STUDIES RELATED TO WILDERNESS
PRIMITIVE AREAS

BLACK RANGE, NEW MEXICO

GEOLOGICAL SURVEY BULLETIN 1319-E

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Mineral Resources of the Black Range Primitive Area, Grant, Sierra, and Catron Counties, New Mexico

By GEORGE E. ERICKSEN, HELMUTH WEDOW, JR., *and* GORDON P. EATON, U.S. GEOLOGICAL SURVEY, *and by* GEORGE R. LELAND, U.S. BUREAU OF MINES

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An evaluation of the mineral potential of the area

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STUDIES RELATED TO WILDERNESS

PRIMITIVE AREAS

In accordance with the provisions of the Wilderness Act (Public Law 88-577, Sept. 3, 1964) and the Conference Report on Senate bill 4, 88th Congress, the U.S. Geological Survey and the U.S. Bureau of Mines are making mineral surveys of wilderness and primitive areas. Areas officially designated as "wilderness," "wild," or "canoe," when the act was passed were incorporated into the National Wilderness Preservation System. Areas classed as "primitive" were not included in the Wilderness System, but the act provides that each primitive area be studied for its suitability for incorporation into the Wilderness System. The mineral surveys constitute one aspect of the suitability studies. This bulletin reports the results of a mineral survey in the Black Range Primitive Area and vicinity, New Mexico. The area discussed in this report includes the primitive area as defined and bordering areas that may come under discussion when the area is considered for wilderness status or that provides geologic perspective of the area.

This bulletin is one of a series of similar reports on primitive areas.

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MINERAL RESOURCES OF THE BLACK RANGE PRIMITIVE AREA, GRANT, SIERRA, AND CATRON COUNTIES, NEW MEXICO

By GEORGE E. ERICKSEN, HELMUTH WEDOW, JR., and GORDON P. EATON, U.S. GEOLOGICAL SURVEY, and GEORGE R. LELAND, U.S. BUREAU of MINES

SUMMARY

A mineral appraisal and geologic studies were made of the Black Range Primitive Area, southwestern New Mexico, as part of broad investigations of wilderness and primitive areas of the United States. The region on which this report is based is in the central part of the Black Range and comprises a total area of about 565 square miles, of which 265.6 square miles is in the established Black Range Primitive Area, and the remainder in the contiguous area. The Black Range is in the Basin and Range physiographic province and is at the eastern side of the Mogollon Plateau. No commercial or potentially commercial mineral deposits were found in the primitive area, but the area is near the well-known Silver City-Santa Rita mining district, and a possibility for existence of buried ore deposits cannot be eliminated. Many small ore deposits occur along the eastern and southern sides of the area studied, within a few miles of the primitive area boundary.

The mineral resources of the Black Range Primitive Area and the surrounding area were appraised by systematic geochemical sampling of stream sediments and rocks, by search for visible altered and mineralized zones, by geologic mapping to locate favorable host rocks and structural features, and by an aeromagnetic survey to locate magnetic mineral deposits of buried structures such as faults and intrusive bodies that might be related to mineral deposits. About 2,000 samples of stream sediments and rocks were collected, each of which was analyzed. All rocks showing evidence of hydrothermal alteration or other evidence of mineralization were studied and sampled with particular care. More than 1,000 miles of foot and horseback traverses were made. A helicopter was utilized to visit some of the more inaccessible areas.

The Datil Formation unconformably overlies the andesite sequence of early Tertiary age at some places, marine sedimentary rocks of Paleozoic age at others, and igneous and metamorphic rocks of Precambrian age at still other places. The Datil volcanic rocks are overlain locally by a unit of basaltic andesite and by the Gila Conglomerate and Santa Fe Formation of late Ter-

tiary and Quaternary age. The Datil Formation consists of many discontinuous mappable units of rhyolite and quartz latite ash-flow tuffs and lava flows and andesite to latite lava flows. The maximum aggregate thickness of the Datil Formation is about 14,000 feet, but no single unit is continuous over the entire area, and the maximum thickness at any one place in the primitive area is estimated to be less than 5,000 feet. The early andesite sequence, which crops out in the eastern part of the area, is about 2,000 feet in maximum thickness, whereas the basaltic andesite is about 600 feet. Precambrian and Paleozoic rocks crop out in a narrow belt in the southeastern part of the area. The Paleozoic sedimentary rocks comprise each Paleozoic system and have an aggregate thickness of about 2,400 feet in the area studied. However, these rocks have been faulted and eroded so that a complete stratigraphic section is not present at any one locality. Granite and hornblende-chlorite schist of Precambrian age are the basement rocks of unknown thickness.

The major structural features are a broad north-trending elongated dome, which is centered in the outcrop area of the Kneeling Nun Tuff Member of the Datil Formation and many north-trending steeply dipping faults that are most numerous and persistent near the eastern side of the area. Layering in the volcanic rocks is nearly horizontal along the crest of the dome and generally dips 5°–15° on the limbs. Many of the faults can be traced for several miles, but maximum displacements on most of them are estimated to be only a few hundred feet.

The aeromagnetic map shows anomalous features that are probably related to buried structural features, but it is not possible to estimate whether any of these structures have associated mineral deposits. The most distinctive feature of the aeromagnetic map is a pronounced magnetic low in the southern third of the map area. This low extends over the outcrop area of the Kneeling Nun Tuff Member, and is bordered by steep magnetic gradients on two sides which shows a complex internal pattern of elongate positive and negative magnetic anomalies.

The geologic and aeromagnetic characteristics of the area of outcrop of the Kneeling Nun suggest that this area may be a resurgent dome in a cauldron that was a major eruptive center of the Kneeling Nun. The aeromagnetic low may be due to a cauldron fill of weakly magnetic rocks such as rhyolite tuff in more strongly magnetic rocks such as the andesite of early Tertiary age. The faults on the eastern side of the map area may be due in part to cauldron collapse during and after eruption and thus mark the cauldron border. The steep magnetic gradients at the northern and western borders of the pronounced magnetic low also may indicate the walls of the cauldron.

No minable mineral deposits were found in the primitive area, and it is concluded that such deposits do not occur in the volcanic rocks of the Datil Formation in this area. On the other hand, minable mineral deposits occur in an early Tertiary andesite sequence that underlies the Datil and in Paleozoic and Precambrian rocks in nearby areas, and similar deposits may occur in these rocks beneath the Datil volcanic rocks in the primitive area. The known distribution of fossil fuels—oil, gas, and coal—in southern New Mexico and the degree of volcanism and faulting in the Black Range indicate that it is unlikely that fuel resources exist in sedimentary rocks in or near the Black Range Primitive Area.

INTRODUCTION

LOCATION AND ACCESSIBILITY

The Black Range Primitive Area is in the Gila National Forest of southwestern New Mexico and extends over the middle part of the Black Range, a major north-south-trending mountain range west of the Rio Grande Valley (fig. 1). It lies along the boundary between

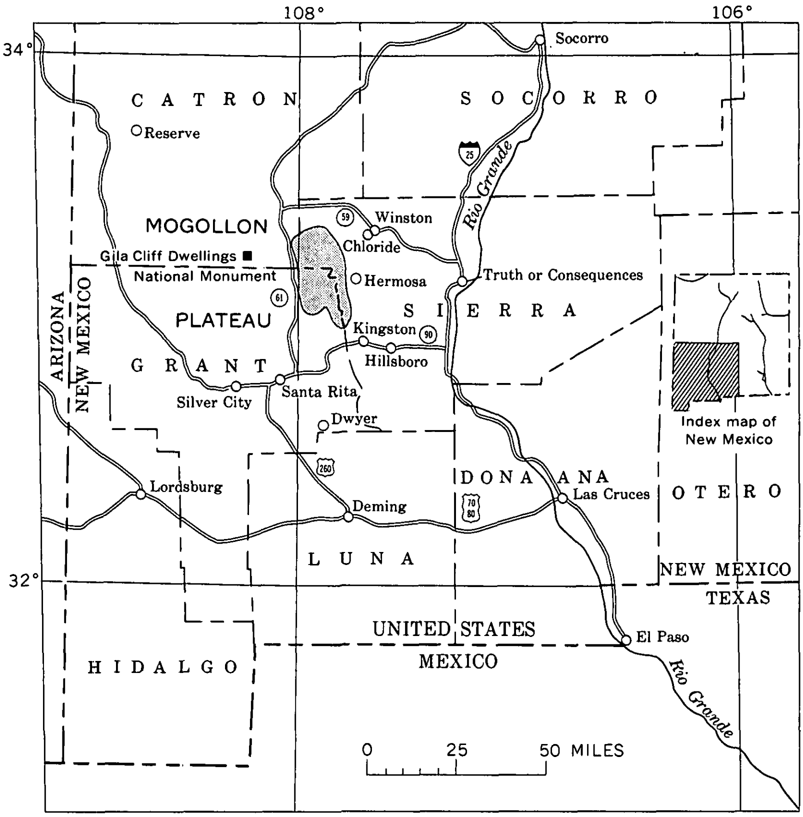

FIGURE 1.—Index map showing location of the Black Range Primitive Area (shaded), New Mexico.

Grant and Sierra Counties, which follows the crest of the Black Range throughout most of the area; the northwesternmost corner of the primitive area extends into Catron County. The area mapped and discussed in the present report, referred to as the map area, study area, or the Black Range area, is about 30 miles long and 13–24 miles wide (fig. 2). It covers an area of about 565 square miles, comprising 265.6 square miles or 169,984 acres of the officially

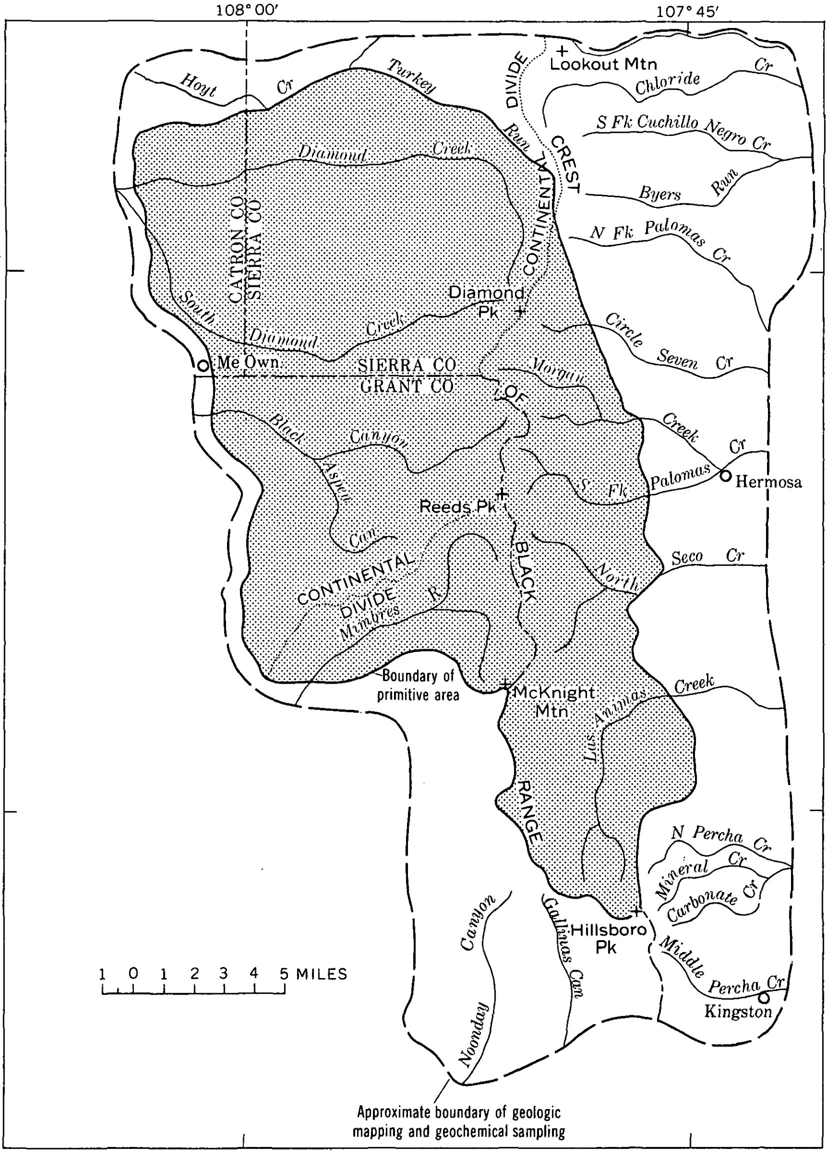

FIGURE 2.—Index map showing the Black Range Primitive Area (shaded) and approximate boundary (dashed line) of the study area.

designated Black Range Primitive Area, and about 300 square miles of surrounding area. The study of part of this surrounding area was requested by the U.S. Forest Service; part of this area was selected for study because it contained known mineral deposits in a geologic environment that could be compared with a similar environment in parts of the primitive area.

The principal nearby towns are Silver City, about 30 miles southwest of the primitive area, and Truth or Consequences, a similar distance to the east (fig. 1). Access to the primitive area is by State Highway 90, which passes along the southern border of the area, and by State Highway 59, which crosses the Black Range several miles north of the area. Both highways are paved. State Highway 61, which extends along the western border of the area, is a graded dirt road except for a paved section at the southern end. A dirt road extends from Winston to Hermosa on the eastern side of the area, and another dirt road extends several miles north from Kingston; other roads approach the edge of the primitive area at several other localities.

Although lacking roads, the Black Range Primitive Area has a well-developed trail system that has been built up over the years by the U.S. Forest Service. The trails furnish access to most of the area. However in some areas, trails are few and are difficult to maintain, particularly in the deeply dissected terrain on the east side of the Black Range, and access is difficult.

Winston (formerly Fairfield), Chloride, Hermosa, and Kingston are former mining settlements near the east side of the primitive area. They date from the boom mining days of the latter part of the last century. During peak years of mineral production, each of these settlements had several hundred to several thousand inhabitants. Now they have only a few buildings and a few inhabitants. Kingston and Winston each have several families in permanent residence, and in 1969 Winston had a small boom because of renewed interest in nearby mines. Two or three families were living in Chloride, and Hermosa had been taken over by the Ladder Ranch as a local headquarters.

TOPOGRAPHY AND DRAINAGE

The Black Range Primitive Area is a deeply dissected mountainous area in one of the major north-trending mountain ranges of southwestern New Mexico. The Black Range forms the eastern mountainous rim of the Mogollon Plateau. South of the area, the Black Range merges with the Mimbres Mountains; northward it becomes progressively less rugged and finally dies out between the San Mateo Range on the east and the Luera Range to the northwest, south of the San Augustin Plains. The Continental Divide extends through the primitive area, following the crest of the Black Range for part of the distance (fig. 2). The crest of the range is a sinuous, sharp ridge generally ranging from 9,000 to 10,000 feet in altitude.

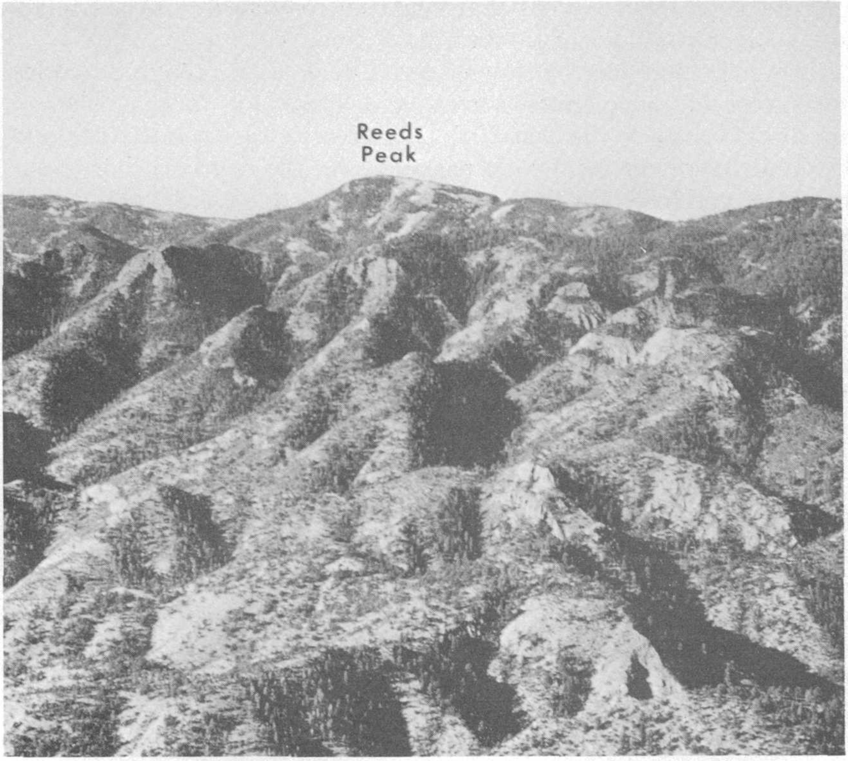

FIGURE 3.—Aerial photograph of east side of the Black Range near Reeds Peak, showing deeply dissected terrain in poorly layered ash-flow tuff of the Kneeling Nun Tuff Member.

The highest peaks along the crest, from north to south, are Diamond Peak (9,850 feet), Reeds Peak (10,015 feet), McKnight Mountain (10,165 feet), and Hillsboro Peak (10,011 feet) (fig. 2).

In the primitive area, the Black Range has an asymmetrical profile—a relatively steep eastern slope and a gentle western slope. The eastern slope is deeply dissected by sharp valleys that separate narrow ridges and peaks (fig. 3). The western side of the range is marked by deep steep-sided valleys separated by broad ridges that slope gently to the west. Stream valleys at the eastern border of the primitive area range from about 6,000 to 6,400 feet in altitude; they are somewhat higher at the western border and range from about 6,700 to 7,000 feet.

Three main drainage systems originate in the Black Range. Streams west and north of the Continental Divide (fig. 2) flow into the Gila River and southwesterly through the Mogollon Plateau, which is within the Pacific drainage. Streams east of the crest of the Black Range drain into the Rio Grande River and the Gulf of Mexico. Streams in the southwestern part of the primitive area drain into the Mimbres River, which flows into a closed basin in southern New Mexico.

Most of the streams of the Black Range Primitive Area are intermittent. Only segments in the upper regions, not necessarily the headwaters, of the following major streams have permanently flowing water: Diamond Creek, South Diamond Creek, Black Canyon, Mimbres River, and Las Animas Creek.

CLIMATE AND VEGETATION

The differences in altitude of from 3,000 to 4,000 feet between the crest of the Black Range and the borders of the area give rise to considerable variation in climate and vegetation. Annual rainfall in the primitive area ranges from about 16 inches in the lower altitudes along the borders to about 30 inches in the higher altitudes along the crest of the range. Most rainfall is during July and August; snow falls mainly during the period December to February. Snow may start to accumulate in the higher altitudes in November, and if snowfalls are heavy, snowdrifts may remain along the crest of the Black Range until early June. June is a month of violent thunderstorms and little rain and is the time of greatest fire hazard in the area. It is not uncommon at this time for lightning to set several fires during a single brief thunderstorm.

Although freezing temperatures may occur at any time of the year in the high altitudes, days and nights are generally frost free during June to September. In the summer, nights are pleasantly cool and days not uncomfortably hot, so that a visit to this area is a pleasant relief from the sweltering 100°+F summer heat in the Rio Grande Valley to the east.

Three vegetation types or zones (Little, 1950, p. 6) can be recognized at different altitudes in the Black Range Primitive Area: (1) Piñon-juniper woodlands in the bordering areas at altitudes from 6,000 to 8,000 feet, (2) ponderosa-pine forest in intermediate altitudes of about 8,000–9,000 feet, and (3) Douglas-fir forest at altitudes above 9,000 feet. The three types grade into each other and a given type may be at higher or at lower altitudes on comparatively dry ridges or in wet valleys.

The piñon-juniper woodlands are dominated by piñon pine (*Pinus edulis* Engelm.), alligator juniper (*Juniperus deppeana* Steud.), one-seed juniper (*Juniperus monosperma* Sarg.), and Utah juniper (*Juniperus osteosperma* Little). Several species of oak also are widespread in the woodlands. The ponderosa-pine forest corresponds to the Transition Life Zone (Little, 1950, p. 6) and is a gradational zone between the above woodlands and the Douglas-fir forest. Ponderosa pine (*Pinus ponderosa* Laws) is the dominant species of this zone. However, ponderosa pine is found throughout the primitive area, from stream bottoms along the borders to the crest of the Black Range. The Douglas-fir forest, characteristic of the upper altitudes, is best displayed in protected areas near the crest of the Black Range and in either valley headwaters or the more broad undulating segments of the crest. The trees of this forest type in the Black Range include Douglas fir (*Pseudotsuga taxifolia* Britton), Engelmann spruce (*Picea engelmanni* Parry), Rocky Mountain white pine (*Pinus strobiformis*), blue spruce (*Picea pungens* Engelm.), white fir (*Abies concolor* Hoopes), and alpine fir (*Abies lasiocarpa* Nutt). At many places, this forest is interrupted by stands of large (as much as 2 feet in diameter) quaking aspens (*Populus tremuloides* Michx.), which also are found in groves along many valley bottoms at lower altitudes.

Many other types of shrubs and trees also are present in the area, some of which serve as important food sources for wildlife. Only a few are mentioned. Several species of oaks are abundant throughout the area, and acorns are an important wildlife food supply. Arizona walnut trees are widespread in many canyon bottoms. Areas that have been burned over or that have poor rocky soil may have dense growths of shrubs; of these, mountain mahogany is an abundant and important source of browse for wild animals. Burned-over areas near the crest of the range have thick stands of New Mexican locust, a thorny shrub or small tree, which are virtually impenetrable to a man on foot or on horseback. The locust covers extensive areas along the crest south of McKnight Mountain, the area of the destructive McKnight fire of 1951.

ARCHEOLOGY

Although the Indians roamed and hunted in the Black Range for many hundreds or even thousands of years, evidently they never developed large permanent settlements in this area as they did in the Gila country to the west, where the well-known Gila Cliff Dwellings are (fig. 1). In the course of the present study, artifacts were found in caves on Diamond Creek (at the site marked "B Ranch" in pl. 1), on South Diamond Creek near Me Own Hill, and in Buckhead Canyon, a tributary of Aspen Canyon (pl. 1). The largest cave in the area, which may have been a permanent camp for several families, is on Taylor Creek near Wall Lake, near the northwestern corner of the area. Pictographs are preserved in canyon walls of Chloride Creek in the northeastern part of the area.

PREVIOUS GEOLOGIC INVESTIGATIONS

Reports describing the geology and mineral deposits of the Black Range Primitive Area are few, whereas those describing nearby areas are numerous, and only a few can be mentioned here. Hill (1921) first described the tin deposits on Taylor Creek near the northwest corner of the primitive area (pl. 1). The Black Range or Taylor Creek tin district, which extends for many miles north of Taylor Creek, was described by Fries (1940) and by Volin, Russell, Price, and Mullen (1947). The geologic map by Fries (1943) covers part of the area north of South Diamond Creek and west of the crest of the Black Range (fig. 2). This map was utilized in preparation of the geologic map (pl. 1) for the present report. Fries, Schaller, and Glass (1942) described the topaz-bearing rhyolites of Round Mountain (pl. 1). The geologic map of the Alum Mountain quadrangle (Willard and others, 1961) includes a small part of the eastern side of the primitive area. Kuellmer (1954) presented a strip map and described the geologic section along State Highway 90 at the southern end of the map area. The geologic map of the Hillsboro Peak quadrangle (Kuellmer, 1956) includes that part of the Black Range Primitive Area south of lat 33° N. (pl. 1). These maps of Kuellmer were utilized in preparing plate 1 of the present report.

The mining districts along the eastern and southern borders of the primitive area were described by Lindgren, Graton, and Gordon (1910) in their monograph on the mineral deposits of New Mexico and by Harley (1934) in a report describing the mineral deposits of Sierra County. Jahns (1955, 1957) and Jicha (1954) described the mineral deposits of the Hermosa area (fig. 2). Kelley and Branson (1947) described the moonstone pegmatites of Rabb Park, near the southwestern corner of the map area (pl. 1).

The regional geologic setting of the Black Range Primitive Area is shown by the geologic map of southwestern New Mexico (Dane and Bachman, 1961) and by the geologic map of New Mexico (Dane and Bachman, 1965). Geologic studies of quadrangles in areas west and south of the primitive area, which have been useful for correlation purposes, are as follows: Elston (1957), Dwyer quandrangle; Jicha (1954a), Lake Valley quadrangle; Jones, Hernon, and Moore (1967), Santa Rita quadrangle; and Pratt (1967), Hurley West quadrangle. Several general or summary reports on this part of New Mexico were of aid in understanding the regional geologic setting and in correlating the rocks in the primitive area. Among these are reports on the following: the Paleozoic and Mesozoic rocks of southwestern New Mexico by Kottlowski (1960, 1963, 1965); the volcanic rocks of the Mogollon Plateau by Elston (1964, 1965, 1968), Elston and Coney (1967), and Elston, Coney, and Rhodes (1968); and the age of volcanic rocks and mineralization in southwestern New Mexico by Kottlowski, Weber, and Willard (1969).

PRESENT INVESTIGATIONS

The primary objectives of our investigations were to determine whether mineral deposits exist at or near the surface in or near the Black Range Primitive Area and to evaluate the potential for mineral deposits in rocks of early Tertiary, Paleozoic, and Precambrian age that are largely covered in the primitive area. The fieldwork centered around systematic geochemical sampling of stream sediments and rocks and around a search for zones of hydrothermally altered rocks or other surface manifestations of mineralization. As part of the work, a reconnaissance geologic map of the area was prepared as an aid to evaluating the mineral potential. The geochemical sampling and geologic mapping were carried into mining districts along the eastern side of the area for comparison with results of sampling and mapping within the primitive area. An aeromagnetic map was made for the purpose of locating rocks or structural features that might be related to buried mineral deposits.

The geologic investigations were carried out by Ericksen and Wedow during four field sessions, fall and spring, starting in October 1967 and ending July 1969; total field time was about 7 months. Investigation of mining-claim locations and evaluation of the local mining industry were made by Leland. All three of these authors collaborated in study and evaluation of known mineral deposits within the primitive area and in areas near its borders. Eaton interpreted the aeromagnetic data.

The study area is completely covered by vertical aerial photographs at scales of about 1:16,000, 1:33,000, and 1:39,000. With the exception of the northwesternmost corner, the area is covered by topographic maps by the U.S. Geological Survey at scales of 1:24,000 and 1:62,500. The entire area is covered with planimetric maps by the U.S. Forest Service, available at scales of 1 inch to the mile and 2 inches to the mile. The following topographic maps of the U.S. Geological Survey were utilized for field mapping and compilation of geological and geochemical information: 7½-minute quadrangle maps at the scale of 1:24,000 are Winston, Copperas Peak NE, Copperas Peak SE, Bonner Canyon, Reeds Peak, Sugarloaf Peak, Hay Mesa, Victoria Park, and Apache Peak; 15-minute quadrangles at the scale of 1:62,500 are Lookout Mountain, San Lorenzo, and Hillsboro. The Forest Service map (1966 edition), scale of 1 inch to the mile, was used as the base for the geologic map (pl. 1) and the sample locality map (pl. 2).

ACKNOWLEDGMENTS

We wish to express our appreciation to the U.S. Forest Service staff, Gila National Forest, for their excellent cooperation in all phases of the work. We particularly wish to thank the following: Richard C. Johnson, forest supervisor; Jack M. Foster, fire control officer; Harry Sontag, recreation and lands officer, of the Silver City office; and the district rangers Kenneth J. Bowman of Beaverhead District, William L. Chapel of Black Range District, and Dickinson H. Pellissier of Mimbres District.

Many geologists have contributed to the study. Particular thanks are due Ing. Andres Jimeno, now Director of the Instituto Nacional de Investigaciones Geológico-Mineras, Colombia, who assisted during fieldwork in the fall of 1967 when he was a foreign inservice participant of the U.S. Geological Survey. We also wish to thank our colleagues in the U.S. Geological Survey, Kenneth C. Watts, who assisted during fieldwork of April-June 1968, and Sherman Marsh who assisted in June 1969. Watts also made part of the analyses shown in table 7, and Marsh made a special study of the quantity and quality of topaz in the topaz-bearing rhyolite of Round Mountain. Elwin L. Mosier was in charge of the mobile laboratory unit at Truth or Consequences during most of the work and made a large percentage of the spectrographic analyses.

The work has benefited by discussions with Prof. Wolfgang E. Elston, University of New Mexico, who has spent many years studying the volcanic rocks of southwestern New Mexico, and with James C. Ratté, U.S. Geological Survey, who has worked in areas west of the Black Range. Wallace R. Griffitts and Henry V. Alminas, U.S. Geological Survey, spent several days in the field introducing us to the geology and to the geochemical characteristics of the rocks of the region.

The investigation of mining claims was facilitated by the assistance of Lowell L. Patten, Paul McIlroy, and Frank E. Williams of the U.S. Bureau of Mines. This work was furthered by aid and information supplied by staffs of the U.S. Forest Service in Albuquerque and Silver City, the U.S. Bureau of Land Management, and the New Mexico Bureau of Mines and Mineral Resources.

Most of the geologic investigations were carried out with the aid of horses and by helicopter. We wish to thank Quentin T. Hulse, packer, for his unstinting efforts to make the work go smoothly and for the long hours he put in, far beyond the call of duty. Philip R. Craig was pilot and Charles S. Hanson, mechanic, during helicopter work in October-November 1968. In addition to their regular duties, they assisted in keeping our camp at Me Own (fig. 2) operating smoothly.

We are grateful to the many local residents for their cooperation and assistance, as follows: Jay Cox and Robert Fingado of Winston; Joe Mong, a former resident of Truth or Consequences; Roy Tirey and B. Franklin of Hillsboro; Don Cole of Kingston; and Ralph Barr and H. A. Wilmeth of Silver City. Special thanks are due Mr. Lee Wilson of Truth or Consequences for many courtesies, not the least of which was furnishing facilities and space for our mobile geochemical laboratory.

Owners and personnel of ranches at the borders of the Black Range Primitive Area were most cooperative in allowing us to camp on ranch lands and to keep horses in ranch corrals. We wish to thank the following: Oscar H. Black, owner of the Powderhorn Ranch; Frank Dines, owner of the Dines Ranch; Robert O. Anderson, owner, and Arthur Evans, foreman, of the Ladder Ranch; and John W. Donaldson, owner of the Diamond Bar Ranch.

GEOLOGY

The Black Range is covered largely with a thick sequence of Tertiary volcanic rocks, chiefly the Datil Formation, which also extend over the Mogollon Plateau and which are widespread in nearby areas of the southwestern United States. The range forms part of the mountainous rim of the Mogollon Plateau and is an upthrust block at the western side of the Rio Grande trough. It is within the Basin and Range physiographic province.

During recent years, there has been much speculation about the structure and origin of the Mogollon Plateau. It is certainly an area of major Tertiary volcanic eruptions, as indicated by the presence of two large cauldrons in the interior of the plateau—the Bursum cauldron and the Gila Cliff Dwelling cauldron (Elston and others, 1968, pl. 1). A third major eruptive center appears to be present in the Black Range, as first suggested by Kuellmer (1954). Elston and his coworkers (see Elston and others, 1968, p. 262) have suggested that topographically the Mogollon Plateau resembles certain craterlike areas on the Moon and on Mars and that these craters and the plateau have a similar origin. These authors (1968, p. 261) further speculate that the broad depression in the center of the plateau, the Gila Sag, represents a "volcanotectonic collapse structure" and that flow-banded rhyolite domes in the mountainous rim are related to a major ring-dike complex.

In the Mogollon Plateau and in the Black Range, the Datil Formation locally is overlain by basalt and basaltic andesite flows and by the Gila Conglomerate (Dane and Bachman, 1965). The Datil Formation rests unconformably on eroded older rocks, including volcanic rocks of early Tertiary age, sedimentary rocks of Mesozoic and Paleozoic age, and igneous and metamorphic rocks of Precambrian age. These older rocks are exposed east and south of the primitive area (pl. 1) and just south of the Mogollon Plateau to the west (Dane and Bachman, 1965).

PRECAMBRIAN ROCKS

Precambrian rocks are exposed only in the southeastern part of the map area (pl. 1). They consist of granite and hornblende-chlorite schist and are unconformably overlain either by Paleozoic sedimentary rocks or by the Tertiary volcanic rocks. The granite is light red to tan and gray and medium to coarse grained. It is cut by dark-green to black dikes of hornblende-chlorite schist, interpreted as metadiabase by Kuellmer (1954, p. 8). Irregular masses of similar rocks, as much as several hundred feet long, occurring within or along the border of the granite may be remnants of metamorphosed sedimentary or volcanic rocks. Contacts between granite and these masses tend to be gradational and show clear evidence of granitization.

Kuellmer (1954, p. 6–10) reported that the granite consists of perthite, quartz, lesser amounts of plagioclase and biotite, and minor amounts of magnetite, ilmenite, zircon, fluorite, and chlorite. The metadiabase consists chiefly of hornblende and chlorite and contains lesser amounts of biotite, magnetite, ilmenite, plagioclase, and epidote.

PALEOZOIC SEDIMENTARY ROCKS

Inasmuch as the Paleozoic rocks crop out sparingly within the primitive area (pl. 1), we did not attempt to study them in detail. The information presented here is largely from Kuellmer (1954, 1956) who studied the Paleozoic rocks in the southern part of the area and from Harley (1934), who described the Paleozoic rocks of Sierra County, including those exposed on the eastern side of the Black Range.

One or more stratigraphic units represent each Paleozoic system and have an aggregate maximum thickness of about 2,400 feet in the Kingston area. The formations recognized here are listed, and information about them is summarized in table 1. They are intensely faulted, and Kuellmer (1954, p. 11) did not find a complete or continuous sequence at any given locality in this area. The Paleozoic strata consist chiefly of carbonate rocks and lesser amounts of sandstone and shale. Limestone, dolomite, and sandstone are the dominant rock types of pre-Devonian age; limestone and shale characterize the younger rocks (Kuellmer, 1954, p. 27).

The Paleozoic rocks exposed in the northeastern part of the map area include the Magdalena Group and the overlying Abo Formation (Harley, 1934, p. 73). These rocks are faulted extensively and are covered by younger rocks, so that neither of the two formations is wholly exposed.

TABLE 1.—*Paleozoic rocks of the Kingston area, Black Range, N. Mex.*
[From Kuellmer, 1954, p. 11–27]

System	Formation	Thickness (feet)	Lithology
Permian	Abo Formation	700	Characteristic red color; shale with interbedded siltstone, sandstone, and conglomerate; few thin limestone layers.
Pennsylvanian	Magdalena Group	650	Gray to black thick- to thin-bedded fossiliferous cherty shaly limestone with interbedded shale; fossils chiefly brachiopods and fusulinid Foraminifera; basal shale unit 50 feet thick.
Mississippian	Lake Valley Limestone	140	Gray to black thick- to thin-bedded cherty limestone; in part shaly and fossiliferous; brachiopods, crinoids, trilobites, and Bryozoa common.
Devonian	Percha Shale	147	Consists of lower member of black fissile unfossiliferous shale and upper member of green, highly fossiliferous calcareous shale with nodules and thin beds of limestone; brachiopods, crinoid columnals, and Bryozoa most abundant.
Silurian	Fusselman Dolomite	85	Gray to brownish-gray and black fine-grained massive dolomite; contains thin beds of limestone and sparse nodules and lenses of gray chert.

TABLE 1.—*Paleozoic rocks of the Kingston area, Black Range, N. Mex.*—Cont.

System	Formation	Thickness (feet)	Lithology
Ordovician	Montoya Limestone	161	Gray to black thick- and thin-bedded cherty limestone and dolomite and interbedded calcareous siltstone; has basal unit of white coarse-grained sandstone; locally has distinctive chert layer 25–35 feet thick, of probable secondary origin.
	El Paso Limestone	280–300	Gray fine-grained slabby to massive bedded limestone with abundant yellow-brown siltstone partings.
Cambrian	Bliss Sandstone	85–201	Glauconitic and hematitic sandstone, siltstone, and shale; few thin layers of limestone, pebble conglomerate, and quartzite.

Jahns (1955, p. 3–4) reported that about 1,300 feet of Paleozoic sedimentary rocks is exposed in the canyon of the South Fork of Palomas Creek, just downstream from Hermosa. The lower part of the sequence is described as consisting of 550 feet of dolomite of Ordovician and Silurian age and of calcareous siltstone and dolomite of Devonian age. The upper and thicker part of the sequence consists of limestone and subordinate shale and siltstone of Mississippian and Pennsylvanian age.

Small outcrops of Paleozoic rocks are found at Las Animas Creek and in the Marshall Creek-Falls Gulch area (pl. 1). The Paleozoic rocks at Las Animas Creek crop out over an area of about a square mile. At the level of the creek the rock is brecciated, intensely silicified, and locally iron stained. Above this zone, it consists of thin- to medium-bedded blue-gray limestone containing productidlike brachiopods that indicate a late Paleozoic age and that perhaps the rocks are equivalent to the Lake Valley Limestone. In the vicinity of Marshall Creek-Falls Gulch are several small isolated outcrops of Paleozoic rocks, of which only the largest is shown on plate 1. The limestone outcrops are apparently the tops of old hills and ridges exposed by the erosion of the younger volcanic rocks. They are from a few tens to a few hundreds of feet in maximum length and consist of blue-gray thin- to medium-bedded limestone and massive light-gray to white crystalline limestone.

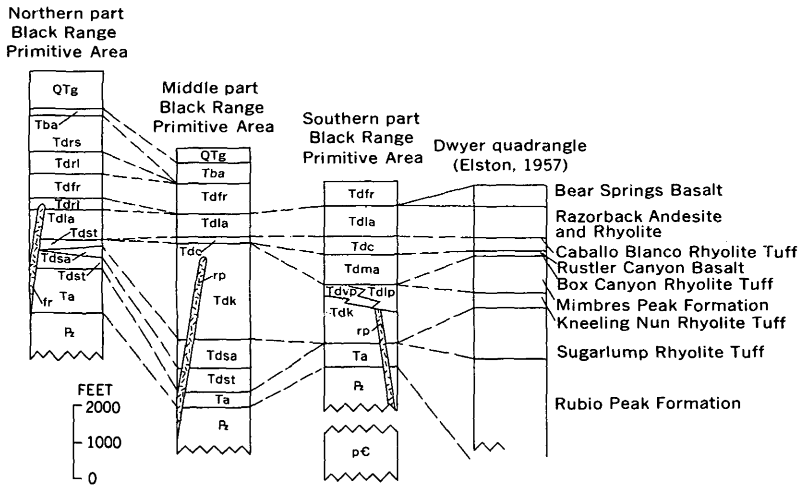

FIGURE 4.—Schematic columnar sections of Tertiary volcanic rocks in and near the Black Range Primitive Area, compared with a section in the Dwyer quadrangle, New Mexico (Elston, 1957). Letter symbols are the same as those used on plate 1.

TERTIARY VOLCANIC ROCKS

The volcanic rocks of Tertiary age, which cover most of the study area, have an aggregate maximum thickness of nearly 17,000 feet (table 2). However, none of the units shown in table 2 is continuous over the entire area (pl. 1), and the maximum thickness of the volcanic sequence at any one place in the area is probably less than 7,000 feet. Because of the complexity of the volcanic rocks and the limited time available for mapping, our knowledge of them is sketchy, and the geologic map (pl. 1) contains much interpretation.

Figure 4 depicts the stratigraphic relation of the volcanic units shown in table 2 and plate 1, together with the tentative correlation of these units with volcanic rocks in the Dwyer quadrangle (Elston, 1957), about 25 miles southwest of the Black Range Primitive Area.

The geologic map of New Mexico (Dane and Bachman, 1965) subdivides the volcanic rocks of the Black Range into three units: (1) A lower unit equivalent to the early andesite sequence of the present report, (2) the Datil Formation, which includes the bulk of the volcanic rocks discussed in this report, and (3) basalt and basaltic andesite flows, corresponding to the basaltic andesite flows of the present report, which overlie the Datil. The estimated maximum thickness of each of these units at any one place in our map

TABLE 2.—*Tertiary volcanic rocks in and near the Black Range Primitive Area, New Mexico*

Map unit (pl. 1)	Estimated maximum thickness (feet)	Remarks
Gila Conglomerate (QTg), Santa		
Basaltic andesite of Hodge Canyon (Tba).	600	Equivalent to Last Chance Andesite(?) (Ferguson, 1927, p. 16; Elston, 1968, p. 266, section 3).
Fe Formation (Tsf).	1,200	
Datil Formation:		
Tin-bearing rhyolite of Taylor Creek (Tdrs).	600	
Rhyolite of Diamond Creek (Tdrl).	1,000	
Flow-banded rhyolite of Rocky Canyon (Tdfr).	1,000	Locally interlayered with Tdrl unit.
Andesite of Aspen Canyon (Tdla)	1,000	
Caballo Blanco Rhyolite Tuff Member (Tdcr, Tdct)	600	Elston (1957, p. 30).
Andesite of Mimbres River-McKnight Mountain area (Tdma).	1,000	
Andesite flows and rhyolite tuff of Victoria Park Mountain (Tdvp)	1,400	Stratigraphic position uncertain.
Rhyolite of Moccasin John area (Tdmj).	1,000	Do.
Latite porphyry of Holden Prong (Tdlp).	1,500	
Kneeling Nun Tuff Member (Tdk)	3,000	Elston (1957, p. 25).
Rhyolite (Tdst) and andesite (Tdsa) of Hermosa area.	1,000	In part equivalent(?) to Sugarlump Tuff of Elston (1957, p. 23).
Early andesite sequence (Ta)	2,000	Early andesite sequence of Kuellmer (1954) and Rubio Peak Formation(?) of Elston (1957, p. 18).
Major unconformity		
Rocks of Precambrian and Paleozoic area.		

area is as follows: (1) Early andesite, 2,000 feet, (2) Datil Formation, 5,000 feet, and (3) basaltic andesite, 600 feet.

