observation is proof that $\{01\bar{1}2\}$ and not $\{20\bar{2}1\}$ is the twin-plane, for only in the former case are cleavages of two individuals parallel.[9]

Calcite twins of this type have been described from Elba,[10] Eisenerz[11] (Styria), Hüttenberg[12] (Carinthia), Rancie[13] (France), and Velmanya[13] (France). None of these twin-crystals, however, are sand-calcite crystals.

The form present on the sand-calcite crystals from Fontainebleau (France) and Vienna is the negative rhombohedron $f\{02\bar{2}1\}$, but as far as known they are not twinned.

At the only previously known American locality for sand-calcite crystals,[14] Rattlesnake Butte, Jackson County, South Dakota, the dominant form on the crystals is the hexagonal bipyramid, $\gamma\{8.8.\overline{16}.3\}$, which is one of the characteristic forms of calcite.

The Cholame Hills specimens here described, then, are apparently the only twin-crystals of sand-calcite on record.

[9] It seems probable that $\{01\bar{1}2\}$, and not $\{20\bar{2}1\}$, is the twin-plane in the calcite crystals from Saint-Julien-de-Valgalques described by Lacroix. If this is true, then only the four following twin-laws are exemplified in calcite: $c\{0001\}$, $e\{01\bar{1}2\}$, $r\{10\bar{1}1\}$, and $f\{02\bar{2}1\}$.

[10] Rath, see Goldschmidt, Atlas der Krystallformen, *Heidelberg*, 1913, **2**, pl. 77, fig. 1395.

[11] Vrba, *ibid.*, pl. 79, fig. 1424.

[12] Rath, *ibid.*, pl. 86, figs. 1510-1511.

[13] Duffour, *Bull. Soc. Fran. de Min.*, **46**, 95-101, 1923.

[14] Penfield and Ford. *Amer. J. Sci.* [4], **9**, 352-354, 1900.

A PECULIAR MANGANIFEROUS SERPENTINE FROM FRANKLIN FURNACE[1]

Earl V. Shannon, *U. S. National Museum*
and
Esper S. Larsen, *Harvard University*

Some two years ago a specimen of a peculiar red-brown mineral was sent to Professor Larsen for identification by Col. Roebling. Although this material superficially resembled garnet its optical properties were such that it could not be that mineral and, at the request of Professor Larsen, Mr. Shannon agreed to analyze the mineral and Colonel Roebling gave his permission for the removal of enough material from the specimen for the analysis. The specimen, following the preliminary microscopic examination, was returned to Col. Roebling who, somewhat later sent it again to

[1] Published by permission of the Secretary of the Smithsonian Institution.

Mr. Shannon at the National Museum for chemical investigation. The small specimen was regrettably mislaid and has only recently been brought to light. The red-brown garnet-like appearing constituent has been separated by the use of heavy solutions and upon analysis has proven to be a manganiferous variety of serpentine of sufficient uniquity of composition, appearance, and optical properties to warrant the following brief description.

The specimen is a small flat piece which bears the following label, in Colonel Roebling's handwriting: "Unknown mineral from Franklin, 1890. Has been called massive garnet but is not that: W.A.R." In color the mineral is red-brown with a somewhat resinous luster and greatly resembles massive garnet. The fracture is imperfectly conchoidal and the material is rather hard, the hardness apparently being near that of apatite or 5.5. The material covers an area 3 by 4 centimeters to a depth of 5 millimeters and is found on a granular aggregate of franklinite, willemite, calcite and bronzy biotite. Although the color of the mineral in the specimen is distinctly red, the powder is golden brown with no red tint and, after ignition, this is changed to pale grayish brown. The crushed powder was purified by the use of methylene iodide-bromoform solutions and was found to vary somewhat in specific gravity. The lightest sample, which was proven pure by microscopic study, was used for the analysis and gave the following results:

Analysis of the Manganiferous Serpentine

SiO_2	41.32
Al_2O_3	0.65
FeO	1.57
MnO	7.57
ZnO	0.14
MgO	32.58
CaO	0.96
H_2O+	12.44
H_2O-	0.94
Total	98.17

The low summation doubtless indicates the presence of minor amounts of alkalies and possibly some other constituents not determined owing to scarcity of material. The composition is clearly that of a serpentine although the presence of nearly eight per cent of manganese oxide as an integral constituent is unique.

Optically the material presents the characters of a metacolloid but gives fair data. It is optically negative with $2V$ medium. The refractive indices are $\alpha=1.561$, $\beta=1.567$, $\gamma=1.568$. These data bring the mineral very close to bowlingite and antigorite in Larsen's tables which should have identified it as a serpentine had it not been for its unusual appearance and manganese reaction.

The writers' thanks are due Colonel Roebling for the privilege of investigating the material.

GEODE CONCRETIONS FROM THE BLACK HILLS, SOUTH DAKOTA

G. M. Schwartz, *University of Minnesota*

Introduction

In 1921, while on field work in the Black Hills with a class, the writer found a number of rather unique geode concretions, in some cases lined with amethystine quartz and various other minerals. In the spring of 1924, the spot was revisited during the annual field trip of the Department of Geology of the University of Minnesota. The occurrence seemed so unusual that the exposure was examined in detail and the concretions studied in the laboratory with the results noted. With the aid of the students several hundred concretions were obtained from the shale and the slopes below. These were broken and the best examples of each type retained for study.

Geologic Occurrence

The Black Hills represent the farthest east outliers of the Rocky Mountain system. They were formed by a domical uplift at the end of the Cretaceous which exposed all of the earlier formations from the granites and schists of the pre-Cambrian to the thick series of Cretaceous sediments. The concretions were found in the shale, which forms the lower part of the Englewood formation (Mississippian), on a bluff of the canyon of Whitewood Creek in the northwest quarter of Section 7, T. 5 N., R. 4 E. This is about three miles below Deadwood and nearly a mile east of the point where the creek bends away from the tracks of the Chicago and Northwestern railroad.