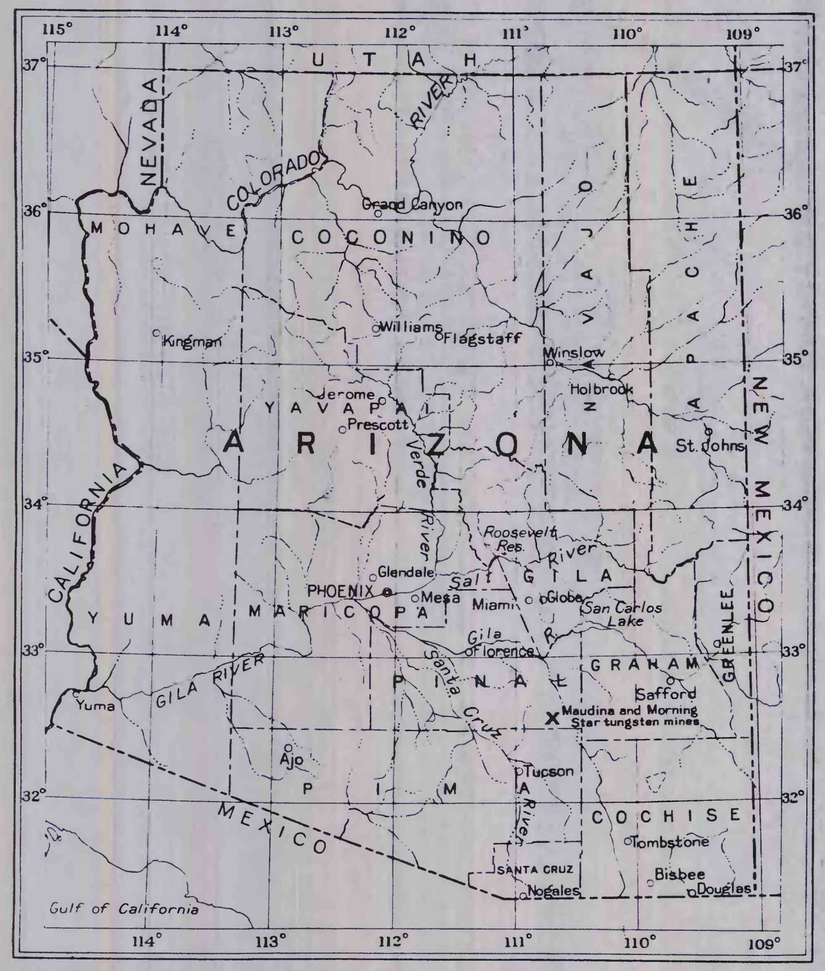

FIGURE 1 INDEX MAP OF ARIZONA SHOWING LOCATION OF MAUDINA AND MORNING STAR TUNGSTEN MINES, PINAL COUNTY

MAUDINA AND MORNING STAR TUNGSTEN MINES,
PINAL COUNTY, ARIZONA

Deposits of scheelite (calcium tungstate) occur in silicified limestone breccia localized along the Mogul fault and its related structures at the Maudina and Morning Star mines, Pinal County, Ariz. The mines are in the northern part of the Santa Catalina Mountains, in the SW¼ sec. 17, T. 10 S., R. 16 E., Gila and Salt River Base and Meridian. The Pure Gold workings, the only active development on the Maudina property in January 1944, and the workings of the Morning Star mine are only 240 feet apart; both may be reached by 7 miles of fair gravel road from Oracle, Ariz.

The Morning Star mine was examined briefly in April 1943 by Konrad Krauskopf and Robert Stopper of the Geological Survey, United States Department of the Interior. In early January 1944, Paul C. Bateman and Max P. Erickson of the Geological Survey spent 3 days mapping and studying the deposits on both properties.

The principal geologic feature of this area is the Mogul fault which trends north of west across the Santa Catalina Range and brings Paleozoic and pre-Cambrian sedimentary and metamorphic rocks on the south into contact with pre-Cambrian granite on the north. The general dip of this fault is from 30° to 60° S. The fault includes many planes of movement over a wide area; the principal zone of brecciation is about 50 feet thick where it is exposed at the Pure Gold workings.

Scheelite mineralization occurs in silicified zones in a small body of limestone just south of the main fault zone. The limestone is bordered by pink quartzite on all sides except the northeast where it is cut off by the fault. Although the contact between the limestone and the quartzite is nowhere exposed, it seems probable that parts of it are faulted, especially to the south. The limestone is fine-grained and locally dolomitic. In most places bedding is not recognizable, but on the ridge southwest of the Pure Gold workings traces of bedding appear to strike N. 20° W. and to dip 75° E.