These volcanic rocks probably range from early to middle or late Tertiary age. The relative ages of some of the units mapped in the Black Range (pl. 1) can be deduced by correlation with rocks of the Mogollon Plateau and elsewhere in southwestern New Mexico for which radiometric age dates have been determined. An age of 43 m.y. (million years), equivalent to late Eocene, has been cited for the "older latite-andesite" of southwestern New Mexico

(Kottlowski and others, 1969, p. 279), which probably is equivalent to the early andesite sequence of the present report. The Datil volcanic rocks are reported by Kottlowski, Weber, and Willard (1969, p. 279) to range from 26 to 37 m.y. old, and this makes them Oligocene in age. These authors cite an age of 33 m.y. for the Kneeling Nun Tuff Member and 30 m.y. for the Caballo Blanco Rhyolite Tuff Member, both of which are part of the Datil. Basalt in the upper Santa Fe and Gila beds have been dated as being 6 m.y. old (Kottlowski and others, 1969, p. 279), or Pliocene in age.

GLOSSARY OF VOLCANIC ROCK TYPES

The volcanic rocks of the study area range from andesite to rhyolite, and five rock types are distinguished, which according to increasing silica contents, are as follows: (1) Basaltic andesite, (2) andesite, (3) latite, (4) quartz latite, and (5) rhyolite. These rocks are gradational from one to another, and their classification is commonly difficult or uncertain in the field. Chemical analyses, such as those shown in table 3, give the most reliable basis for classification. The rather simple classification of the volcanic rocks shown in this table is based on the amount of silica present and the relative amounts of K_2O and Na_2O. In contrast, the rocks shown in table 7 are based largely on field identification, wherein color and presence or absence of quartz, orthoclase, plagioclase, biotite, and olivine were taken into consideration in classifying the rock. In the field, dark-colored quartz-free rock was classified as andesite, or as basaltic andesite if it was dark gray to black and contained visible olivine or its alteration product, iddingsite; medium-light-colored (generally pale-red or medium-gray) quartz-free plagioclase- and orthoclase-bearing rock was classified as latite; light-colored (white to light-gray, pale-red, and yellow-brown) quartz- and feldspar-bearing rock was classified as rhyolite. No attempt was made to distinguish between quartz latite and rhyolite in the field; the two rocks are similar in appearance and are classified as rhyolite in table 7.

The general characteristics of each of the five rock types distinguished in the present report are described below. The color terms used here and elsewhere in this report for describing the volcanic rocks generally follow usage in the Rock-Color Chart of Goddard and others (1948).

Basaltic andesite.—In this report, basaltic andesite is considered to be a dark-colored andesite containing as much as 58 percent SiO_2 (table 3). It is a dark-gray to brownish-black fine-grained olivine-bearing commonly vesicular flow rock typical of the younger volcanic unit (Tba, pl. 1), but it also occurs in some of the older volcanic rock units. The basaltic andesite generally contains sparse phenocrysts of olivine, commonly altered to red-brown iddingsite, and plagioclase feldspar. It is intermediate in composition to andesite, described below, and basalt which is a very dark gray to black volcanic rock containing less than 52 percent SiO_2. Basalt does not occur within the Black Range study area, but it does occur in nearby areas as flows in the Gila Conglomerate.

Andesite.—Andesite, as classified in table 3, contains 58–64 percent SiO_2 and more Na_2O than K_2O. The principal mineral is andesine, but pyroxene, hornblende, and magnetite commonly are also present. The andesite of the Black Range is predominantly dark gray, but locally it shows shades of green, brown, and red. Dense fine-grained massive andesite flows are widespread; flow breccia, agglomerate, and tuff also are present. Sparse small phenocrysts of plagioclase feldspar and augite or hornblende generally are present. Porphyries containing abundant plagioclase phenocrysts are rare.

Latite.—As classified in table 3, latite contains SiO_2 in amounts similar to andesite but has near-equal amounts of Na_2O and K_2O. Latite generally occurs as a fine-grained to porphyritic flow rock in the Black Range. Principal minerals of the latite are plagioclase feldspar, alkali feldspar, hornblende, and biotite; typical colors range from pale red to medium dark gray. Many dark-colored fine-grained latites are difficult if not impossible to distinguish from andesite in hand specimen, and some of the rock classified as andesite in table 7 is undoubtedly latite. Similarly, some rock called latite in table 7 may be andesite.

Quartz latite.—Rock designated as quartz latite in this report ranges from about 66 to 69 percent SiO_2 and has Na_2O about equal to K_2O. In the Black Range, quartz latite is typically a pale-red crystal-rich ash-flow tuff or porphyritic flow rock that resembles rhyolite. Phenocrysts, which commonly make up 30–50 percent of the rock, are chiefly plagioclase feldspar, alkalic feldspar (generally sanidine), and quartz, with lesser amounts of biotite. The Kneeling Nun Tuff Member consists chiefly of quartz latite ash-flow tuff. Because of the difficulty of distinguishing them in the field, some of the quartz latite is referred to as rhyolite in the present report. In table 7, quartz latite is included with rhyolite.

Rhyolite.—Rhyolite contains more than 66 percent SiO_2 and has more K_2O than Na_2O. In the Black Range, rhyolite is white to pale red, tan, and medium gray; principal phenocrysts are sanidine, quartz, and biotite; and the groundmass is glassy to very fine grained. Flow-banded rhyolite (Tdfr, pl. 1), porphyritic rhyolite

TABLE 3.—*Chemical analyses, water content, and normative*

[U.S. Geol. Survey analysts: L. Artis, S. Botts, G. Chloe, P. Elmore, J. Glenn, J. Kelsey, and supplemented by

Field No.[1]	244	495	518	594
Sample	1	2	3	4
				Chemical analyses, recalculated
SiO_2	65.20	66.90	69.02	68.12
Al_2O_3	17.34	17.29	17.03	16.95
Fe_2O_3	4.26	2.24	2.55	2.45
FeO	.18	.33	.31	.41
MgO	.86	.94	.35	.63
CaO	2.53	3.05	2.04	2.35
Na_2O	4.77	4.68	3.77	4.29
K_2O	3.75	3.76	4.18	3.98
TiO_2	.76	.52	.54	.52
P_2O_5	.28	.22	.15	.23
MnO	.06	.08	.07	.06
CO_2	<.05	<.05	<.05	<.05
				Water content, reported
H_2O-	0.33	0.29	0.68	1.0
H_2O+	1.0	.71	1.1	.90
				Norms (weight
Quartz	17.2	18.0	26.6	22.6
Corundum	1.5	.5	3.0	1.9
Orthoclase	22.2	22.2	24.7	23.5
Albite	40.3	39.6	31.9	36.3
Anorthite	10.7	13.7	9.1	10.1
Wollastonite	.....	.....	.....	.....
Enstatite	2.1	2.3	.9	1.6
Ferrosilite	.....	.....	.....	.....
Magnetite	.....	.....	.....	.007
Hematite	4.3	2.2	2.5	2.4
Ilmenite	.5	.9	.8	1.0
Rutile	.5	.06	.1	.....
Apatite	.7	.5	.4	.6
Calcite	.....	.....	.....	.....

Field No.[1]	531	421	434	442
Sample	13	14	15	16
				Chemical analyses, recalculated water
SiO_2	57.29	69.57	76.99	70.58
Al_2O_3	18.28	16.81	12.51	15.30
Fe_2O_3	2.87	1.73	1.53	2.11
FeO	4.31	.29	.10	.12
MgO	3.80	.56	.12	.32
CaO	5.95	1.53	.12	.91
Na_2O	3.59	4.69	3.46	4.33
K_2O	2.05	4.18	4.88	5.74
TiO_2	1.23	.45	.21	.44
P_2O_5	.43	.14	.06	.06
MnO	.10	.07	.02	.08
CO_2	.08	<.05	<.05	<.05
				Water content, reported in
H_2O-	0.55	0.57	0.36	0.05
H_2O+	1.5	.83	.58	.37

[1] Sample locality shown on plate 1.

minerals of volcanic rocks in the Black Range, N. Mex. —Continued

H. Smith. Analytical method as described by Shapiro and Brannock (1962) and as atomic absorption]

510	485	488	498	596	262	282	416
5	6	7	8	9	10	11	12
water free (weight percent)							
76.62	63.66	59.02	60.95	62.77	61.63	58.21	58.74
13.20	17.31	17.21	17.65	18.20	15.18	16.98	18.00
.94	4.12	4.41	5.95	3.48	5.64	4.40	4.63
.02	.54	2.36	.37	1.53	1.23	3.17	2.16
.25	2.16	3.69	2.15	1.84	1.85	3.58	3.70
.42	4.74	5.64	4.72	5.11	3.90	5.73	5.66
3.48	3.81	3.69	3.80	3.78	3.90	3.68	3.91
4.81	2.58	2.56	2.98	2.25	4.31	1.94	1.95
.18	.77	.98	1.00	.77	1.44	1.74	.76
.00	.24	.33	.37	.20	.81	.42	.33
.09	.08	.11	.06	.06	.12	.09	.09
<.05	<.05	<.05	<.05	<.05	<.05	.05	.05
in original analyses							
0.53	1.4	0.95	1.1	0.83	0.83	0.89	0.84
.87	.70	1.3	1.0	.97	.87	.51	.96
percent)							
36.7	18.9	11.8	15.2	19.0	14.3	13.3	11.9
1.5	.2	......	.5	.7	......	......	.08
28.4	15.2	15.1	17.6	13.3	25.4	11.5	11.6
29.4	32.2	31.2	32.1	32.0	33.0	31.2	33.1
2.1	22.0	22.8	21.0	24.0	11.2	24.1	25.6
......	......	1.2	......	......	1.2	.5	......
.6	5.4	9.2	5.4	4.6	4.6	8.9	9.2
......	......	......	......	......	......	......	......
......	......	5.1	......	2.9	.2	5.5	5.1
.9	4.1	.9	6.0	1.5	5.5	.6	1.1
.2	1.3	1.9	.9	1.5	2.7	3.3	1.4
.06	.08	......	.5	......	......	......	......
......	.6	.8	.9	.5	1.9	1.0	.8
......	......	......	......	......	......	.1	.1

466	469	550	581	471	616	619	408
17	18	19	20	21	22	23	24
free (weight percent)							
75.68	75.35	76.96	76.22	63.55	68.49	66.68	56.81
13.03	12.98	13.36	12.87	16.46	15.93	16.32	16.35
1.31	1.01	.80	1.31	5.28	2.54	3.24	5.28
.12	.20	.19	.30	1.04	.53	.69	3.21
.15	.41	.13	.05	1.24	.52	.61	2.69
.54	1.01	1.00	.14	3.00	1.32	1.52	5.90
3.74	3.62	4.10	3.72	4.24	4.57	4.66	3.83
5.05	5.03	3.13	5.13	4.24	5.28	5.27	2.97
.28	.22	.27	.17	.13	.61	.70	1.86
.02	.04	.02	.03	.70	.15	.21	1.03
.07	.08	.04	.06	.10	.08	.10	.16
<.05	<.05	<.05	<.05	<.05	<.05	<.05	.08
original analyses							
0.10	0.20	0.70	0.09	0.65	0.23	0.34	0.76
.61	.46	5.6	.34	.85	.66	.27	2.0

TABLE 3.—*Chemical analyses, water content, and normative*

Field No.[1]	531	421	434	442
Sample	13	14	15	16
				Norms (weight
Quartz	9.9	22.6	37.9	21.2
Corundum	.5	2.1	1.5	.5
Orthoclase	12.1	24.7	28.8	33.9
Albite	30.4	39.6	29.3	36.6
Anorthite	26.2	6.6	.2	4.1
Wollastonite	......	......	......	......
Enstatite	9.5	1.4	.3	.8
Ferrosilite	3.7	......	......	......
Magnetite	4.2	......	......	......
Hematite	......	1.7	1.5	2.1
Ilmenite	2.3	.8	.3	.4
Rutile	......	.05	.08	.2
Apatite	1.0	.3	.1	.1
Calcite	.2	......	......	......

[1] Sample locality shown on plate 1.

Sample	*Classification*	*Map unit (pl. 1)*	*Description*
1	Latite	Ta	Dusky-red porphyritic flow; phenocrysts of plagioclase and orthoclase; sparse biotite.
2, 3, 4	Quartz latite	Tdk	Pale-red crystal-rich ash-flow tuff; phenocrysts of plagioclase, sanidine, quartz, and biotite.
5	Rhyolite	Tdk	Light-gray and pale-red felsitic flow-banded rhyolite.
6, 7, 8, 9	Andesite	Tdma	Dark-gray to brownish-gray fine-grained dense flows; sparse plagioclase phenocrysts; no. 7 contains olivine altered to iddingsite.
10	Latite	Tdla	Olive-gray fine-grained slightly vesicular flow; sparse phenocrysts of plagioclase and pyroxene.

flows (Tdrs, pl. 1), and crystal-rich to crystal-poor rhyolite ash-flow tuffs are widespread and abundant rocks in the Black Range.

CHEMICAL COMPOSITION AND TRACE-ELEMENT CONTENT OF VOLCANIC ROCKS

Rapid chemical analyses of 24 unaltered volcanic rocks from the Black Range are shown in table 3, along with calculated normative minerals based on these analyses. The rocks for chemical analyses were selected to give a compositional range from basaltic andesite to highly silicic rhyolite. A triangular plot (fig. 5) gives an idea of variations in composition in terms of the principal normative minerals. Semiquantitative spectrographic analyses of many unaltered volcanic rocks are shown in table 7, and statistical data—50th percentile (median), 5th percentile, and 95th percentile values—for eight selected trace elements in these rocks are shown in table 4.

Mineral composition and chemical analyses indicate that andesitic flows in Black Range tend to be rather high in silica and potash.

minerals of volcanic rocks in the Black Range, N. Mex.

466	469	550	581	471	616	619	408
17	18	19	20	21	22	23	24
percent)							
33.3	32.5	38.9	34.7	16.3	18.6	15.8	11.0
.5	......	1.5	1.0	1.1	.7	.7	......
29.8	29.7	18.5	30.3	25.1	31.2	31.1	16.5
31.6	30.6	34.7	31.5	35.9	38.6	39.4	32.4
2.5	4.3	4.8	.5	10.3	5.5	6.2	19.2
......	.05	......	......	......	......	......	1.2
.4	1.0	.3	.1	3.1	1.3	1.5	6.7
......	......	......	......	......	......	......	......
......	.3	......	.7	3.3	.2	.5	5.4
1.3	.8	.8	.8	3.0	2.4	2.9	1.5
.4	.4	.5	.3	.3	1.2	1.3	3.5
.07	......	.005	......	......	......	......	......
.05	.1	.05	.07	1.7	.4	.5	2.4
......	.1	......	......	......	......	......	.2

Sample	*Classification*	*Map unit (pl. 1)*	*Description*
11, 12, 13	Andesite or basaltic andesite.	Tdla	Dark-gray fine grained dense to vesicular flows; sparse phenocrysts of plagioclase and pyroxene; samples 12 and 13 contain olivine altered to iddingsite.
14	Quartz latite	Tdla	Pale-red porphyritic flow; phenocrysts of plagioclase, sanidine, quartz, and biotite.
15, 16, 17, 18, 19, 20	Rhyolite	Tdfr	Pale-red, pale-red-purple, and very-light-gray felsitic flow-banded rhyolite; sparse phenocrysts of sanidine, quartz, and biotite; sample 15 is in map unit Tdrl.
21, 22, 23	Latite or quartz latite.	Tdrl	Grayish-red to grayish-purple porphyritic flow; phenocrysts of plagioclase, orthoclase, hornblende, and biotite.
24	Basaltic andesite	Tba	Brownish-black scoriaceous fine-grained flow; contains olivine altered to iddingsite.

Rhyolitic ash-flow tuff and lava flows tend to be low-silica rhyolite or quartz latite in the lower part of the Datil Formation and high-silica rhyolite in the upper part. Andesite that is typical of the area (table 3, samples 6–9) contains 59–63 percent SiO_2 and has a Na_2O–K_2O ratio of about 3:2. Quartz latite ash-flow tuff of the Kneeling Nun Tuff Member (table 3, samples 2–4) contains 67–69 percent SiO_2 and has nearly equal amounts of Na_2O and K_2O. The flow-banded rhyolite (table 3, samples 15–20), which represents a high-silica rhyolite in the upper part of the Datil, contains 70–77 percent SiO_2 and generally more K_2O than Na_2O.

As can be seen in tables 4 and 7, the volcanic rocks of the Black Range show certain trends of elemental abundances among the various rock types. Trace elements such as Ba, Co, Cr, Cu, Ni, Sc, Sr, Ti, and V tend to be more abundant in the mafic or low-silica rocks, such as andesite and basaltic andesite, than in the felsic or high-silica rocks such as rhyolite and quartz latite. On the other hand, the elements B, Be, Mo, Nb, and Sn appear to be more abundant in the more silicic rocks. The median values determined

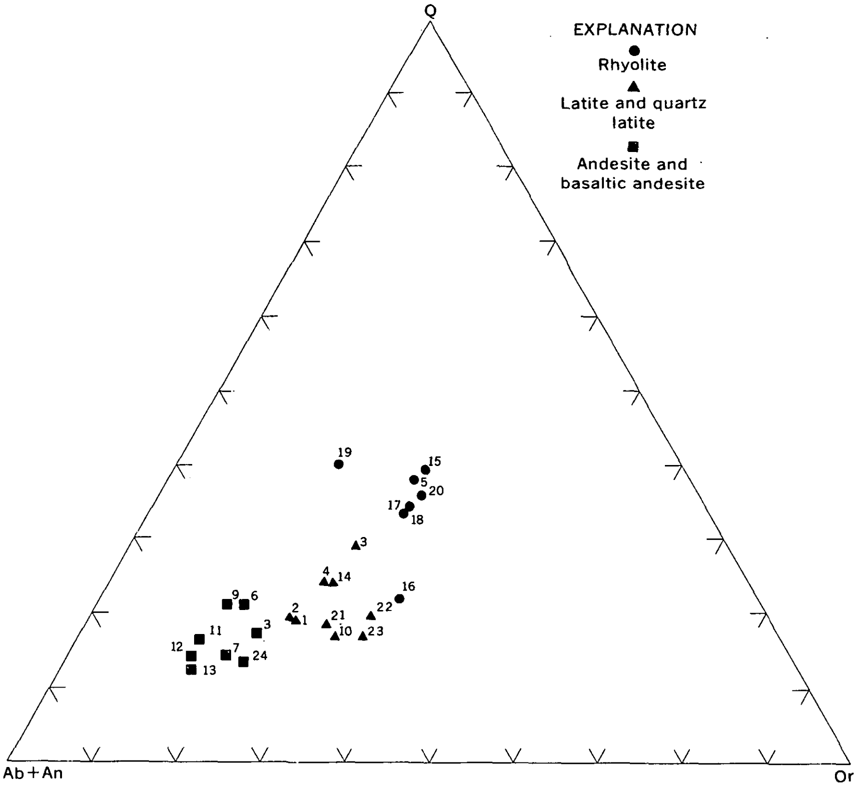

FIGURE 5.—Ratios of normative plagioclase (Ab+An), orthoclase (Or), and quartz (Q) in volcanic rocks of the Black Range, N. Mex. Numbers refer to samples listed in table 3.

for eight elements in the andesite and rhyolite of the Black Range (table 4) show the following approximate ratios of these elements in the two rock types:

	Ba	Be	Cu	Mo	Sn	Sr	V	Ti
Andesite	2	1	4	1	1	>20	7½	1
Rhyolite	1	>2	1	>1	>1	1	1	1

Several differences can be seen in table 4 between the trace-element content of map units having rocks of similar chemical composition. Thus, the tin-bearing rhyolite and flow-banded rhyolite are low in Ba, Sr, and V and high in Be relative to the Kneeling Nun and Caballo Blanco Members. The tin-bearing rhyolite also is

TABLE 4.—*Median (50th percentile) and 5th and 95th percentile values of eight elements in selected groups of volcanic rocks from the Black Range, N. Mex.*

[From data in Table 7. Tba, andesite and basaltic andesite, chiefly in western part of area; Tdma, andesite of the Mimbres River-McKnight Mountain area and from overlying latite or andesite units, chiefly in the southwestern part of the area; Ta, andesite from the early andesite sequence on the east side of the Black Range; Tdlp, latite porphyry interbedded with and overlying the Kneeling Nun Member; Tdk, rhyolite or quartz latite tuff of the Kneeling Nun Tuff Member; Tdc, rhyolite tuff of the Caballo Blanco Rhyolite Tuff Member; Tdfr, flow-banded rhyolite; Tdrs, tin-bearing rhyolite. L, element was detected but in amounts below the lower sensitivity limit. N, element was looked for but not found. All results are in parts per million except as indicated.]

		Andesites				Latite Porphyry	Rhyolite and quartz latite				
Element[1]	Percentile	Ta	Tdma	Tba	All andesites	Tdlp	Tdk	Tdc	Tdfr	Tdrs	All rhyolites
Ba (10)	5	500	500	1,000	500	700	10	10	10	L	10
	50	1,500	1,000	2,000	1,000	700	1,000	1,000	100	30	500
	95	3,000	2,000	3,000	3,000	2,000	1,500	3,000	2,000	150	2,000
Be (1)	5	N	N	N	N	1	L	N	1	5	1
	50	L	L	1	L	1	1.5	1	3	5	2
	95	3	3	1.5	2	2	7	7	5	10	7
Cu (5)	5	5	10	L	5	5	L	L	L	L	L
	50	20	20	7	20	15	5	7	5	5	5
	95	50	50	50	50	30	20	70	30	15	30
Mo (5)	5	N	N	N	N	N	N	N	N	N	N
	50	N	N	N	N	N	N	N	N	L	N
	95	L	5	5	5	7	5	7	5	10	7
Sn (10)	5	N	N	N	N	N	N	N	N	N	N
	50	N	N	N	N	N	N	N	N	L	N
	95	N	N	L	N	N	10	20	15	70	20
Sr (50)	5	500	500	700	500	300	N	N	N	N	N
	50	700	1,000	1,000	1,000	700	300	150	N	N	N
	95	1,500	1,500	1,500	1,500	1,500	700	700	200	L	700
V (5)	5	50	70	100	70	50	L	N	L	N	L
	50	150	100	150	150	70	50	30	10	10	20
	95	300	300	200	300	100	100	150	70	30	100
Ti (20)	5	3,000	3,000	5,000	3,000	2,000	1,000	1,000	500	500	500
	50	5,000	5,000	10,000	7,000	3,000	2,000	1,500	1,500	700	1,500
	95	>10,000	>10,000	>10,000	>10,000	5,000	5,000	>10,000	3,000	1,500	5,000
Number of samples in set		12	39	12	63	11	39	11	36	17	103

[1] Number in parentheses indicates lower limit of sensitivity for the element.

high in Sn and Mo and is low in Ti relative to the other units of rhyolite and quartz latite. The basaltic andesite is higher in Ba and Ti and lower in Cu than the andesites of the other units (Ta and Tdma) listed in table 4.

DESCRIPTION AND CORRELATION OF MAP UNITS

EARLY ANDESITE VOLCANIC SEQUENCE

The oldest unit of the Tertiary volcanic rocks in the Black Range comprises a sequence of interlayered andesitic flows, breccia, tuff, tuffaceous sandstone, and agglomerate and sparse rhyolitic flows and ash-flow tuff. These rocks have been referred to as the "early andesite volcanic sequence" by Kuellmer (1954, p. 30) and are so designated in the present report. The "lower basic volcanic series" of Fries (1943) corresponds to the upper part of the early andesite sequence as exposed at the head of Chloride Creek, in Turkey Run, and in Seventyfour Draw in the northern part of the map area (pl. 1). The early andesite rests on the eroded surface of Precambrian and Paleozoic rocks and is unconformably overlain by various younger volcanic rock units in different parts of the map area. It is thickest, probably at least 2,000 feet thick, in the northern part of the area (pl. 1). It is less widely exposed in the southern part of the area where it has an estimated maximum thickness of 1,700 feet (Kuellmer, 1954, p. 30).

The early andesite sequence is important because it alone, of all the Tertiary map units on plate 1, contains minable metalliferous mineral deposits (see section "Mineral resources") near but outside the primitive area.

The early andesite sequence of the study area may be equivalent to the Rubio Peak Formation of Elston (1957, p. 18) and to the andesitic rocks underlying the Rubio Peak referred to as the "andesite breccia" in the Santa Rita quadrangle (Jones and others, 1967, p. 59) and the Macho pyroxene andesite in the Lake Valley quadrangle (Jicha, 1954a, p. 39). Kuellmer (1954, p. 29) suggested a pre-Miocene age for the early andesite sequence. Jones, Hernon, and Moore (1967, p. 59–62) described the andesite breccia unit as being stratigraphically equivalent to Kuellmer's early andesite sequence and postulated that it was of Late Cretaceous or early Tertiary age. An age of 43 m.y. cited by Kottlowski, Weber, and Willard (1969, p. 279) for the "older latite-andesite" of southwestern New Mexico, which is probably equivalent to our early andesite sequence, indicates an early Tertiary (Eocene) age for at least part of the rocks in this sequence.

Kuellmer (1954, p. 31–32) described the early andesite sequence in the Kingston area as follows:

> The lower part of the early andesite volcanic sequence consists of well-bedded flows, tuffs and agglomerates.*** The flows are a dense bluish black with sparse colorless to white feldspar phenocrysts about 2 mm long. The thickness of the individual flows in the lower part of this unit is in most outcrops 6 feet or less.*** Interbedded with the flow units are thin beds of a red-violet, fine to coarse, essential or accessory tuff, and thick beds of light-green, gray, or purple lapilli tuff or agglomerate. The fragments in the pyroclastic beds are aphanitic porphyries with very abundant small (1 mm and less) subhedral white phenocrysts, that have been considerably altered. Less abundant, but identical, phenocrysts are also found in the matrix of the pyroclastic rocks.
>
> Above this is a great thickness of massive flows and flow breccias. These rocks are aphanitic, red violet, purple, gray, green, or various combinations of these colors, and contain abundant white subhedral phenocrysts which may be as large as 1 cm, although most are 2 mm and less. Locally, small hornblende laths which may show an alignment are abundant. Faint color bands and a slabby weathering, present in many outcrops, probably represent a flow banding.
>
> The upper part of this volcanic sequence consists of massive beds of volcanic breccia and agglomerate, and thin to thick beds of essential and accessory

tuffs. The grain size extends over the entire tuff range. These beds are red, purple, gray, green, white, black, or mixtures of these colors.

In the northeastern part of the map area (pl. 1), the early andesite sequence consists of a lower unit of andesite flows, breccia, and tuff that has been extensively epidotized and an upper unit of andesite flows and breccia that has not been epidotized. Predominant colors are dark gray to dark red, greenish black to dark-yellowish green, and dusky purple. Some latite is present in the sequence, and a unit of pale-brown to grayish-red rhyolite tuff and tuffaceous sandstone, more than 100 feet thick, crops out in the headwaters of Chloride Creek. Iron-stained fractures and veinlets and pods of quartz or calcite are found at many places in the early andesite sequence. Fries (1943) noted that some of the rocks in this sequence contain disseminated pyrite grains.

An exposure of andesite on Hoyt Creek, in the northwestern part of the map area (pl. 1), was included in the "lower basic volcanic series" by Fries (1943). We have included it in the early andesite sequence on the basis of Fries' work and also because an aeromagnetic anomaly (pl. 1) indicates that it is a partly buried steep-sided hill of the kind that might be expected to occur on the eroded surface of the early andesite. This correlation, however, is tentative, and the andesite may represent one of the younger volcanic units, perhaps the andesite of Aspen Canyon (Tdla, pl. 1).

Sedimentary rocks make up a small part of the early andesite sequence. Agglomerate, such as that exposed near the mouth of Marshall Creek southwest of Hermosa, contains abundant cobbles and pebbles of Paleozoic limestone in a tuffaceous matrix. An irregularly shaped mass of epidotized conglomerate or breccia, more than 100 feet thick, is exposed near the site of James Cabin on Diamond Creek (pl. 1). It is within the more typical andesite flows and breccia of the early andesite sequence and may represent an old alluvial fan or talus accumulation. Medium- to coarse-grained dark-red-brown sandstone is exposed at the junction of Morgan Creek and the South Fork of Palomas Creek near Hermosa (pl. 1). It is several tens of feet thick and is unconformably overlain by interbedded light-colored rhyolite tuff and tuffaceous sandstone of the next younger unit of the volcanic sequence.

DATIL FORMATION

Rhyolite and andesite of the Hermosa area

In the Hermosa area and the northeastern part of the study area, the early andesite is overlain by a sequence of rhyolite tuff and tuffaceous sandstone (Tdst, pl. 1) and andesite and latite flows

(Tdsa). The sequence is tentatively correlated with the Sugarlump Tuff of Elston (1957, p. 23–25), which is exposed in the Dwyer quadrangle. However, it may be younger, perhaps in part equivalent to the Kneeling Nun Member. The sequence is readily distinguished in the northeastern part of the study area (pl. 1) but was not recognized in the southern part, where, if present, it was mapped as part of the Kneeling Nun. Furthermore, in the northern part of the area, where the Kneeling Nun Member is absent, the sequence may include rhyolites younger than the Kneeling Nun, perhaps as young as the rhyolite of Diamond Creek.

The rhyolite is well exposed in a conical hill about a mile northwest of Hermosa (hill marked "cone" in pl. 1), in Lake Mountain southwest of Hermosa, and in the ridge between Byers Run and the South Fork of Cuchillo Negro Creek (pl. 1). The andesitic unit is on top of the rhyolite tuff unit in the vicinity of Hermosa and is within the tuff unit in the ridge between Byers Run and the South Fork of Cuchillo Negro Creek. Thin andesite flows are also found within the tuff unit in Lake Mountain and may occur elsewhere. The maximum thickness of the sequence is about 1,000 feet (table 2) ; the rhyolitic unit generally makes up two-thirds or more of the total.

The rhyolite unit consists of interlayered pumiceous relatively soft ash-flow tuff layers, a few feet to as much as 25 feet thick, and poorly cemented thin-bedded air-fall tuff or water-laid tuffaceous sandstone. Colors of the sandstone and tuff are similar, generally shades of light tan to light gray and light red. Locally, the sandstone is grayish green. The ash-flow tuff and sandstone of this unit contain sanidine, plagioclase feldspar, quartz, and biotite. The tuff commonly contains 10–30 percent crystals, and in having both plagioclase and sanidine it resembles the quartz latite tuff of the Kneeling Nun.

The andesitic unit consists of fine-grained dense dark-gray to dark-red and dusky-brown andesite flows and flow breccia. Typical rock has a fine-grained groundmass consisting chiefly of small plagioclase laths, and has sparse phenocrysts of plagioclase and augite or hornblende.

Kneeling Nun Tuff Member

The Kneeling Nun Rhyolite Tuff was named for a prominent rock monument that overlooks the Chino open pit (Kuellmer, 1953, p. 42; Jicha, 1954a, p. 44). The name was changed to Kneeling Nun Tuff (Pratt, 1967, p. 60) and is herein reduced to member rank in the Black Range area and made a member of the Datil Formation. It consists chiefly of quartz latite tuff rather than

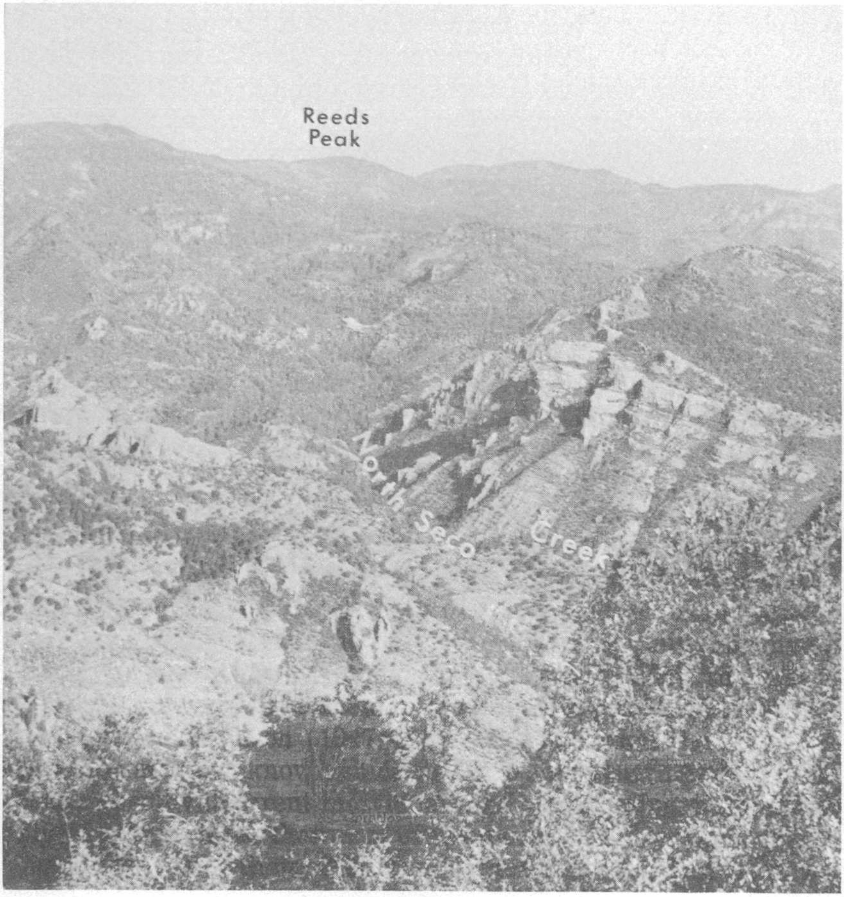

FIGURE 6.—Ash-flow tuff layers in the Kneeling Nun Tuff Member, North Seco Creek southeast of Reeds Peak. Photograph taken from Victoria Park Mountain.

rhyolite tuff in the Black Range Primitive Area. It is the thickest and most widespread unit of the volcanic sequence in the map area and attains a maximum exposed thickness of about 3,000 feet in the central part of the area (pl. 1). The unit is equivalent to the "tuffaceous rhyolite" of Kuellmer (1954, p. 42) which is described in his section at the south end of the primitive area. The Kneeling Nun consists of many cooling units of welded ash-flow tuff, each of relatively small areal extent. In some places, as is well shown in figure 6, thick layers are prominent; in other places, layering is poorly developed and obscure (fig. 3). In aerial photographs, part of the Kneeling Nun appears to have an indistinct light and dark layering, which may be due to intertonguing of many ash flows.

In the Black Range, the Kneeling Nun is typically a crystal-rich hard and compact massive quartz latite ash-flow tuff. Locally, it contains layers of andesite, latite porphyry, and spherulitic glass. Crystals and crystal fragments of feldspar and quartz, ½–5 mm long, commonly make up 30–50 percent of the rock, the remainder being largely glassy to very fine grained groundmass. At most places, the Kneeling Nun is a distinctive pale red that grades to light gray, yellow brown, and pale-red purple. The principal minerals are sanidine and plagioclase that occur in nearly-equal amounts and quartz and biotite. Small amounts of magnetite generally are present, and some rock also contains hornblende or augite. The groundmass contains abundant welded and contorted pumice fragments, glass, crystal fragments, and dust.

Kuellmer (1954, p. 42–47) estimated the "tuffaceous rhyolite" in the southern part of the study area to be at least 1,300 feet thick. He described it as a gray, violet-gray, white, pink, or brown massive porphyry consisting of 13–69 percent quartz, feldspar, and biotite phenocrysts.

In the southwesternmost part of the study area, the tuffaceous rhyolite of Kuellmer contains unusual amounts of xenoliths—fragments of older rocks—consisting chiefly of early andesite and Paleozoic sedimentary rocks. These xenoliths may indicate proximity of an eruptive center or centers from which the tuff came. The rocks that contain very abundant and large xenoliths are considered to be agglomerate that accumulated in the volcanic vents that were the sites of eruptions (Kuellmer, 1954, p. 67). The elongated dome and pronounced magnetic low in the area of the Kneeling Nun (pl. 1) lend support to Kuellmer's idea of an eruptive center. (See sections "Structure" and "Aeromagnetic interpretation".)

Latite porphyry of Holden Prong

In the southern part of the study area, the Kneeling Nun Tuff Member is overlain by a sequence of distinctive latite porphyry flows that locally is as much as 1,500 feet thick. The flows in the lower part of this sequence intertongue with the ash-flow tuff in the upper part of the Kneeling Nun. The best exposures and thickest sections are in Holden Prong and at Hillsboro Peak (pl. 1), although exposures also are extensive in the area between Hillsboro Peak and Las Animas Creek. The porphyry is particularly well displayed in East Curtis and West Curtis Canyons where a massive unit forms a nearly vertical cliff 200–300 feet high. The northernmost exposure of the latite porphyry is an isolated plate resting on the Kneeling Nun at the crest of the Black Range, just north of McKnight Mountain (pl. 1).

The latite porphyry is pale red to grayish red, pale-red purple, and bluish gray. At some places it shows unusually distinct and persistent color banding. The porphyry generally consists of 20–30 percent of white feldspar crystals ranging from about ½ to 10 mm long, in a microcrystalline to glassy groundmass. Plagioclase feldspar is the most abundant mineral occurring as phenocrysts; alkali feldspar and quartz are scarce. Accessory minerals are hornblende, biotite, and magnetite.

In Holden Prong, near the mouth of Sids Prong (pl. 1), the porphyry shows a distinct and persistently uniform flow layering that resembles very thin bedding or laminae of a sedimentary rock. Layers ½–5 cm thick are continuous for several feet or even tens of feet. Alternate layers have distinctively different colors—shades of pale red, grayish red, and pale-red purple—but tend to be only slightly different in quantity and in size of phenocrysts. At first glance, contacts between layers appear to be sharp; but when examined closely, they are irregular and show a transitional color-change zone over a thickness of a millimeter or two. The rock shows little or no tendency to break parallel to layering.

Andesite flows and rhyolite tuff of Victoria Park Mountain

A major unresolved problem is the age and correlation of the sequence of dark-gray fine-grained andesite flows and interlayed rhyolite ash-flow tuff at Victoria Park Mountain and in the upland area to the east of it, between Las Animas Creek and North Seco Creek. Because of the presence of several layers of white to very light gray relatively soft pumiceous tuff, the sequence resembles the Caballo Blanco Rhyolite Tuff Member and the overlying andesite of Aspen Canyon. The sequence is tentatively correlated with these units but is mapped as a separate unit (pl. 1).

Rhyolite of the Moccasin John area

A distinctive rhyolitic sequence crops out on Moccasin John Mountain and in the area drained by Moccasin John Creek and the North Fork of Palomas Creek (pl. 1). The sequence consists of interlayered flow-banded rhyolite, perlitic glass, and rhyolite ash-flow tuff. Locally, these rocks have been kaolinized and show yellow, red, and brown iron-stained zones, apparently due to hydrothermal alteration. The zone of most intense alteration is shown on plate 1.

The sequence is bounded by faults, and its stratigraphic relation to surrounding rocks is uncertain. It may be only a hydrothermally altered zone in the Kneeling Nun, which in the Moccasin John area has an exceptional abundance of volcanic glass and flow-banded rhyolite. On the other hand, it may constitute an intrusive-extrusive complex in a vent area and thereby be a source of part of the Kneeling Nun Tuff Member or of even younger rhyolitic units. Another possibility is that this rhyolite sequence is equivalent to the Mimbres Peak Formation of Elston (1957, p. 27) which overlies the Kneeling Nun in the Dwyer quadrangle (fig. 6). The Mimbres Peak Formation also crops out along State Highway 90 about 4 miles east of Kingston (Kuellmer and Kottlowski, 1965, p. 31), where it contains volcanic glass and contorted flow-banded rhyolite similar to some of the units in the Moccasin John area.

The rhyolitic units of this sequence are highly variable in texture and color. Typical flow-banded rhyolite of the sequence has sparse small crystals of quartz, sanidine, and biotite in a glassy to very fine grained partly devitrified groundmass. The color of hand specimens is medium to light gray and yellowish gray to pale-red purple. Delicate but persistent contorted flow layers range from a fraction of a millimeter to several centimeters thick. The most intensely altered rock is white to grayish yellow and consists largely of very fine grained kaolin and quartz. Perlitic and spherulitic glass, found at many places, is medium gray to grayish red, moderate brown to brown, and black. Large red spherulites ranging from about 1 to 5 cm in diameter make up as much as 30 percent of some of the glasses. Ash-flow tuff layers are white to pale brown and light red; they are poorly to strongly welded and crystal poor to crystal rich. Some of the crystal-rich tuff is similar to the quartz latite tuff in the Kneeling Nun Tuff Member.

