THE DOLOMITES OF THE STILLWATER, WELLINGTON, GARBER, HENNESSEY, AND DUNCAN FORMATIONS

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The purpose of this article is to call attention to the presence of a considerable quantity of dolomite in the Stillwater, Wellington, Garber, Hennessey, and Duncan Formations, which as far as known to the writers, has not been described to date.

Analyses of samples of the above mentioned formations reveals the local presence of dolomite. These samples, one hundred odd, were taken from widely separated points in Logan, Oklahoma, Cleveland, McClain, and Pottawatomie counties; a fact which clearly testifies to the widespread occurrence of this mineral. Its distribution, however, both in space and in quantity, is exceedingly erratic. Locally, as in many places in the upper fifty feet of the Garber, it may constitute fifty to ninety-five per cent of the rock, while in most of the massive sandstones it is absent or present in small quantities only, in other cases as in thinly bedded, shaly appearing rocks and many of the so-called white streaks, it varies in amount from zero to one hundred per cent. This mineral is not confined to definite beds, at least not beds which are persistent, for any great distance, for an almost pure dolomite may grade along the strike into a dolomitic sandstone, a dolomite shale, or a pure sandstone.[1]

The most common type of dolomite is that which occurs in rocks of conglomeratic appearance. These often form ledges several feet thick which, being more resistant to physical weathering than the loose sandstones, remain as cappings of the hilltops, (Fig. 6). These dolomite rocks showing pebbles may grade into shaly or sandy appearing rocks in which no pebbles can be seen by the unaided eye, (Fig. 5). The latter phase, however, is identical in composition and in structure with the former, as seen in thin sections, (Fig. 1), the difference in appearance being due entirely to weathering, which brings the pebbles into relief. Under the microscope the pebbles and the matrix are seen to have the same composition, namely dolomite or dolomite containing a small amount of quartz. This latter mineral is identical in size, degree of roundness and etching, etc., with the quartz of the massive sandstones. The size of the dolomitic pebbles varies considerably, the maximum diameter being three inches and the most common one-quarter to one-half inch. These rounded masses do not show radial or concentric structures but occasionally do show fine parallel laminations, which latter, however, are not parallel in different pebbles. Pebbles of quartz, feldspar, calcite, or any mineral, other than dolomite were not observed.

In an attempt to explain the above features the writers wish to advance a tentative hypothesis, namely, that these rocks are intra-formational conglomerates. According to this view, beds of dolomite, some containing detrital quartz, were deposited, then by wave action broken into fragments of varying sizes which were rolled around, acquiring some degree of roundness. The more finely broken material later was dropped or rolled between the coarser pebbles, cementing the latter and thus giving a similar composition to the pebbles and to the matrix. The presence of fine parallel laminations, suggesting bedding planes, in the pebbles and the fact that these lines are not parallel in different pebbles lends support to this mode of origin, for the bedding planes in the different pebbles would not remain iriented during the rolling of the latter. The cross bedded character of many of the dolomitic ledges, (Fig. 6), clearly shows that these rocks were subjected to wave action.

The above hypothesis is considered merely suggestive, for the dolomite rocks outcrop over such a wide area and in such an erratic manner that a considerable amount of field work will be required to bring out all their salient features.

The quantity of dolomite in the above mentioned formations is considerable and though, at present, it is impossible to estimate this quantity, yet the writers wish to emphasize its abundance and consequently make the hazardous estimate that at least five per cent by weight of these formations taken as a unit is dolomite.

EXPLANATION OF PLATE

Figures 1 to 4 inclusive are photomicrographs of thin sections, magnification 45 diameters.

Fig. 1, Section through a dolomitic pebble.

Fig. 2, Section through a dolomitic rock. Note the well developed rhombs of dolomite and the angular to semi-rounded quartz.

Fig. 3, Section of a dolomitic rock. Note the well developed rhombs of dolomite.

Fig. 4, Section of a dolomite rock. Note the small rhombs of dolomite and the angular to rounded quartz.

Fig. 5, Conglomerate appearing dolomite, in lower left hand corner, grading into a thinly bedded rock, which, however, is identical with the former, the difference in appearance being due to weathering. Not the cross bedding.

Fig. 6, A ledge of dolomite.

Fig. 7, Loose dolomite pebbles.

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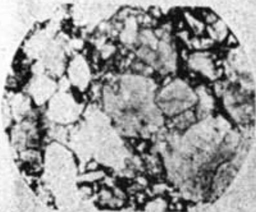

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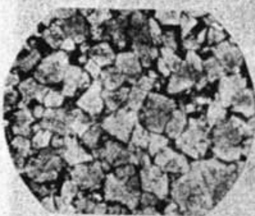

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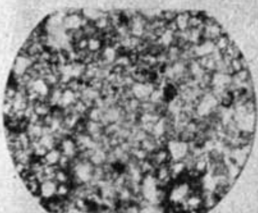

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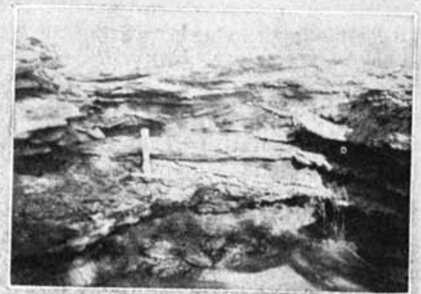

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