The Maudina property is owned by the Campo Bonito Tungsten Mines Company, Inc., and was operated in January 1944 by Edward H. Molson, in association with E. J. Ewing and I. M. McKinley, under lease and option from this company. A substantial amount of scheelite ore was produced during the first World War from old workings about 1,000 feet northeast of the Pure Gold development.

The deposit on the Pure Gold claim was discovered in the summer of 1943. Workings on this claim consist of an open cut, from which all the ore mined by January 1944 was produced; a 120-foot adit; and several trenches. Most of the ore was shipped to the Metals Reserve Company stockpile at Phoenix, Ariz. Molson planned, however, to ship the ore to the Hilton-Jacobs custom mill at Tucson as soon as reconstruction of that mill, in progress in January 1944, was completed.

During the latter part of December 1943 and in January 1944, more than 340 tons of ore containing at least 2.0 percent of WO_3 was shipped from the Maudina mine to the Metals Reserve Company stockpile at Phoenix. The rate of production in January 1944 was 24 tons of ore per day.

The Pure Gold ore body is localized in silicified breccia in the principal Mogul fault zone. The ore body appears to dip with the fault about 40° to 50° S. The ore zone ranges from 5 to 40 feet in width at the surface where it is exposed for a length of about 200 feet. It may continue under alluvium to the south and connect with a mineralized breccia exposed near the portal of the lower adit on the Morning Star property.

The 120-foot adit barely reaches the downward extension of the mineralized zone, 50 feet below the level of the open cut (section A-A'). Only a trace of scheelite appears under ultraviolet light in the face of the adit, and samples taken by B. R. Prisbie of the Reconstruction Finance Corporation contained only 0.14 and 0.05 percent of WO_3. The adit, however, does not penetrate the mineralized zone far enough to permit adequate sampling on this level.

About 300 tons of ore may be assumed per foot of depth, and the ore body may be expected to continue downward for at least 15 feet beneath the floor of the cut. On the further assumption that the grade of ore remains constant, this block consisting of 4,500 tons would contain 9,000 units of WO_3. Available information gives no basis for estimating how far the ore may persist below this depth.

The Morning Star mine, owned by Mrs. Elizabeth Lambert Wood, was leased in January 1944 by the Morning Star Mining Company which acquired the lease from the Fortuna Mining Company in August 1943. Total production from the Morning Star mine since 1940 amounts to an estimated 1,450 units of WO_3. The ore was treated in a small gravity mill about 1½ miles from the mine.

All the ore produced was mined from a glory hole and some small stopes west of the glory hole. Other workings comprise a haulage level for the glory hole and stopes, a 23-foot shaft, a 120-foot adit, and several small pits. In January 1944, the 120-foot adit was being extended to cut the ore zones in the glory hole at a depth of 60 feet below the bottom of the glory hole.

Scheelite in the glory hole and stopes is erratically distributed in an irregular, elongate body of silicified limestone that trends northeast. Large crystals of scheelite are concentrated along two faults which strike at right angles to each other, cutting the silicified limestone (Morning Star glory hole level, fig. 2). The northwest-trending fault, along which some post-mineral movement took place, offsets the southwest-trending fault about 10 feet. Under ultraviolet light, the ore along the faults appears in places to contain as much as 10 percent of WO_3 across widths of from 0.5 to 2.0 feet, although in most places the grade is not over 1 percent of WO_3. In the remainder of the silicified zone, scheelite is sparsely disseminated.

A 5-foot layer of silicified limestone breccia near the portal of the lower adit contains substantial amounts of scheelite so fine-grained that the WO_3 content is difficult to estimate under ultraviolet light. This zone may be a continuation of the ore zone on the Pure Gold claim. The first 60 feet of the adit is also in silicified limestone that contains little scheelite.

Reserves of ore beneath the glory hole and stope with at least 1.0 percent of WO_3 may amount to 2,000 to 3,000 tons. The extension of the Pure Gold ore zone may also contain reserves of commercial ore, but there was not sufficient information in January 1944 on which to base an estimate of its amount or grade.

The Mogul fault zone is believed to offer opportunities for further exploration which might lead to the discovery of additional ore bodies. The most favorable areas are those where limestone is adjacent to the fault.

MAUDINA AND MORNING STAR TUNGSTEN MINES, PINAL COUNTY, ARIZONA