U. S. National Museum, who provided most of the crystals. This study is part of a program being conducted by the U. S. Geological Survey on behalf of the Division of Research, U. S. Atomic Energy Commission.

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NATIVE SELENIUM FROM GRANTS, NEW MEXICO*

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INTRODUCTION

In the course of working on a calibration curve for the determination of selenium by an *x*-ray spectroscopic method, a sample containing native selenium was encountered. This sample (No. 760) was collected from the Marquez mine of the Uranium Division, Calumet and Hecla, Inc., in Section 23, T.13N., R.9W., McKinley County, New Mexico, about 20 miles north of Grants.

OCCURRENCE

The native selenium occurs in a claystone gall in the Brushy Basin member of the Jurassic Morrison formation. The Brushy Basin member is generally subdivided into three parts (see Freeman and Hilpert, 1956). The upper part consists mainly of claystone and clayey sandstone. The middle part is largely poorly sorted fine to coarse sandstone with some claystone lenses and galls. The lower part is mostly claystone.

In the Poison Canyon area and in the vicinity of the Marquez mine, the sandstone of the middle part of the Brushy Basin member is usually called Poison Canyon sandstone by local persons. Poison Canyon is about 5 miles due West of the Marquez mine. "Poison Canyon sandstone" has not been accepted as an official stratigraphic name, although it has

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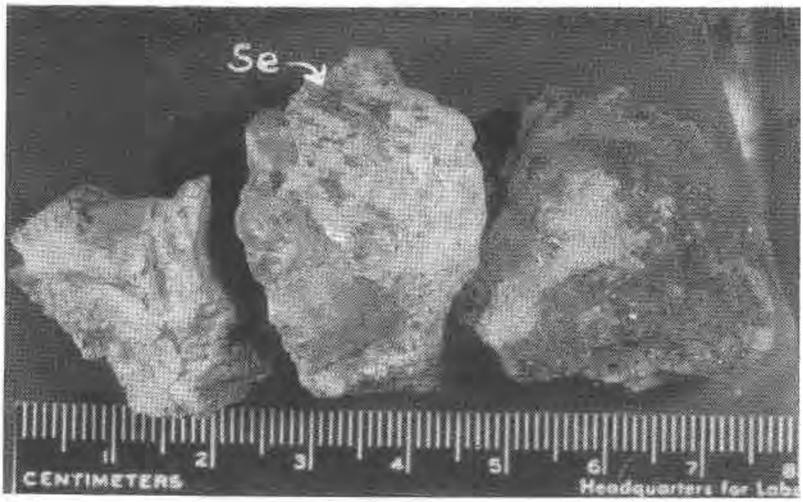

FIG. 1. Corrugated thin films of native selenium on slickensides of claystone gall in the so-called Poison Canyon sandstone, middle part of the Brushy Basin member of the Jurassic Morrison formation near Grants, New Mexico.

been used in many reports, such as those by Dodd (1956) and Hilpert and Freeman (1956).

The so-called Poison Canyon sandstone is the major uranium bearing sediment in the vicinity of Poison Canyon and the Marquez mine. The sandstone is predominantly medium to coarse grained. Minor seams of claystone and conglomerate occur between the sandstone beds. Claystone galls are found throughout the unit, but are generally found along bedding planes. Faults and fractures are not common at the Marquez

TABLE 1. *X*-RAY POWDER DIFFRACTION DATA OF NATIVE SELENIUM, NEAR GRANTS, NEW MEXICO

Radiation: CuKα=1.54178 Å; Camera dia.=114.59 mm.

d (Å)	I	*d* (Å)	I
3.79	7	1.43	2
3.00	10	1.38	<1
2.18	2	1.32	<1
2.07	5	1.18	1
1.99	3	1.12	1
1.77	4	1.08	<1
1.66	2	1.04	<1
1.51	2		

mine. There is, however, movement along some of the bedding planes and contacts. Slickensides are formed in these areas. One of the claystone (No. 760) was broken and thin films of native selenium were seen on the slickensides. Fig. 1 shows the selenium film on the slickensides. The selenium film is rather corrugated because it was deposited between the polished and striated surfaces of the slickensides. Numerous minute and fresh pyrite crystals appear in the claystone.

Identification

Some physical properties of the native selenium are as follows: Luster metallic, color grayish black; some with bluish tint. Because of this bluish tint, some thin films of the native selenium may be mistaken for molybdenite. Streak grayish black. Some of the thinnist fragments are brownish red in transmitted light. The x-ray powder diffraction data are listed in Table 1.

Acknowledgment

The permission of the Uranium Division, Calumet and Hecla, Inc., to publish this geological note is gratefully acknowledged.

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SIMPLE TECHNIQUE FOR THE CONSTRUCTION OF POLYHEDRAL STRUCTURE MODELS

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When complex crystal structures are studied the visualization of the structures requires good structure models. The standard ball models help this visualization, but they are often either too expensive to purchase or too time-consuming to construct. Most structures, however,

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