of the fact that its thickness, lithologic character and stratigraphic position are well shown at Poughquag, Dutchess co. N. Y. A typical exposure of the Poughquag quartzite occurs on the south side of Peekskill creek near its junction with the Hudson river. This is well shown on pl. 54, the slaty cleavage of the quartzite being particularly noticeable.

Stockbridge and Barnegat limestones

The Barnegat or blue limestone of Orange and southwestern Dutchess county and the crystalline Stockbridge limestone of the other southeastern counties and western New England, are more or less highly metamorphosed equivalents of the Cambro-Silurian limestones of northern Dutchess county. As a whole, the Barnegat and Stockbridge formations are predominantly magnesian. They rarely carry sufficient magnesia to qualify as true dolomites, however; and contain occasional beds of almost pure lime carbonate.

The crystalline Cambro-Silurian limestone of Westchester county was described as the Inwood limestone by Dr F. J. H. Merrill in the paper previously cited. These Westchester county limestones are essentially continuous, stratigraphically, with the Stockbridge limestone of the Taconic region; and in order to prevent two names being used for the same formation, the formation name Stockbridge has been accepted as that of earlier date.

Mather in 1842 described the semicrystalline blue limestone of Orange county as the Barnegat limestone. Though there seems to be little doubt of the essential equivalence of the Barnegat and Stockbridge, it seems best to retain both names as the Stockbridge probably includes Trenton beds, which in the less metamorphosed area of Orange county and New Jersey can be differentiated from the Barnegat. South of the New York line the names Kittatinny and Wallkill have been applied to the Barnegat limestone, but these can hardly be regarded as tenable in view of the many other names of earlier date.