Andesite of the Mimbres River-McKnight Mountain Area

In the Mimbres River-McKnight Mountain area (pl. 1), the Kneeling Nun Tuff Member is overlain by thick-bedded andesite, which has a maximum thickness of about 1,000 feet in the Mimbres River valley and about 600 feet on McKnight Mountain. In the southernmost part of the map area, the unit is absent; it either pinches out in this direction or has been stripped away by erosion. It was not recognized north of Aspen Mountain.

The andesite of this unit is dense, fine grained, medium to dark gray, and brownish gray. Typical andesite contains sparse phenocrysts of plagioclase feldspar and hornblende or augite, generally less than 2 mm long, in a finely crystalline groundmass consisting largely of feldspar. Local variants are porphyritic andesite, which contains as much as 30 percent feldspar phenocrysts, and basaltic andesite, which is vesicular and contains phenocrysts of olivine largely altered to iddingsite. Cavities in some of this vesicular rock contain crystals of quartz and calcite and botryoidal masses of chalcedony.

The andesite of the Mimbres River-McKnight Mountain area may be equivalent to the Rustler Canyon Basalt of Elston (1957, p. 30) that crops out in the Dwyer quadrangle. It also may be stratigraphically equivalent to a basaltic andesite in the Santa Rita quandrangle, described by Jones, Hernon, and Moore (1967, p. 109) as underlying the Caballo Blanco Rhyolite.

Caballo Blanco Rhyolite Tuff Member

The Caballo Blanco Rhyolite Tuff was named by Elston (1957) from the exposures in the Dwyer quadrangle, southwest of the Black Range. The Caballo Blanco Rhyolite Tuff is extended into the Black Range and adopted as the Caballo Blanco Rhyolite Tuff Member of the Datil Formation. The unit is exposed on the north side of the Mimbres River valley (pl. 1) and consists of white soft pumiceous nonwelded or poorly welded rhyolite ash-flow tuff layers (Tdct, pl. 1), interlayered with tan to pale-red hard strongly welded crystal-rich rhyolite tuff (Tdcr, pl. 1). The principal phenocrysts are sanidine, quartz, and plagioclase. Maximum thickness is about 500 feet. North of the Mimbres valley, rhyolite considered to be equivalent to the Caballo Blanco is exposed in Buckhead Canyon, in the headwaters of Black Canyon, and east of the crest of the Black Range as far north as the North Fork of Palomas Creek (pl. 1).

In the Mimbres River drainage, the Caballo Blanco rests on andesite (Tdma), but northward this andesite evidently pinches out, and the Caballo Blanco rests directly on the Kneeling Nun (pl. 1).

In the headwaters of Cooney Canyon, a tributary stream on the north side of the Mimbres valley (pl. 1), the following four units (1 is the basal unit) of the Caballo Blanco can be distinguished:

	Thickness (feet)
4. White tuff similar to unit 2	25–50
3. Light-red tuff similar to unit 1	100
2. White to pink soft pumiceous rhyolite tuff	200
1. Light-red hard cliff-forming crystal-rich rhyolite tuff	200

Each of these units has the appearance of being a single ash flow or cooling unit. Nevertheless, there may be only two cooling units, each consisting of a densely welded zone (units 1 and 3 above) that grades upwards into a poorly welded zone (units 2 and 4).

Andesite of Aspen Canyon

The Caballo Blanco Rhyolite Tuff Member is overlain by a sequence of latite, andesite, and basaltic andesite flows and flow breccia in which there are several layers of rhyolite tuff and tuffaceous sandstone. The sequence is best exposed in the area drained by Aspen Canyon (pl. 1). From here it extends northeastward to the crest of the Black Range and then northward to the headwaters of the North Fork of Palomas Creek where it is apparently cut off by a fault (pl. 1). It is at least 1,000 feet thick in the Aspen Canyon area, but it thins to the north and is about 600 feet thick in the headwaters of Circle Seven Creek.

The lava flows that make up the bulk of this map unit are similar in character to the andesite of Mimbres River-McKnight Mountain. They tend to be dense, fine grained, and dark colored, and show shades of gray to black, greenish gray, brownish gray, and purplish gray. Typical andesite contains sparse phenocrysts of plagioclase feldspar and augite in a fine-grained groundmass consisting largely of feldspar laths. The latite contains biotite and (or) hornblende, augite, and alkalic feldspar, in addition to plagioclase. The latite tends to be lighter colored than the andesite, being typically a medium gray to grayish red. The basaltic andesite tends to be dark brown and black and contains phenocrysts of olivine partly or wholly altered to iddingsite.

Layers of pumiceous rhyolite tuff and associated tuffaceous sandstone in the Aspen drainage area are a few feet to several tens of feet thick. Tuff is white to light red and light brown. It shows slight to moderate welding. Well-bedded light-gray to light-brown tuffaceous sandstone associated with tuff layers is exposed in the ridges at the north and south sides of Buckhead Canyon near its junction with Aspen Canyon.

According to J. C. Ratté and David Gaskill (written commun., 1969), the andesite sequence of Aspen Canyon can be traced westward into the Gila Wilderness where it is equivalent to the Alum Mountain Formation of Elston. (See Elston and others, 1968, p. 266.) These rocks probably are also equivalent to the Razorback Formation of Elston (1957, p. 32), which crops out in the Dwyer quadrangle, and to an andesite sequence that overlies the Caballo Blanco Rhyolite Tuff Member in the Santa Rita quadrangle (Jones and others, 1967, p. 107).

Flow-banded Rhyolite of Rocky Canyon and Rhyolite of Diamond Creek

A widespread and distinctive flow-banded rhyolite unit in the northwestern part of the map area (pl. 1) is well exposed in Rocky Canyon, particularly in roadcuts of State Highway 61. The unit appears to be several hundred feet thick at most places and may have a maximum thickness of more than 1,000 feet. In the Rocky Canyon and Aspen Canyon areas, the flow-banded rhyolite overlies the andesite of Aspen Canyon and is overlain by the basaltic andesite of Hodge Canyon. Northward it is within and partly interlayered with rhyolite and latite tuffs and flows referred to as the rhyolite of Diamond Creek. As can be seen on plate 1, the flow-banded rhyolite unit is discontinuous. It wedges out in the vicinity of Diamond Creek but appears again in the Turkey Run and Hoyt Creek areas.

The flow-banded rhyolite of Rocky Canyon is equivalent to the "felsitic volcanic series" that Fries (1943) mapped in the northern part of the Black Range Primitive Area. The rhyolite of Diamond Creek is partly equivalent to the "rhyolite volcanic series" of Fries (1943), which overlies his felsitic volcanic series, and in which he included the tin-bearing rhyolite that is discussed separately in the present report.

The typical flow-banded rhyolite has a conspicuous planar to contorted color banding or layering. The layers generally range from less than a millimeter to a centimeter or two in thickness. In some of the rock the layering is very distinct, and individual layers can be traced for many feet. In other rock the layering is indistinct and discontinuous. The colors of the layers range from very light gray to pale red, to light-bluish gray and pale-red purple. Small phenocrysts of quartz and sanidine and locally of biotite and plagioclase, rarely more than 2 mm long, make up less than 10 percent of the typical flow-banded rhyolite. The groundmass is generally a very fine grained, partially devitrified glass, which locally contains tiny incipient spherulites.

In Rocky Canyon and Aspen Canyon (pl. 1), the basal part of the flow-banded rhyolite consists of a thin moonstone-bearing rhyolite tuff or tuffaceous sandstone, which may be equivalent to the Bloodgood Canyon Rhyolite of Elston (1968) (J. C. Ratté and David Gaskill, written commun., 1969), a formation that is widespread and thick in the Mogollon Plateau. Tuff and sandstone layers also occur in the basal part of the flow-banded rhyolite in Black Canyon, but they do not resemble the Bloodgood Canyon Rhyolite as exposed in Rocky Canyon. In Aspen Canyon, the flow-banded rhyolite is capped by a layer of pumice breccia 10–30 feet thick. Ratté and Gaskill (written commun., 1969) found a similar pumice breccia on the flow-banded rhyolite in Squaw Creek (pl. 1), west of the Black Range Primitive Area, and also noted the presence of pumice at the base of the flow-banded rhyolite in the Rocky Canyon area.

It is possible that the flow-banded rhyolite in Rocky Canyon makes up a complex extrusive-intrusive dome as suggested by Ratté and Gaskill (written commun., 1969) and that other domes or eruptive centers of the flow-banded rhyolite occur farther northward in the primitive area. Whether such domes are related to a ring-dike system, as suggested by Elston and others (1968, p. 262), is yet to be proved.

The rhyolite of Diamond Creek is composed of a sequence of interbedded latitic to rhyolitic tuffs, flows, volcanic glasses, and tuffaceous sandstones. It also contains andesite flows and flow breccias and layers of flow-banded rhyolite. Pumiceous tuffs and sandstones tend to be light colored and generally very light gray to pale red. Crystal-rich tuffs, which are less abundant, are darker. Some of the flows have a composition between latite and rhyolite as indicated by samples 22 and 23 in table 3; these flows are somewhat porphyritic and have phenocrysts of sanidine, plagioclase, green hornblende, and biotite. Volcanic glasses are black to medium gray, grayish green, grayish red, and dusky brown. Some of the glasses are perlitic and contain abundant red spherulites; others are crystal-rich obsidians, which lack perlitic cracks and spherulites. An unusual type of glass, found on Middle Diamond Creek, is a light-brown crystal-rich obsidian containing abundant angular fragments of black obsidian as much as a foot in diameter.

Tin-bearing Rhyolite

The tin-bearing rhyolite occurs only in the northwestern part of the map area, but it extends north for a distance of more than 20 miles (Fries, 1943). As shown on plate 1, the distribution of this unit is largely from the geologic map of Fries (1943). This unit is referred to as tin bearing because much of the rock contains detectable trace amounts of tin (table 4) in contrast to the other formations of the Black Range, which do not contain detectable tin. Tin-bearing veinlets occur in the unit outside the primitive area.

The lithology and mineralogy of the tin-bearing rhyolite has been described by Fries (1940, p. 361). The rock is a pale-red to light-gray porphyritic rhyolite, in which the phenocrysts generally make up 30–50 percent. It has a distinct flow layering at many places, and Fries (1943) suggested that certain areas of persistent, steeply dipping to vertical sheeting are in vent areas from which the rhyolite was extruded. He indicated that one of these vents is under the tin-bearing rhyolite cropping out along Diamond Creek.

The tin in the tin-bearing rhyolite occurs chiefly as cassiterite in veinlets and in disseminated grains associated with hematite and other minerals in steeply dipping sheeted zones (Fries, 1940). Trace amounts of tin in the rock either may be incorporated in the normal igneous rock-forming minerals or be present as finely disseminated cassiterite.

The tin-bearing rhyolite at Round Mountain (see p. E72) contains prismatic to spindle-shaped topaz crystals in lithophysae in a porphyritic very light gray rhyolite. The crystals are unusual in that they consist of an aggregate of mineral grains of the rhyolite that were incorporated into the growing topaz crystal.

BASALTIC ANDESITE OF HODGE CANYON

Basaltic andesite flows, the youngest volcanic rocks exposed in the study area, rest on the eroded surface of the older volcanic rocks. They are probably equivalent to basaltic andesite flows along the Gila River west of the Black Range Primitive Area, which have been provisionally correlated with the Last Chance Andesite of the Mogollon mining district (Ferguson, 1927, p. 16) by Elston, Coney, and Rhodes (1968, p. 266).

The basaltic andesite attains a maximum thickness of about 600 feet in the Hodge Canyon area. It is typically dense to vesicular and scoriaceous, dusky brown to brownish black or dark gray to black, and fine grained. Phenocrysts, which generally make up less than 5 percent of the rock, include plagioclase feldspar and lesser amounts of light-green augite and of olivine partly altered to iddingsite. The groundmass consists chiefly of small plagioclase feldspar laths.

At places, cavities in the basaltic andesite contain botryoidal masses of white chalcedony several inches in diameter and crystals and crystalline masses of quartz or calcite. Where chalcedony occurs in the rock, the overlying soils commonly contain abundant convoluted masses of chalcedony that weathered out of the underlying rock. Some of these have interesting shapes and might be of interest to the mineral collector.

INTRUSIVE ROCKS OF TERTIARY AGE

Intrusive rocks of Tertiary age include steeply inclined or vertical dikes that range from a few feet to several hundred feet wide and equidimensional to elongate or irregularly shaped intrusive masses that generally are less than a mile in diameter (pl. 1). They consist of three distinct rock types: (1) Quartz monzonite porphyry, (2) rhyolite, and (3) andesite. The rhyolite intrusions can be further subdivided into four textural types: (1) Coarsely porphyritic rock, (2) fine-grained flow-banded rock, (3) even-grained rock of sugary texture, and (4) glass.

QUARTZ MONZONITE PORPHYRY

Dikes and other small intrusions of quartz monzonite porphyry that occur in the southeasternmost part of the map area were described by Kuellmer (1954, p. 35). Only the larger intrusions are shown on plate 1; smaller intrusions are found at several other places in this southeastern area and northward to near Apache Peak, at the edge of the area about a mile south of Las Animas Creek (pl. 1). The quartz monzonite porphyries are the oldest of the Tertiary intrusive rocks. They intrude Paleozoic rocks and the early andesite sequence and in turn are cut by younger rhyolite dikes. Kuellmer (1954, p. 37) described the rock as a gray to green chloritized and epidotized quartz monzonite porphyry consisting of white feldspar phenocrysts 1 cm or less in diameter in an aphanitic groundmass.

RHYOLITE PORPHYRY

Rhyolite porphyry intrusive bodies were mapped by Kuellmer (1954) at the south end of the study area, west of Emory Pass. Similar large rhyolite porphyry dikes occur on North Percha Creek and near the Kelso place on Las Animas Creek. The large rhyolite porphyry mass in Water Canyon (pl. 1) differs from the other porphyries by containing small andesite fragments and by having a partly glassy groundmass.

The rhyolite porphyry intrusions at the south end of the area have been described by Kuellmer (1954, p. 50–51).

Large rhyolite porphyry dikes in Massacre Canyon (pl. 1), near the Kelso place, are faintly mottled yellowish gray, light gray, and pale-greenish gray. The rock consists of about 30 percent phenocrysts, chiefly plagioclase feldspar ¼–10 mm long in a fine-grained groundmass. Less abundant are phenocrysts of potassium feldspar, quartz, hornblende, and biotite. The fine-grained groundmass consists chiefly of feldspar.

The rhyolite porphyry at Rabb Park, at the southwestern corner of the study area (pl. 1), contains pegmatite dikes in which there are large moonstone crystals. This area is a well-known mineral-collecting locality. Kelley and Branson (1947, p. 699–702) described the pegmatites and the enclosing rhyolite porphyry as follows:

> The pegmatites are small bodies within a rhyolite porphyry plug that has been injected into rhyolite tuffs of Tertiary age. The pegmatites consist dominantly of quartz and sanidine with accessory quantities of cleavelandite, biotite, sphene, magnetite, and ilmenite. The sanidine, which occurs in

crystals up to one or two feet on a side, is the moonstone variety and displays limpid blue and white play of colors.***

* * * * * * *

The rhyolite porphyry is an irregular intrusive body with three principal curving extensions. The average diameter of the central part is about 4,000 feet. Flow banding, which is vertical to steeply inclined, is developed along the margins of the intrusive. The moonstone pegmatites occur as irregular segregations in the porphyry.

The great bulk of the intrusive is a light-gray porphyry with an earthy-gray groundmass which under the microscope is fine-grained to clouded sub-microscopic in size. In the usual rock the most abundant phenocrysts have an average diameter of about one millimeter, but many phenocrysts are as much as five millimeters.***

Locally, and especially in the vicinity of the pegmatites, the texture ranges greatly. There are, however, two distinct textures. One is a fine-grained, sugary-appearing porphyry consisting of about 80 percent nearly equidimensional phenocrysts of quartz and sanidine in a microcrystalline groundmass. The other is granitoid in which the average diameter of grain is about three millimeters with occasional grains of sanidine, oligoclase, or quartz as much as ten millimeters. Even in this fabric there is about ten percent microcrystalline groundmass. Texturally, although not always spacially, the granitoid material may be said to grade into the pegmatite.***

Kelley and Branson (1947, p. 702) reported that the rhyolite in Rabb Park had been hydrothermally altered and that sericite and kaolin had formed; also, that some of the rock had been pyritized.

We visited this locality briefly and found only one small pegmatite dike in which the largest moonstone crystals observed were only 2 or 3 cm long. These crystals proved to be so intensely fractured that they broke out of the rock as small fragments.

The porphyry mass in Water Canyon consists of as much as 50 percent phenocrysts. Strongly fractured clear sanidine crystals, as much as 2 cm long, and white plagioclase crystals are abundant throughout the rock. Quartz is also abundant, and biotite is the chief accessory mineral. The groundmass is glassy to cryptocrystalline and grayish red. This body differs from the other porphyries by having a glassy groundmass and sparse small fragments of red-brown to dark-gray andesite In this respect it resembles a rhyolite tuff. However, contacts are steep to vertical and cut across the layering of the enclosing Kneeling Nun Tuff Member as shown in figure 7. The porphyry may be a vent agglomerate that at depth gives way to a holocrystalline porphyry similar to the other rhyolite porphyry intrusions in the area.

The rhyolite porphyry dikes on North Percha Creek, in the southeastern part of the map area (pl. 1), differs from the other porphyries by having conspicuous color banding. The layers range from a few millimeters to several centimeters wide, and alternate

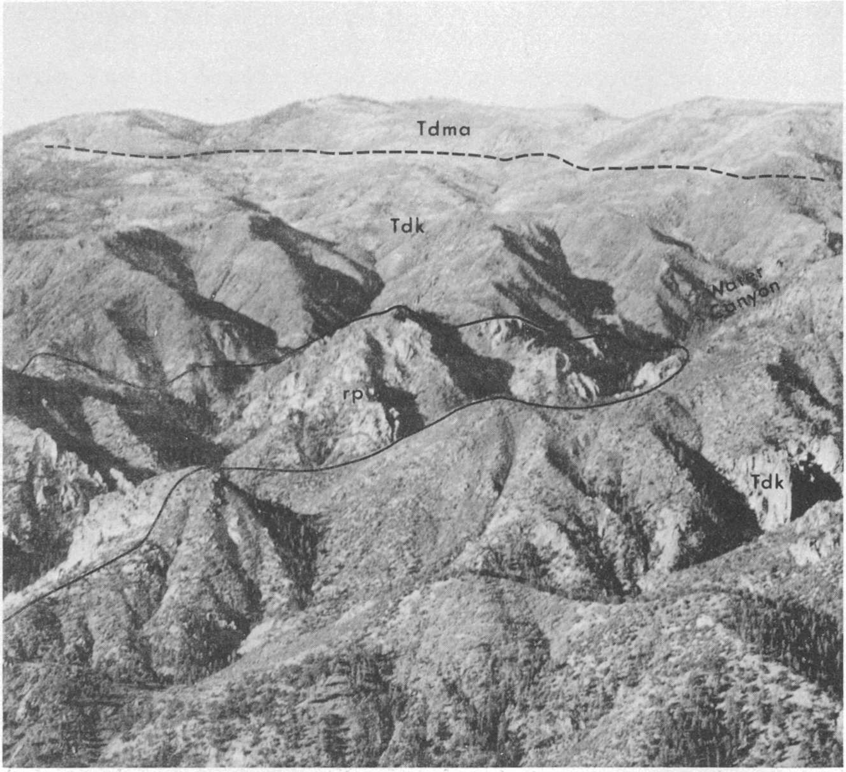

FIGURE 7.—Aerial photograph of rhyolite porphyry (rp) intrusive into the Kneeling Nun Tuff Member (Tdk), Water Canyon near crest of anticline (pl. 1). Crest of Black Range is capped with andesite (Tdma) of the Mimbres River-McKnight Mountain area.

layers are light and dark shades of gray and greenish gray. Layering is undulatory to intensely contorted. The rock consists of as much as 50 percent phenocrysts of which crystals of pink orthoclase and white plagioclase, as much as 2 cm long, are most abundant; also present are quartz, biotite, and hornblende.

FLOW-BANDED RHYOLITE

The fine-grained flow-banded rhyolite that makes up the large dike and plug near Circle Seven Creek (fr, pl. 1) resembles the rock in the flow-banded rhyolite unit (Tdfr, pl. 1) to the west. The flow-banded dike in the headwaters of Circle Seven Creek has weathered into a sharp ridge that is one of the most prominent topographic features in the Black Range Primitive Area. It is 500–700 feet thick and about 1 mile long. Nearly-vertical cliffs, representing the walls of the dike or joint planes in it, are 100–400 feet high. The dike shows a clear crosscutting relation with the enclosing volcanic rocks. Both ends of the dike terminate abruptly; this is seemingly a consequence of the intrusion terminating against older fault planes rather than displacement of the dike by younger faults. Flow banding in the dike tends to be nearly vertical. It is undulatory to strongly contorted and tends to be oriented at angles to the dike walls rather than parallel to them.

The flow-banded plug that makes up the conical-shaped Sugarloaf Peak is 1,500–2,000 feet in diameter. It is assumed to have a crosscutting relation with the surrounding rocks because of nearly-vertical flow banding. However, actual contacts were not seen, so that the intrusive nature is not quite as certain as it is for the above-mentioned flow-banded dike.

The typical rock of these intrusions is laminated and gives the appearance of alternate light and dark layers that range from less than a millimeter to several centimeters wide. The widest and most continuous layers can be traced for distances of many feet or even tens of feet. On the whole, the rock tends to be somewhat darker than the flow-banded rhyolite of Rocky Canyon (Tdfr, pl. 1). The widest layers are typically pale red, grayish red, and grayish-red purple, whereas the narrower layers tend to be light gray or light-yellowish gray.

Phenocrysts of sanidine and quartz, ½–2 mm in diameter, generally make up 5–10 percent of the rock. Under the microscope the groundmass is seen to be a partially devitrified glass that is contorted and appears to flow around phenocrysts.

FINE-GRAINED RHYOLITE

Narrow dikes of very light gray to pale-yellowish-gray and pinkish-gray fine-grained rhyolite (r, pl. 1) are found at several places on the east side of the Black Range. Most occur in the Kneeling Nun Tuff Member. Dikes of this type were not found in the younger volcanic rocks on the west side of the Black Range. It is as yet uncertain whether dikes are absent (or scarce) in the younger rocks or whether they were not found because of the greater amount of soil cover in this area.

Typical of the fine-grained rhyolite dikes are those in a dike swarm near the junction of Water Canyon and Sids Prong in the Las Animas drainage (pl. 1). Here, many dikes occur in a zone nearly 2 miles long and half a mile wide. Only part of the dikes present are shown on plate 1. Dikes range from several feet to nearly 25 feet wide and from a few tens of feet to about half a mile long. The typical rock is very light gray and has a sugary groundmass consisting chiefly of quartz and feldspar. Phenocrysts of quartz and feldspar, most of which are less than a millimeter long, make up less than 5 percent of the rock. Sparse biotite and magnetite are also present. Some of the dikes show excellent columnar jointing perpendicular to the dike walls, thereby giving the appearance of stacked cordwood.

RHYOLITE GLASS DIKES

Green vitrophyre dikes exposed in road-cuts along State Highway 90, west of Emory Pass, have been described by Kuellmer (1954, p. 53–60). Tabular to irregular masses of green, reddish-brown, and black volcanic glass, tentatively interpreted as dikes, occur in the canyon of upper Hoyt Creek near the McCauley Ranch (pl. 1). They were not mapped, and their distribution and extent are not known.

ANDESITE DIKES

Small andesite dikes were observed at several places in rocks as young as the andesite of Aspen Canyon. They are not shown on plate 1. In hand specimen the dike rock is greenish gray, brownish gray, and dark gray. It has a granular crystalline groundmass and sparse feldspar phenocrysts less than 2 mm long.

LATE TERTIARY AND QUATERNARY SEDIMENTS

Semiconsolidated conglomerate and sandstone of late Tertiary age occur on the flanks of the Black Range (pl. 1) and are part of a widespread rock unit in southwestern New Mexico. These rocks are referred to as the Gila Conglomerate west of the Continental Divide and as the Santa Fe Formation east of the divide. In the study area, they rest on the eroded bedrock surface and form a dissected piedmont surface that is inclined gently away from the center of the Black Range. The Gila Conglomerate attains a thickness of at least 600 feet in the northwestern part of the area and may be more than 1,000 feet thick. It thins and pinches out toward the crest of the Black Range. At two places, the Gila is in fault contact with volcanic rocks (pl. 1). The Santa Fe Formation is widespread and is as thick (or thicker) east of the map area as the Gila is in the west, but as can be seen on plate 1, very little Santa Fe occurs within the map area. The Santa Fe, like the Gila, locally is faulted against the older rocks (pl. 1).

The Gila Conglomerate and Santa Fe Formation generally dip away from the Black Range crest at angles of a few degrees. Rounded cobbles and pebbles in the conglomerate consist chiefly of volcanic rocks similar to those now exposed in the Black Range.

Clearly, the formations represent the erosion products that accumulated on the flanks of the range as it was uplifted and eroded during the late Tertiary. Basalt flows and rhyolite tuff occur in the Gila and Santa Fe outside the map area (pl. 1), but apparently they are absent within the area.

Quaternary sediments consist of stream gravels, which are sparse in most of the area and which were not mapped. The most extensive gravels are along the lower reaches of the major streams of the west side of the area, particularly in Diamond and South Diamond Creeks where alluvial flats are as much as half a mile wide and the stream gravels may be 100 feet or more thick.

STRUCTURE

The Black Range has had a complex history of structural deformation and uplift, beginning in Precambrian time and ending with final uplift of the range in late Tertiary and Quaternary time. The earliest phase or phases of deformation in Precambrian time resulted in batholitic intrusion and metamorphism with formation of the granite and hornblende-chlorite schist masses now exposed in the southeastern part of the map area (pl. 1). The Paleozoic and Mesozoic sedimentary rocks that were laid down on the eroded Precambrian rocks were in turn deformed and uplifted in late Mesozoic and (or) early Tertiary. Deformation at this time was much less intense than it was during the culmination in Precambrian time, and as a consequence the sedimentary rocks were compressed only into gentle folds and there was little or no metamorphism. Block faulting, however, was intense during this stage of deformation, and many of the diverse dips shown on plate 1 are due to tilting of fault blocks. Erosion during and after uplift associated with this stage of deformation stripped away part of the Paleozoic sedimentary rocks.

Deformation and erosion during late Mesozoic and early Tertiary time were accompanied by quartz monzonite intrusions and by volcanism to form at least part of the early andesite sequence (pl. 1). This volcanism began after major deformation and erosion of the sedimentary rocks, as indicated by the position of the volcanic rocks on the eroded surface of the older rocks and by the fact that they are less complexly deformed than the older rocks. Part of the volcanic rocks in the early andesite sequence were epidotized and chloritized, probably by alteration at the time they were forming rather than at a later stage. This alteration was chiefly or wholly restricted to the lower part of the early andesite sequence. Erosion of the early andesite formed a new topographic surface and locally stripped the andesite to expose the Paleozoic and Precambrian rocks, before the first eruptions of the Datil Formation.

The major structural features of the Datil Formation are a broad north-trending elongated dome and many faults, which are most numerous along the eastern side of the map area (pl. 1). This dome centers over the outcrop area of the Kneeling Nun Tuff Member and appears to be assymetrical with respect to most of the younger volcanic units, which are confined largely to the area west of the crest of the Black Range. The crest of the elongated dome is broad, and its position as shown on plate 1 is only approximately located. Flow layering of the Kneeling Nun along the crest of the dome is nearly horizontal, and attitudes in volcanic rocks on the flanks are generally 5°–15°. At a few places, flow layering in tilted fault blocks is 45° or more.

It seems probable that this region is a major eruptive center of the Kneeling Nun Tuff Member and that the elongated dome shown on plate 1 may be related to resurgent doming in a cauldron. Cauldron collapse and development of resurgent domes have been recognized in other eruptive centers, and information about them recently has been summarized by Smith and Bailey (1968). A discussion of the processes of resurgent doming is beyond the scope of this report, and our data are too scanty to give positive proof for the presence or absence of a resurgent dome in the Black Range. Nevertheless, cauldron collapse and development of a resurgent dome seem to be indicated by the following: (1) Presence of a domelike structure over the thick sequence of the Kneeling Nun Tuff Member, (2) presence of a prominent magnetic low over the same area, suggesting a cauldron fill, (3) a complex pattern of smaller magnetic highs and lows within this larger magnetic low, which is similar to a complex pattern of magnetic anomalies over the resurgent dome in Valles Caldera of northern New Mexico (R. L. Smith, oral commun., 1970), (4) prominent faulting along the eastern side of the Kneeling Nun outcrop area, which suggests collapse at the cauldron rim and which results in younger rocks (Kneeling Nun) being dropped downwards against older rocks (early andesite sequence and Paleozoic and Precambrian rocks), (5) steep magnetic gradients along the north and west sides of the prominent magnetic low, which also suggests cauldron walls, and (6) presence of large xenolith zones that may be vent agglomerates.

A broad very gentle north-trending syncline is well exposed in Lake Mountain (pl. 1) and can be traced for a few miles north and south. It may be due to local warping related to faulting.

Most of the faults shown on the geologic map (pl. 1) trend in a northerly direction and are steeply dipping to vertical. A few faults trend northeasterly or easterly. The faults shown probably represent only a part of those actually present. Very few of the faults were observed on the ground. Many have been mapped to designate lithologic changes that are seemingly too abrupt to be caused by a normal contact or unconformity. Others, which show up clearly in aerial photographs but not so clearly on the ground, are indicated by displacements of layering in the volcanic rocks and by prominent linear topographic features that appear to be unrelated to those developed by the normal drainage system. It is estimated that displacements on most of the faults range from a few tens of feet to several hundreds of feet.

The fault zone along the eastern side of the primitive area is marked by many faults, of which only the largest or most prominent are shown on plate 1. Nearly all the faults trend in a northerly direction, and most of them are apparently downthrown on the west side. The relative displacement is opposite to that which prevailed in the development of the Rio Grande trough or graben to the east.

AEROMAGNETIC INTERPRETATION

In 1968, the U.S. Geological Survey flew an aerial magnetic survey of the area between about lat 32°57′30″ and 33°25′ N. and long 107°40′ and 108°05′ W., which includes all but the southernmost part of the map area (pl. 1). The survey was flown at a barometric altitude of 10,500 feet and an average flight-line spacing of 1 mile. The aeromagnetic data are shown on plate 1 by contours at an interval of 20 gammas. Correlations between the magnetic data and geology, as well as preliminary interpretations of some of the anomalies, were made. No measurements of rock magnetic properties were made in the laboratory, but J. C. Ratté (written commun., 1970) has provided physical property data on two samples of the Kneeling Nun Tuff Member collected from several miles southwest of the primitive area. Depth estimates, based on a study of the flight-line profiles, were made of the most prominent anomalies, but the extreme variations in topographic relief and in rock magnetic properties in the area make these estimates of depth somewhat questionable. At best, they are useful for placing the anomaly source either near of well below the surface of the ground.

The magnetic map (pl. 1) can be divided into three areas on the basis of anomaly configuration and general magnetic intensity. The most conspicuous area is a magnetically depressed region enclosed by the 600-gamma contour in the southeastern one-third of the area; in general, this is the area in which the Kneeling Nun Tuff Member crops out. The low magnetic intensity of this whole area probably reflects a relatively low susceptibility and (or) reversed polarization for the Kneeling Nun. J. C. Ratté (written commun., 1970) found that two samples of the Kneeling Nun collected from near the southwestern corner of our map area showed a low magnetic susceptibility and reversed polarization. The low magnetic intensity of the area underlain by the rhyolite tuff implies an appreciable thickness of these rocks, which may, in turn, be related to a cauldron fill. The northern edge of this area is marked by a prominent and steeply southward sloping magnetic gradient, probably due to a vertical or nearly vertical boundary that may represent the border of the cauldron. Similarly, the eastward-sloping magnetic gradient along the western edge of the area may also reflect a cauldron wall.

The complex pattern of magnetic lows and highs within the area of low magnetic intensity is probably due to dikes. Several of the anomalies have a highly elongated configuration typical of relatively thin or tabular vertical bodies. The trend of their long axes is north-south, parallel to the regional structural grain, and they may indicate the presence of near-surface dikelike bodies or of elongate xenolith zones such as those mapped by Kuellmer (1954). Unfortunately, the aeromagnetic map does not include the southernmost part of the primitive area where Kuellmer found the xenolith zones (pl. 1) so that the nature of their magnetic fields is not known. Some of the inferred intrusive masses may have reversed magnetic polarization, as reflected by their negative magnetic character in relation to the background intensity of 500–600 gammas. Others, such as the porphyry intrusion in Water Canyon, have positive anomalies.

The northeastern part of the map area is characterized by magnetic intensities in excess of 800 gammas. The magnetic field culminates in a peak value of 1,155 gammas along the North Fork of Palomas Creek just east of the Continental Divide. This is the highest magnetic value recorded within the map area. Estimates of maximum depth for this anomaly place its source at, or within several hundred feet of, the surface. It is tentatively interpreted as a shallow quartz monzonite intrusion, such as those in the southern part of the primitive area, but geologic evidence for such an intrusion is lacking.

Between the North Fork of Palomas Creek and the South Fork of Cuchillo Negro Creek, and approximately 5 miles east-northeast of the 1,155-gamma high, there is a broad low with a minimum value of 745 gammas. This low is interpreted as an area of pronounced and extensive thinning of the early andesite sequence over a broad buried topographic high formed of the underlying nonmagnetic

Paleozoic sedimentary rocks. Supporting evidence for this interpretation is the presence of a hill of Paleozoic rock projecting through the volcanic rocks, 2.2 miles northeast of the center of the low, and Paleozoic rock cropping out along the eastern border of the map area (pl. 1).

In the magnetically elevated northeastern area are two other anomalies worthy of comment, one near the junction of South Diamond Creek and Burnt Canyon and the other between Running Water Canyon and East Diamond Creek (pl. 1). The first anomaly, a high with a peak value of 907 gammas, occurs in an area of uniform flow-banded rhyolite and ash-flow tuff. Depth to its source is estimated to be several hundred feet below the surface; this anomaly may reflect the presence of an intrusion or a conduit through which the rhyolite rose. The second anomaly, which has the configuration of a magnetic nose projecting westward, is probably caused by the isolated plate of exposed basaltic andesite resting on less magnetic rhyolite beneath it.

The remainder of the map area, a strip 4–8 miles wide along its west side, has an average magnetic intensity intermediate between the two areas just described. Its eastern edge is quasilinear, trends north, and extends from McKnight Canyon north to McCauley Ranch on Hoyt Creek. In the south, the area is marked by an abrupt eastward-sloping gradient that borders the zone of low magnetic intensity of the Kneeling Nun. In the north it is marked by a more gentle westward-sloping magnetic gradient that is interpreted as a vertical offset in moderately magnetic volcanic rocks, which have been elevated on the east side. An average of six estimates of depth places the source of this anomaly, in the northern area, at about 1,000 feet below the ground surface.

A distinct magnetic high over an area of andesite between Hoyt and Cox Canyons in the northwestern part of the map area (pl. 1) is interpreted as indicating a steep-sided hill that was buried by rhyolite and then partly exposed by erosion. The geologic data in the area support this interpretation.

The western part of the map area is marked by two other magnetic highs, one centering near Meason Flat, south of Black Canyon, and the other on the Continental Divide near Signboard Saddle. The anomaly near Meason Flat is over the area where the basaltic andesite unit (Tba, pl. 1) attains its maximum thickness of at least 600 feet, and it probably reflects the presence of this relatively magnetic rock. The center of the anomaly near Signboard Saddle is over an area where basaltic andesite layers are abundant in the upper part of the andesite sequence of Aspen Canyon. This anomaly is slightly irregular in profile and may have a multiple source. Part is due to the presence of basaltic andesite at the surface near Signboard Saddle, but the origin of the more deep-seated toe of the anomaly to the northwest is not understood. It may reflect a deeply buried steep-sided intrusive body, but corroborative evidence is lacking.

None of the magnetic anomalies described above, when viewed in conjunction with the geologic and geochemical evidence, suggest favorable sites for ore deposits. However, certain of the anomalies may be worthy of further study. For example, the magnetic data indicate that early andesite and older rocks of Paleozoic and Precambrian age may be relatively close to the surface at places in the northern part of the map area. More detailed magnetic work in this area might furnish clues to structural features that could be related to ore deposits and that could be explored by drilling through the relatively thin barren Tertiary volcanic cover. Quartz monzonite intrusions, which may be indicated by magnetic highs, as suggested above, might be favorable areas for concealed ore deposits in the early andesite sequence.

Many cauldrons are known to have associated metallic mineral deposits, and perhaps the cauldron that we believe occurs in the southern part of the map area should be considered as one of these. However, there is a paucity of geochemical anomalies in the area (figs. 9–15), which one would not expect if metallic mineralization accompanied cauldron development.

MINERAL RESOURCES

Minable mineral deposits were not found within the Black Range Primitive Area. The Tertiary volcanic rocks, the Datil Formation, have nonminable occurrences of kaolin, perlite, moonstone, topaz, and tin in or near the primitive area. Many lead, zinc, copper, and silver deposits occur in the pre-Datil rocks—early Tertiary volcanic rocks, Paleozoic sedimentary rocks, and Precambrian igneous and metamorphic rocks—along the eastern and southern sides of the map area. Most deposits are several miles from the primitive area boundary, but a few are within a mile or two of the boundary. These deposits have been prospected or mined on a small scale, and it is possible that additional ore was found in some deposits during renewed prospecting in 1968 and 1969. Because these older rocks contain noteworthy mineral deposits near the primitive area, it is assumed that similar deposits might occur in them beneath the Datil Formation in the primitive area.

The Datil Formation is known to have minable ore deposits elsewhere in southwestern New Mexico; for example, deposits in the Mogollon district at the western side of the Mogollon Plateau and deposits in the Magdalena district, west of Socorro (fig. 1). It is therefore conceivable that these rocks could contain ore deposits in the Black Range. Such deposits should be discoverable by the method of geochemical sampling utilized in this study, but none were discovered, and it is concluded that mineralization in Datil or post-Datil time did not take place in this part of the Black Range.

An evaluation of the potential for concealed mineral deposits in early Tertiary and older rocks where they are covered with the Datil volcanic rocks can be made only by inference from the regional pattern of mineralization. The Black Range Primitive Area is about 15 miles northeast of the Silver City-Santa Rita area, one of the major mining districts of the Western United States. The Chino copper deposit, which is near the eastern side of this district, is a huge low-grade disseminated copper deposit that is presently a major copper producer. Elsewhere in the Silver City-Santa Rita area are many lead, zinc, copper, iron, and silver deposits. Mining in this region began during the last century, and many of the deposits are being worked today.

Northeast of the Chino deposit, mineral deposits are fewer and smaller. The Georgetown district, about 4 miles northeast of the Chino mine and on the west side of the Mimbres valley, yielded silver-bearing ores before the mines closed in 1893 because of a drop in the price of silver (Lindgren and others, 1910, p. 319). Many small base-metal and silver deposits have been mined in the Chloride, Hermosa, and Kingston districts at the east side of the map area and in the Carpenter district south of the area (fig. 16). In the Sierra Cuchillo, a few miles east of Winston, small lead-zinc-copper deposits occur in early Tertiary and older rocks. Considerable placer gold was produced in the Animas Hills near Hillsboro, about 10 miles east of Kingston. Also, a large but low-grade copper deposit (Copper Flat) is known to occur in the Hillsboro area (Kuellmer, 1955).

GEOCHEMICAL SAMPLING AND ANALYTICAL RESULTS

Systematic geochemical sampling was undertaken in the Black Range area to search for anomalous amounts of selected elements that might aid in the detection of mineral deposits. Two basic types of material were sampled: (1) Stream sediment, and (2) bedrock. The stream sediment that was sampled generally consisted of fine gravel, sand, and silt- and clay-size material. At a few sample sites, where no alluvium was available, colluvium or soil was collected. For the stream-sediment data presented in table 7, only the minus 80-mesh fraction of the sample was analyzed. In addition, pan concentrates of stream gravels were obtained at many sites throughout the area, particularly at the confluences of major streams. The pan concentrates were further concentrated before analysis by removing the magnetite.

The data on the bedrock samples analyzed are grouped under two major headings in table 7—unmineralized rock, and vein material and mineralized rock clearly associated with metallic mineralization. Most of the unmineralized rock samples are fresh and unaltered; a few have been kaolinized and (or) iron stained due to alteration in volcanic vent(?) areas.

Analyses of 2,027 samples are presented in table 7; sample locations are shown on plate 2. Included are 1,330 stream-sediment samples, 334 panned-concentrate samples, 311 unmineralized-rock samples, and 52 vein-material or mineralized-rock samples.

