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NOTE ON THE NATURE OF CONE-IN-CONE.

BY CHARLES R. KEYES.

Cone-in-cone is a term which has been applied more or less widely to a peculiar structure often found in beds of shale. Ordinarily it appears in thin sheets or layers, from three to six inches in thickness. The bands have a more or less well-marked columnar structure, each column being about half an inch in diameter and composed of a series of small conical segments set one within another. In general appearance fragments resemble the familiar coral Lithostrotion.

Much has been written on the origin of cone-in-cone, and numerous and widely different explanations have been offered. So far as I know, none of these numberless attempts to account for this peculiar structure appear to be satisfactory expositions of the true cause of the formation.

Recently there have been obtained in Marion, Boone and Webster counties, in this state, some unusually instructive examples which offer, I believe, a correct solution to the problem of origin. These specimens range from a black, opaque, clayey variety—the common form—through all gradations to a white, translucent kind. The latter is found to be made up of numerous long, often needle-like crystals and flat plates which radiate from a center—the apex of the cone—new needles coming in as rapidly as the spaces between those near the center become large enough to admit them. Chemical analysis shows that this variety is nearly pure calcic carbonate, in a well-crystalized form. Analysis of the more earthy kinds also show a high percentage of lime. The results of examinations by Prof. G. E. Patrick are as follows:

- I. Clear variety from Madrid... ..96.36 per cent Ca CO₃
- II. Clayey variety from Fort Dodge.....83.12 per cent Ca CO₃

As the clear cone-in-cone acquires more and more clayey matter the crystals of calcite gradually lose their mineralogical

characteristics until in the common form the presence of calcite would not be suspected, and the surface of the cones, instead of showing clearly the individual calcite needles sharply terminating, has only a peculiar crinkled or roughened appearance.

Owing to the very strong crystalizing force known to be possessed by calcite, so powerful an influence is exerted by this substance in solution, which is manifestly at the point of saturation, though distributed rather sparingly through the clay layers, that even the clay is pressed into the form assumed under normal conditions by the calcite. The process and results are not unlike those which have taken place in certain sandstone beds in central France, in which calcic carbonate has crystalized in the sand, and large perfect models of sand cemented by lime are found, having the well formed and characteristic crystallographic faces of calcite.

TWO REMARKABLE CEPHALOPODS FROM THE UPPER PALEOZOIC.

BY CHARLES R. KEYES.

There have been recently discovered in the coal measures of Mississippi basin some excellently preserved remains of Cephalopods, which are remarkable on account of the huge size attained. Both are representatives of the retrosiphonate Nautiloidea; but one is a member of the most closely coiled end of the series, while the other is a perfectly straight form. The former belongs to the genus *Nautilus* and the latter to *Orthoceras*.

The first group comprises a series of shells, which were obtained from the upper coal measures at Kansas City, Mo. Several unusually fine specimens are the property of M. S. J. Hare of that place, and others are in the possession of other collectors. The form was originally described by White* as *Nautilus ponderosus*, the diagnosis of which is essentially as follows:

* U. S. Geol. Sur., Nebraska, p. 236, 1872.