NOTES AND NEWS

TWINNED PSEUDOMORPHS AFTER PYRITE FROM KING'S BUTTE, GREENE COUNTY, MISSOURI*

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An unusual form of twinned crystals, goethite pseudomorphs after pyrite, has been found in a layer in the Compton limestone of lower Mississippian (Kinderhook) age at King's Butte, Missouri. So far as the writer is aware these complex "paddle-wheel" twins have not heretofore been described. Because of the increasing interest in these twinned crystals shown by mineralogists and collectors, it seems worthwhile to describe their occurrence and physical properties as mineralogical oddities.

King's Butte is a small but conspicuous turretlike rock formation crowning a rounded hill, situated $1\frac{1}{4}$ miles south of North Dry Sac Creek and three-fourths of a mile east of the Prestley Hill cut on State Highway No. 13; it lies 3 miles south of Brighton, and 14 miles north of Springfield, Missouri. The butte proper is capped by an indurated layer of vermicular siltstone (Northview sandstone) underlain by about 40 feet of softer shaly siltstone belonging to the same member; the siltstones form the steep slopes. The more gently rounded hill below the butte is composed of dolomitic limestone of lower Ordovician age. This is overlain by a thin sandstone of lower Mississippian age, which in turn ~~in turn~~ is overlain by several feet of white to buff-colored Compton limestone.

King's Butte has long been known as a good collecting ground for limonitized fossils. The fossils have been preserved as internal and external molds of iron oxide derived from the alteration of iron sulfide. The profusion of limonite fossils, as well as pseudomorphs after the cube and pyritohedron, found on the slopes of the butte bears evidence of the great abundance of pyrite that had been deposited in most of the rocks of the area.

The unusual twinned pseudomorphs occur only on that part of the slope underlain by the limestone formation, and are found in the greatest abundance in the gullies where the Compton limestone is exposed. Some slabs of the limestone contain the twinned crystals in place, and the dark brown residual clay from the disintegration of the limestone rock contains many good specimens. The same type of twinned pseudomorphs has been noted at several other localities, but always in calcareous rocks.

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This restricted occurrence of a distinctly different type of crystallization of a mineral of common occurrence reflects the effect of some physical or chemical difference in the solutions and the sediments of the particular bed or layer in which these crystals were deposited.

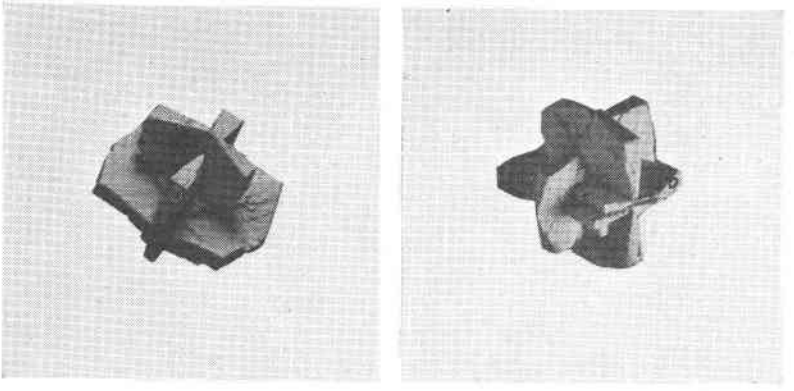

FIG. 1. Twinned pseudomorphs of goethite after pyrite from King's Butte, Greene County, Missouri. The photograph marked with a small white circle is a front view, and the one marked with a black circle is a side view of the same specimen, showing the curious twinning habit and the characteristic striation pattern. (Natural size.)

The two illustrations above are photographs of the same twinned crystal showing the twinning habit and crystallography of a typical specimen. The sizes of the crystals range from 2 millimeters to 20 millimeters. The crystals occur singly and in interlocked groups of 2 to 10 or more. The color ranges from light-brown to nearly black, and the luster varies correspondingly from earthy to submetallic. Some of the crystals are coated by a film of iridescent limonite which gives the surface an apparent but not real metallic luster. Single specimens are composed of three primary, flat, tabular, or platelike crystals, or of three pairs of wedge-shaped crystals, systematically united at right angles to one another. On some specimens secondary plates or wedges have formed adjacent to the primary plate. Striations are common on all of the faces but are best developed on the larger flat surfaces which are distinctly marked by a featherlike pattern having a center rib or joint that corresponds to the shaft of a feather, and a system of fine, slanting striae that correspond to the barbs. The tabular plates are arranged so as to lie in the three planes of symmetry which coincide with the planes of the crystallographic axes and are parallel to the faces of a cube projected on these axes. The striations and traces of lamination on the flat faces of

the plates somewhat resemble those on marcasite; and striations on the ends of the plates resemble those on the rounded faces of a combination of the cube and the pyritohedron. In crystals that do not show apparent distortion, the three axes of symmetry are equal and at right angles to one another. This isometric symmetry is so persistent that it can hardly be accidental.

In order to determine the composition of the pseudomorphs, several of the least altered specimens were crushed and the fragments studied in the Chemical Laboratory of the U. S. Geological Survey. It was found that the residual iron sulfide present in the central core of some of the crystals gave an x-ray diffraction pattern identical with that of pyrite, and the pattern of the reddish-brown iron oxide, the principal part of the pseudomorphs, corresponds to that of goethite.

The author is aware that a goniometric examination of these crystals is certainly in order, and that without such measurements this paper is lacking in its essential requirements, but circumstances do not permit such an examination at this time.

POLYCRASE IN NEW YORK STATE

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Uranium bearing minerals have hitherto been reported from several localities in New York State. E. S. Dana (1892) mentions uranothorite as "From the Champlain iron region, New York, exact locality unknown." Luquer (1896), (1904) and Kerr (1935) have listed and described various uranium bearing minerals from the well known Bedford area. Gratacap (1912) mentions both autunite and torbernite as having been found on "New York Island," presumably Manhattan, and Manchester (1914) states that uraninite was found "years ago" in New York City at Broadway and 155th Street. Pitchblende is reported by Zodac (1939) to have been found in 1924, although not recognized until some years later, associated with molybdenite in thin dikes of grey granite near the east end of the Bear Mountain bridge in Westchester County. Schaub (1940) has identified uraninite in material collected at the McLear pegmatite near Richville Station, St. Lawrence County.

Other than the lost locality "in the Champlain iron region" no radioactive minerals have been reported from the Precambrian complex of the Adirondack Mountains. Hence the purpose of this paper is to announce a new locality for radioactive minerals in New York State, the