Thirty elements were sought for in the semiquantitative spectrographic analyses of all the samples taken in the Black Range. Of these, the data on 22 (Ag, B, Ba, Be, Co, Cr, Cu, La, Mn, Mo, Nb, Ni, Pb, Sc, Sn, Sr, V, Y, Zn, Zr, Fe, and Ti) are listed in table 7. Data on bismuth, cadmium, and tungsten, where detected, are included under remarks. The limited data on antimony and arsenic are not included in table 7. Antimony was detected in only seven panned concentrates and one rock sample in amounts ranging from less than 100 ppm to 200 ppm and in 14 mineralized rock and vein material in amounts of as much as 700 ppm. An arsenic content of 300 ppm was found in one panned concentrate. In 16 samples of mineralized rock and vein material, arsenic was found in amounts ranging from less than 200 to 5,000 ppm.

In addition to the above-mentioned elements, calcium and magnesium were determined for all samples. The data on these elements have not been included in table 7 for reasons of space. The amounts of these two elements found were normal for the rock types sampled. Although the quantities of these elements give a clue to rock composition—for example, in general, in igneous rocks the greater the amounts of calcium and magnesium the more mafic the rock—such data are not critical in the evaluation of trace-metal distribution in the search for mineral deposits.

Gold was noted in a few of the spectrographic analyses, but because gold was also determined by the more sensitive atomic absorption method (table 7), the few positive spectrographic results were not deemed significant and are not cited. Mercury was also determined by separate chemical analysis for the first several hundred samples taken, but because the data did not appear to be significant, analysis for mercury was discontinued, and the data acquired are not shown.

The frequency distributions (table 5) of the values for seven metals (Au, Ag, Cu, Mo, Pb, Sn, and Zn) listed in table 7 are given for each of the four major categories of sample types taken in the Black Range. These data, as well as the geological information about the deposits in the mineralized districts peripheral to the primitive area, indicate that these seven metals are the most critical in the evaluation of the mineral-resource potential of the area. Consequently, the frequency distributions of the data for these metals have been studied carefully to determine the minimum value of each metal in each sample type that can be considered anomalously high. This value is referred to as the threshold value by Hawkes and Webb (1962, p. 27).

To determine threshold values it is first necessary to establish the "background" for each of the metals—that is, the mean or average values and general range of each element (in each of the sample types) that is considered as the normal amount (within certain limits) to be expected in repeated sampling of areas where veins or mineralized rock are lacking. These statistics are given in table 5 and were established by plotting the percentage-cumulative-frequency distributions (table 5) on lognormal-probability paper (Hald, 1952, p. 162). In these diagrams a lognormal distribution of the minor-element geochemical data will appear as a straight line. However, where such data are not significantly truncated or censored (Hald, 1962, p. 144–151), the plots of the cumulative-frequency distributions are not straight lines but show an upward inflection in the higher values. This feature is shown by the lognormal-probability plot (fig. 8) of stream-sediment lead in the Black Range map area. The change in slope from 100 to 150 ppm (parts per million) lead appears to be caused by the interaction of two essentially lognormal subdistributions—one representing background lead, the other probably related to lead derived from mineralized bodies. The minimum anomalous or threshold value is thus 150 ppm and is taken at the next value just above the inflection point of the bimodal distribution. The increase in slope must therefore represent the point where the range in values of background metal can no longer mask the more variable distribution of metal contributed by mineralized bodies. The use of the point of change in slope in the lognormal-probability plot of polymodal geochemical data for separating background from anomalous values appears to have been first suggested by Tennant and White (1959, p. 1254–1289). More recent discussions of the problem and examples are given by Cohen, Brooks, and Reeves (1969, p. 520–521) and Lepeltier (1969, p. 545–546).

In distributions (table 5) where the lower ends are truncated by the lower limits of detection, the geometric means (median) are

TABLE 5.—*Frequency distribution of values for gold, silver, copper, molybdenum, lead, tin, and zinc in samples from the Black Range Primitive Area, New Mexico*

[From data in table 7. F indicates frequency or number of samples of a particular value; cf indicates the cumulative frequency or the cumulative number of samples through a particular value; percent cf indicates cumulative frequency calculated to 100 percent; N, looked for but not found and hence may occur only in amounts below the lower sensitivity limit; L, detected but in amounts below the sensitivity limit; >, more than the amount shown; <, less than the amount shown; ...., element not looked for or analysis was not made]

Values (ppm)	Stream sediments			Panned concentrates			Unmineralized rocks			Vein materials and mineralized rocks		
	F	Cf	Percent cf	F	Cf	Percent cf	F	Cf	Percent cf	F	Cf	Percent cf
						Gold						
N	201	201	20.0	39	39	24.2	16	16	6.2	....	....	......
L	579	780	77.5	44	83	51.6	211	227	87.6	17	17	37.8
<0.04	47	827	82.1	16	99	61.5	....	......	......	....	....	......
< .1	5	832	82.6	2	101	62.7	....	......	......	....	....	......
.02	129	961	95.4	25	126	78.3	9	236	91.1	7	24	53.3
.03	29	990	98.3	9	135	83.8	1	237	91.5	1	25	55.6
.04	6	996	98.9	13	148	91.9	11	248	95.8	3	28	62.2
.05	5	1,001	99.4	....	......	......	....	......	......	....	....	......
.06	2	1,003	99.6	2	150	93.2	6	254	98.1	1	29	64.4
.07	......	....	....	1	151	93.8	....	......	......	....	....	......
.08	3	1,006	99.9	1	152	94.4	2	256	98.8	2	31	68.9
.1	......	....	....	8	158	99.4	....	......	......	3	34	75.6
.2	......	....	....	1	161	100.0	....	......	......	3	37	82.2
.3	......	....	....	....	......	......	2	258	99.6	2	39	86.7
.4	......	....	....	....	......	......	1	259	100.0	3	42	93.3
.6	......	....	....	....	......	......	....	......	......	1	43	95.6
1.3	1	1,007	100.0	....	......	......	....	......	......	....	....	......
1.4	......	....	....	....	......	......	....	......	......	1	44	97.8
24	......	....	....	....	......	......	....	......	......	1	45	100.0
	Stream sediments			Panned concentrates			Unmineralized rocks			Vein materials and mineralized rocks		
Geometric mean....ppm........	<0.02 (probably about 0.007)			<.02 (probably about 0.01)			<0.02 (probably about 0.002)			0.02		
Minimum anomalous value (T)..ppm..	.04			.06			.06			.06		

TABLE 5.—*Frequency distribution of values for gold, silver, copper, molybdenum, lead, tin, and zinc in samples from the Black Range Primitive Area, New Mexico*—Continued

Values (ppm)	Stream sediments			Panned concentrates			Unmineralized rocks			Vein materials and mineralized rocks		
	F	Cf	Percent cf	F	Cf	Percent cf	F	Cf	Percent cf	F	Cf	Percent cf
						Silver						
N	1,269	1,269	95.4	257	257	76.9	284	284	91.3	10	10	19.2
L	13	1,287	96.4	2	259	77.5	12	296	95.2	....	....	......
.5	11	1,293	97.2	7	266	79.6	8	304	97.7	5	15	28.8
.7	7	1,300	97.7	1	267	79.9	4	308	99.0	1	16	30.8
1	5	1,305	98.1	14	281	84.1	1	309	99.4	1	17	32.7
1.5	7	1,312	98.6	4	285	85.3	....	......	......	1	18	34.6
2	3	1,315	98.9	8	293	87.7	1	310	99.7	5	23	44.2
3	2	1,317	99.0	1	294	88.0	....	......	......	1	24	46.2
5	2	1,319	99.17	4	298	89.2	....	......	......	3	27	51.9
7	1	1,320	99.25	3	301	90.1	....	......	......	3	30	57.7
10	3	1,323	99.47	5	306	91.6	1	311	100.0	3	33	63.5
15	2	1,325	99.62	1	307	91.9	....	......	......	1	34	65.4
20	2	1,327	99.77	6	313	93.7	....	......	......	1	35	67.3
30	....	....	....	1	314	94.0	....	......	......	1	36	69.2
50	1	1,328	99.85	5	319	95.5	....	......	......	....	....	......
70	....	....	....	2	321	96.1	....	......	......	5	41	78.8
100	....	....	....	6	327	97.9	....	......	......	1	42	80.8
150	....	....	....	1	328	98.2	....	......	......	1	43	82.7
200	....	....	....	1	329	98.5	....	......	......	2	45	86.5
300	....	....	....	2	331	99.1	....	......	......	1	46	88.5
500	....	....	....	1	332	99.4	....	......	......	1	47	90.4
700	....	....	....	....	......	......	....	......	......	....	....	......
1,000	1	1,329	99.92	....	......	......	....	......	......	2	49	94.2
1,500	....	....	....	....	......	......	....	......	......	1	50	96.2
2,000	1	1,330	100.00	1	333	99.7	....	......	......	....	....	......
3,000	....	....	....	....	......	......	....	......	......	1	51	98.1
5,000	....	....	....	....	......	......	....	......	......	....	....	......
>5,000	....	....	....	1	334	100.0	....	......	......	1	52	100.0
	Stream sediments			Panned concentrates			Unmineralized rocks			Vein materials and mineralized rocks		
Geometric mean....ppm........	<.5 (probably about 0.007)			<.5 (probably about 0.05)			<.5 (probably about 0.05)			5		
Minimum anomalous value (T)..ppm..	1			10			.5			10		

TABLE 5.—*Frequency distribution of values for gold, silver, copper, molybdenum, lead, tin, and zinc in samples from the Black Range Primitive Area, New Mexico*—Continued

Values (ppm)	Stream sediments			Panned concentrates			Unmineralized rocks			Vein materials and mineralized rocks		
	F	Cf	Percent cf	F	Cf	Percent cf	F	Cf	Percent cf	F	Cf	Percent cf
					Copper							
L	11	11	0.83	4	4	1.2	51	51	16.4	1	1	1.9
5	60	71	5.3	2	6	1.8	77	128	41.2	1	2	3.8
7	42	113	8.5	1	7	2.1	30	158	50.8	1	3	5.8
10	212	325	24.4	21	28	8.4	34	192	61.7	3	6	11.5
15	238	563	42.3	7	35	10.5	29	221	71.1	4	10	19.2
20	336	899	67.6	20	55	16.5	39	260	83.6	4	14	26.9
30	298	1,197	90.0	89	144	43.1	35	295	94.9	11	25	48.1
50	80	1,277	96.0	68	212	63.5	11	306	98.4	5	30	57.7
70	31	1,308	98.3	16	228	68.3	2	308	99.0	6	36	69.2
100	6	1,314	98.8	48	276	82.6	2	310	99.7	5	41	78.8
150	5	1,319	99.17	22	298	89.2	1	311	100.0	1	42	80.8
200	3	1,322	99.40	12	310	92.8	....	......	......	....	....	......
300	1	1,323	99.47	5	315	94.3	....	......	......	....	....	......
500	3	1,326	99.70	7	322	96.4	....	......	......	....	....	......
700	2	1,328	99.85		324	97.0	....	......	......	3	45	86.5
1,000	....	....	....	5	329	98.5	....	......	......	....	....	......
1,500	....	....	....	....	......	......	....	......	......	....	....	......
2,000	1	1,329	99.92	3	332	99.4	....	......	......	1	46	88.5
3,000	....	....	....	....	......	......	....	......	......	2	48	92.3
5,000	....	....	....	....	......	......	....	......	......	....	....	......
7,000	....	....	....	1	333	99.7	....	......	......	1	49	94.2
10,000	....	....	....	1	334	100.0	....	......	......	1	50	96.2
15,000	....	....	....	....	......	......	....	......	......	1	51	98.1
20,000	....	....	....	....	......	......	....	......	......	1	52	100.1
>20,000	1	1,330	100.00	....	......	......	....	......	......	....	....	......
	Stream sediments			Panned concentrates			Unmineralized rocks			Vein materials and mineralized rocks		
Geometric mean....ppm........	20			50			7			50		
Minimum anomalous value (T)..ppm..	150			500			70			500		

TABLE 5.—*Frequency distribution of values for gold, silver, copper, molybdenum, lead, tin, and zinc in samples from the Black Range Primitive Area, New Mexico*—Continued

Values (ppm)	Stream sediments			Panned			Unmineralized rocks			Vein materials and mineralized rocks		
	F	Cf	Percent cf	F	Cf	Percent cf	F	Cf	Percent cf	F	Cf	Percent cf
					Molybdenum							
N	1,103	1,103	82.9	256	256	76.6	209	209	67.2	14	14	26.9
L	37	1,140	85.7	2	258	77.2	27	236	75.9	2	16	30.8
5	95	1,235	92.9	16	274	82.0	57	293	94.2	8	24	46.2
7	35	1,270	95.5	10	284	85.0	9	302	97.1	2	26	50.0
10	35	1,305	98.1	21	305	91.3	6	308	99.0	4	30	57.7
15	14	1,319	99.17	10	315	94.3	2	310	99.7	4	34	65.4
20	3	1,322	99.40	7	322	96.4	....	......	......	5	39	75.0
30	5	1,327	99.77	5	327	97.9	....	......	......	....	....	......
50	....	....	....	2	329	98.5	....	......	......	3	42	80.8
70	....	....	....	2	331	99.1	1	311	100.0	3	45	86.5
100	1	1,328	99.85	1	332	99.4	....	......	......	3	48	92.3
150	1	1,329	99.92	....	......	......	....	......	......	2	50	96.2
200	....	....	....	....	......	......	....	......	......	1	51	98.1
300	....	....	....	1	333	99.7	....	......	......	1	52	100.0
500	....	....	....	1	334	100.0	....	......	......	....	....	......
700	1	1,330	100.00	....	......	......	....	......	......	....	....	......
	Stream sediments			Panned concentrates			Unmineralized rocks			Vein materials and mineralized rocks		
Geometric mean....ppm........	<5 (probably about 1)			<5 (probably about 2)			<5 (probably about 1)			7		
Minimum anomalous value (T)..ppm..	20			30			10			50		

TABLE 5.—*Frequency distribution of values for gold, silver, copper, molybdenum, lead, tin, and zinc in samples from the Black Range Primitive Area, New Mexico*—Continued

Values (ppm)	Stream sediments			Panned concentrates			Unmineralized rocks			Vein materials and mineralized rocks		
	F	Cf	Percent cf	F	Cf	Percent cf	F	Cf	Percent cf	F	Cf	Percent cf
						Lead						
N	....	....	....	....	......	......	6	6	1.9	....	....	......
L	3	3	0.26	22	22	6.6	6	12	3.9	....	....	......
10	25	28	2.1	29	51	15.3	26	38	12.2	3	3	5.8
15	150	178	13.4	38	89	26.6	53	91	29.3	4	7	13.5
20	369	547	41.1	46	135	40.4	90	181	58.2	2	9	17.3
30	442	989	74.4	57	192	57.5	86	267	85.8	7	16	30.8
50	211	1,200	90.3	22	214	64.1	26	293	94.2	1	17	32.7
70	90	1,290	97.0	22	236	70.7	12	305	98.1	4	21	38.5
100	28	1,318	99.10	16	252	75.4	4	309	99.4	2	23	44.2
150	4	1,322	99.40	11	263	78.7	1	310	99.7	....	....	......
200	....	....	....	29	292	87.4	....	......	......	4	27	51.9
300	3	1,325	99.62	17	309	92.5	....	......	......	1	28	53.8
500	....	....	....	7	316	94.6	1	311	100.0	6	34	65.4
700	....	....	....	3	319	95.5	....	......	......	2	36	69.2
1,000	....	....	....	....	......	......	....	......	......	2	38	73.1
1,500	2	1,327	99.77	2	321	96.1	....	......	......	2	40	76.9
2,000	1	1,328	99.85	2	323	96.7	....	......	......	3	43	82.7
3,000	....	....	....	2	325	97.3	....	......	......	1	44	84.6
5,000	....	....	....	1	326	97.6	....	......	......	....	....	......
7,000	1	1,329	99.92	....	......	......	....	......	......	....	....	......
10,000	1	1,330	100.00	3	329	98.5	....	......	......	....	....	......
15,000	....	....	....	....	......	......	....	......	......	2	46	88.5
20,000	....	....	....	2	331	99.1	....	......	......	3	49	94.2
>20,000	....	....	....	3	334	100.0	....	......	......	3	52	100.0
	Stream sediments			Panned concentrates			Unmineralized rocks			Vein materials and mineralized rocks		
Geometric mean....ppm........	30			30			20			200		
Minimum anomalous value (T)..ppm..	150			500			100			500		

TABLE 5.—*Frequency distribution of values for gold, silver, copper, molybdenum, lead, tin, and zinc in samples from the Black Range Primitive Area, New Mexico*—Continued

Values (ppm)	Stream sediments			Panned concentrates			Unmineralized rocks			Vein materials and mineralized rocks		
	F	Cf	Percent cf	F	Cf	Percent cf	F	Cf	Percent cf	F	Cf	Percent cf
						Tin						
N	1,255	1,255	94.4	106	106	31.7	266	266	85.5	49	49	94.2
L	19	1,274	95.8	12	118	35.3	12	278	89.4	....	....	......
10	28	1,302	97.9	18	136	40.7	21	299	96.1	....	....	......
15	8	1,310	98.5	19	155	46.4	5	304	97.7	....	....	......
20	7	1,317	99.02	37	192	57.5	3	307	98.7	....	....	......
30	5	1,322	99.40	20	212	63.5	3	310	99.7	1	50	96.2
50	3	1,325	99.62	23	235	70.4	....	......	......	....	....	......
70	3	1,328	99.85	24	259	77.5	1	311	100.0	1	51	98.1
100	....	....	....	31	290	86.8	....	......	......	....	....	......
150	....	....	....	20	310	92.8	....	......	......	....	....	......
200	....	....	....	14	324	97.0	....	......	......	....	....	......
300	1	1,329	99.92	5	329	98.5	....	......	......	....	....	......
500	....	....	....	2	331	99.1	....	......	......	....	....	......
700	....	....	....	3	334	100.0	....	......	......	1	52	100.0
1,000	1	1,330	100.00	....	......	......	....	......	......	....	....	......
	Stream sediments			Panned concentrates			Unmineralized rocks			Vein materials and mineralized rocks		
Geometric mean....ppm........	<10 (probably about 1)			20			<10 (probably about 2)			<10 (probably about 0.5)		
Minimum anomalous value (T)..ppm..	15			200			15			15		

TABLE 5.—*Frequency distribution of values for gold, silver, copper, molybdenum, lead, tin, and zinc in samples from the Black Range Primitive Area, New Mexico*—Continued

Values (ppm)	Stream sediments			Panned concentrates			Unmineralized rocks			Vein materials and mineralized rocks		
	F	Cf	Percent cf	F	Cf	Percent cf	F	Cf	Percent cf	F	Cf	Percent cf
						Zinc						
N	1,222	1,222	91.9	32	32	10.7	303	303	97.4	15	15	28.8
L	59	1,281	96.3	32	64	21.3	3	306	98.4	2	17	32.7
200	28	1,309	98.4	24	88	29.3	4	310	99.7	3	20	38.5
300	8	1,317	99.02	46	134	44.7	....	......	......	4	24	46.2
500	4	1,321	99.32	48	182	60.7	1	311	100.0	3	27	51.9
700	4	1,325	99.62	56	238	79.3	....	......	......	2	29	55.8
1,000	3	1,328	99.85	30	268	89.3	....	......	......	3	32	61.5
1,500	....	....	....	15	283	94.3	....	......	......	4	36	69.2
2,000	....	....	....	14	297	99.0	....	......	......	3	39	75.0
3,000	1	1,329	99.92	....	......	......	....	......	......	2	41	78.8
5,000	....	....	....	....	......	......	....	......	......	....	....	......
7,000	1	1,330	100.00	....	......	......	....	......	......	2	43	82.7
10,000	....	....	....	2	299	99.7	....	......	......	1	44	84.6
>10,000	....	....	....	1	300	100.0	....	......	......	8	52	100.0

	Stream sediments	Panned concentrates	Unmineralized rocks	Vein materials and mineralized rocks
Geometric mean....ppm........	<200 (probably about 30)	500	<200 (probably about 50)	500
Minimum anomalous value (T)..ppm..	300	2,000	200	2,000

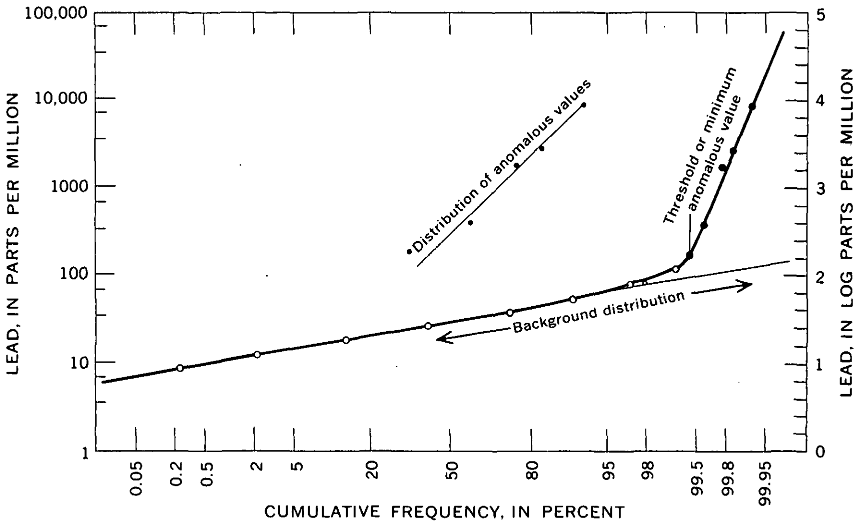

FIGURE 8.—Lognormal-probability plot of stream-sediment lead-frequency distributions in the Black Range Primitive Area, New Mexico. Heavy line is plot of percentage-cumulative frequency of 1,330 samples from data in tables 5 and 6. Open circles indicate background part of distribution; solid circles indicate anomalous part of distribution. Light lines indicate subdistributions obtained by partitioning total distribution into background and anomalous parts (from data in table 6).

shown as being less than the detection limit. These values were estimated by projecting the line representing background-frequency distributions in the lognormal-probability plot downward into the realm below the detection limits. For example, if the lower detection limit for lead were 30 ppm rather than 10 ppm, it would be possible to project a line through the 70-, 50-, and 30-ppm-cumulative-frequency percentages (fig. 8), which when extended downward to the 50th percentile would serve to estimate the median value. Thus, a graphic approximation (about 25 ppm lead) would serve satisfactorily, other data not being available. The approximation of the geometric mean would then be stated (table 5) as < 30, probably about 25 ppm.

To investigate the problem of polymodalism in the distributions of the seven metals used in the study and the possible significance of this polymodalism, the distributions were partitioned at inflection points into separate cumulative-frequency distributions. Thus for lead (table 5), which has a bimodal distribution, the bulk of the samples (99.4 percent) constitute background with a geometric mean of about 30 ppm and a general range of values from about 5 to between 100 and 150 ppm. The anomalous values, totaling only

0.6 percent of the original distribution, appear to be from the upper end of a distribution that has a geometric mean of about 300 ppm and a possible general range of from less than 1 ppm (if not truncated below 100 ppm) to more than 100,000 ppm (10 percent). The lower, or "negatively anomalous," part of this distribution would, of course, be completely concealed in the mass of background data. Furthermore, the "negative" part of this distribution conceivably represents rock depleted in lead, which, assuming an ore lead source from depth, would be unlikely to occur at the surface in the area sampled.

The consideration of what is an anomalously high value relative to background is thus critical in the evaluation of mineral occurrences by geochemical methods. Care must be taken to avoid the pitfalls of "false anomalies" (Hawkes and Webb, 1962, p. 158–161). Such conditions may arise from the juxtaposition of areas of low and high background values which develop from two kinds of bedrock, wherein each has a different but expectable abundance pattern of the element being sought. An example of this problem in the Black Range area can be seen in table 4, where the abundance of strontium in the average andesite is more than 20 times that in the average rhyolite. Incorrect interpretation of this relationship could lead to the erroneous assumption that there might be a greater potential for strontium-bearing ore, or a closely associated mineral deposit, in the andesite than in the rhyolite. This is not so, and the seemingly anomalous situation is explained by the fact that strontium is closely related chemically to calcium and hence should be more abundant in a more calcium-rich rock such as andesite.

Another false anomaly situation is created by the fact that the high "tail" of a background-frequency distribution may well overlap lower values in the frequency distribution of data from a mineralized area. Values from both distributions in this overlap zone are generally indistinguishable from one another. Thus, the expected high values of a background distribution could well be as high or higher than some of the expected lower values from a mineral occurrence. Consequently, when a large area, such as the Black Range, is being sampled, a few randomly located, high-tail background values with no significance should be expected among the data.

The samples deemed anomalously high are plotted on the sketch maps (figs. 9–15). Also given on these maps are histograms showing graphically the frequency distributions and threshold values of each metal by sample type.

Six of the seven metals thus examined—tin (fig. 14) being the exception—show a generally random or spotty distribution of a

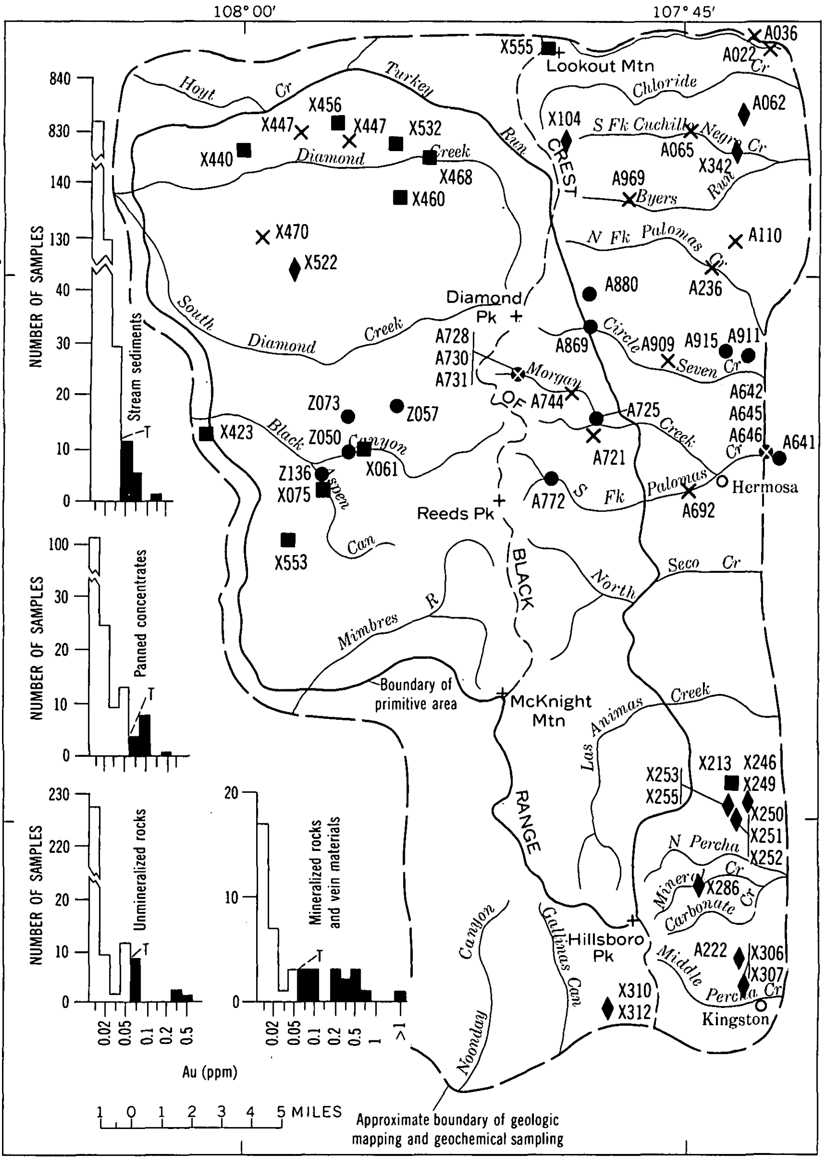

FIGURE 9.—Locations of samples containing anomalous amounts of gold in the Black Range Primitive Area. The × indicates stream sediments containing 0.04 ppm or more; solid circle indicates panned concentrates containing 0.06 ppm or more (solid circle with × indicates stream-sediment sample and panned-concentrate sample from same locality); solid square indicates unmineralized rocks containing 0.06 ppm or more; solid diamond indicates mineralized rocks or vein material containing 0.06 ppm or more. Histograms show frequency distribution of samples in six-step log intervals. T indicates threshold of anomalous values. Analytical values are listed in table 7; more precise sample localities are shown on plate 2.

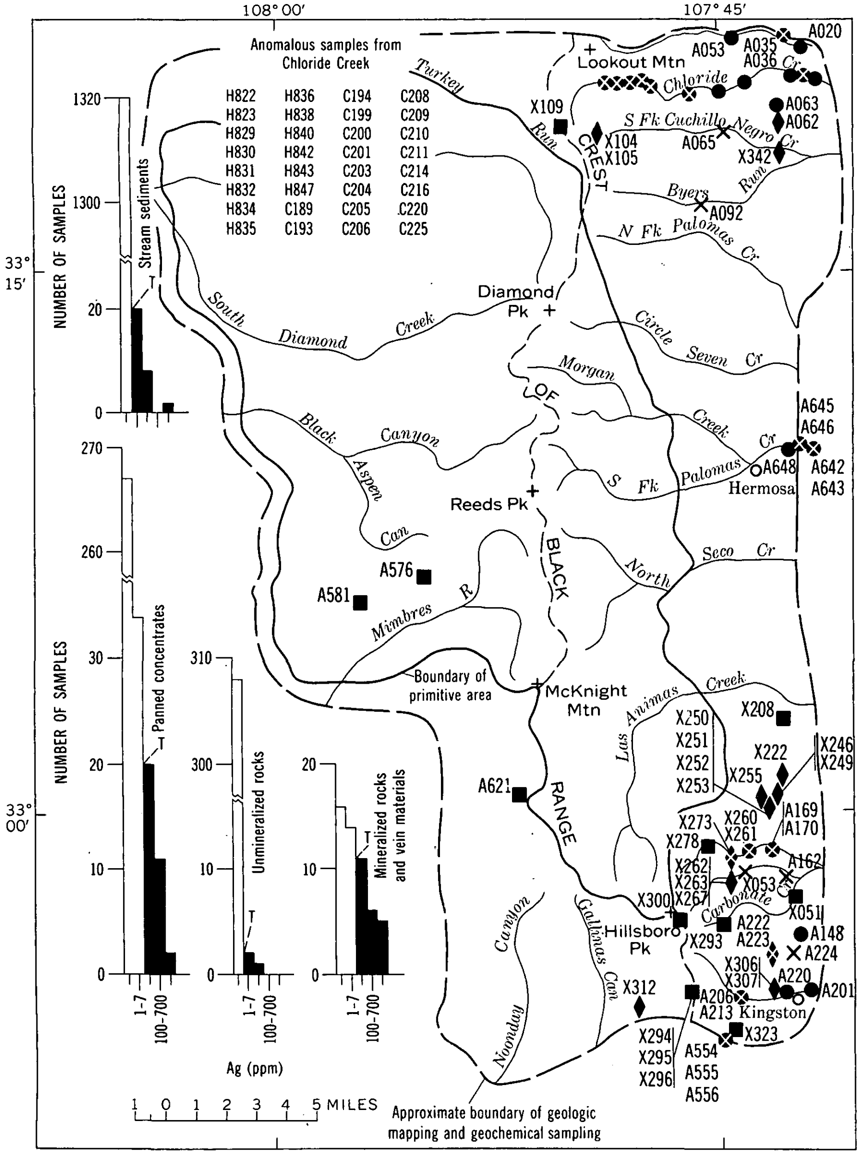

FIGURE 10.—Locations of samples containing anomalous amounts of silver in the Black Range Primitive Area and contiguous areas. The × indicates stream sediments containing 1 ppm or more; solid circle indicates panned concentrates containing 10 ppm or more (solid circle with × indicates stream-sediment sample and panned-concentrate sample from same locality); solid square indicates unmineralized rocks containing 0.5 ppm or more; solid diamond indicates mineralized rocks or vein material containing 10 ppm or more. Histograms show frequency distributions of samples in six-step log intervals. T indicates threshold of anomalous values. Analytical values are listed in table 7; more precise sample localities are shown on plate 2.

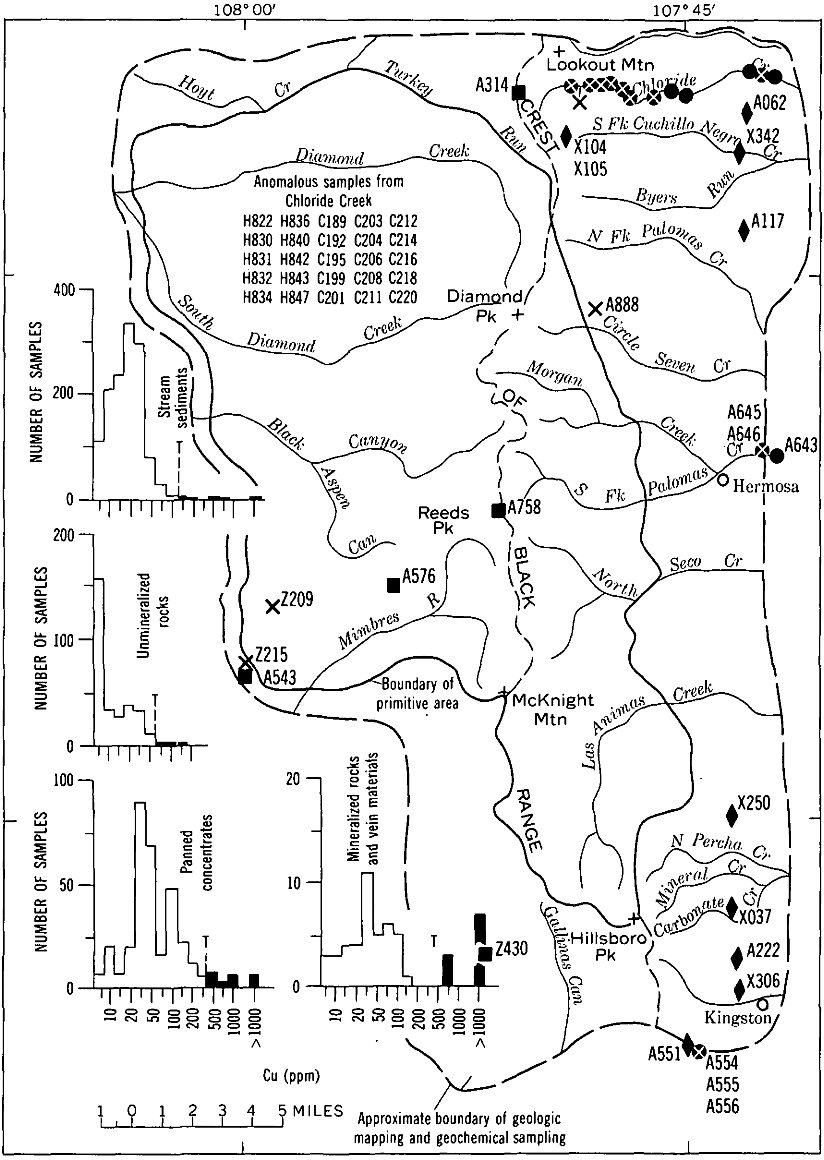

FIGURE 11.—Locations of samples containing anomalous amounts of copper in the Black Range Primitive Area. The × indicates stream sediments containing 150 ppm or more; solid circle indicates panned concentrates containing 500 ppm or more (solid circle with × indicates stream-sediment sample and panned-concentrate sample from same locality); solid diamond indicates unmineralized rocks containing 70 ppm or more; solid diamond indicates mineralized rocks or vein material containing 500 ppm or more. Histograms show frequency distributions of samples in six-step log intervals. T indicates threshold of anomalous values. Analytical values are listed in table 7; more precise sample localities are shown on plate 2.

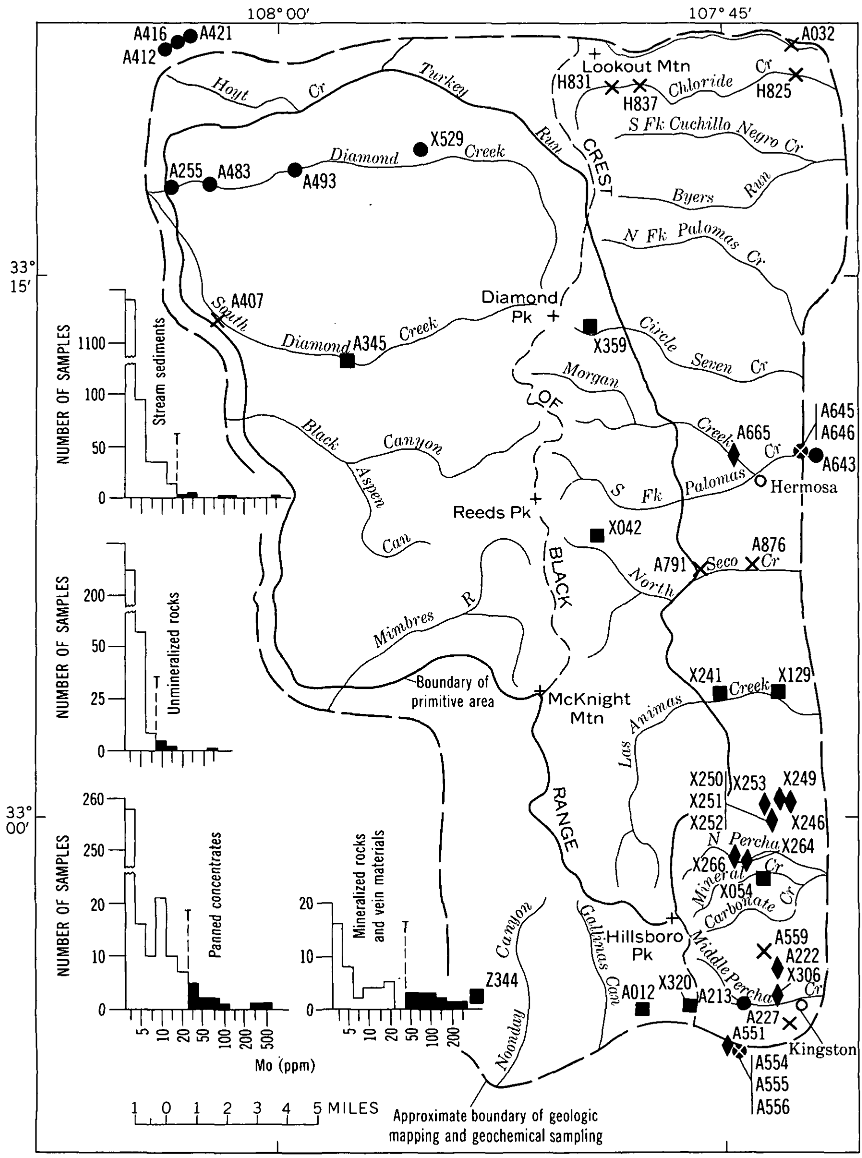

FIGURE 12.—Locations of samples containing anomalous amounts of molybdenum in the Black Range Primitive Area. The × indicates stream sediments containing 20 ppm or more; solid circle indicates panned concentrates containing 30 ppm or more (solid circle with × indicates stream-sediment sample and panned-concentrate sample from same locality); solid square indicates unmineralized rocks containing 10 ppm or more; solid diamond indicates mineralized rocks or vein material containing 50 ppm or more. Histograms show frequency distributions of samples in six-step log intervals. T indicates threshold of anomalous values. Analytical values are listed in table 7; more precise sample localities are shown on plate 2.

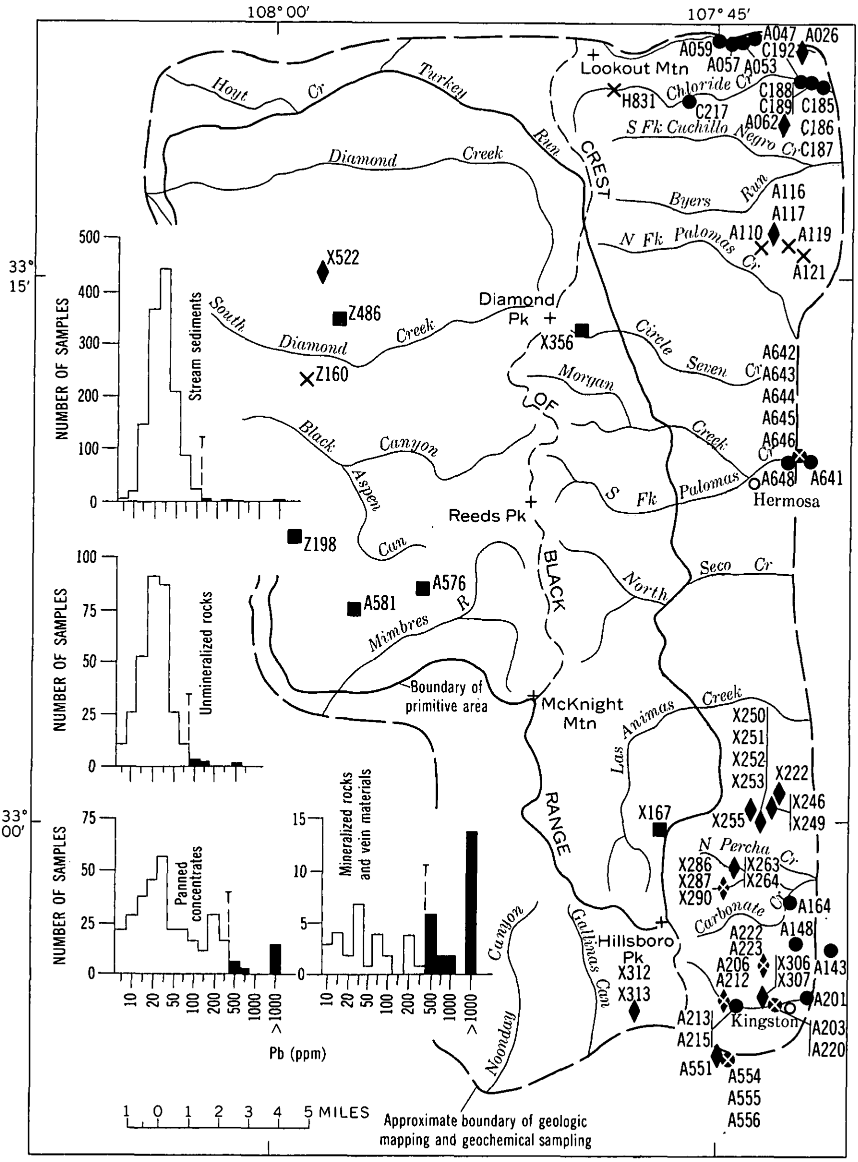

FIGURE 13.—Locations of samples containing anomalous amounts of lead in the Black Range Primitive Area. The × indicates stream sediments containing 150 ppm or more; solid circle indicates panned concentrates containing 500 ppm or more (solid circle with × indicates stream-sediment sample and panned-concentrate sample from same locality); solid square indicates unmineralized rocks containing 100 ppm or more; solid diamond indicates mineralized rocks or vein material containing 500 ppm or more. Histograms show frequency distributions of samples in six-step log intervals. T indicates threshold of anomalous values. Analytical values are listed in table 7; more precise sample localities are shown on plate 2.

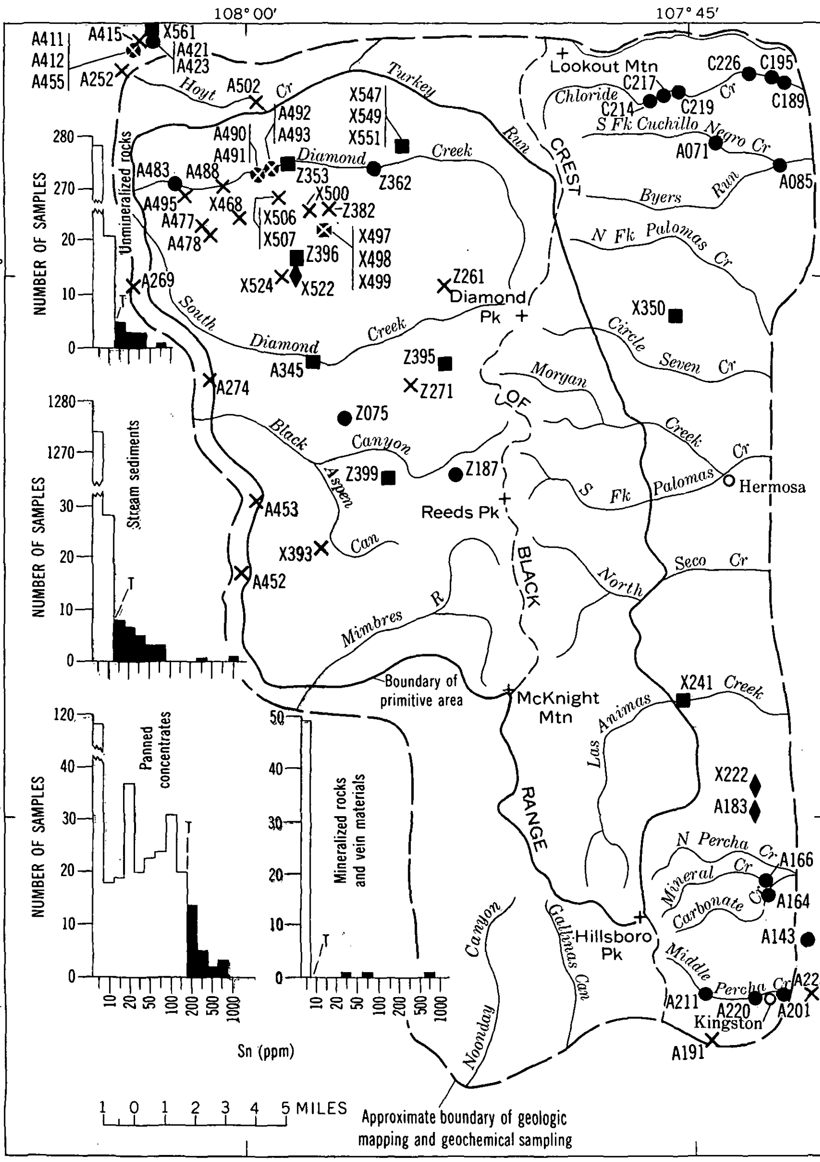

FIGURE 14.—Locations of samples containing anomalous amounts of tin in the Black Range Primitive Area. The × indicates stream sediments containing 15 ppm or more; solid circle indicates panned concentrates containing 200 ppm or more (solid circle with × indicates stream-sediment sample and panned-concentrate sample from same locality); solid square indicates unmineralized rocks containing 15 ppm or more; solid diamond indicates mineralized rocks or vein material containing 15 ppm or more. Histograms show frequency distributions in six-step log intervals. T indicates threshold of anomalous values. Analytical values are listed in table 7; more precise sample localities are shown on plate 2.

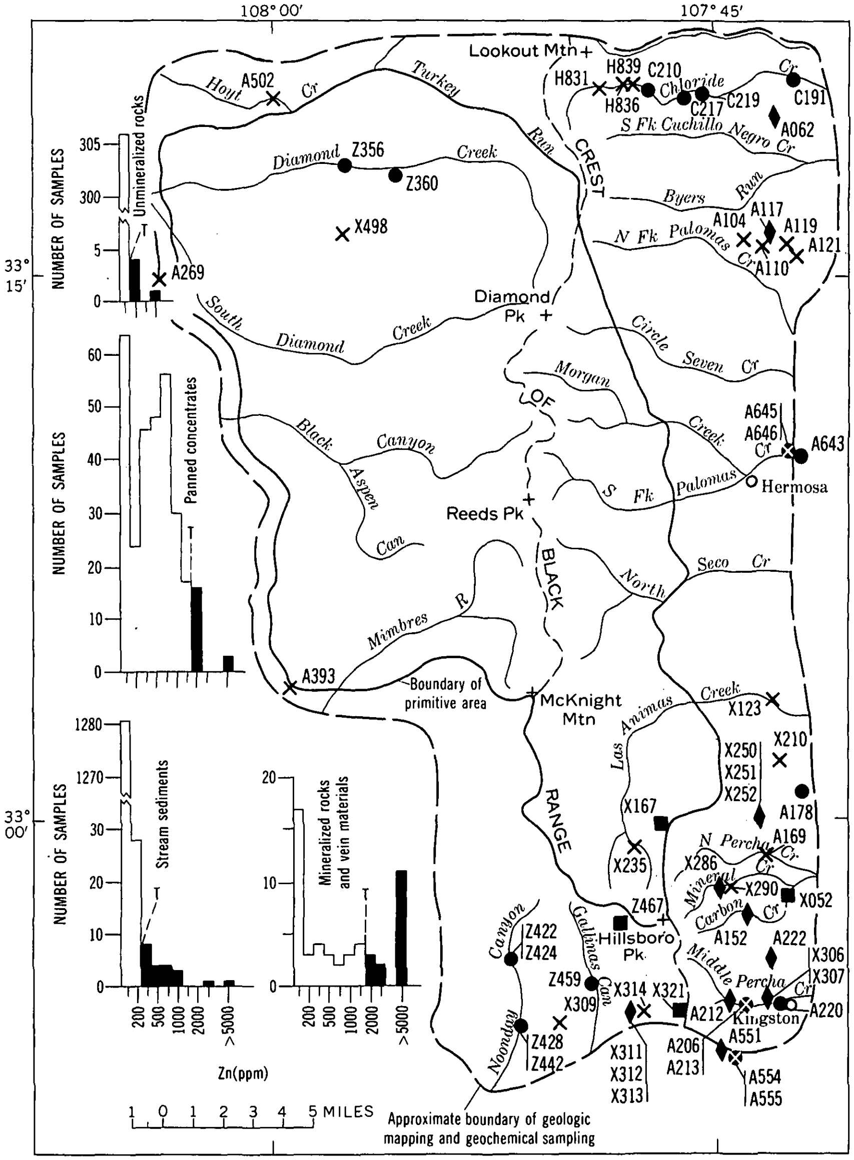

FIGURE 15.—Locations of samples containing anomalous amounts of zinc in the Black Range Primitive Area. The × indicates stream sediments containing 300 ppm or more; solid circle indicates panned concentrates containing 2,000 ppm or more (solid circle with × indicates stream-sediment sample and panned-concentrate sample from same locality); solid square indicates unmineralized rocks containing 200 ppm or more; solid diamond indicates mineralized rocks or vein material containing 2,000 ppm or more. Histograms show frequency distributions of samples in six-step log intervals. T indicates threshold of anomalous values. Analytical values are listed in table 7; more precise sample localities are shown on plate 2.

few anomalously high values within the primitive area. This distribution indicates that concentrations of these metals are absent in the Tertiary volcanic rocks. On the other hand, clusters of samples having anomalous values do occur along the eastern side of the map area (pl. 2) where mineral deposits are known to be present. The few scattered high values of these metals within the primitive area are thus interpreted to be the randomly located expectedly high values of a normal background distribution. Thus, clusters of anomalous values for silver, lead, and zinc (figs. 10, 13, and 15, respectively) show the concentration of these metals expected from the ore deposits of the Chloride, Hermosa, and Kingston districts. Anomalous copper values (fig. 11) in this eastern area are fewer than those for silver, lead, and zinc, but show strongly in the Chloride district where copper is more abundant than in the other districts.

Anomalous amounts of molybdenum (fig. 12), although generally associated with the previously discussed metals in the eastern area mineral districts, appear to be conspicuous only in the deposits of the Kingston district. Gold (fig. 9) shows only a vague relation to the other metals, and this chiefly in the Kingston area, which again is consistent with the gold-poor, silver-rich mineral deposits of the region.

Tin is the only metal of the seven that shows large numbers of anomalous samples within the Black Range Primitive Area (fig. 14). For the most part, these high values are due to a relatively high tin background of the tin-bearing rhyolites of the northwestern part of the primitive area. It can be noted that a few anomalous samples of gold (fig. 9) and molybdenum (fig. 12) also occur in the tin-bearing northwestern part of the area, perhaps indicating a tendency for these metals to be associated with the tin mineralization. This association is rather vague, however, for most of the anomalous tin samples are not anomalous in gold and molybdenum.

MINING CLAIMS IN THE PRIMITIVE AREA

According to the records of the U.S. Bureau of Land Management, Santa Fe, N. Mex., there are neither patented mining claims nor oil and gas leases within the Black Range Primitive Area. Bureau of Land Management plats show many patented claims near the primtive area in the Chloride, Hermosa, Kingston, and Carpenter mining districts. Patented mining claims in the Chloride district are within 3–10 miles of the primitive area boundary. Claims in the Hermosa district are within 2–5 miles and those in the Kingston district within 1–5 miles of the primitive area boundary. The Carpenter district claims are west of the crest of the Black Range, about 3–10 miles south of the primitive area.

Courthouse records of Catron County (in Reserve), Grant County (in Silver City), and Sierra County (in Truth or Consequences) were examined, in the spring of 1969, to determine the extent of unpatented mining claims within and adjacent to the primitive area. These records show unpatented claims at only one place in the primitive area, the Ramsey claims at the northern border (fig. 16). Since the spring of 1969, although considerable prospecting has taken place in the Chloride and Kingston areas and although many new claims have been located there, no prospecting or claims are known to be in the primitive area.

Approximately 75 placer claims, representing the southern part of the Ramsey group of claims, are in secs. 21, 22, 27, and 28, T. 11 S., R. 10 W. (fig. 16). They cover an area south of the Ramsey kaolin prospect. There are no workings on these claims, and neither kaolin nor other type of mineral showings are evident.

Fries (1940, p. 359) shows two occurrences of tin along Baily Creek and Volin, Russell, Price, and Mullen (1947) show two lode claims in sec. 33, T. 11 S., R. 11 W., and sec. 2, T. 12 S., R. 11 W. (fig. 16), but neither describe these occurrences. The area was examined in the present study, but neither prospects nor tin showings were found. The tin-bearing rhyolites here are apparently no more likely to contain minable tin deposits than those described by Fries (1940) north of the primitive area.

NONMETALLIFEROUS DEPOSITS

Nonmetalliferous deposits that occur within or near the primitive area are: (1) Kaolin deposits in the Moccasin John area, (2) perlite deposits at several localities, (3) a topaz occurrence at Round Mountain, and (4) moonstone-bearing pegmatite dikes in Rabb Park. None of these occurrences is of a grade high enough or large enough to be minable, but they may be of interest to the mineral collector.

KAOLIN DEPOSITS

Kaolin deposits, resulting from hydrothermal alteration of rhyolite tuffs and flows, have been found at several localities near the north end of the primitive area. The deposits in the White Horse claims (fig. 16) are the largest and most extensive. These deposits were being exploited during 1969 by the DeVilliers Nuclear Corp. The kaolin prospects on the Ramsey claims (fig. 16) are chiefly in one small zone north of the primitive area. Small kaolin showings

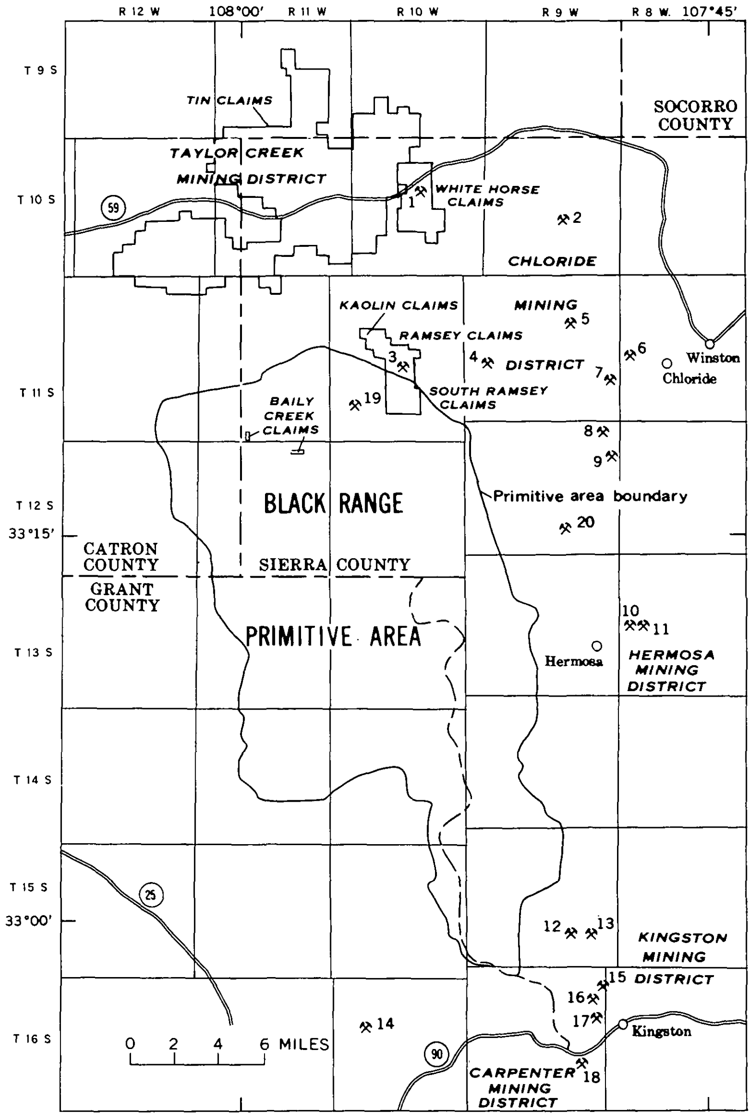

FIGURE 16.—Mining claims and mineral occurrences in and near the Black Range Primitive Area. 1, White Horse kaolin prospect. 2, Ivanhoe mine. 3, Ramsey kaolin prospect. 4, Silver Monument mine. 5, Dreadnaught mine. 6, Wall Street mine. 7, U.S. Treasury mine. 8, Midnight mine. 9, Bald Eagle mine. 10, Pelican mine. 11, Palomas Chief mine. 12, Virginia mine. 13, Mineral Creek group. 14, Rabb Park moonstone deposits. 15, Lady Franklin group (Lady Franklin, Black Colt, Comstock, and Superior). 16, Iron King group (Iron King, Matchless, and Climax). 17, Blackeyed Susan group (Blackeyed Susan, Andy Johnson, Brush Heap, and United States). 18, Gray Eagle. 19, Round Mountain topaz deposit. 20, Moccasin John kaolin occurrences.

also have been prospected in the hydrothermally altered zone in the Moccasin John area within the primitive area (pl. 1).

The White Horse kaolin deposit is covered by two groups of unpatented mining claims known as the Reese and DeVilliers properties. The claims cover approximately 4 square miles in secs. 9, 10, 15, 16, 21, 22, and 27, T. 10 S., R. 10 W., about 6 miles north of the primitive area. The White Horse property was sampled by the U.S. Bureau of Mines in 1959. Results of tests on the samples showed the kaolin to range from an intermediate to a heavy-duty refractory material. The purest kaolin has been tested for use in making ceramic tile (Patterson and Holmes, 1965, p. 316) and for use as coating for paper products. Although kaolin is widespread in this area, much of it contains too much unaltered rock and silica to be of commercial value.

The Ramsey kaolin deposit, about three-quarters of a mile north of the primitive area in sec. 15, T. 11 S., R. 10 W., was discovered by Glen P. Ramsey in 1931. In 1963, Western Nuclear, Inc., staked 175 placer claims that overlie and surround the Ramsey kaolin prospect. These claims are in secs. 8, 9, 10, 15, 16, 20, 21, 22, 27, and 28, T. 11 S., R. 10 W. The degree of alteration varies in the Ramsey deposit. This alteration produces kaolin of good quality as well as white siliceous volcanic rock of no economic value. The kaolin is probably associated with quartz lenses and veins that crop out in a zone reported to be about 100 yards across (McKinlay and Clippinger, 1947, p. 3). Tests on samples taken by the U.S. Bureau of Mines in 1959 (unpub. data, 1959) show the Ramsey kaolin to be light-duty refractory material. The only known kaolin showings in the general area are near the Ramsey prospect, and Western Nuclear, Inc., confined its exploration work to this locality. Eight holes were drilled in 1964, and the cores from these holes were tested for clay quality. Results were discouraging, and the property was abandoned.

In the Moccasin John area, rhyolite tuff and flows have been widely but variably bleached, iron stained, and kaolinized. The relative amount of kaolin in the rock is generally small, but at a few places solid masses and stringers of kaolin occur, and at one place, a tabular body of kaolin several feet thick and more than 50 feet long was found. This tabular body evidently was formed by hydrothermal alteration along a fault zone in the rhyolite. Pure kaolin is rare; most of that seen, including the tabular body, contains unaltered mineral grains and rock fragments and is stained yellow to brown with iron oxide. It is unlikely that the kaolin in any zone or locality is of sufficient quality or quantity to be minable.

PERLITE DEPOSITS

Perlite is a volcanic glass containing about 2–5 percent water, which expands upon heating and which is used in the expanded form as a light-weight aggregate. It is similar to obsidian, a volcanic glass that contains less than 1 percent water, and to pitchstone, another volcanic glass that contains 5–10 percent water. These glasses, unlike perlite, will not make an expanded aggregate upon heating. All three types of volcanic glass are found in and near the Black Range Primitive Area. Perlitic glasses as referred to in this section include both pitchstone and perlite and are distinguished from obsidian by their perlitic structure.

The principal occurrences of perlitic glass in the primitive area are in the North Fork of Palomas Creek and the nearby area southward to Moccasin John Mountain (pl. 1). Perlite also occurs in Hoyt Creek, Diamond Creek, and East Diamond Creek. The perlitic glasses in these areas appear to be of limited horizontal extent, are thin, are interlayered with other types of volcanic rock, and contain abundant spherulites. No deposit was found that appears to contain perlite in sufficient quantity or of high enough grade to be exploitable.

ROUND MOUNTAIN TOPAZ DEPOSIT

Topaz and the associated rare mineral bixbyite, $(Mn,Fe)_2O_3$, occur in the porphyritic rhyolite at Round Mountain, north of Diamond Creek (fig. 16). Sparse prismatic crystals of colorless to pale-yellow topaz as much as 2 cm long and ½ cm in diameter are found in lithophysae in the rhyolite. The crystals are impure and contain small fragments and mineral grains of rhyolite that were incorporated into them as they grew in the cavities. As a consequence, even though crystal outlines are sharp, the crystals themselves are aggregates of mineral grains cemented with topaz. The typical crystal contains less than 50 percent topaz. Tiny crystals of bixbyite, generally less than 1 mm across the face, occur on the topaz crystals and on the walls of the cavities in which the topaz crystals occur. Bixbyite also occurs elsewhere in the tin-bearing rhyolite of the Taylor Creek district and locally it is associated with another rare mineral, pseudobrookite, $Fe_2O_3 \cdot TiO_2$ (Fries and others, 1942).

Sherman Marsh, U.S. Geological Survey, made a heavy-mineral concentrate of the topaz-bearing rhyolite from Round Mountain to determine whether the rhyolite contained disseminated topaz in sufficient quantity for economic recovery as a refractory material. He found that the topaz is restricted to the crystals in cavities and that the amount of topaz is only a fraction of a percent of the total rock (Sherman Marsh, oral commun., 1969).

The Round Mountain topaz deposit is of interest as a mineral-collecting locality, but it does not contain gem-quality topaz nor topaz in sufficient quantity for recovery as refractory material. Bixbyite also is of interest to the mineral collector but otherwise has no economic value.

RABB PARK MOONSTONE DEPOSITS

Moonstone, a semiprecious gemstone form of alkali fieldspar, occurs as large crystals in pegmatites in the intrusive rhyolite porphyry underlying Rabb Park, near the southwestern corner of the map area (pl. 1). Kelley and Branson (1947, p. 699) reported the moonstone to be sanidine. Crystals as much as 1 or 2 feet on the side have been found at this locality. Additional information about the pegmatites, from Kelley and Branson (1947), is cited earlier in this report (p. E38). The Rabb Park area was visited briefly in the course of the present study, but no detailed examination was made because the area is outside the primitive area. Geochemical samples of the pegmatite, of the surrounding rhyolite porphyry, and of the sediments in streams draining the area do not show any unusual content of trace metals (pl. 2 and table 7).

Kelley and Branson (1947, p. 700) reported that the Rabb Park deposits had been known since the 1920's and that moonstone had been mined by different individuals and sold as mineral specimens. They further stated that most of the moonstone was unsuitable for gem cutting and that production of gem material had been very small.

METALLIFEROUS DEPOSITS

Metalliferous deposits near the Black Range Primitive Area include tin occurrences, chiefly north of the area, and lead, zinc, copper, and (or) silver deposits in the Chloride, Hermosa, Kingston, and Carpenter mining districts.

TAYLOR CREEK TIN DEPOSITS

The approximate locations of the Taylor Creek tin claims are shown in figure 16. Unpatented placer and lode claims cover an area of approximately 60 square miles in T. 9 S., R. 10 W.; T. 9 S., R. 11 W.; T. 10 S., R. 10 W.; T. 10 S., R. 11 W.; T. 10 S., R. 12 W.; T. 11 S., R. 11 W.; and T. 11 S., R. 12 W. The claim nearest to the primitive area is about 2½ miles from the boundary.

The tin deposits of the Taylor Creek district were discovered in 1918 and were first described by Hill (1921). Tin showings were explored extensively during 1919 and 1920, but evidently no tin-bearing material was shipped at that time. Sporadic prospecting continued in the area until about 1937 when the first known shipment of tin concentrates was made. This shipment consisted of 325 pounds of handpicked vein material from Taylor Creek (Fries, 1940, p. 358). Shipments of placer concentrates were made in 1939 (700 pounds) and in 1940 (800 pounds). Small but undisclosed amounts of tin concentrates were produced in the periods 1941–44 and 1965–66 (U.S. Bureau of Mines, unpub. data).

During the period 1939–42, the U.S. Geological Survey and the U.S. Bureau of Mines studied the deposits (Fries, 1940; Volin and others, 1947). Six of the best exposed lode showings were examined, and it was found that the overall grade of bodies of minable size did not exceed 0.02–0.06 percent tin. The grade of placer deposits is less than 0.05 pound of tin per cubic yard (Fries, 1940, p. 365–367).

Sporadic prospecting for tin, in the region north of the primitive area, has continued into the 1960's. In the mid-1960's a small concentration plant was erected near Boiler Peak, just south of State Highway 59 (fig. 1), and black sand, containing magnetite, cassiterite, and hematite, was recovered from residual soils. The operation was abandoned and the plant dismantled prior to 1969.

Fries (1940, p. 363–364) described the tin occurrences in bedrock, as follows:

> The tin mineral cassiterite occurs mainly in widely scattered stringers of northerly trend, which cut the rhyolite in the altered zones.*** The stringers range in size from thin films 1 or 2 feet long to tabular masses, many of which are about an inch thick and 20 or 30 feet long and a few of which are larger. The small stringers *** [are] *** irregular and non-persistent.*** Cassiterite is disseminated in the wall rock for a few inches on either side. In addition to cassiterite, the stringers contain specularite and, at places, a little magnetite.

Fries (1940, p. 366–367) stated that although nuggets of cassiterite and cassiterite-bearing black sand were widespread in the unconsolidated sediments and soils of the region, the amount in any given deposit was small. He found that stream gravels, in general, contained little tin and that the richest parts of the stream gravels, in the absence of visible nuggets of cassiterite, rarely contained more than 1 percent tin. The richest placer that was found (Fries, 1940, p. 368) contained about 4,000 cubic yards of gravel averaging about 2 pounds of tin to the cubic yard. Thin residual soils and slope wash near areas of cassiterite veinlets were found to contain as much as 0.02 pound of tin per cubic yard (Fries, 1940, p. 367).

Production of tin from the Taylor Creek deposits has been small, and the potential for production of tin is negligible under present economic conditions.

CHLORIDE MINING DISTRICT

The Chloride mining district was discovered in 1879 (Harley, 1934, p. 42), and according to File and Northrop (1966, p. 42) the district was prospected extensively in 1880. It encompasses a large area northeast of the primitive area in Tps. 10, 11, and 12 S. along R. 9 W. The major mineral occurrences are shown in figure 16. Silver ores, some of them very rich, were mined until the panic of 1893 when the price of silver fell drastically. Renewed activity in 1905 and again in 1909 was reported by Lindgren, Graton, and Gordon (1910, p. 265–266); a tube mill and a cyanide plant operated at Chloride in 1914 (File and Northrop, 1966, p. 44). Exploration and mining in the district in the 1930's yielded but little production.

In the late 1960's, because of higher prices of silver, the Chloride district once more attracted attention. During 1968, many mining claims were located around old patented claims. In the spring and summer of 1969, active exploration was being undertaken by the following: (1) Metals Corp. of America, (2) Silver Monument Mining Co., (3) Silver Bar Mining Co., (4) Carl Rogers, and (5) The Goldfield Corp. The most extensive exploration included: (1) An exploration drift that was being driven on the Dreadnaught claim, (2) systematic drilling of the U.S. Treasury property, and (3) rehabilitation of the Silver Monument mine. These properties are within a few miles of the primitive area.

Throughout its history the Chloride mining district has produced about $1 million in mineral wealth. The production estimated from the Chloride district for the period 1880–1932 is listed in table 6. Only $50,000 of the total has been credited to the period 1904–32, and production after 1932 has been negligible. The Silver Monument mine was the major producer of the district, having had a production of $415,000, or about 40 percent of the total.

The ore deposits of the Chloride district have been described by Lindgren, Graton, and Gordon (1910, p. 260–266) and Harley (1934, p. 75–77). Fissure-filling veins in andesite are most abundant and have been the most productive. The veins account for an estimated 90 percent of the reported production. Minor production has come from veins in rhyolite, and a small amount has been reported from veins where the country rock is limestone or dolomitic limestone. Harley (1934, p. 75–76) described two vein systems, one trending north-south and the other east-west. Production from the north-south veins was chiefly silver and gold, whereas that from the east-west system was silver and copper. The ore shoots in both systems were found to be short and irregular, but in some places they measured several hundred feet vertically.

TABLE 6.—*Approximate production of the Chloride mining district, 1880–1932*
[From Harley, 1934, p. 78]

Area	Mines	Amount	Type of ore
Fluorine	Miscellaneous prospects	Small	Gold-silver.
Phillipsburg	Occidental and Black Mount (Minnehaha).	25,000	Do.
	Great Republic	25,000	Do.
	Keystone	5,000	Do.
	Miscellaneous prospects	5,000	Do.
Grafton	Emporia	60,000	Do.
	Ivanhoe	100,000	Do.
	Alaska	Small	Do.
	Miscellaneous prospects	40,000	Do.
Bear, Dry, and Mineral Creeks.	Readjustor (Mahoning Group).	15,000	Silver-copper-gold.
	Dreadnaught	75,000	Do.
Chloride	Wall Street	Small	Gold-silver-copper.
	White Mountain	15,000	Do.
	U.S. Treasury	20,000	Do.
	Colossal	75,000	Do.
	Midnight	20,000	Do.
	Silver Monument	415,000	Silver-copper.
	New Era	15,000	Do.
Pye Lode	Miscellaneous prospects	Small	Gold-silver.
Monument Creek	Bald Eagle (Minnie)	30,000	Do.
	Bald Eagle (lead-zinc)	Small	Lead-zinc-silver.
Miscellaneous	(Includes "small' items above).	60,000	Mostly silver-gold.
Total		1,000,000	

Among the deposits of the district, the nearest to the primitive area are copper showings in Blackhawk Gulch, a tributary of Chloride Creek. These were explored long ago by two or three short adits or shafts, now caved and inaccessible. The host rock is the early andesite. Ore fragments on dumps contain malachite, and of two copper-bearing ore samples from this locality, X104 and X105 (table 7), one shows a high silver content. Exploration was renewed in this area in 1969, but it is doubtful that any significant quantity of ore was found.

Although small-scale mining operations may be realized in the Chloride district in the near future, the development of large deposits of valuable minerals is improbable.

HERMOSA MINING DISTRICT

The Hermosa mining district (also known as the Palomas district) is 2–5 miles east of the primitive area boundry (fig. 16 and pl. 1). Most of the production of the district was from the Palomas

Camp area which is less than a square mile in extent. The workings of the Palomas Camp (the Pelican and Palomas Chief mines) are in S½ sec. 18 and N½ sec. 19, T. 13 S., R. 8 W. (fig. 16).

The following information about the district is from Lindgren, Graton, and Gordon (1910, p. 266–268), Harley (1934, p. 92–97), and Jahns (1955). Ore bodies, consisting chiefly of silver-bearing sulfides of lead, zinc, and copper, occur along steeply dipping faults and fractures and as replacements along gently dipping bedding planes of Paleozoic dolomite near fault intersections. Ore shoots are small; the largest yielded only a few hundred tons of shipping ore. Silver, the principal metal of value in the district, is associated chiefly with galena, chalcopyrite, and bornite. The principal gangue minerals are quartz and calcite. Near-surface parts of veins have been oxidized and contain a wide variety of copper, lead, zinc, and silver minerals and free gold. Jicha (1954b, p. 766) lists 42 minerals as occurring in the veins of the Hermosa district.

Discoveries in the Hermosa district date from 1879. The history of the district is similar to that of the Chloride district, in that most of the mining activity was in the 1880's. Ten mining claims were located in the district in the name of the Ladder Ranch in 1968.

Harley (1934, p. 95) listed the production of the principal mines in the Hermosa mining district, through 1932, as follows:

	Value
Pelican	$1,000,000
Palomas Chief	200,000
Antelope and Ocean Wave	200,000
American Flag, Flagstaff, Wolford, Argonaut, Cliff-L-Embolite, and miscellaneous	100,000
Total	1,500,000

Harley (1934, p. 97) and Jahns (1955) estimated that a substantial tonnage (estimated at 50,000 tons by Harley) of mill-grade ore is contained in the dumps and filled stopes of the Palomas Camp area. They further agreed that the chance of finding ore below the old workings is good. Such ore, if it follows the pattern of that which has been mined, would be high in grade but low in tonnage. The ore bodies tend to be small and scattered.

The mineralized center of the Hermosa district is some distance from the primitive area, and although iron-stained and quartz-bearing fracture zones are found near the primitive area boundary, they appear to be small and virtually barren. Sample X044 (table 7) was collected from a typical iron-stained quartz-bearing shear zone at the mouth of Marshall Creek (pl. 2). As can be seen, it does not contain anomalous amounts of base metals or silver. Sample A665 (table 7) from a prospect in a quartz-bearing pyritic zone in Morgan Creek, contains a detectable amount of silver.

KINGSTON MINING DISTRICT

The Kingston mining district is on the east side of the Black Range near Kingston (fig. 16) and extends over an area roughly 9 miles long in a north-south direction and about 4 miles wide. Although mines and prospects are found throughout this area, the greatest production of ore, in which silver was the chief metal of value, came from relatively few mines within a few miles west and north of Kingston. None of the mines was operating during the late 1960's, but a small amount of prospecting was being carried out in response to the recent increase in the value of silver.

The major period of mining activity at Kingston was during the latter part of the 19th century, but sporadic mining continued till the middle part of the present century. Silver was discovered in the Kingston district in the fall of 1880 (Thompson, 1965); the value of production to 1904, chiefly from silver, was estimated to be $6,250,000 (Jones, 1964, p. 36). Harley (1934, p. 103) estimated production for the district from 1910 to 1930 at $90,000–$100,000. The types and quantities of ore shipped during this period are as follows (Harley, 1934, p. 103):

Type of ores	*Tons*
Lead-copper-silver ores	590
Lead-zinc ores	60
Silver and silver-gold ores	2,025
Low-grade manganiferous silver ores	1,000
Total	3,675

From November 19, 1951, through November 30, 1955, a total of 1,820 long tons of handpicked manganese ore was shipped from the Kingston district to the U.S. General Services Administration stockpile at Deming, N. Mex. Shipments were made from 18 mines; the Iron King mine (fig. 16), the largest producer, shipped 831 tons. The grade of ore ranged from 22 to 42 percent manganese, with a weighted average of 33.5 percent.

On the Middle Fork of Percha Creek, about 2 miles west of Kingston, a zone of lead-bearing veinlets and impregnations in Paleozoic limestone was explored in 1966 or 1967 by a surface cut and short adit. Concentration tests were made in a small jig-type pilot plant. Evidently the operation proved to be unsuccessful; the prospect was abandoned in 1967, and the pilot plant was dismantled in 1968.

The ore deposits in the Kingston district occur as fissure-filling veins in Precambrian rocks and the early andesite and as veins and replacements in Paleozoic limestone and dolomite. The principal ore bodies are pipes along steeply dipping fractures as well as layers and pockets in Paleozoic limestone and dolomite below the Percha Shale (Harley, 1934, p. 100). The size of mine dumps indicates that individual mines and ore bodies were small and shallow, although they were closely spaced and numerous in some areas, as at the Lady Franklin Group of mines (fig. 16).

Ores of the Kingston district are described by Harley (1934, p. 101–102). He notes that most of the ore mined in the district consisted of oxidized minerals that formed secondarily enriched deposits.

Shallow secondary silver ores, the chief source of production in the Kingston district, have been mined out, and the possibility of finding significant quantities of additional silver or base-metal ores is judged to be remote. Manganese ore, which also is shallow and of secondary origin, is of relatively low grade and occurs in small quantity.

An unusual type of rare-earth mineralization, which may warrant further study, occurs near Bald Hill (sample A183, pl. 2, table 7) near the edge of the map area. A sample of residuum of weathered Precambrian granite with sugary vein quartz that was collected here shows an unusual concentration of the following elements:

	Parts per million
Beryllium	50
Bismuth	200
Lanthanum	>1,000
Niobium	500
Scandium	>100
Strontium	5,000
Tin	70
Titanium	>10,000
Vanadium	1,000
Yttrium	>200
Zirconium	>1,000

The large quantity of quartz fragments and the unusual assemblage of elements suggest that the sample was taken from the weathered overburden of a quartz vein or a quartz-bearing pegmatite containing rare-earth minerals as well as traces of cassiterite, beryl, and perhaps columbite.

Three other soil samples from Bald Hill, in the same general area as the above anomalous sample, do not contain unusual amounts of trace elements, perhaps indicating that the rare-earth occurrence is of restricted extent. These samples were collected by W. L. Chapel, district ranger, U.S. Forest Service, in January 1970, and analyzed by R. L. Parker and Matt Paidakovich, U.S. Geological Survey. The analyses, reported by R. L. Parker (written commun., 1970), were made by X-ray spectrometer techniques of the fine fraction (minus 65-mesh) of the samples and of heavy-mineral concentrates of the 35- to 65-mesh fraction. The minus 65-mesh fractions showed no unusual content of rare elements. The heavy-mineral concentrates showed detectable niobium and yttrium. An X-ray diffraction study of mineral grains of the heavy-mineral fractions did not identify niobium- or yttrium-bearing minerals but did show the presence of ilmenite and zircon, which according to Parker (written commun., 1970) contain niobium and rare-earth elements in some rock types.

CARPENTER (SWARTZ) MINING DISTRICT

The Carpenter or Swartz mining district is southwest of the Kingston district (fig. 16), on the west side of the Black Range near the crest. The Lucky Seven prospect, which is just within the map area (pl. 1), is the northernmost mineral locality in the district. Other mines and prospects in the heart of the district, several miles to the south, are accessible by a dirt road from the Mimbres Valley about 15 miles south of the primitive area.

Ore deposits of this district were first described by Lindgren, Graton, and Gordon (1910) and later by Harley (1934). Geological studies and diamond drilling were undertaken in the district during 1943–44 by field parties of the U.S. Geological Survey and U.S. Bureau of Mines. Kinney (1944) reported on the geology of the Royal John mine area, and R. L. Griggs, S. P. Ellison, Sr., H. C. Wagner, D. M. Kinney, and A. B. Weissenborn (unpub. data, 1945) discussed the geology and ore deposits of the district as a whole. Hill (1946) reported on the results of diamond drilling.

Production from the Carpenter district, chiefly of lead-zinc ores, has been sporadic and small. Lindgren, Graton, and Gordon (1910, p. 272) reported that the district was being explored in 1905, the time of their visit, but that no ore had yet been shipped. These explorations were centered in the two areas that later became the two most important mines, the Grandview and Royal John. R. L. Griggs and others (unpub. data, 1945) reported sporadic production from the district from 1916 to 1942, totaling about 35,000 tons of ore. This ore had a metal content of 2,000 tons of zinc and 1,500 tons of lead. The earliest mining venture, which proved to be unsuccessful, was in 1906–07 at the Royal John mine (Harley, 1934,

p. 112). The first shipment of lead-zinc ore from the Grandview mine was in 1937, and this mine was operated continuously until 1945 (Warner and others, 1959, p. 116). The subsequent history of operation is not available, but the Royal John mine was being operated in the late 1960's by the Westamerica Mining Co., which operated a mill that produced base-metal concentrates (chiefly zinc) that were shipped to the New Jersey Zinc Co. at Hanover, N. Mex.

The following brief description of the ore deposits of the district is summarized from Kinney (1944) and R. L. Griggs and others (unpub. data, 1945). The district lies within a horst between two major faults—the Mimbres fault to the west and the Owens fault to the east. The ore deposits are small and generally of marginal grade, and consist chiefly of replacement bodies in the Montoya Dolomite at or near faults. Galena and sphalerite, the principal ore minerals, are associated with quartz, calcite, chalcopyrite, and pyrite. Small amounts of other minerals occur, including the rare beryllium mineral helvite, $Mn_4B_3Si_3O_{12}S$, which was first discovered in the Grandview mine (Weissenborn, 1948). Negligible amounts of gold and silver occur. Locally, the limestone in and near the ore bodies is silicified or altered to a tactite that contains abundant garnet, epidote, chlorite, and magnetite.

The Lucky Seven prospect, in Iron Creek just north of State Highway 90 (pl. 1), is covered by an unpatented claim (Embree Hale, Sr., oral commun., 1969). The prospect consists of a steeply inclined shaft, about 25 feet deep, on an indefinite mineralized zone in Paleozoic limestone. A ton or two of ore, consisting chiefly of irregular masses and disseminations of galena in limestone, was found in the shaft. According to Mr. Hale, near-surface oxidized ore contains high silver values.

The Carpenter district is the only mining district near the Black Range Primitive Area that had an active mining operation in the late 1960's. This operation, the Royal John mine, is relatively small, and information about actual production and reserves and grades of ore is not available.

FUELS

Fossil fuels—oil, gas, and coal—have not been found in the sedimentary rocks in or near the Black Range Primitive Area. The nearest oil and gas showings are in test wells drilled in northern Catron County, 60–70 miles north of the primitive area, and in eastern Sierra County, 40–50 miles east of the primitive area (Wengerd, 1962; Foster, 1964). The nearest known coal deposits, which evidently are noncommercial, are in the Engle coal field, 30–35 miles east of the primitive area (Kottlowski and Beaumont, 1965, p. 104, 114).

The Black Range is in a region of intense faulting and volcanic activity, an environment that is not very favorable to accumulation and preservation of oil and gas pools. Nevertheless, Foster (1964, p. 49) noted that southeastern Catron County (which includes the northwesternmost part of the primitive area as shown in fig. 1)

> is rather favorable for exploration because of the possible completeness of the stratigraphic section. Depending on the extent of pre-Tertiary faulting, there could be between 2,000 and 3,000 feet of Cretaceous rocks, 3,000 feet of Permian strata (mostly carbonates), about 1,000 feet of Pennsylvanian, and from zero to 600 feet of sediments from Ordovician to Mississippian age.

Kottlowski (1963, p. 86) stated that "Almost all the Paleozoic and Cretaceous units of south-central and southwestern New Mexico are marine deposits containing potential source beds of oil and gas."

Thus, even though the Black Range Primitive Area would seem to be unfavorable for oil and gas, the possibility of their occurrence in deeply buried pre-Tertiary sedimentary rocks cannot be entirely discounted. Coal deposits appear to be absent in this part of New Mexico.

CONCLUSIONS

No commercial or potentially commercial mineral deposits were found in the Black Range Primitive Area, and it is unlikely that such deposits exist in the volcanic rocks of the Datil Formation that underlie most of the area. In contrast, Precambrian, Paleozoic, and lower Tertiary rocks of nearby areas contain mineral deposits that have been exploited, and it is inferred that similar deposits could occur in these rocks under the Tertiary volcanic cover of the Black Range. Lead, zinc, copper, and silver deposits such as those in bordering areas east and south of the primitive area might be present. The proximity of the large disseminated copper deposit at Santa Rita (Chino deposit) suggests the possibility for occurrence of a similar deposit in the Black Range.

On the basis of present knowledge, it is impossible to designate areas in the Black Range that are most likely to have hidden ore deposits in the older rocks. Search for such deposits by present-day geologic and geophysical techniques or by exploratory drilling would be risky and uncertain. The geological mapping, geochemical sampling, and airborne geophysical study that were undertaken give no indication of mineral deposits in these older rocks, nor are additional studies of these types likely to locate buried deposits. Because of the extent of volcanism and faulting in the Black

Range, it is unlikely that oil and gas occur in the Paleozoic sedimentary rocks of the area. Coal deposits are not known to occur in the sedimentary rocks of this area.

Although minable metallic and nonmetallic mineral deposits are known to occur in the Datil Formation elsewhere in southwestern New Mexico, they appear to be absent in these rocks in the Black Range Primitive Area.

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TABLE 7

TABLE 7.—*Analyses of samples from the*

[Sample localities given below by township, range, and section (T. R. S.); thus, T. 10 S., R. 10 W., sec. 10 is recorded as 10-10-10. All are south of the New Mexico base line and west of the New Mexico meridian. Localities are shown on plate 2.

Analyses for gold were made by L. W. Bailey, W. L. Campbell, M. S. Rickard, Z. C. Stephenson, and A. W. Wells. Semiquantitative spectrographic analyses were made by Arnold Farley, Jr., E. L. Mosier, D. F. Siems, and K. C. Watts.

The data are reported to the nearest number in the series 1, 0.7, 0.5, 0.3, 0.2, 0.15, 0.1, and so forth, which represent approximate midpoints of group data on a geometric scale. The assigned group for semiquantitative results will include the quantitative values about 30 percent of the time; these data should not be used without stating these limitations. Other symbols used: >, more than the amount shown; <, less than the amount shown; L, detected

		Atomic absorption (ppm)	Semiquantitative spectrographic analyses (ppm)											
Sample	T. R. S. (pl. 2)	Au (0.02)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
							Stream sediments							
A002	16-10-26	L	N	L	700	1.5	20	100	20	70	1,500	N	10	50
A003	16-10-26	L	N	10	700	1.5	15	100	15	70	1,500	N	10	50
A005	16-10-26	L	N	10	700	1.5	30	70	20	N	1,500	N	10	50
A006	16-10-25	L	N	10	700	2	5	10	20	30	1,000	N	15	10
A007	16-10-24	L	N	L	700	2	20	50	10	50	1,500	N	20	10
A008	16- 9-18	L	N	10	700	2	N	15	15	20	1,000	7	10	7
A009	16- 9-18	L	N	15	700	3	5	20	10	20	1,000	7	10	10
A010	16- 9-17	L	N	20	700	1	15	100	15	20	1,000	10	10	50
A014	16- 9-16	L	N	30	700	2	20	70	20	20	1,000	N	15	30
A016	11- 8-20	L	N	10	1,000	2	10	70	20	50	1,000	N	15	50
A018	11- 8-17	L	N	20	1,000	2	20	100	20	50	1,500	10	20	50
A021	11- 8-18	L	N	20	1,000	2	20	150	20	50	1,000	N	15	50
A022	11- 8-18	0.05	0.5	20	1,000	2	15	100	15	50	1,000	N	15	50
A025	11- 8-25	L	N	20	1,000	2	20	100	30	50	1,000	15	15	50
A028	11- 8-18	L	N.	30	1,500	2	20	100	20	50	1,500	N	10	50
A030	11- 8-18	L	N	15	1,000	2	10	70	20	50	1,000	N	15	50
A032	11- 8-18	L	N	15	1,000	2	10	70	20	30	1,000	20	15	50
A034	11- 8-18	L	N	20	1,500	3	20	100	20	70	1,500	N	15	70
A036	11- 8- 7	1.3	1	20	1,500	3	10	50	15	70	1,500	N	30	20
A038	11- 9-12	L	N	20	1,000	3	5	20	15	50	1,000	N	30	15
A040	11- 9-12	L	N	20	1,000	2	15	70	20	50	1,500	N	20	50
A042	11- 9-12	L	N	20	1,500	2	20	70	30	70	1,500	10	20	70
A044	11- 9-12	L	N	20	1,500	1.5	20	100	50	70	1,500	N	20	70
A046	11- 9-11	L	N	15	1,000	3	5	50	10	100	1,000	N	15	10
A048	11- 9-11	L	N	20	1,000	1.5	20	70	30	50	1,500	N	15	70
A050	11- 9-11	L	N	20	1,000	2	10	70	15	20	1,500	N	15	50
A052	11- 9-11	L	N	15	1,000	1.5	10	50	50	20	2,000	N	10	70
A054	11- 9-11	L	N	15	1,500	2	10	50	20	30	1,500	N	15	30
A056	11- 9-14	L	N	15	1,500	1.5	30	150	50	30	2,000	N	10	100
A058	11- 9-14	L	N	10	1,500	1.5	15	70	30	30	2,000	7	10	70
A060	11- 9-10	L	N	15	1,500	1.5	15	100	70	30	2,000	N	L	50
A065	11- 9-27	.04	2	L	1,000	1	30	150	20	30	1,500	N	10	70
A066	11- 9-27	L	N	10	1,000	1.5	20	70	20	50	1,500	N	10	30
A067	11- 9-27	L	N	L	1,000	1	30	300	30	30	1,500	N	10	50
A068	11- 9-35	L	N	10	1,000	2	20	150	20	N	1,000	N	10	50
A069	11- 9-35	L	N	10	1,000	2	20	150	20	50	1,500	N	10	50
A070	11- 9-35	L	N	10	700	2	15	70	15	50	1,500	N	10	30
A072	11- 9-35	L	N	10	700	2	N	N	7	N	700	N	N	N
A074	11- 9-35	L	N	10	1,000	1.5	20	150	15	50	1,000	N	L	50
A075	11- 9-35	<.04	N	10	1,000	2	20	70	15	50	1,000	N	10	50
A076	11- 9-35	L	N	10	1,000	1.5	20	100	20	50	1,000	N	L	50
A077	11- 9-36	L	N	10	1,000	1.5	30	150	20	50	1,000	5	10	70
A078	11- 9-36	L	.5	70	700	2	50	100	30	70	1,500	N	10	70
A079	11- 9-36	L	N	>100	700	2	30	100	20	50	1,000	N	10	70
A081	11- 9-36	L	L	10	1,000	1.5	50	150	20	50	1,000	N	10	50
A082	12- 8- 6	L	N	20	1,000	1.5	20	100	20	30	1,000	N	L	50
A083	12- 8- 6	L	N	20	1,000	2	30	100	20	30	1,000	N	10	50
A084	12- 8- 6	L	N	20	1,000	1.5	50	300	30	30	1,500	N	10	70
A086	12- 8- 6	L	N	10	1,000	L	50	500	30	50	1,500	N	L	100
A087	12- 9- 1	L	N	10	1,500	L	50	500	30	50	1,500	N	10	70
A088	12- 9-11	L	N	L	1,000	1	20	300	20	30	1,000	N	L	70
A089	12- 9-11	L	N	10	1,000	1.5	30	300	30	30	1,500	N	10	70
A090	12- 9-11	L	N	10	1,000	1.5	30	500	20	50	1,500	N	10	70
A091	12- 9- 9	L	N	10	1,500	1	50	200	30	30	1,500	N	L	70
A092	12- 9-10	L	5	10	1,500	1	50	300	50	30	1,500	N	10	70

Black Range Primitive Area, New Mexico

but in amounts below the sensitivity limit; N, looked for but not found and hence may occur only in amounts below the lower sensitivity limit; .., element not looked for or analysis was not made. The numbers in parenthesis beneath the element symbols represent the usual lower limit of sensitivity for that element.

Ca (0.05) and Mg (0.02) were determined spectrographically but were found in quantities anticipated as normal for the rocks in the region sampled and, hence, were not judged to be significant. Also looked for spectrographically but not found except as mentioned in the text or under remarks: As(200), Bi(10), Cd(20), Sb(100), and W(50). Au(10) was also noted in a few of the spectrographic analyses, but, because gold was also determined by a more sensitive method, the few positive results have not been shown]

Semiquantitative spectrographic analyses--Continued

	(ppm)								(percent)		
Sample	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	Remarks
					Stream sediments						
A002	20	15	N	500	300	30	L	100	7.0	0.7	
A003	15	15	N	700	200	30	N	100	7	.7	
A005	30	15	N	500	300	20	L	100	7	.7	
A006	70	7	N	300	100	20	N	150	3	.5	
A007	50	15	N	500	300	50	L	500	7	1	
A008	30	5	N	500	70	15	N	300	2	.3	
A009	50	10	N	300	100	20	N	100	2	.3	
A010	50	15	N	500	200	30	N	150	3	.5	
A014	100	15	N	500	200	30	L	300	7	.7	
A016	20	15	N	500	200	30	N	500	5	.7	
A018	30	20	N	500	200	50	N	700	7	1	
A021	20	15	N	500	200	50	N	500	5	1	
A022	30	15	N	500	200	30	N	700	5	.7	
A025	20	15	N	500	200	30	N	500	5	.7	
A028	20	20	N	1,000	300	50	N	500	7	.7	
A030	50	15	N	700	150	50	N	500	5	1	
A032	50	15	N	500	150	30	N	500	5	.7	
A034	50	20	N	700	200	50	N	1,000	7	1	
A036	70	20	N	200	200	70	N	>1,000	7	1	
A038	50	15	N	100	100	50	N	1,000	3	.7	
A040	30	20	N	1,000	200	20	N	300	5	.7	
A042	50	20	N	1,000	200	70	N	700	7	1	
A044	50	20	N	1,000	200	50	N	700	7	1	
A046	30	10	N	200	100	50	N	500	2	.5	
A048	70	20	N	700	200	30	N	500	5	1	
A050	20	15	N	1,000	200	20	N	500	5	.7	
A052	20	15	N	500	300	20	N	1,000	5	1	
A054	30	15	N	500	200	30	N	700	5	1	
A056	50	20	N	1,000	300	30	N	700	10	>1	
A058	20	15	N	1,000	300	30	N	700	10	1	
A060	20	15	N	500	500	30	N	>1,000	10	>1	
A065	50	20	N	1,000	200	20	N	200	7	.7	
A066	30	15	N	1,000	150	20	N	150	5	.5	
A067	30	20	N	1,000	300	10	N	150	7	.7	
A068	30	15	N	700	200	15	L	150	5	.3	
A069	30	20	N	1,000	200	15	N	150	5	.5	
A070	30	15	N	500	150	20	N	100	5	.5	
A072	50	N	N	N	20	N	N	100	1	.2	
A074	20	15	N	500	200	30	N	200	5	.7	
A075	30	15	N	300	100	50	N	150	7	.5	
A076	20	20	N	700	200	50	N	500	5	.7	
A077	15	20	N	700	200	30	N	500	5	1	
A078	50	20	N	300	200	50	200	300	7	.7	700 ppm As.
A079	50	20	N	700	200	30	L	200	5	.5	20 ppm Bi.
A081	30	20	N	1,000	200	30	L	200	7	.7	
A082	50	20	N	1,000	200	20	N	200	5	.5	
A083	30	20	N	700	200	30	N	200	5	.5	
A084	100	20	N	1,000	200	30	N	200	7	.5	
A086	50	20	N	1,500	500	20	L	200	10	.7	
A087	50	20	N	1,500	300	30	L	300	10	1	
A088	20	15	N	1,000	200	20	L	200	5	.5	
A089	30	20	N	1,000	200	30	L	200	7	.7	
A090	20	15	N	700	200	30	L	300	7	.7	
A091	15	20	N	1,000	300	30	N	150	7	.7	
A092	30	20	N	1,000	300	30	N	200	7	.7	

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
			Stream sediments--Continued											
A093	12- 9-10	L	N	10	1,000	1.5	30	200	30	50	1,000	5	L	50
A094	12- 9-11	L	N	10	1,000	1.5	30	300	20	50	1,000	N	L	50
A095	12- 9-11	L	N	10	1,000	1.5	50	300	50	50	1,000	N	10	70
A096	12- 9-11	L	N	10	1,500	2	30	200	20	30	1,000	N	10	50
A097	12- 9- 1	L	N	10	1,500	2	20	100	20	30	1,500	N	L	50
A098	12- 9- 1	L	0.5	10	1,500	2	30	100	30	50	1,000	N	10	50
A099	12- 9- 1	L	N	L	1,500	1	20	300	50	50	1,500	N	10	100
A100	12- 9- 1	L	.5	20	1,000	2	20	50	50	50	1,500	N	15	50
A101	12- 9-11	L	N	15	1,500	1.5	30	300	70	50	2,000	N	L	150
A102	12- 9-11	L	N	15	1,000	1.5	20	150	30	50	1,500	N	L	70
A103	12- 9-14	L	N	10	1,500	1.5	30	300	50	50	1,500	N	10	70
A104	12- 9-14	<0.04	N	L	1,000	2	30	700	30	50	2,000	N	10	70
A105	12- 9-13	L	N	L	1,000	1.5	30	300	30	50	1,500	N	10	70
A106	12- 9-14	L	N	L	1,500	1.5	30	500	30	50	1,500	N	10	70
A107	12- 9-13	L	N	10	1,000	1	20	300	20	20	1,500	N	L	70
A108	12- 9-13	L	N	L	700	N	30	1,500	50	N	3,000	N	N	150
A109	12- 9-13	L	N	L	1,500	1.5	20	200	20	50	1,500	N	10	70
A110	12- 9-13	.06	N	10	1,000	1	20	500	30	50	1,500	N	L	100
A111	12- 9-13	L	N	10	1,000	1.5	20	70	20	50	1,500	N	L	30
A112	12- 9-13	L	N	10	1,500	1.5	30	300	30	30	1,500	N	L	100
A113	12- 9-13	L	N	10	1,500	1	30	300	30	30	1,500	N	L	100
A114	12- 8-18	L	N	10	1,500	1	20	300	20	30	1,500	N	L	50
A115	12- 8-18	L	N	10	1,500	1	30	200	30	30	1,500	N	L	50
A118	12- 8-18	L	N	10	1,000	1	30	300	20	N	1,500	N	10	70
A119	12- 8-18	L	.7	10	1,500	1.5	30	300	100	N	3,000	N	10	70
A120	12- 8-18	L	N	10	1,500	1.5	30	200	50	N	1,500	5	10	70
A121	12- 8-18	L	N	15	1,500	1.5	50	200	50	30	1,500	N	10	70
A122	12- 8-18	L	N	10	1,500	1	50	300	30	50	1,500	N	10	100
A123	12- 8-18	L	N	10	1,500	1	50	300	30	30	1,500	N	L	100
A124	12- 8-18	L	N	L	1,500	1	50	500	50	N	2,000	N	L	70
A125	12- 8-17	L	N	L	1,500	1	50	300	50	50	1,500	N	L	100
A126	12- 8-17	L	N	10	1,500	1	50	300	50	50	1,500	N	L	100
A127	12- 9- 2	L	N	10	1,000	3	10	20	10	20	700	N	10	7
A128	12- 9- 3	.03	N	15	1,500	3	10	70	15	50	1,500	N	10	50
A129	12- 9- 3	L	N	20	1,500	3	30	150	30	50	2,000	N	10	70
A130	12- 9- 3	L	N	20	1,500	3	20	70	15	50	1,500	N	10	50
A131	12- 9- 3	L	N	15	1,500	3	30	100	20	50	1,500	N	10	70
A132	12- 9- 2	L	N	20	1,500	2	30	150	20	50	1,500	N	10	70
A133	12- 9- 2	L	N	15	1,500	2	30	100	20	50	1,500	N	10	70
A134	12- 9- 2	L	N	15	1,500	2	30	150	20	50	1,500	N	10	70
A135	12- 9- 2	L	N	10	1,500	1	50	500	30	50	1,500	N	15	100
A136	12- 9- 2	L	N	15	1,500	1.5	30	100	20	50	1,000	N	15	50
A137	12- 9- 1	L	N	15	1,500	2	30	200	20	50	1,500	5	10	70
A138	12- 9- 1	L	N	30	1,500	1	50	300	30	50	1,000	N	10	70
A139	12- 9- 1	L	N	15	1,500	1.5	50	300	30	50	1,000	N	10	70
A140	12- 8- 6	L	N	10	1,500	1.5	20	300	20	50	1,000	N	10	50
A141	12- 8- 6	L	N	20	1,500	1	30	300	30	50	1,500	N	10	70
A142	16- 8- 9	L	N	50	1,500	1	30	200	20	50	1,500	N	10	70
A144	16- 8- 5	L	L	50	700	2	20	70	15	N	1,500	5	10	50
A145	16- 8- 5	L	L	50	700	1	20	70	15	20	1,500	5	10	50
A146	16- 8- 5	L	N	20	500	2	10	50	20	20	1,500	N	L	20
A147	16- 8- 6	L	L	10	300	1.5	5	70	15	20	1,500	N	L	10
A149	16- 8- 6	L	N	30	500	2	10	70	15	20	1,500	N	L	20
A150	15- 9-35	L	N	15	1,000	3	10	50	10	20	1,500	5	15	20
A153	15- 9-35	L	N	20	1,000	5	20	150	30	50	1,500	N	15	50
A154	16- 9- 1	L	N	10	700	5	20	70	20	50	1,000	N	10	50
A155	16- 9- 1	L	N	10	1,000	3	20	100	30	30	1,000	N	10	50
A156	16- 9- 1	L	N	10	300	1	5	50	30	20	1,500	5	L	10
A157	15- 9-36	L	N	15	150	1	5	200	15	50	1,000	N	L	50
A158	15- 9-36	L	N	20	700	1.5	15	150	20	50	1,500	N	L	50

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10) (ppm)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05) (percent)	Ti (0.002)	Remarks
Stream sediments--Continued											
A093	20	15	N	1,000	200	20	N	100	5.0	0.5	
A094	20	15	N	1,000	200	20	N	200	5	.7	
A095	20	20	N	1,000	300	30	N	300	7	.7	
A096	20	15	N	1,000	150	30	N	200	7	.7	
A097	20	15	N	1,000	150	30	N	100	5	.7	
A098	30	20	N	1,000	300	50	L	500	10	1	Soil.
A099	30	10	N	2,000	300	20	N	500	7	1	
A100	70	15	N	300	200	50	N	500	7	1	
A101	30	15	N	2,000	300	30	N	500	10	1	
A102	30	15	N	1,000	200	30	N	200	7	.7	
A103	30	15	N	1,000	300	30	L	500	10	1	
A104	20	20	N	700	500	30	700	200	10	>1	
A105	20	15	N	700	300	30	L	500	10	1	
A106	20	20	N	1,000	500	30	L	300	10	1	
A107	20	20	N	700	200	15	N	100	7	.5	
A108	N	70	N	1,000	500	30	200	100	15	1	
A109	20	20	N	1,000	200	30	N	200	7	1	
A110	150	20	N	1,000	200	20	300	100	7	.7	
A111	20	15	N	500	200	20	L	150	7	.7	
A112	50	20	N	1,000	300	30	N	200	10	1	
A113	20	20	N	700	500	30	N	200	10	1	
A114	50	15	N	1,000	200	15	200	150	7	.7	
A115	30	15	N	1,000	500	20	L	150	10	.7	
A118	100	20	N	1,000	300	20	200	150	10	1	
A119	2,000	20	N	1,000	300	20	7,000	150	10	.7	
A120	70	20	N	1,000	300	20	N	200	10	1	
A121	150	20	N	1,000	300	30	500	200	10	1	
A122	10	20	N	1,000	300	20	N	300	10	1	
A123	10	20	N	1,000	500	20	L	200	15	>1	
A124	15	20	N	1,000	700	20	200	100	20	>1	
A125	100	20	N	1,000	300	30	200	200	10	1	
A126	15	20	N	1,000	300	30	N	150	10	1	
A127	50	7	N	200	100	30	N	500	5	.5	
A128	70	10	N	500	100	30	N	300	5	.7	
A129	50	15	N	700	200	50	L	300	7	.7	
A130	50	15	N	700	150	30	N	300	3	.5	
A131	30	15	N	1,000	150	30	N	500	5	.7	
A132	20	15	N	1,000	200	30	N	200	5	.7	
A133	30	15	N	700	200	30	N	200	7	.7	
A134	30	15	N	1,000	200	30	N	300	7	1	
A135	30	20	N	1,000	300	30	N	500	10	>1	
A136	20	15	N	1,000	200	30	N	200	7	.7	
A137	15	15	N	1,000	200	30	N	200	7	.7	
A138	20	30	N	1,000	500	50	N	200	15	1	
A139	20	20	N	1,000	300	30	L	300	10	1	
A140	10	15	N	1,000	200	20	N	200	5	.7	
A141	30	20	N	1,000	300	30	N	200	15	1	
A142	30	20	N	700	300	50	N	500	10	1	
A144	70	15	N	100	150	50	N	500	7	.7	
A145	30	15	N	200	150	50	N	200	5	.7	
A146	50	10	N	100	100	30	N	150	5	.5	
A147	50	7	N	N	70	30	N	150	5	.2	
A149	20	15	N	100	150	30	N	150	5	.5	
A150	30	10	N	300	150	20	N	300	7	.7	
A153	50	15	N	200	200	100	N	700	7	.7	
A154	10	15	N	200	200	100	N	500	5	.7	
A155	30	15	N	500	200	50	N	500	7	.7	
A156	70	5	N	N	70	30	N	100	2	.2	
A157	50	10	N	100	150	30	N	100	3	.3	
A158	30	15	N	200	150	30	N	150	7	.5	

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
			Stream sediments--Continued											
A159	15- 9-36	L	L	150	500	5.0	20	150	20	50	1,000	10	15	50
A160	15- 9-36	L	N	10	200	3	5	50	30	N	1,500	N	10	20
A161	15- 9-36	L	N	100	500	5	15	200	30	100	1,000	N	10	70
A162	15- 9-36	L	10.0	50	500	3	20	100	30	70	1,000	N	15	70
A163	15- 9-36	L	.5	30	700	3	30	100	30	50	1,500	N	15	70
A165	15- 9-25	L	.7	20	500	3	15	70	15	50	1,000	N	10	50
A167	15- 9-25	L	.7	50	500	5	20	100	20	70	1,500	N	15	70
A168	15- 9-25	L	L	30	700	3	20	100	20	70	1,500	10	15	70
A169	15- 9-24	L	1	20	700	3	70	100	70	20	3,000	N	15	70
A171	15- 9-24	0.03	N	20	700	2	15	70	20	50	1,500	N	10	30
A172	15- 9-24	L	N	15	1,500	3	10	20	20	70	1,500	N	10	5
A173	15 -9-24	L	N	20	1,000	3	30	70	30	50	1,500	7	10	30
A174	15- 9-13	L	N	15	700	3	15	70	20	20	1,000	5	10	30
A175	15- 8- 7	L	N	10	1,000	2	15	70	15	30	1,000	N	L	30
A177	15- 8-18	L	N	10	700	3	10	50	10	50	1,000	N	15	15
A179	15- 8- 7	L	N	10	700	2	15	50	10	30	1,000	10	10	30
A180	15- 8- 8	L	N	15	1,000	3	20	70	15	50	1,500	N	10	30
A181	15- 8- 7	L	N	15	1,000	3	20	100	15	70	1,000	N	10	50
A182	15- 8- 7	L	N	15	1,500	3	15	70	10	70	1,000	N	10	20
A184	16- 8-18	L	N	20	1,000	3	30	150	30	20	1,500	N	10	70
A185	16- 9-24	L	N	20	1,000	3	30	50	20	N	1,500	N	10	10
A187	16- 9-24	L	.5	30	1,000	2	30	30	30	N	1,500	N	10	10
A188	16- 9-24	L	N	20	1,500	2	20	20	30	N	2,000	N	L	10
A189	16- 9-24	L	N	20	1,000	2	30	150	30	50	1,500	N	10	70
A190	16- 9-24	L	L	30	1,000	3	30	70	50	20	1,500	N	10	50
A191	16- 9-23	L	N	30	700	3	20	70	20	N	1,500	N	10	50
A193	16- 9-23	L	.5	20	2,000	5	5	20	30	N	>5,000	N	10	10
A194	16- 9-22	<.04	N	20	1,500	2	30	100	50	50	1,500	N	15	70
A195	16- 9-22	L	N	15	1,500	3	30	100	30	50	1,500	N	10	50
A196	16- 9-22	L	N	70	1,500	3	20	150	70	50	1,500	N	10	50
A197	16- 9-15	L	N	20	1,500	2	30	150	50	20	1,500	N	10	50
A200	16- 9-16	L	N	L	1,500	2	20	100	50	30	2,000	N	15	50
A202	16- 8-18	L	.5	50	700	3	20	100	30	50	1,500	N	10	50
A203	16- 8-18	L	.5	70	500	2	15	200	20	70	1,000	N	10	70
A204	16- 8-18	L	N	50	700	3	20	150	20	50	1,000	N	10	50
A205	16- 9-13	L	N	50	700	3	20	70	20	50	1,500	N	10	30
A206	16- 9-14	L	1	50	1,000	3	20	150	20	50	1,500	10	10	50
A207	16- 9-14	L	N	50	1,000	3	20	100	20	50	1,500	N	10	50
A208	16- 9-10	L	N	20	1,000	3	20	50	20	50	1,000	N	10	30
A209	16- 9-10	L	N	20	1,000	5	10	50	30	70	1,500	N	15	20
A210	16- 9-14	<.04	N	10	1,000	2	20	50	20	20	1,500	N	10	20
A214	16- 9-14	L	N	70	700	3	30	200	30	50	1,000	15	10	70
A216	16- 9-14	L	N	100	300	2	20	200	20	30	1,000	5	10	70
A217	16- 9-13	L	N	50	1,000	2	20	150	30	50	1,500	10	10	50
A218	16- 9-13	L	N	100	500	2	20	150	20	N	1,000	N	L	50
A219	16- 8-18	L	N	70	700	3	20	200	30	30	2,000	N	L	70
A221	16- 8-18	L	N	50	700	3	20	150	30	30	1,500	N	10	50
A223	16- 9-12	L	5	20	1,500	3	20	30	50	50	2,000	N	10	20
A224	16- 8- 7	L	7	20	1,000	3	20	70	30	N	5,000	N	10	50
A225	16- 8-16	L	N	50	700	3	30	100	30	N	1,500	N	10	70
A226	16- 9-16	<.04	N	30	1,500	2	30	100	50	50	1,500	N	15	50
A227	16- 8-19	L	L	50	1,500	3	30	100	30	20	1,500	30	10	50
A228	16- 8-17	L	N	50	1,500	2	30	100	30	20	1,500	5	10	70
A229	16- 8-17	L	N	30	1,500	2	30	70	30	30	1,500	N	10	50
A230	12- 9-24	L	N	L	700	2	10	50	15	20	1,000	10	L	50
A232	12- 9-24	L	N	10	700	2	15	50	15	30	1,000	N	L	50
A234	12- 9-23	L	N	15	1,000	1	30	100	20	50	1,500	N	20	20
A235	12- 9-23	L	N	L	700	1	20	70	20	20	1,000	5	L	50
A236	12- 9-23	.04	N	L	1,500	1.5	30	200	30	50	1,500	10	10	70
A237	12- 9-15	L	N	10	700	2	20	70	20	50	1,000	5	L	50

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10) (ppm)	Sc (5) (ppm)	Sn (10) (ppm)	Sr (50) (ppm)	V (5) (ppm)	Y (5) (ppm)	Zn (200) (ppm)	Zr (10) (ppm)	Fe (0.05) (percent)	Ti (0.002) (percent)	Remarks
					Stream sediments--Continued						
A159	50	15	N	N	200	30	N	300	7	0.7	
A160	100	5	N	N	100	10	N	150	3	.2	
A161	70	20	N	N	200	70	200	300	7	.5	
A162	50	15	N	200	150	50	N	300	5	.5	
A163	100	15	N	200	150	70	N	500	7	.7	
A165	50	15	N	200	100	30	N	200	3	.5	
A167	70	20	N	100	150	100	N	300	7	1	
A168	100	15	N	100	150	30	N	300	7	.7	
A169	100	30	N	100	300	70	500	500	10	>1	
A171	30	15	N	100	150	20	N	150	7	.5	
A172	100	10	N	500	150	30	N	150	7	.7	
A173	70	15	N	100	200	50	N	200	7	1	
A174	50	10	N	200	150	30	N	100	5	.5	
A175	20	10	N	500	150	30	N	200	5	.5	
A177	50	10	N	200	150	50	N	500	5	.5	
A179	30	10	N	300	100	20	N	100	3	.5	
A180	50	15	N	500	150	30	N	200	5	.7	
A181	30	15	N	500	200	30	L	150	5	.7	
A182	50	15	N	500	150	50	N	200	5	.7	
A184	20	15	N	200	200	30	N	150	7	.5	
A185	20	15	N	200	200	30	N	150	7	.5	
A187	50	15	N	100	150	50	N	300	7	.5	
A188	30	15	10	500	150	30	N	300	7	.7	
A189	50	20	10	300	200	50	N	200	7	1	
A190	30	20	10	200	200	50	N	500	7	.7	
A191	30	15	20	200	200	30	N	150	5	.5	
A193	50	20	5	700	200	70	N	300	10	1	Soil.
A194	100	20	10	700	300	50	L	500	10	1	
A195	30	15	N	700	200	30	N	200	10	1	
A196	70	15	N	200	150	70	N	300	5	.7	
A197	70	20	N	700	300	30	N	300	15	1	
A200	70	15	N	500	500	30	200	200	15	1	
A202	70	15	N	200	200	50	L	150	5	.5	
A203	300	15	N	200	200	50	N	150	5	.5	
A204	20	15	N	300	200	50	N	200	7	.5	
A205	20	15	N	100	200	30	N	200	5	.5	Soil?
A206	1,500	15	N	500	300	30	700	200	7	.7	
A207	50	15	N	500	200	30	N	200	7	.5	
A208	30	15	N	300	200	30	N	200	5	.5	
A209	50	15	N	200	200	30	N	150	5	.7	
A210	30	15	N	500	200	20	L	100	7	.7	
A214	30	20	N	500	300	50	N	150	10	.7	
A216	30	15	N	500	200	30	N	150	7	.7	
A217	70	15	N	500	200	50	N	100	5	.5	
A218	100	10	N	200	200	30	N	200	5	.2	
A219	70	15	N	N	200	30	200	200	7	.7	
A221	20	15	N	200	200	50	L	200	5	.7	
A223	150	15	N	N	150	50	200	300	5	.7	
A224	70	15	10	100	150	50	N	300	5	.5	
A225	100	15	15	200	200	30	N	200	5	.7	
A226	70	20	N	1,000	300	30	L	300	15	1	
A227	70	20	N	300	200	50	N	300	10	.7	
A228	50	20	N	500	200	30	N	300	10	.7	
A229	20	20	N	500	200	30	N	300	7	.7	
A230	20	10	N	200	100	20	N	100	5	.3	
A232	20	10	N	200	100	20	N	200	5	.5	
A234	15	10	N	700	500	20	N	300	15	1	
A235	20	15	N	700	200	20	L	100	7	.7	
A236	30	15	N	1,500	300	30	N	200	10	1	
A237	30	15	N	500	100	30	N	200	3	.5	

TABLE 7.—*Analyses of samples from the Black*

		Atomic absorption (ppm)	Semiquantitative spectrographic analyses (ppm)											
Sample	T. R. S. (pl. 2)	Au (0.02)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
						Stream sediments--Continued								
A238	12- 9-15	L	N	10	700	1.5	20	70	20	20	1,000	N	L	50
A239	12- 9-15	L	N	10	700	2	15	70	20	30	1,000	N	L	50
A241	12- 9-15	L	N	10	700	2	30	200	20	30	1,500	N	L	50
A243	12- 9-16	L	N	10	700	2	20	70	20	30	1,000	N	L	30
A245	12- 9-16	L	N	10	700	1.5	10	50	20	30	1,000	5	L	30
A247	12- 9-16	L	N	15	500	5	N	N	5	30	1,000	N	10	5
A248	13- 9- 2	L	N	15	700	1.5	20	100	20	20	1,000	15	L	70
A249	13- 9- 3	L	N	10	700	1.5	15	70	15	20	1,000	5	L	50
A250	13- 9- 3	L	N	15	700	1.5	30	200	30	50	1,500	N	10	70
A251	13- 9- 4	L	N	15	700	2	20	70	20	20	1,000	7	10	50
A252	11-12-10	---	N	20	700	2	10	30	15	100	1,000	N	20	30
A253	11-12-34	---	N	20	500	5	5	20	10	30	700	N	30	10
A254	11-12-35	---	N	20	500	7	10	30	5	50	700	N	30	15
A256	11-12-34	---	N	30	700	5	10	30	10	70	1,000	N	30	20
A257	11-12-34	---	N	30	1,000	3	10	10	10	70	700	N	20	10
A258	12-12- 3	---	N	30	500	3	10	30	7	70	1,000	N	30	20
A259	12-12- 2	---	N	50	700	5	10	30	10	70	1,000	N	30	20
A260	12-12- 2	---	N	30	700	3	10	30	10	70	1,000	N	30	20
A261	12-12- 2	---	N	50	500	3	10	50	7	70	1,000	N	30	15
A262	12-12- 2	---	N	30	500	5	10	20	7	100	700	5	30	15
A263	12-12-11	---	N	30	700	3	10	50	10	30	1,000	N	30	15
A264	12-12-11	---	N	30	700	3	10	50	15	70	1,000	N	20	20
A265	12-12-11	---	N	30	500	3	10	30	10	70	1,000	N	30	15
A266	12-12-11	---	N	30	500	3	10	50	10	70	1,000	N	50	15
A267	12-12-11	---	N	30	500	3	10	20	10	70	1,000	N	20	20
A268	12-12-14	---	N	30	700	3	10	30	10	50	1,000	N	30	15
A269	12-12-14	---	N	10	500	2	50	200	50	200	5,000	10	100	20
A270	12-12-14	---	N	30	700	3	15	50	30	50	1,000	N	30	20
A271	12-12-23	---	N	50	700	3	15	50	20	50	1,000	N	20	20
A272	12-12-23	---	N	50	700	3	10	30	15	70	1,000	N	20	20
A273	12-11-31	---	N	30	1,000	5	15	20	15	70	1,500	N	20	15
A274	12-11-31	---	N	30	700	2	30	50	30	100	3,000	5	50	20
A275	12-11-31	---	N	30	700	3	20	30	20	70	1,500	N	30	15
A276	12-11-31	---	N	50	700	3	20	50	20	70	1,000	N	30	20
A278	13-11- 7	---	N	20	1,000	2	30	50	15	100	1,500	N	30	15
A279	13-11- 7	---	N	20	1,000	3	20	30	7	70	1,500	N	30	15
A280	13-11- 8	---	N	20	1,000	2	20	10	5	100	1,000	N	20	10
A281	13-11- 8	---	N	20	1,000	2	20	30	5	50	1,500	N	20	20
A282	13-11- 7	---	N	15	1,000	2	50	300	20	70	1,500	N	30	100
A283	13-11-18	---	N	30	700	3	30	70	20	70	1,000	N	30	70
A284	11-10- 5	---	N	30	700	3	20	50	20	70	1,500	N	20	50
A285	11-10 -5	---	N	30	700	3	15	30	15	70	1,000	N	20	30
A286	11-10- 5	---	N	50	1,000	3	10	30	10	70	1,000	5	30	30
A287	11-10- 5	---	N	50	700	3	20	30	20	70	1,000	N	20	50
A288	11-10- 5	---	N	30	700	2	30	70	20	100	1,500	N	20	70
A289	11-10- 4	---	N	30	700	2	30	70	20	70	1,500	N	30	50
A290	11-10- 4	---	N	20	700	2	30	50	20	100	2,000	N	50	50
A292	11-10- 4	---	N	30	150	7	5	10	15	150	1,500	N	70	5
A293	11-10- 9	---	N	50	700	5	20	50	20	50	1,000	N	30	50
A294	11-10- 9	---	N	30	700	3	20	20	20	50	1,000	N	20	20
A295	11-10- 9	---	N	30	700	1	50	100	30	100	2,000	N	30	70
A296	11-10- 9	---	N	20	700	2	20	50	20	100	2,000	N	50	50
A297	11-10- 9	---	N	20	700	2	20	30	20	50	1,000	N	30	30
A298	11-10- 9	---	N	20	300	5	5	10	10	100	1,500	N	50	10
A299	11-10-15	---	N	20	700	5	7	15	15	100	1,000	N	30	5
A300	11-10-15	---	N	15	700	3	20	30	20	30	1,000	N	20	30
A301	13- 9- 5	L	N	10	700	2	20	70	20	70	1,000	10	10	30
A302	13- 9- 5	L	N	10	1,000	2	20	200	20	20	1,500	5	L	50
A303	12- 9-32	L	N	10	700	3	10	50	20	100	1,000	5	10	10
A304	12- 9-32	L	N	15	1,000	2	20	300	20	30	1,000	N	10	70

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	Remarks
	(ppm)								(percent)		
					Stream sediments--Continued						
A238	20	15	N	700	100	20	N	150	3	.5	
A239	20	15	N	700	100	20	N	150	3	.3	
A241	20	15	N	700	150	20	N	150	5	.5	
A243	20	10	N	700	150	30	N	200	5	.5	
A245	20	N	N	500	100	20	N	200	7	.5	
A247	20	15	N	N	20	30	N	100	2	.1	
A248	10	15	N	700	200	30	N	150	7	.5	
A249	20	20	N	700	200	20	N	200	5	.5	
A250	30	15	N	700	300	30	L	300	7	1	
A251	30	15	N	700	200	50	N	200	5	.5	
A252	20	10	70	300	150	70	N	300	7	.7	
A253	20	5	N	100	50	50	N	500	3	.2	
A254	20	7	N	200	100	50	N	300	5	.5	
A256	30	10	N	300	100	70	N	500	7	.5	
A257	30	7	N	300	70	50	N	300	5	.3	
A258	20	10	N	200	100	50	N	300	7	.5	
A259	50	10	N	300	100	50	N	500	5	.5	
A260	30	10	N	500	100	50	N	500	7	.5	
A261	30	7	N	200	100	50	N	700	5	.5	
A262	20	10	N	300	100	50	N	500	5	.5	
A263	20	7	N	200	100	50	N	1,000	7	.5	
A264	20	10	N	500	150	70	N	700	10	.7	
A265	20	10	N	200	150	50	N	500	7	.5	
A266	20	7	N	200	150	50	N	500	7	.7	
A267	30	10	N	200	100	50	N	200	7	.5	
A268	20	7	N	200	150	50	N	700	7	.7	
A269	20	50	70	200	1,000	200	1,000	>1,000	>20	>1	
A270	30	10	N	300	150	50	N	500	10	1	
A271	20	10	N	200	150	50	N	500	10	1	Soil.
A272	15	10	N	200	150	50	N	700	10	1	Do.
A273	30	10	N	300	150	50	N	500	10	1	
A274	30	20	20	200	300	100	200	1,000	20	>1	
A275	30	10	N	300	150	70	N	500	10	1	
A276	30	15	N	300	150	50	N	700	10	>1	
A278	30	15	N	700	200	70	N	500	10	>1	
A279	20	10	N	500	150	50	N	500	10	1	
A280	20	15	N	500	200	50	N	500	15	>1	
A281	20	10	N	300	200	50	N	500	10	1	
A282	15	20	N	700	500	50	N	300	15	>1	
A283	20	15	N	700	200	50	N	300	10	1	
A284	50	10	N	500	150	50	N	300	10	.7	
A285	50	10	N	500	100	50	N	300	7	.5	
A286	50	10	N	500	70	50	N	300	7	.3	
A287	50	10	N	500	100	50	N	300	7	.5	
A288	30	15	N	500	200	70	N	700	15	1	
A289	30	15	N	500	200	70	N	700	15	>1	
A290	30	15	N	300	200	100	L	500	15	>1	
A292	50	5	L	N	30	100	N	500	5	.3	
A293	50	10	N	500	100	50	N	500	10	.5	
A294	50	7	N	300	70	50	N	300	7	.5	
A295	50	20	N	700	200	100	N	700	20	>1	
A296	30	20	N	500	150	200	N	1,000	15	>1	
A297	20	10	N	300	150	50	N	1,000	10	1	
A298	10	5	N	100	50	100	N	700	7	.5	
A299	20	7	N	200	50	50	N	500	5	.7	
A300	20	10	N	300	150	30	N	500	10	.7	
A301	20	15	N	500	300	70	N	500	7	.7	
A302	20	15	N	700	200	30	N	100	7	.7	
A303	50	20	N	500	100	50	N	200	5	.5	
A304	20	10	N	700	200	50	N	200	7	.7	

TABLE 7.—*Analyses of samples from the Black*

		Atomic absorption (ppm)	Semiquantitative spectrographic analyses (ppm)											
Sample	T. R. S. (pl. 2)	Au (0.02)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
					Stream sediments--Continued									
A305	12- 9-32	L	N	20	700	5.0	5	50	20	100	1,000	N	20	10
A306	12- 9-32	L	N	L	1,000	1.5	20	200	30	N	1,500	N	10	70
A307	12- 9-32	L	N	10	1,000	3	15	30	20	50	1,000	10	15	10
A308	12- 9-32	L	N	10	1,000	2	20	300	30	20	1,000	N	10	70
A309	12- 9-30	L	N	10	1,000	2	20	150	20	50	1,000	N	10	50
A310	12- 9-32	L	N	20	1,000	1.5	10	200	20	50	1,500	N	L	70
A311	12- 9-32	L	N	10	1,000	2	30	300	30	N	1,500	N	10	70
A312	11-10-14	---	N	15	700	1.5	15	30	20	30	1,000	N	20	20
A313	11-10-14	---	N	15	700	2	20	30	20	50	1,000	N	30	30
A315	11-10- 7	---	N	50	700	3	20	30	20	50	1,000	N	20	50
A316	11-10- 7	---	N	50	1,000	3	10	50	20	70	1,000	5	20	50
A317	11-10- 7	---	N	20	700	2	10	50	10	50	1,000	N	20	30
A318	11-10- 7	---	N	30	700	2	15	50	10	50	1,000	N	20	50
A319	11-10- 7	---	N	50	700	2	15	50	15	50	1,000	N	30	50
A320	11-10- 7	---	N	50	700	2	20	70	20	70	1,000	N	20	50
A321	11-11-12	---	N	50	700	3	20	50	15	70	1,000	N	30	30
A322	11-11-14	---	N	20	500	7	5	15	10	50	1,000	N	50	10
A323	11-11-14	---	N	50	700	3	10	50	15	70	1,000	N	20	30
A324	11-11-12	---	N	50	700	3	15	70	20	70	1,000	N	20	50
A326	11-10-36	---	N	20	500	10	N	5	15	70	700	N	30	5
A327	11-10-26	---	N	20	500	3	10	15	20	70	1,000	N	20	10
A328	11-10-26	---	N	20	500	3	10	20	20	30	700	N	15	10
A329	11-11-12	---	N	30	700	3	15	70	20	50	1,000	N	20	30
A341	12-11-33	---	N	20	1,500	2	30	20	20	100	2,000	N	50	5
A342	12-11-34	---	N	30	1,000	1	20	50	20	70	1,000	N	30	20
A343	12-11-34	---	N	20	700	3	10	20	20	70	700	N	30	15
A346	12-11-35	---	N	10	1,500	2	10	15	10	100	1,500	N	20	5
A347	12-11-34	---	N	15	1,000	3	10	10	10	100	1,500	N	50	5
A348	12-11-34	---	N	10	700	2	15	20	10	70	700	N	20	15
A349	12-11-34	---	N	10	1,000	2	15	20	10	70	1,000	N	20	15
A350	12-11-34	---	N	10	700	2	15	30	15	70	1,000	N	20	30
A351	11-10-18	---	N	15	500	1	15	70	15	70	1,500	N	20	30
A352	11-10-18	---	N	15	500	3	15	30	15	50	1,000	5	30	20
A353	11-10-18	---	N	20	500	3	15	50	15	50	700	N	30	30
A354	11-10-18	---	N	15	700	2	15	50	15	70	1,000	N	50	30
A355	11-10-18	---	N	15	700	2	15	100	15	70	700	N	20	30
A356	11-10-17	---	N	10	500	2	15	30	10	70	1,000	N	30	30
A357	11-10-17	---	N	10	700	3	15	20	15	70	1,000	N	30	20
A358	11-10-16	---	N	10	700	3	10	15	20	70	1,000	N	20	15
A359	11-10-21	---	N	10	300	7	7	15	20	50	700	N	50	15
A360	11-10-22	---	N	15	700	5	15	15	15	70	1,000	N	30	15
A361	11-10-22	---	N	10	700	2	15	20	20	50	700	N	20	15
A362	11-10-22	---	N	10	500	3	15	15	20	50	1,000	N	20	15
A363	11-10-22	---	N	10	700	2	15	20	20	50	700	N	20	20
A364	11-10-22	---	N	10	700	2	20	30	30	50	1,000	N	20	20
A365	11-10-23	---	N	10	700	2	20	15	30	50	700	N	15	15
A367	11-10-23	---	N	10	700	1.5	15	20	20	50	700	N	15	15
A368	11-10-26	---	N	10	700	2	20	20	20	50	1,000	N	15	20
A369	11-10-26	---	N	10	700	2	20	20	20	50	1,500	N	15	15
A370	11-11-12	---	N	20	700	2	20	70	15	50	1,000	N	20	50
A371	11-11-12	---	N	20	700	3	20	50	20	100	1,500	5	50	30
A390	14-11-33	---	N	10	700	1	20	100	20	50	1,000	N	20	50
A391	14-11-34	---	N	10	700	1	30	100	30	50	1,000	N	30	50
A393	14-11-21	---	N	10	700	L	50	200	50	70	2,000	N	50	50
A394	14-11-20	---	N	10	1,000	1	30	70	30	70	1,500	N	15	30
A395	14-11-20	---	N	10	700	1.5	15	50	20	50	1,000	N	20	20
A396	14-11-20	---	N	10	700	1.5	20	50	20	30	1,500	N	15	30
A397	14-11-17	---	N	L	700	1.5	10	30	15	50	700	N	20	20
A398	14-11- 8	---	N	50	500	2	15	30	10	30	1,000	N	50	15
A399	14-11- 8	---	N	15	300	2	15	100	20	50	2,000	N	70	50

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	Remarks
	(ppm)								(percent)		
					Stream sediments--Continued						
A305	70	20	N	N	30	70	N	200	3.0	0.3	
A306	20	15	N	1,000	300	30	N	200	7	.7	
A307	50	20	N	300	200	50	N	500	7	.7	
A308	20	15	N	1,000	200	20	N	150	5	.7	
A309	30	20	N	700	200	30	N	200	5	.7	
A310	20	20	N	1,000	300	30	N	200	7	.7	
A311	20	15	N	700	300	50	N	300	7	1	
A312	15	10	N	300	100	20	N	300	7	.7	
A313	15	10	N	200	150	50	N	500	10	.7	
A315	50	10	N	500	150	50	N	500	10	.7	
A316	50	10	N	700	150	50	N	300	10	.5	
A317	20	10	N	500	150	50	N	300	10	.5	
A318	30	10	N	500	150	50	N	300	10	.5	
A319	20	15	N	500	150	50	N	500	10	.7	
A320	20	15	N	700	150	50	N	300	10	.7	
A321	20	15	N	500	150	70	N	500	10	.7	
A322	30	7	N	200	50	70	N	500	5	.5	
A323	30	10	N	500	150	50	N	300	7	.5	
A324	50	10	N	700	150	50	N	300	10	.7	
A326	30	L	N	100	30	70	N	300	2	.3	
A327	20	7	N	500	100	30	N	200	5	.5	
A328	20	7	N	300	100	20	N	200	5	.5	
A329	30	10	N	500	150	50	N	300	10	.7	
A341	30	20	N	700	300	70	200	700	20	>1	
A342	20	10	N	500	200	50	N	300	15	.7	
A343	30	10	N	300	100	70	N	500	7	1	
A346	20	10	N	500	100	70	N	700	10	1	
A347	30	10	N	300	70	100	N	1,000	10	1	
A348	15	10	N	500	100	50	N	300	7	.7	
A349	30	10	N	500	150	50	N	300	7	1	Soil.
A350	20	10	N	500	100	50	N	300	7	.7	
A351	15	15	N	300	150	50	200	300	10	.7	
A352	30	10	N	300	100	50	N	200	5	.3	
A353	30	10	N	300	100	50	N	300	7	.3	
A354	30	15	N	500	150	100	N	500	10	1	
A355	30	10	N	500	100	50	N	500	10	.5	
A356	30	10	L	300	100	70	L	500	7	.7	
A357	20	10	N	300	100	50	N	500	7	.5	
A358	30	10	N	300	70	50	N	200	5	.3	
A359	50	5	L	200	70	50	N	200	3	.5	
A360	30	10	N	500	100	70	N	300	7	1	
A361	20	7	N	300	70	20	N	200	5	.5	
A362	20	7	N	300	70	20	N	200	5	.5	
A363	15	10	N	300	100	20	N	500	7	.7	
A364	20	10	N	500	100	20	N	500	10	1	
A365	30	10	N	500	100	20	N	300	10	.7	
A367	20	7	N	300	70	20	N	300	7	.5	
A368	20	10	N	500	150	20	N	300	10	.7	
A369	30	10	N	500	100	50	N	300	10	.7	
A370	30	15	N	500	150	50	N	300	10	.5	
A371	20	15	N	500	200	100	N	1,000	10	.7	
A390	15	10	N	500	200	30	N	300	15	1	
A391	20	15	N	500	300	30	N	700	15	>1	
A393	30	20	N	300	500	30	500	1,000	20	>1	
A394	30	15	N	500	300	30	N	1,000	15	>1	
A395	15	7	N	300	100	20	N	300	7	.7	
A396	15	15	N	500	150	20	N	200	10	.5	
A397	15	7	N	500	70	20	N	200	5	.5	
A398	30	7	N	200	100	30	N	500	5	.7	
A399	20	10	N	500	100	50	L	700	10	1	

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
					Stream sediments--Continued									
A400	14-11- 8	---	N	10	700	5.0	5	20	10	30	1,500	N	100	7
A401	12-11-34	---	N	15	1,000	3	15	15	15	70	1,500	N	30	10
A402	12-11-33	---	N	10	700	3	10	20	15	70	1,000	N	30	10
A403	12-11-33	---	N	10	700	3	7	15	30	50	700	N	20	15
A404	12-11-29	---	N	10	1,000	5	10	20	15	70	1,000	N	20	20
A405	12-11-30	---	N	15	700	3	7	20	10	50	700	N	20	15
A406	12-11-30	---	N	15	700	3	7	15	15	70	1,000	N	20	15
A407	12-12-24	---	N	20	700	3	7	30	15	50	1,000	30	30	15
A408	12-12-24	---	N	20	1,000	3	15	30	20	70	1,000	N	30	15
A409	12-12-13	---	N	20	1,000	3	10	20	10	70	1,000	N	20	10
A410	12-12-13	---	N	20	1,000	3	10	30	15	100	1,000	N	50	15
A411	11-12-10	---	N	30	300	10	5	30	15	70	1,000	5	70	15
A413	11-12-10	---	N	30	300	7	5	10	15	70	700	N	50	15
A415	11-12- 2	---	N	30	300	7	5	10	10	70	1,000	5	100	10
A418	11-12- 2	---	N	20	50	15	N	N	10	100	1,000	7	70	N
A420	11-12- 2	---	N	30	300	10	5	20	15	70	1,500	N	70	15
A422	11-12- 2	---	N	20	500	7	5	7	10	50	1,000	N	50	10
A424	11-12-14	---	N	20	700	3	10	30	20	70	1,000	N	50	20
A425	11-12-13	---	N	20	500	5	5	20	15	50	500	N	20	15
A426	11-12-13	---	N	30	500	5	7	30	15	50	700	N	30	15
A427	11-12-13	---	N	20	500	5	7	20	15	50	700	N	30	20
A428	11-11-18	---	N	20	700	5	7	30	15	70	1,000	N	30	20
A429	11-11-19	---	N	20	700	3	15	50	20	70	1,000	N	30	30
A430	11-11-19	---	N	20	700	3	10	30	15	50	1,500	N	30	20
A431	11-11-17	---	N	30	700	3	15	30	20	50	1,000	N	30	30
A433	12-11-16	---	N	20	1,000	5	15	20	20	100	2,000	N	30	10
A434	12-11-16	---	N	10	1,000	3	10	7	10	100	1,500	N	30	5
A438	12-11-16	---	N	20	1,000	5	15	20	15	100	1,000	N	30	15
A439	12-11-17	---	N	20	1,000	3	10	20	15	100	1,500	N	50	10
A440	12-11-17	---	N	20	1,000	5	10	10	10	70	1,000	N	50	10
A441	12-11-17	---	N	50	700	5	10	30	15	70	1,000	N	30	20
A442	12-11-18	---	N	20	1,000	5	10	10	10	70	1,000	N	50	10
A443	12-11-18	---	N	50	1,000	5	10	15	10	100	1,500	N	50	15
A444	12-11-18	---	N	20	1,000	3	15	30	15	70	1,000	N	30	20
A445	12-12-13	---	N	20	1,000	5	10	30	10	100	1,000	N	50	10
A446	12-12-13	---	N	30	700	5	15	30	20	100	1,000	N	30	20
A447	12-12-11	---	N	20	700	5	5	20	10	70	1,000	N	30	10
A448	11-11-14	---	N	30	700	5	7	30	15	50	1,000	5	30	30
A449	11-11-14	---	N	30	1,000	3	10	30	15	70	2,000	N	50	30
A450	11-11-14	---	N	50	700	5	10	30	20	70	1,000	N	30	30
A451	14-11- 5	---	N	20	200	7	5	10	10	100	2,000	N	100	5
A452	14-11- 5	---	N	20	300	7	5	15	10	70	3,000	N	100	10
A453	13-11-20	---	N	20	500	3	20	300	30	100	5,000	5	100	70
A454	11-12-10	---	N	20	700	5	15	20	10	100	700	N	50	30
A456	11-12-35	---	N	20	700	5	10	30	10	50	1,000	N	30	15
A457	11-12-35	---	N	20	700	5	5	20	15	50	1,000	N	50	10
A458	11-12-35	---	N	20	700	3	10	30	10	50	1,000	N	30	20
A459	11-12-25	---	N	20	700	3	10	30	20	50	1,000	N	20	20
A460	11-12-25	---	N	15	700	5	7	30	20	50	1,000	N	30	15
A461	11-12-25	---	N	20	700	3	10	50	30	70	1,000	N	30	20
A462	11-12-25	---	N	20	700	5	7	30	15	50	1,000	N	50	20
A463	11-11-30	---	N	20	700	3	10	30	30	70	1,500	N	50	15
A464	11-11-30	---	N	15	500	3	10	30	20	50	1,000	N	30	15
A465	11-11-30	---	N	10	700	5	10	30	15	50	1,000	N	20	20
A466	11-11-30	---	N	20	500	5	10	30	20	70	1,000	N	30	20
A467	11-11-30	---	N	10	500	7	5	15	15	50	1,500	N	50	15
A468	11-11-29	---	N	20	500	3	5	30	20	50	1,000	N	30	15
A469	11-11-29	---	N	15	700	3	15	50	30	70	2,000	N	50	30
A470	11-12-35	---	N	20	500	5	5	20	10	50	1,000	N	50	15
A471	11-12-36	---	N	20	700	5	10	30	15	70	1,000	N	70	15

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10) (ppm)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05) (percent)	Ti (0.002)	Remarks
					Stream sediments--Continued						
A400	15	5	N	N	30	50	N	500	5.0	0.5	
A401	30	10	N	500	100	50	N	500	10	1	
A402	20	10	N	700	100	50	N	300	10	1	
A403	15	10	N	500	100	30	N	300	5	.7	
A404	20	15	N	700	100	50	N	500	7	.7	
A405	15	10	N	300	100	30	N	300	7	.7	
A406	15	10	N	500	100	50	N	500	7	1	
A407	30	10	N	300	150	50	N	500	7	.5	
A408	20	10	N	500	150	50	N	500	10	1	
A409	15	10	N	500	100	50	N	500	7	1	
A410	30	10	N	300	150	50	N	700	10	1	
A411	50	7	15	200	70	70	N	300	7	.3	
A413	30	5	N	200	50	70	N	200	3	.2	
A415	20	5	50	100	30	70	N	300	3	.3	
A418	70	N	10	N	50	150	N	200	2	.1	Mine dump fines.
A420	50	7	10	150	50	100	N	300	5	.5	
A422	30	5	L	150	30	50	N	300	3	.3	
A424	30	10	N	500	100	50	N	300	7	.5	
A425	20	5	N	300	30	30	N	200	3	.2	
A426	30	5	N	500	70	30	N	500	5	.5	
A427	20	5	N	300	70	30	N	300	5	.5	
A428	20	7	N	500	100	30	N	300	7	.7	
A429	50	10	N	300	150	50	N	300	7	.7	
A430	30	7	N	500	100	30	N	300	7	.5	
A431	30	10	N	300	150	50	N	200	7	.7	
A433	70	10	L	300	100	100	N	500	10	1	
A434	30	10	N	200	100	70	N	500	10	.7	
A438	20	10	N	500	100	70	N	500	10	1	
A439	70	10	N	300	70	70	N	500	7	.5	
A440	50	10	N	300	70	50	N	500	7	.5	
A441	50	10	N	300	100	50	N	300	7	.5	Soil.
A442	50	7	N	500	100	50	N	500	7	.5	
A443	50	10	N	500	100	70	N	700	10	.7	
A444	50	10	N	300	150	50	N	500	10	.7	
A445	50	10	N	500	150	70	N	1,000	10	1	
A446	50	10	N	500	150	70	N	500	10	1	
A447	30	5	N	200	70	30	N	300	5	.3	
A448	50	10	N	500	70	30	N	300	7	.5	
A449	70	10	N	300	100	70	N	700	10	.7	
A450	50	10	N	300	100	50	N	300	7	.5	
A451	70	10	10	N	30	70	N	300	5	.5	
A452	50	10	20	100	50	70	L	200	7	.7	
A453	50	20	70	L	150	100	200	500	15	>1	
A454	30	10	N	500	70	70	N	500	7	.7	
A456	30	5	N	200	70	50	N	300	5	.5	
A457	50	5	N	200	70	70	N	700	7	.5	
A458	50	7	N	300	100	50	N	500	7	.7	
A459	50	7	N	150	100	50	N	300	7	.5	
A460	30	7	N	300	100	50	N	500	5	.5	
A461	50	10	N	300	150	50	N	1,000	7	.5	
A462	30	10	N	200	100	70	N	500	7	.5	
A463	50	10	10	300	100	70	N	700	10	.7	
A464	30	5	N	200	100	50	N	300	7	.5	
A465	30	5	N	300	100	50	N	300	7	.3	
A466	50	7	N	200	100	50	N	500	7	.5	
A467	20	7	N	200	70	70	N	500	7	.7	
A468	30	7	N	200	100	30	N	300	5	.5	
A469	30	10	10	300	200	100	L	1,000	15	>1	
A470	30	5	L	150	100	50	N	300	7	.5	
A471	30	10	N	300	100	50	N	300	7	.5	

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
			Stream sediments--Continued											
A472	12-12- 1	---	N	15	500	5.0	5	30	20	70	1,000	5	70	15
A473	12-12- 1	---	N	15	700	5	7	30	30	70	1,000	N	50	15
A474	12-12- 1	---	N	20	500	5	10	30	20	100	2,000	5	100	15
A475	12-12- 1	---	N	20	700	3	10	30	20	100	1,500	N	50	20
A476	12-12- 1	---	N	20	500	5	10	20	15	70	1,000	N	70	15
A477	12-11- 6	---	N	15	500	3	10	30	20	100	2,000	N	150	10
A478	12-11- 7	---	N	15	300	5	5	10	20	50	1,000	N	100	10
A479	12-11- 7	---	N	20	1,000	5	10	30	20	100	1,500	N	50	15
A480	12-11- 8	---	N	20	700	5	10	50	20	100	1,000	N	50	15
A481	12-11- 8	---	N	20	1,500	3	10	50	20	100	1,000	N	50	15
A482	11-12-36	---	N	20	500	5	7	30	15	50	1,500	N	70	15
A484	11-12-36	---	N	20	500	5	5	30	20	70	1,000	N	30	15
A485	11-12-36	---	N	20	700	3	10	30	20	70	1,000	N	20	20
A486	11-12-36	---	N	20	300	7	5	20	20	50	1,000	N	50	10
A487	11-11-31	---	N	20	300	7	5	20	15	50	1,000	N	30	10
A488	11-11-31	---	N	20	300	7	10	50	15	70	1,500	7	100	15
A489	11-11-32	---	N	20	500	7	7	30	20	70	1,500	N	70	15
A490	11-11-33	---	N	30	300	7	7	30	15	100	1,500	5	100	30
A492	11-11-33	---	N	15	500	5	10	30	15	70	1,000	N	30	30
A494	11-11-15	---	N	30	500	3	10	30	20	70	1,000	N	30	30
A495	11-11-15	---	N	30	700	3	7	20	20	70	1,000	N	30	10
A497	11-11-15	---	N	30	700	3	10	30	20	70	1,000	N	30	30
A498	11-11-15	---	N	20	500	3	5	20	30	70	1,000	N	20	7
A499	11-11-21	---	N	20	700	3	10	30	15	50	1,000	N	30	30
A501	11-11-21	---	N	30	700	2	10	30	20	70	1,000	N	50	30
A502	11-11-16	---	N	20	700	2	20	100	30	100	2,000	N	50	50
A503	11-11-16	---	N	20	700	3	20	20	30	30	1,500	N	20	20
A504	14-11-27	---	N	20	700	3	20	70	30	30	1,000	N	20	50
A506	14-11-27	---	N	10	700	2	20	100	30	70	1,500	N	20	50
A508	14-11-23	---	N	10	700	2	20	70	30	30	1,000	N	20	50
A510	14-11-23	---	N	10	1,000	2	20	100	20	100	1,500	N	30	50
A511	14-11-23	---	N	10	1,000	2	15	50	20	50	1,000	N	20	30
A512	14-11-23	---	N	10	1,000	2	20	70	20	50	1,000	N	30	50
A514	14-11-23	---	N	10	1,500	2	10	20	15	50	1,000	N	20	15
A515	14-11-23	---	N	10	1,000	2	20	70	50	70	1,500	N	20	50
A516	14-11-13	---	N	L	1,000	2	10	50	30	30	1,500	N	10	30
A518	14-11-13	---	N	10	500	1.5	30	100	30	50	1,500	N	20	50
A520	14-11-13	---	N	L	700	2	30	200	30	20	1,500	N	15	150
A523	14-11-27	---	N	10	700	2	20	150	30	70	1,500	N	20	70
A525	14-10- 9	---	N	10	1,000	2	20	50	30	100	1,500	N	20	20
A527	14-10- 9	---	N	15	1,000	3	10	10	30	50	1,500	N	20	10
A529	14-10- 9	---	N	10	700	7	5	30	15	50	1,500	N	15	15
A530	14-10-10	---	N	10	1,000	2	20	20	20	50	1,500	N	30	15
A531	14-10-10	---	N	10	500	7	5	10	20	50	1,500	N	20	5
A532	14-10-10	---	N	10	700	5	7	10	15	50	1,000	N	20	10
A533	14-10-10	---	N	10	500	5	15	15	20	50	1,500	N	50	5
A534	14-10-10	---	N	10	500	5	10	20	15	50	1,000	N	20	10
A536	14-10-10	---	N	10	700	7	10	10	20	70	1,000	N	20	10
A538	14-10-10	---	N	10	700	7	5	15	20	50	700	N	20	10
A540	14-10-15	---	N	10	700	2	15	30	15	50	1,000	N	30	10
A541	14-10-14	---	N	15	700	5	10	20	20	70	700	N	30	10
A542	14-10-14	---	N	10	700	3	15	30	20	70	1,000	N	30	15
A544	14-11-23	---	N	15	700	3	20	100	30	50	1,000	N	30	70
A545	14-11-23	---	N	10	700	3	15	70	30	50	1,000	N	30	50
A547	14-11-24	---	N	15	700	1.5	30	150	50	50	1,000	N	20	100
A548	14-11-24	---	N	10	500	1.5	30	200	30	20	1,000	N	10	100
A540	14-10-19	---	N	15	700	2	50	300	50	30	1,500	N	20	150
A550	14-10-18	---	N	10	700	1	50	300	70	50	1,500	N	15	100
A553	16- 9-23	---	0.7	50	500	3	20	70	50	50	1,500	N	20	50
A555	16- 9-23	---	50	20	300	3	10	50	2,000	20	3,000	100	15	30

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	Remarks
	(ppm)								(percent)		
	Stream sediments--Continued										
A472	50	10	N	150	70	50	N	300	7.0	0.5	
A473	30	10	N	200	100	50	N	500	7	.7	
A474	30	15	10	200	150	70	200	500	10	1	
A475	30	10	N	200	100	50	N	500	7	1	
A476	30	7	N	200	70	50	N	300	5	.5	
A477	50	15	50	200	150	70	200	1,000	10	>1	
A478	30	7	20	100	50	50	N	500	5	.5	
A479	50	10	L	300	100	70	N	700	7	1	
A480	30	10	N	300	100	70	N	300	7	.7	
A481	50	10	N	200	100	70	N	500	7	.7	
A482	30	10	10	200	100	70	N	500	7	.5	
A484	50	7	N	200	100	50	N	500	7	.5	
A485	30	7	30	200	100	50	N	300	7	.7	
A486	50	5	L	200	70	50	N	500	5	.5	
A487	30	5	10	150	50	50	N	300	5	.3	
A488	30	15	15	100	150	70	L	700	10	1	
A489	50	10	10	200	70	70	N	500	7	.7	
A490	50	10	30	150	70	70	N	700	7	.7	
A492	30	10	20	150	70	50	N	300	7	.5	
A494	70	10	10	300	100	50	N	300	7	.5	
A495	70	5	N	200	70	50	N	300	5	.3	
A497	50	10	N	500	150	50	N	500	7	.7	
A498	50	5	N	100	50	30	N	300	3	.3	
A499	20	10	N	300	100	50	N	500	7	.5	
A501	30	10	N	300	150	70	N	700	10	.7	
A502	30	20	20	300	200	150	300	1,000	15	>1	
A503	30	10	N	500	100	30	N	200	10	1	
A504	30	10	N	500	100	30	N	300	10	1	
A506	20	15	N	700	150	30	N	300	10	1	
A508	20	15	N	700	150	30	N	300	10	1	
A510	50	15	N	500	150	50	N	500	15	>1	
A511	30	10	N	500	100	30	N	700	10	1	
A512	30	10	N	500	150	50	N	700	.5	1	
A514	50	5	N	500	100	30	N	150	7	.5	
A515	20	15	N	300	300	30	N	1,000	20	>1	
A516	30	10	N	500	150	20	N	500	10	1	
A518	10	15	N	200	300	30	L	1,000	20	>1	
A520	10	15	N	500	200	20	N	300	15	>1	
A523	20	15	N	500	200	30	N	1,000	15	>1	
A525	30	15	N	500	200	30	N	1,000	15	>1	
A527	30	10	N	500	150	30	N	500	15	1	
A529	30	5	N	300	50	30	N	300	5	.3	
A530	30	10	N	500	200	30	N	700	15	>1	
A531	30	5	N	300	30	30	N	300	5	.5	Soil; <10 ppm Bi.
A532	30	7	N	300	70	30	N	500	7	.5	
A533	30	10	N	300	100	30	N	1,000	10	1	
A534	30	7	N	300	100	30	N	300	7	.7	
A536	30	10	N	500	100	50	N	300	7	.5	
A538	30	7	N	500	70	30	N	300	3	.3	
A540	20	10	N	300	150	30	N	700	10	1	
A541	50	7	N	500	70	30	N	300	7	.5	
A542	30	7	N	300	150	30	N	700	10	1	
A544	50	10	N	700	100	30	N	200	10	.5	
A545	50	7	N	500	100	30	N	500	7	.5	
A547	30	10	N	500	150	20	N	300	10	1	
A548	10	15	N	300	100	20	N	150	10	.7	
A549	20	15	N	500	200	30	N	300	15	>1	
A550	30	15	N	700	300	30	N	300	10	>1	
A553	50	15	N	500	200	30	N	300	10	.7	
A555	7,000	10	N	300	100	20	3,000	150	5	.3	

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
			Stream sediments--Continued											
A557	16- 9- 1	---	L	10	700	3.0	10	50	30	70	1,000	N	30	15
A559	16- 9- 1	---	N	10	700	3	15	30	30	70	1,000	30	20	20
A561	16- 9- 1	---	N	30	700	5	7	30	30	70	3,000	5	30	20
A562	14-10- 9	---	N	10	700	5	7	20	15	70	1,500	N	20	15
A563	14-10- 9	---	N	10	700	3	7	5	10	50	1,000	N	20	10
A564	14-10- 9	---	N	10	1,000	2	10	50	30	50	1,000	N	20	30
A565	14-10- 4	---	N	10	1,000	5	10	15	15	70	1,000	N	30	10
A566	14-10- 4	---	N	15	700	7	10	20	20	70	1,000	N	20	15
A567	14-10- 4	---	N	10	1,000	2	10	30	20	50	700	N	20	20
A568	13-10-33	---	N	15	500	5	10	30	30	70	1,000	N	10	20
A569	13-10-33	---	N	10	1,000	1	10	30	20	50	1,000	N	10	20
A571	13-10-33	---	N	10	1,000	1.5	20	70	20	50	1,000	N	20	30
A572	13-10-33	---	N	15	500	5	5	30	20	70	1,000	N	20	15
A573	13-10-33	---	N	15	1,000	2	20	30	30	70	1,000	N	20	20
A574	14-10- 7	---	N	15	700	2	20	100	30	50	1,000	N	20	50
A575	14-10- 7	---	N	15	1,000	3	20	70	30	100	1,500	N	30	30
A577	14-10- 5	---	N	15	1,500	3	10	30	30	100	700	N	20	10
A578	14-10- 6	---	N	15	1,000	2	20	50	30	50	1,000	N	20	20
A579	14-10- 6	---	N	20	1,000	3	20	100	50	70	1,000	N	20	50
A580	14-11-12	---	N	30	700	3	20	150	30	50	1,000	N	20	100
A582	14-11-14	---	N	L	1,000	1	30	200	30	50	1,000	N	20	70
A583	14-11-14	---	N	L	700	1.5	20	70	20	70	700	N	20	50
A584	14-11-14	---	N	L	700	2	30	150	30	70	1,000	N	20	70
A585	14-11-14	---	N	L	1,000	1.5	30	70	20	70	1,000	N	20	50
A586	14-11-14	---	N	L	700	1.5	5	20	10	50	1,000	N	20	15
A587	14-11-22	---	N	L	700	1.5	15	70	15	50	700	N	20	30
A588	14-10-18	---	N	L	300	1	20	200	30	N	700	N	10	70
A589	14-10-21	---	N	10	300	1.5	15	70	30	20	500	N	10	50
A590	14-10-21	---	N	10	500	2	15	70	20	50	700	N	15	50
A591	14-10-21	---	N	10	700	2	30	200	20	50	1,000	N	20	50
A592	14-10-21	---	N	L	300	1	10	50	20	50	700	N	10	20
A593	14-10-20	---	N	10	500	1.5	15	100	30	50	700	N	15	50
A594	14-10-20	---	N	10	700	1.5	20	100	30	30	700	N	15	50
A595	14-10-20	---	N	10	700	1	30	100	30	30	1,000	N	15	70
A597	14-10-19	---	N	10	500	1.5	20	70	30	30	1,000	N	15	50
A598	14-10-19	---	N	10	700	2	20	70	20	20	700	N	15	50
A599	14-11-25	---	N	15	700	1.5	30	100	30	30	1,000	N	15	50
A601	14-10- 8	---	N	10	700	3	5	20	20	50	700	N	15	15
A602	14-10- 8	---	N	L	700	2	5	10	10	30	500	N	15	10
A603	14-10- 8	---	N	10	700	2	5	20	20	50	700	N	15	15
A604	14-10- 8	---	N	10	700	1.5	5	30	20	50	700	N	15	15
A605	14-10-18	---	N	10	1,000	2	30	30	30	70	1,500	N	50	15
A606	14-10-18	---	N	10	700	2	30	100	30	50	2,000	N	30	20
A607	14-10-18	---	N	L	700	1	20	70	20	50	1,000	N	20	20
A609	14-10-18	---	N	L	700	1.5	20	70	30	70	1,000	N	20	20
A611	14-10-18	---	N	L	500	1.5	20	70	20	70	700	N	20	30
A612	14-10- 7	---	N	L	700	1	15	30	20	100	1,000	N	20	20
A613	14-10- 7	---	N	L	700	1.5	15	70	20	70	700	N	15	20
A614	14-10- 7	---	N	L	500	L	20	70	30	20	1,000	N	10	50
A615	14-10- 7	---	N	L	500	1.5	10	30	15	30	700	N	15	15
A623	14-10-32	---	N	10	700	1	15	70	30	50	1,000	N	15	50
A624	14-10-32	---	N	10	700	1.5	20	70	30	70	1,000	N	15	50
A625	14-10- 8	---	N	15	700	1	20	70	30	50	1,000	N	15	30
A626	14-10- 8	---	N	10	700	1	20	70	30	70	1,000	N	20	30
A627	14-10- 5	---	N	10	300	1	10	30	20	20	500	N	15	20
A628	14-10- 5	---	N	10	700	1.5	20	70	20	100	1,500	N	30	30
A629	14-11-13	---	N	L	700	1.5	10	30	15	70	1,000	N	20	15
A631	14-11-13	---	N	L	1,000	1	20	70	30	70	1,000	N	20	50
A640	13- 8-19	L	N	L	1,000	1	5	30	15	50	500	N	15	7
A642	13- 8-19	0.05	10.0	50	200	1	5	70	20	20	500	15	L	15

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	Remarks
	(ppm)								(percent)		
				Stream sediments--Continued							
A557	100	10	N	150	150	70	N	700	10.0	0.5	
A559	70	10	N	200	100	70	N	500	7	.5	
A561	100	10	N	100	70	50	N	500	10	.5	
A562	50	10	N	500	70	50	N	300	5	.5	
A563	20	10	N	500	50	30	N	200	5	.5	
A564	50	10	300	700	100	20	N	700	10	.7	
A565	50	15	N	500	100	70	N	1,000	15	1	
A566	50	7	N	300	100	50	N	300	7	.5	
A567	20	10	N	500	100	30	N	300	10	.7	
A568	30	7	N	200	100	70	N	200	5	.5	
A569	30	7	N	500	100	20	N	300	10	.7	
A571	30	10	N	700	150	30	N	700	15	1	
A572	50	7	N	200	70	70	N	500	3	.3	
A573	50	10	N	500	100	30	N	300	10	.7	
A574	20	10	N	700	150	30	N	300	10	1	
A575	50	10	N	500	150	50	N	500	15	1	
A577	70	10	N	500	100	30	N	1,000	10	1	Soil.
A578	20	10	N	300	100	20	N	300	10	1	Do.
A579	20	15	N	200	150	20	N	500	15	>1	Do.
A580	20	15	N	300	100	20	N	300	15	1	Do.
A582	15	15	N	700	200	30	N	500	10	1	
A583	20	10	N	500	100	30	N	300	7	1	
A584	20	10	N	700	150	20	N	300	10	>1	
A585	15	10	N	500	150	30	N	300	7	1	
A586	15	7	N	200	70	20	N	200	5	.5	
A587	15	10	N	300	100	20	N	200	5	.5	
A588	15	10	N	300	200	20	N	100	7	.7	
A589	15	7	N	200	150	20	N	100	3	.5	
A590	15	10	N	300	100	30	N	150	5	.5	
A591	15	15	N	300	200	30	N	300	10	1	
A592	20	5	N	200	100	20	N	100	5	.3	
A593	15	10	N	300	150	30	N	200	7	.5	
A594	20	10	N	300	150	20	N	200	7	.7	
A595	15	10	N	300	150	20	N	300	10	.7	
A597	15	10	N	300	100	20	N	200	7	.5	
A598	15	10	N	300	100	20	N	300	7	.5	
A599	20	10	N	500	150	30	N	300	7	.7	
A601	20	5	N	300	70	20	N	200	3	.3	
A602	15	5	N	300	50	15	N	100	3	.3	
A603	20	5	N	200	70	30	N	300	3	.5	
A604	20	5	N	200	70	20	N	200	3	.5	
A605	20	10	N	300	200	30	L	700	15	>1	
A606	20	10	N	300	200	30	200	700	20	>1	
A607	20	10	N	500	150	30	N	500	15	1	
A609	20	15	N	300	150	30	N	700	15	>1	
A611	15	15	N	500	150	30	N	300	10	1	
A612	15	15	N	300	150	30	N	500	15	1	
A613	20	10	N	300	100	20	N	200	7	.7	
A614	L	15	N	700	150	20	N	100	10	.7	
A615	20	10	N	300	70	20	N	100	3	.3	
A623	15	10	N	500	100	20	N	300	7	.7	
A624	15	15	N	500	100	20	N	300	10	.7	
A625	20	15	N	500	150	20	N	300	10	1	
A626	20	15	N	300	150	30	N	300	10	1	
A627	15	7	N	300	70	15	N	150	3	.5	
A628	20	15	N	500	150	50	N	500	15	>1	
A629	20	7	N	300	70	30	N	300	5	.5	
A631	15	15	N	700	150	30	N	300	10	>1	
A640	30	7	N	300	70	10	N	150	3	.5	
A642	1,500	15	N	L	70	15	L	150	3	.2	Mine dump fines.

TABLE 7.—*Analyses of samples from the Black*

		Atomic absorption (ppm)	Semiquantitative spectrographic analyses (ppm)											
Sample	T. R. S. (pl. 2)	Au (0.02)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
					Stream sediments--Continued									
A645	13- 8-19	0.06	1,000.0	20	200	L	L	70	700	L	700	150	L	15
A647	13- 8-19	.02	N	L	1,000	1.0	L	50	20	20	300	L	10	10
A649	13- 9-16	.03	N	L	1,000	1	L	10	15	20	300	N	10	L
A651	13- 9-16	.02	N	L	1,000	1	L	15	20	20	500	N	15	L
A653	13- 9-16	.02	N	L	1,500	L	7	70	20	50	500	N	10	20
A654	13- 9-16	L	N	L	1,500	1	5	30	70	30	300	N	L	10
A655	13- 9-16	L	N	L	1,500	1	5	30	5	30	300	N	L	10
A656	13- 9-16	L	N	L	1,500	1	L	15	30	20	500	N	15	7
A658	13- 9-15	L	N	L	1,000	1.5	5	30	7	20	300	5	10	10
A659	13- 9-15	.02	N	L	1,500	1.5	L	10	10	20	300	N	10	L
A660	13- 9-15	L	N	L	1,000	1.5	L	10	15	30	300	N	10	L
A661	13 -9-15	L	N	L	1,000	L	L	20	5	30	300	7	15	L
A662	13- 9-15	L	N	L	1,500	1.5	L	10	10	30	500	N	15	L
A664	13- 9-22	N	N	L	1,000	1	L	15	15	30	500	10	L	L
A666	13- 9-23	.02	N	L	1,000	2	L	15	15	30	300	N	10	L
A668	13- 9-23	.02	N	L	1,500	1	L	10	15	30	300	N	10	L
A670	13- 9-23	.02	N	L	1,000	L	5	30	10	30	300	N	10	5
A672	13- 9-24	L	N	L	700	L	5	30	10	50	500	N	30	5
A674	13- 9-24	.02	N	L	700	L	10	70	10	30	500	N	10	50
A676	13- 9-24	.02	N	L	700	L	7	50	10	20	300	N	10	20
A678	13- 9-24	.02	N	L	700	L	5	70	15	30	300	N	15	15
A680	13- 9-24	.02	N	20	150	1	L	100	10	50	300	N	L	50
A681	13- 9-24	L	N	L	200	L	5	100	15	30	300	N	L	30
A683	13- 9-28	.02	N	L	1,000	1	L	15	15	30	500	N	10	5
A685	13- 9-28	.02	N	L	1,000	1.5	L	10	15	30	300	N	L	L
A687	13- 9-28	.02	N	L	700	1	L	15	15	30	300	N	L	L
A689	13- 9-28	L	N	L	1,000	1	10	15	10	30	700	N	10	5
A691	13- 9-27	.02	N	L	700	1	L	15	15	30	500	N	10	5
A692	13- 9-27	.05	N	L	1,000	L	7	30	30	30	500	L	10	10
A693	13 -9-27	N	N	L	1,000	L	10	20	15	30	500	10	15	7
A694	13 -9-27	N	N	L	1,000	L	10	20	20	20	300	5	L	7
A695	13- 9-22	L	N	L	700	L	10	30	20	30	700	N	10	15
A696	13- 9-22	.03	N	L	1,000	L	5	15	15	30	500	5	15	5
A697	13- 9-22	L	N	L	1,000	1	L	15	10	30	300	N	L	5
A698	13- 9-22	.02	N	L	1,000	1	L	10	10	30	500	N	L	L
A699	13- 9-22	.02	N	L	1,000	L	L	15	15	30	300	N	15	L
A700	13- 9-10	L	N	L	1,000	L	7	70	10	100	500	N	10	15
A701	13- 9-10	.02	N	L	1,500	L	7	50	7	30	1,000	N	L	15
A702	13- 9-21	.02	N	L	1,000	L	L	10	7	20	300	N	10	L
A703	13- 9-21	L	N	L	1,000	1	5	L	15	30	300	N	10	5
A704	13- 9-16	.02	N	L	1,000	1	5	20	15	30	300	N	15	7
A705	13- 9- 6	.02	N	L	1,000	1.5	L	L	10	30	300	N	15	5
A706	13- 9- 6	N	N	L	700	1	L	L	15	20	300	N	10	5
A707	13- 9- 5	.02	N	L	700	L	L	L	20	20	300	N	10	5
A708	13- 9- 5	L	N	L	1,000	L	10	30	15	30	300	N	10	15
A709	13- 9- 8	L	N	L	700	L	5	20	15	30	300	N	10	7
A711	14- 9- 4	.02	N	L	1,000	L	7	30	15	50	500	5	10	7
A712	13 -9-33	.02	N	L	1,500	L	7	20	10	30	700	7	10	7
A713	13- 9-33	L	N	L	1,500	L	10	15	15	70	300	N	10	7
A714	13 -9-33	L	N	L	1,000	L	5	10	10	30	500	N	10	7
A715	13- 9-33	L	N	L	1,000	L	5	10	30	50	300	N	10	7
A716	13- 9-28	L	N	L	1,000	L	L	10	7	20	300	N	L	5
A717	13- 9-17	L	N	L	1,000	L	5	30	20	50	500	N	10	7
A718	13- 9-17	.02	N	L	1,000	L	L	10	10	30	500	N	10	7
A719	13- 9-18	.02	N	L	1,000	1	L	L	15	30	500	N	15	7
A720	13- 9-18	.03	N	L	1,000	L	5	10	15	30	300	N	10	7
A721	13- 9-18	.05	N	L	1,500	L	5	10	15	30	700	N	10	5
A722	13- 9-18	.02	N	L	1,500	1	L	10	10	20	500	N	L	10
A724	13- 9- 7	.02	N	L	1,500	L	5	10	20	20	500	N	L	7
A726	13- 9- 7	L	N	L	1,000	1.5	L	15	15	30	500	N	L	7

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	Remarks
	(ppm)								(percent)		
				Stream sediments--Continued							
A645	10,000	10	N	150	70	15	700	100	3.0	0.15	
A647	10	10	N	500	70	20	N	100	5	.3	
A649	15	7	N	200	70	15	N	200	2	.5	
A651	15	7	N	200	70	20	N	100	3	.5	
A653	20	15	N	300	100	30	N	100	5	.7	
A654	15	10	N	300	70	20	N	100	3	.3	<10 ppm Bi.
A655	15	10	N	300	50	15	N	150	3	.3	
A656	20	10	N	300	70	15	N	150	3	.3	<10 ppm Bi.
A658	15	10	N	300	70	15	N	150	5	.3	
A659	15	15	N	300	70	20	N	500	3	.3	
A660	15	10	N	300	70	15	N	300	3	.2	
A661	20	10	N	300	70	10	N	150	2	.3	
A662	30	10	N	300	70	15	N	150	2	.2	
A664	10	10	N	500	70	15	N	100	2	.3	
A666	20	10	N	300	70	20	N	150	3	.2	
A668	15	10	N	300	70	20	N	100	2	.3	
A670	15	5	N	300	70	15	N	100	3	.3	
A672	15	10	N	300	100	30	N	300	5	.5	
A674	15	15	N	300	70	20	N	150	3	.3	
A676	10	15	N	300	70	15	N	150	3	.3	
A678	15	10	N	300	70	20	N	200	3	.3	
A680	20	15	N	200	70	20	N	100	3	.2	
A681	30	15	N	300	70	20	N	100	3	.2	
A683	15	15	N	300	50	30	N	150	3	.5	
A685	15	10	N	300	70	20	N	100	3	.3	
A687	L	10	N	300	70	15	N	150	3	.3	
A689	15	15	N	500	70	20	N	150	5	.5	
A691	10	15	N	300	70	20	N	150	3	.3	
A692	20	15	N	300	70	20	N	150	5	.5	
A693	15	15	N	500	50	20	N	200	5	.3	
A694	15	10	N	500	70	15	N	100	3	.3	
A695	20	15	N	500	70	20	N	150	5	1	
A696	30	10	N	500	70	20	N	150	3	.5	
A697	20	10	N	300	70	20	N	150	5	.3	
A698	20	10	N	300	70	20	N	150	3	.5	
A699	15	10	N	200	70	15	N	200	3	.7	
A700	15	15	N	500	100	20	N	150	5	.5	
A701	15	10	N	300	50	20	N	150	5	.3	
A702	10	7	N	200	50	15	N	150	3	.3	
A703	30	5	N	300	70	15	N	150	3	.3	
A704	20	7	N	300	70	15	N	150	3	.3	
A705	20	7	N	200	70	20	N	200	3	.3	
A706	20	7	N	200	50	15	N	200	3	.3	
A707	20	10	N	200	70	15	N	200	3	.7	
A708	20	10	N	300	70	20	N	150	3	.3	
A709	30	7	N	300	100	20	N	150	5	.3	
A711	15	15	N	300	100	30	N	300	5	.5	
A712	15	10	N	300	70	20	N	150	7	.5	
A713	20	10	N	300	100	20	N	150	5	.3	
A714	20	7	N	500	70	20	N	200	3	.3	
A715	20	10	N	500	70	30	N	100	3	.3	
A716	15	L	N	500	30	15	N	70	2	.15	
A717	30	10	N	300	100	20	N	150	5	.3	
A718	30	10	N	300	70	15	N	100	3	.5	
A719	30	7	N	300	50	30	N	150	3	.3	
A720	30	15	N	300	70	15	N	200	5	.7	
A721	20	10	N	300	70	20	N	300	3	.7	
A722	20	10	N	300	70	15	N	300	3	.5	
A724	30	10	N	300	70	15	N	150	3	.3	
A726	20	5	N	200	70	20	N	100	2	.3	

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
						Stream sediments--Continued								
A728	12-10-36	0.04	N	L	1,000	L	10	70	20	30	700	N	15	30
A730	12-10-35	.05	N	L	1,000	1.5	5	30	10	30	500	N	10	7
A732	12-10-36	L	N	L	700	1	10	70	10	30	300	N	15	15
A734	13- 9- 6	.02	N	L	1,000	1	L	20	20	30	300	N	10	5
A736	12-10-36	L	N	L	700	1.5	5	15	15	30	700	N	L	5
A737	13-10- 1	.02	N	L	1,000	1	L	20	10	50	500	N	L	5
A739	13-10- 1	.02	N	L	700	L	L	70	15	30	500	N	10	5
A741	13-10- 1	L	N	L	700	L	L	10	10	50	300	N	15	L
A742	13- 9- 7	.02	N	L	1,000	1.5	L	15	10	30	300	N	10	L
A744	13- 9- 7	.04	N	L	500	L	L	20	15	30	300	N	10	5
A746	13- 9- 6	.02	N	L	1,000	L	L	150	20	50	500	N	10	30
A748	13- 9- 6	L	N	L	1,000	L	10	30	20	30	300	N	10	15
A749	13- 9- 7	N	N	L	1,000	1	5	L	20	30	300	N	15	5
A751	13-10-11	N	N	L	700	L	L	70	15	30	300	N	L	15
A752	13-10-11	L	N	L	700	1	5	100	30	50	500	N	L	50
A753	13-10-11	.02	N	L	700	L	10	50	15	30	300	N	10	20
A754	13-10-10	.03	N	L	700	1.5	10	L	10	30	300	N	10	L
A755	13- 9- 7	L	N	L	700	1	L	10	15	20	300	N	20	5
A757	13- 9- 7	L	N	L	1,000	1	5	L	10	30	500	N	15	L
A759	13- 9-29	L	N	L	1,000	1	5	L	20	30	500	N	10	L
A760	13- 9-29	L	N	L	1,500	1	5	20	15	30	500	N	15	5
A761	13- 9-29	L	N	L	1,500	L	5	15	10	30	500	N	15	L
A762	13- 9-29	N	N	L	1,000	1	5	15	15	50	500	N	15	5
A763	13- 9-30	L	N	L	700	1	5	20	10	50	700	N	10	10
A764	13- 9-30	.02	N	L	1,000	L	5	30	30	50	700	N	15	5
A765	13- 9-30	L	N	L	700	L	5	30	5	30	300	N	L	7
A766	13 -9-30	L	N	L	700	L	L	30	10	30	700	N	L	5
A768	13- 9-30	L	N	L	700	1.5	L	30	7	50	300	N	L	5
A770	13- 9-30	L	N	L	700	L	L	30	7	30	500	N	10	7
A771	13- 9-19	L	N	L	700	1.5	L	L	30	30	300	N	10	5
A773	13- 9-19	L	N	L	300	1	L	15	10	30	700	N	L	5
A775	13 -9-32	.02	N	L	1,000	1	10	30	70	30	700	N	15	15
A777	13- 9-32	.02	N	L	1,000	L	10	30	50	30	700	N	15	15
A778	13- 9-32	L	N	L	1,000	1.5	10	20	30	30	700	N	15	10
A779	14- 9- 4	L	N	L	1,000	1	7	15	30	30	500	N	20	10
A781	14- 9- 4	N	N	L	1,500	L	10	30	30	30	700	N	20	10
A783	14- 9- 5	L	N	L	2,000	1.5	15	30	30	50	700	N	30	5
A784	14- 9- 5	L	N	L	1,500	1.5	10	30	30	50	500	N	20	7
A785	14- 9- 9	N	N	L	700	L	7	70	50	30	700	N	10	15
A787	14- 9- 9	N	N	L	1,000	1	7	50	15	50	700	N	10	10
A791	14- 9- 3	L	N	L	1,500	1.5	20	70	20	50	700	30	20	30
A792	14- 9- 3	.02	N	L	1,500	1.5	10	70	20	30	1,500	7	20	15
A793	14- 9- 4	L	N	L	1,500	1	10	70	30	30	700	5	15	15
A794	14- 9- 8	L	N	L	1,500	L	7	70	30	50	500	N	20	7
A796	14- 9- 8	L	N	L	2,000	1	7	30	20	50	700	N	20	5
A798	14- 9-17	.03	N	L	1,500	1	7	30	20	50	500	N	20	7
A799	14- 9-17	.02	N	L	1,500	L	7	30	30	50	700	N	30	7
A800	14- 9-17	.02	N	L	1,500	1	N	10	50	30	300	N	L	L
A801	13-10-13	L	N	L	700	1.5	5	20	50	30	300	N	15	10
A803	13-10-13	.02	N	L	1,000	1	10	15	15	30	300	N	15	5
A805	13-10-13	.02	N	L	700	1.5	10	15	15	30	500	N	10	7
A807	13- 9-30	.02	N	L	700	L	7	15	15	30	300	N	L	7
A809	13- 9-30	.03	N	L	700	1	10	15	15	30	700	N	10	7
A811	13- 9-30	.02	N	L	700	L	7	20	15	50	500	N	L	5
A813	13- 9-28	.02	N	L	700	L	15	15	30	30	300	N	10	7
A815	13- 9-28	.02	N	L	700	L	10	30	20	30	700	N	15	7
A817	13- 9-20	.03	N	L	700	L	7	30	10	30	500	N	L	7
A819	13- 9-20	.02	0.5	L	700	L	5	L	30	30	300	N	L	L
A820	14- 9-18	N	N	L	1,500	1	10	30	15	30	700	N	15	7
A821	14- 9-18	N	N	L	1,500	1	7	30	30	30	500	N	15	7

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

	(ppm)								(percent)		
Sample	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	Remarks
					Stream sediments--Continued						
A728	30	15	N	300	70	30	N	150	5.0	0.5	
A730	30	10	N	500	70	20	N	150	2	.3	
A732	20	10	N	300	70	15	N	200	3	.5	
A734	20	5	N	200	50	15	N	100	2	.15	
A736	30	10	N	200	70	20	N	100	3	.2	
A737	20	10	N	200	70	30	N	150	3	.3	
A739	30	10	N	200	70	30	N	150	3	.3	
A741	15	7	N	200	70	30	N	100	3	.7	
A742	15	7	N	200	70	20	N	150	1.5	.15	
A744	20	7	N	300	70	15	N	100	3	.5	
A746	15	15	N	300	100	20	N	200	5	.7	
A748	20	10	N	300	70	15	N	150	7	.3	
A749	20	7	N	300	70	15	N	150	5	.3	
A751	10	7	N	300	70	5	N	100	3	.5	
A752	30	10	N	300	70	15	N	150	5	.7	
A753	15	15	N	300	50	15	N	150	3	.5	
A754	15	7	N	200	30	30	N	150	2	.2	
A755	20	7	N	200	50	20	N	100	3	.5	
A757	30	7	N	300	50	20	N	150	3	.5	
A759	20	10	N	300	70	15	N	300	3	.5	
A760	30	15	N	300	70	20	N	300	5	.7	
A761	15	7	N	300	70	15	N	150	3	.5	
A762	15	15	N	300	100	30	N	200	5	.7	
A763	15	10	N	300	100	20	N	150	5	.7	
A764	30	10	N	300	70	30	N	150	3	.5	
A765	15	10	N	300	70	15	N	150	3	.2	
A766	30	7	N	300	70	15	N	150	3	.2	
A768	30	10	N	300	70	30	N	300	3	.2	
A770	20	10	N	300	70	10	N	150	3	.2	
A771	30	7	N	300	70	15	N	150	3	.2	
A773	50	7	N	200	70	30	N	150	3	.15	
A775	30	10	N	500	70	30	N	300	5	.5	
A777	20	15	N	500	70	30	N	200	7	.7	
A778	20	15	N	500	70	30	N	300	7	.7	
A779	30	10	N	500	70	30	N	150	5	.3	
A781	30	15	N	500	70	30	N	150	7	.5	
A783	30	15	N	500	70	30	N	200	5	.7	
A784	20	15	N	300	70	30	N	200	5	.7	
A785	30	15	N	300	70	20	N	200	5	.5	
A787	30	15	N	500	100	20	N	300	7	.7	
A791	30	15	N	500	100	30	N	150	7	.7	
A792	30	15	N	700	70	30	N	150	7	.7	
A793	30	10	N	300	70	30	N	150	7	.7	
A794	30	15	N	300	100	30	N	300	7	.7	
A796	30	15	N	500	100	30	N	300	7	.7	
A798	30	10	N	300	70	30	N	150	7	.7	
A799	30	10	N	500	70	30	N	300	7	.7	
A800	30	15	N	300	50	20	N	200	3	.3	
A801	50	10	N	300	70	20	N	150	7	.5	
A803	20	10	N	300	70	30	N	150	3	.5	
A805	30	7	N	300	70	30	N	200	3	.2	
A807	30	7	N	300	70	20	N	150	3	.2	
A809	30	15	N	300	100	30	N	150	3	.3	
A811	30	7	N	300	70	20	N	100	3	.2	
A813	20	15	N	300	100	30	N	150	5	.3	
A815	50	15	N	300	100	30	N	200	5	.5	
A817	30	15	N	300	70	30	N	150	3	.3	
A819	30	10	N	300	70	15	N	200	3	.1	
A820	30	15	N	300	70	30	N	150	7	.3	
A821	50	15	N	300	70	30	N	150	5	.5	

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
			Stream sediments--Continued											
A822	14- 9-18	L	N	L	1,500	L	5	15	15	30	700	N	20	5
A823	14- 9-19	0.02	N	L	700	L	10	20	15	50	700	N	20	5
A825	14- 9-19	N	N	L	1,500	L	10	30	15	30	700	N	30	5
A827	14- 9-17	.02	N	L	1,000	1.0	5	15	15	50	700	N	20	L
A828	14- 9- 9	L	N	L	1,000	L	L	20	10	70	1,000	N	30	L
A829	14- 9- 9	.02	N	L	700	L	5	20	20	70	300	N	15	5
A830	14- 9- 9	.02	N	L	1,000	L	5	20	7	30	300	N	15	5
A831	14- 9- 9	.02	N	L	1,000	1.5	7	10	7	20	700	10	10	5
A832	14- 9-18	L	N	L	700	2	7	70	30	30	700	N	15	20
A834	14- 9-18	.02	N	L	1,000	2	5	70	20	50	700	N	15	30
A836	14- 9-18	L	N	L	1,000	1	5	50	20	30	700	N	30	10
A837	14- 9-18	L	N	L	700	L	15	150	30	30	500	N	L	50
A838	14- 9-18	N	N	L	700	L	10	100	20	30	500	N	10	50
A839	14- 9-18	N	N	L	1,000	L	15	70	20	30	700	N	15	30
A840	14- 9-18	L	N	L	700	L	7	70	10	30	500	N	15	10
A841	14- 9- 7	L	N	L	700	L	L	20	30	30	500	N	10	5
A843	14- 9- 7	L	N	L	700	L	5	30	7	30	700	N	15	L
A845	14- 9- 8	L	N	L	700	L	7	30	7	30	500	N	20	L
A846	14- 9- 7	L	N	L	1,000	L	5	30	7	30	700	N	15	7
A848	14- 9- 7	L	N	L	1,000	L	5	30	15	30	300	N	15	15
A850	14- 9- 7	N	N	L	1,000	L	10	70	15	30	700	5	20	20
A852	14- 9- 7	L	N	L	700	2	L	50	20	50	700	N	10	10
A854	14- 9- 7	N	N	L	1,500	1	10	30	15	70	300	L	15	10
A855	14- 9- 7	N	N	L	1,500	1	L	20	30	30	700	N	15	7
A856	14- 9- 6	L	N	L	1,500	L	5	30	10	20	500	N	15	15
A857	14- 9- 6	L	N	L	1,000	1	5	70	15	20	500	N	15	20
A858	14- 9- 6	L	N	L	700	1.5	L	30	10	70	500	N	20	7
A860	14- 9- 6	N	N	L	700	1.5	L	70	10	20	5,000	N	30	7
A862	14- 9- 5	N	N	L	1,000	1	5	30	20	20	700	N	20	5
A863	14- 9- 5	L	N	L	1,000	1	5	30	30	20	700	N	20	7
A865	12- 9-31	.02	N	L	700	1	5	70	20	30	1,500	N	20	15
A867	12- 9-31	.03	N	L	500	L	15	150	30	20	1,000	N	15	50
A868	12- 9-31	N	N	L	700	L	5	50	15	20	1,000	N	15	15
A870	12- 9-31	L	N	L	700	L	7	70	10	30	700	N	15	20
A872	12- 9-31	.02	N	L	700	L	5	50	30	L	700	N	15	15
A874	12- 9-30	L	N	L	700	L	7	100	20	20	700	L	10	30
A876	14- 9- 2	L	N	L	1,500	L	7	70	15	20	700	30	15	20
A877	14- 9- 2	L	N	L	700	L	10	70	50	L	1,000	15	L	20
A879	12- 9-19	L	N	L	700	L	5	50	10	20	700	N	15	10
A881	12- 9-19	N	N	L	1,000	L	5	70	15	20	700	N	15	20
A883	12- 9-30	.02	N	L	700	L	5	100	15	30	700	N	10	30
A885	12- 9-30	L	N	L	1,000	L	5	50	20	30	700	N	15	15
A886	12- 9-30	L	N	L	1,000	L	15	70	20	20	1,000	N	15	20
A888	12- 9-30	L	N	L	700	L	10	100	150	20	700	N	15	50
A889	12- 9-30	L	N	L	700	L	10	150	15	50	700	N	15	70
A891	13- 9- 4	L	N	L	700	1	10	70	30	50	700	N	15	20
A892	13- 9- 4	.02	N	L	700	L	10	100	15	30	500	N	L	30
A896	13 -8- 6	L	N	L	700	L	10	70	20	30	700	N	L	20
A898	12- 9-36	L	N	L	1,500	L	15	70	30	30	500	N	L	30
A899	12- 9-36	L	N	L	1,500	L	10	70	15	30	300	N	L	20
A900	12- 9-36	L	N	L	1,000	L	7	70	30	20	300	N	L	20
A902	12- 9-29	L	N	L	500	1.5	L	L	5	30	300	N	15	L
A904	12- 9-32	.02	N	L	700	1.5	L	15	7	50	700	N	L	5
A906	12- 9-33	L	N	L	1,000	1.5	L	L	15	70	300	N	L	L
A908	12- 9-33	.03	N	L	1,000	1	L	L	10	50	500	N	L	L
A909	13- 9- 3	.04	N	L	1,500	L	15	100	30	50	700	N	10	30
A910	13- 9- 3	.03	N	L	700	L	5	70	20	50	700	N	L	20
A912	12- 9-36	.03	N	L	700	L	5	50	20	30	300	N	10	15
A914	12- 9-35	.02	N	L	700	L	7	70	15	30	500	N	15	30
A916	12- 9-23	.02	N	L	500	1	L	L	5	50	500	N	20	L

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	Remarks
	(ppm)								(percent)		
				Stream sediments--Continued							
A822	30	10	N	300	70	30	N	150	3.0	0.7	
A823	30	10	N	300	70	30	N	150	3	.5	
A825	30	10	N	300	70	30	N	150	7	.7	
A827	30	10	N	200	70	30	N	150	3	.3	
A828	50	10	N	300	70	30	N	150	3	.2	<10 ppm Bi.
A829	30	15	N	500	70	30	N	150	3	.3	Do.
A830	20	15	N	300	100	20	N	150	3	.3	Do.
A831	30	10	N	300	70	30	N	300	3	.3	Do.
A832	50	15	N	300	70	30	N	150	3	.3	Do.
A834	50	15	N	500	70	30	N	150	5	.3	
A836	30	15	N	300	70	30	N	300	7	.3	
A837	30	15	N	700	70	30	N	150	7	.5	
A838	30	15	N	500	70	30	N	150	5	.3	Do.
A839	30	15	N	700	70	30	N	150	5	.7	Do.
A840	30	10	N	500	70	30	N	150	5	.3	Do.
A841	50	10	N	300	70	20	N	150	2	.3	Do.
A843	30	10	N	300	70	20	N	150	3	.3	Do.
A845	15	10	N	300	100	20	N	150	7	.7	Do.
A846	50	15	N	500	70	30	N	150	3	.7	
A848	30	15	N	300	70	30	N	150	3	.5	Do.
A850	30	15	N	500	100	30	N	150	5	.7	Do.
A852	30	10	N	300	70	30	N	100	3	.3	
A854	20	15	N	300	70	30	N	150	3	.5	Do.
A855	30	5	N	300	50	30	N	150	3	.2	<20 ppm Bi.
A856	15	7	N	500	70	30	N	150	5	.5	
A857	10	10	N	500	70	20	N	150	3	.3	
A858	30	7	N	300	50	70	N	150	3	.5	
A860	30	10	N	300	70	30	N	200	5	.5	
A862	30	10	N	300	70	20	N	200	7	.5	
A863	30	15	N	300	70	20	N	150	5	.7	
A865	30	15	N	300	70	30	N	150	5	.5	<10 ppm Bi.
A867	10	15	N	500	70	20	N	150	7	.7	Do.
A868	15	10	N	300	50	30	N	150	5	.3	
A870	20	10	N	300	70	20	N	150	7	.5	
A872	30	10	N	300	70	20	N	150	5	.5	
A874	15	15	N	300	70	20	N	150	7	.7	
A876	20	10	N	300	70	20	N	150	7	.5	Do.
A877	15	10	N	500	70	10	N	150	7	.3	
A879	30	10	N	300	50	15	N	150	3	.3	Do.
A881	20	10	N	300	70	15	N	150	5	.5	
A883	15	15	N	300	70	20	N	150	5	.5	
A885	15	10	N	300	70	15	N	150	7	.5	Do.
A886	30	15	N	300	70	20	N	150	7	.5	
A888	20	15	N	300	70	20	N	150	7	.7	10 ppm Bi.
A889	20	15	N	300	100	30	N	150	7	.7	
A891	15	10	N	500	70	30	N	200	5	.5	
A892	20	15	N	300	70	20	N	150	3	.3	
A896	20	15	N	300	70	30	N	150	3	.3	
A898	15	15	N	500	100	30	N	150	5	.7	
A899	15	15	N	700	100	20	N	150	5	.7	
A900	20	15	N	300	70	20	N	150	5	.3	
A902	30	5	N	100	10	30	N	150	1	.1	
A904	30	5	N	100	15	50	N	150	1.5	.15	
A906	30	5	N	150	10	30	N	150	1.5	.07	
A908	30	5	N	200	10	30	N	150	1	.05	
A909	20	15	N	700	70	30	N	200	7	.7	
A910	20	10	N	300	70	30	N	150	3	.3	
A912	20	7	N	300	70	20	N	150	2	.3	
A914	30	15	N	300	70	30	N	150	3	.3	
A916	30	5	N	N	10	30	N	150	1.5	.15	

TABLE 7.—*Analyses of samples from the Black*

		Atomic absorption (ppm)	Semiquantitative spectrographic analyses (ppm)											
Sample	T. R. S. (pl. 2)	Au (0.02)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
					Stream sediments--Continued									
A918	12- 9-23	0.02	N	L	1,000	L	L	50	7	30	300	N	15	10
A920	12- 9-22	.02	N	L	700	1.5	L	L	5	50	300	N	15	L
A922	12- 9-22	.02	N	L	700	1	L	L	5	30	500	N	10	L
A924	12- 9-18	L	N	L	1,000	L	7	50	15	30	500	N	10	15
A926	12- 8-31	.02	N	L	1,500	L	10	100	20	30	500	N	L	30
A928	12- 8-31	.02	N	L	1,500	L	15	70	30	30	500	N	L	30
A929	12- 8-31	.02	N	L	1,500	L	15	70	30	30	700	N	10	30
A931	12- 9-36	.02	N	L	1,500	L	10	200	30	30	500	N	L	70
A932	12- 9-36	.02	N	L	1,000	L	10	100	50	30	700	N	L	50
A933	12- 9-36	.02	N	L	1,000	L	10	150	30	20	700	N	L	70
A934	12- 9-36	.02	N	L	1,000	L	10	150	20	20	700	N	10	50
A936	12- 8-31	.02	N	L	1,000	L	10	70	20	30	700	N	L	15
A938	12- 9-25	.02	N	L	700	L	L	70	20	30	700	N	10	10
A940	12- 9-18	.02	N	L	700	L	L	30	20	20	700	N	10	10
A942	12- 9-18	.02	N	L	1,000	L	5	70	15	30	700	N	10	15
A944	12- 9-18	.02	N	L	1,000	L	5	70	20	30	700	N	L	15
A946	12- 9-17	.02	N	L	1,000	L	7	70	30	30	700	N	10	15
A947	12- 9-17	.03	N	L	1,000	L	L	30	15	30	500	N	10	5
A948	12- 9-17	.03	N	L	1,000	L	10	100	20	50	1,000	N	L	30
A949	12- 9-17	.03	N	L	500	2	N	N	10	30	1,000	N	15	L
A950	12- 9-22	.02	N	10	1,000	2	N	5	10	50	300	N	15	L
A951	12- 9-18	.03	N	L	1,000	1	N	50	30	30	500	N	L	15
A953	12- 9-18	.02	N	L	1,500	L	10	100	30	20	700	N	L	30
A954	12- 9-17	.02	N	L	1,500	L	5	100	50	20	700	N	L	50
A955	12- 9-17	.02	N	L	1,500	L	15	150	30	20	700	N	L	70
A957	12- 9-17	.02	N	L	1,000	L	15	200	30	20	700	N	L	70
A959	12- 9- 8	.02	N	L	1,500	L	10	70	30	20	700	N	L	50
A961	12- 9- 8	.03	N	L	2,000	L	10	150	30	20	700	N	L	70
A963	12- 9- 8	.03	N	L	1,500	L	15	150	30	30	700	N	L	70
A964	12- 9- 7	.03	N	L	1,500	L	10	150	30	30	500	N	L	50
A966	12- 9- 6	.03	N	L	1,000	L	15	150	30	20	300	N	L	30
A967	12- 9- 8	.03	N	L	700	L	15	150	20	20	500	N	L	30
A969	12- 9- 8	.04	N	L	1,000	L	10	150	20	20	500	N	L	20
A971	12- 9-27	.03	N	L	300	1.5	N	L	15	30	300	5	20	L
A973	12- 9-23	.03	N	L	700	L	5	50	15	50	300	N	15	15
A974	12- 9-23	.03	N	L	700	L	N	15	10	30	300	N	15	5
A976	12- 9-21	.03	N	L	500	2	N	5	7	50	300	5	10	5
A978	12- 9-22	.02	N	L	700	1.5	N	5	7	50	300	N	20	L
A981	12- 9-22	.03	N	L	300	1.5	N	L	15	30	300	7	20	L
A983	12- 9-22	.02	N	L	700	1.5	N	L	7	50	200	5	15	5
A987	12- 9-22	.02	N	15	1,000	1	N	10	7	30	100	7	15	5
A989	12- 9-25	.02	N	L	1,500	L	15	30	15	30	500	N	L	15
A990	12- 9-25	.03	N	L	1,000	L	15	70	15	30	700	N	10	30
A992	12- 9-35	.03	N	L	1,500	L	15	150	20	30	500	N	10	70
A993	12- 9-35	.02	N	L	700	L	5	70	20	50	300	N	15	30
A995	12- 9-27	L	N	L	700	1	L	30	15	30	700	N	15	5
A997	12- 9-27	L	N	L	1,000	1.5	7	30	10	20	700	N	15	15
A998	12- 9-34	.02	N	L	1,500	1	7	50	10	20	1,000	N	15	20
A999	12- 9-35	L	N	L	700	L	10	70	15	30	700	N	10	50
Z001	13- 9-10	N	N	L	1,500	L	15	100	30	50	300	N	L	50
Z002	13- 9-10	N	N	L	1,500	L	15	70	20	30	500	N	L	50
Z004	13- 9- 9	N	N	L	1,500	L	15	150	30	20	300	N	L	70
Z005	13- 9- 9	N	N	L	1,500	L	10	150	30	20	700	N	L	70
Z008	13-11- 9	.02	N	15	300	L	5	L	15	20	300	L	15	5
Z010	13-11- 9	N	N	10	700	L	7	150	30	20	500	N	L	20
Z012	13-11- 9	N	N	L	1,000	L	15	70	20	30	700	N	15	50
Z015	13-11-10	N	N	20	200	1.5	L	15	30	30	500	5	15	7
Z016	13-11-15	N	N	L	700	1	5	L	30	30	700	7	15	7
Z017	13-11-15	N	N	L	500	1	7	30	30	50	300	5	15	15
Z018	13-11-15	N	N	L	1,000	1	10	70	30	30	700	L	L	20

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	Remarks
	(ppm)								(percent)		
					Stream sediments--Continued						
A918	30	5	N	200	70	30	N	150	2.0	0.3	
A920	30	5	N	N	15	30	N	150	1	.15	
A922	30	5	N	N	15	30	N	150	1	.15	
A924	30	10	N	500	70	30	N	150	3	.3	
A926	20	15	N	700	70	30	N	150	5	.5	
A928	20	15	N	700	70	30	N	150	7	.5	
A929	30	15	N	700	70	30	N	150	7	.7	
A931	10	15	N	700	150	20	N	150	7	1	
A932	20	15	N	500	150	20	N	150	7	.7	
A933	15	15	N	300	100	15	N	150	7	.7	
A934	20	15	N	300	100	15	N	150	7	.7	
A936	20	15	N	500	100	15	N	150	7	.7	
A938	20	10	N	300	70	15	N	150	5	.7	
A940	30	10	N	300	70	15	N	150	5	.5	
A942	30	15	N	300	70	20	N	300	7	.7	
A944	30	15	N	700	70	15	N	150	5	.7	
A946	30	15	N	500	70	15	N	200	7	.7	
A947	30	10	N	200	50	15	N	150	3	.3	
A948	30	15	N	500	100	30	N	150	7	.7	
A949	50	5	N	100	N	30	N	100	1.5	.15	
A950	30	7	N	L	10	30	N	500	2	.2	
A951	30	10	N	300	70	30	N	150	3	.3	
A953	30	15	N	700	70	15	N	150	7	.7	
A954	30	15	N	700	100	20	N	150	7	1	
A955	30	20	N	700	70	20	N	200	7	1	
A957	15	15	N	500	70	20	N	150	7	.7	
A959	20	15	N	700	100	20	N	150	7	.7	
A961	15	15	N	700	150	20	N	150	10	1	
A963	20	20	N	500	100	20	N	150	7	1	
A964	20	15	N	700	70	15	N	150	7	.7	
A966	30	15	N	700	100	15	N	150	7	.7	
A967	10	15	N	500	100	20	N	150	7	.7	
A969	15	15	N	700	100	15	N	100	7	.7	
A971	30	7	N	N	L	30	N	200	1.5	.15	
A973	30	10	N	500	70	20	N	300	3	.3	
A974	30	7	N	150	15	30	N	200	2	.2	
A976	20	5	N	100	10	30	N	150	1.5	.1	
A978	30	5	N	200	15	30	N	300	1.5	.15	
A981	50	5	N	L	L	30	N	150	1.5	.15	
A983	30	5	N	100	10	30	N	150	2	.15	
A987	30	7	N	N	10	30	N	150	1.5	.15	
A989	20	15	N	700	100	30	N	150	5	.5	
A990	20	15	N	500	70	30	N	150	5	.7	
A992	15	15	N	700	70	30	N	150	7	1	
A993	30	10	N	300	50	30	N	150	3	.5	
A995	20	L	N	150	30	20	N	150	2	.2	
A997	30	7	N	300	50	20	N	200	3	.3	
A998	20	7	N	300	50	20	N	150	3	.3	
A999	20	15	N	300	70	20	N	200	7	.5	
Z001	20	15	N	700	70	15	N	150	7	.7	
Z002	30	15	N	300	70	15	N	200	5	.7	
Z004	20	15	N	500	70	15	N	150	10	.7	
Z005	20	15	N	500	70	20	N	200	7	.7	
Z008	30	5	N	150	15	30	N	150	3	.15	
Z010	30	10	N	300	70	20	N	150	3	.7	
Z012	70	15	N	500	100	50	N	200	7	1	
Z015	70	7	N	L	15	50	N	150	3	.2	
Z016	50	7	N	200	20	30	N	150	3	.3	
Z017	30	10	N	300	50	30	N	150	3	.3	
Z018	30	15	N	500	70	30	N	150	3	.5	

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
						Stream sediments--Continued								
Z020	13-11- 9	N	N	L	1,000	L	7	L	30	50	700	N	15	L
Z022	13-11- 8	N	N	10	1,500	L	15	15	15	50	700	L	15	10
Z023	13-11- 8	N	N	L	1,500	1.0	5	5	15	70	700	N	10	L
Z025	13-11- 8	N	N	L	1,000	L	7	50	15	30	700	N	L	7
Z027	13-10-16	N	N	L	1,500	L	5	20	20	30	500	N	10	7
Z029	13-10-16	N	N	L	1,500	1	5	15	20	30	500	N	10	5
Z031	13-10-20	N	N	L	1,500	L	5	15	15	20	300	N	L	5
Z033	13-10-17	N	N	10	300	1.5	5	10	15	30	700	N	15	15
Z035	13-10-18	N	N	L	1,000	L	7	20	10	30	500	N	10	15
Z037	13-10-18	N	N	L	500	1	10	30	15	30	500	L	15	20
Z039	13-10- 8	N	N	15	70	1.5	N	7	10	70	700	L	20	5
Z040	13-10- 8	N	N	15	70	2	N	5	10	70	500	5	20	7
Z042	13-10-17	N	N	L	700	L	10	70	20	50	700	N	15	15
Z043	13-10-18	N	N	L	700	L	15	70	20	30	700	N	L	15
Z044	13-10-18	N	N	L	1,500	L	15	70	30	30	700	N	L	15
Z045	13-10-18	N	N	L	1,500	L	15	100	30	50	500	N	L	30
Z046	13-10-18	N	N	L	1,000	L	7	50	10	20	500	N	10	7
Z048	13-11-13	N	N	L	1,000	L	10	70	30	30	500	N	L	15
Z049	13-11-13	N	N	L	1,000	L	7	30	30	200	500	N	10	7
Z051	13-11-14	N	N	10	700	L	7	50	15	30	300	N	L	15
Z052	13-11-14	N	N	10	700	L	5	30	15	20	300	N	10	10
Z054	13-11-14	N	N	10	1,000	L	20	150	20	70	700	N	L	30
Z056	13-11-14	N	N	L	500	L	10	70	20	30	700	L	15	20
Z058	13-10- 7	N	N	10	500	1	L	L	15	50	500	L	15	L
Z060	13-10- 7	N	N	10	50	1.5	N	L	10	30	500	L	20	L
Z063	13-10- 7	N	N	L	300	1.5	N	N	7	30	300	L	15	5
Z064	13-10- 7	.02	N	10	500	1	15	30	20	50	500	L	20	15
Z065	13-10- 7	.02	N	10	50	1.5	N	15	15	20	300	L	20	L
Z066	13-11-12	N	N	10	15	1.5	N	L	10	20	300	L	20	L
Z067	13-11-12	N	N	L	300	2	5	10	15	50	700	L	20	5
Z069	13-11-12	N	N	10	700	1.5	5	7	20	50	700	L	20	L
Z071	13-11-12	.02	N	15	100	2	L	7	10	30	1,000	N	10	L
Z072	13-11-12	N	N	L	150	L	5	L	10	20	300	5	15	7
Z074	13-11-12	N	N	10	150	2	L	5	15	30	700	L	20	L
Z076	13-11-11	N	N	L	70	1.5	N	N	10	100	300	L	15	5
Z077	13-11-11	N	N	10	150	1	N	N	15	20	300	L	15	5
Z078	13-11-11	N	N	L	300	1.5	N	L	15	30	700	L	20	5
Z080	13-11-11	N	N	L	1,500	L	15	10	30	70	700	L	15	10
Z082	13-11-11	N	N	15	700	1	7	L	30	50	700	N	20	5
Z083	13-11-10	N	N	L	300	1.5	L	7	15	20	500	N	15	7
Z084	13-11-10	N	N	L	700	1.5	5	10	20	30	700	N	15	7
Z132	13-11-23	.02	N	L	2,000	N	20	200	50	50	700	N	L	100
Z134	13-11-23	.02	N	L	1,500	L	20	150	30	50	1,000	N	L	100
Z135	13-11-23	.02	N	L	3,000	N	20	70	30	30	700	N	L	20
Z153	13-11- 5	N	N	L	1,500	1.5	7	20	70	70	300	N	10	N
Z154	13-11- 5	N	N	L	2,000	1.5	10	10	100	100	1,000	N	15	L
Z155	13-11- 5	N	N	L	3,000	1.5	10	7	30	150	1,000	N	15	L
Z156	13-11- 5	N	N	L	3,000	1.5	10	7	30	100	1,000	N	15	L
Z157	13-11- 5	N	N	L	2,000	1	7	7	30	70	1,000	N	20	N
Z159	12-11-33	.02	N	L	2,000	1.5	N	7	30	70	700	N	20	N
Z160	12-11-33	N	N	L	3,000	1.5	N	7	30	70	700	N	20	N
Z161	13-11- 4	N	N	L	2,000	1.5	15	20	30	70	1,500	N	15	10
Z163	13-11- 2	N	N	L	5,000	1	5	10	10	70	1,000	N	20	L
Z165	13-11- 2	N	N	L	2,000	L	20	30	15	70	1,500	N	20	N
Z166	13-11- 2	N	N	L	1,500	L	10	15	15	50	1,000	N	15	N
Z167	13-11- 3	N	N	10	1,500	L	30	50	20	100	3,000	N	20	10
Z168	13-11- 3	N	N	L	1,500	1.5	15	10	30	70	1,000	N	15	N
Z169	13-11- 3	.02	N	15	700	1	7	30	10	30	700	N	10	N
Z171	13-10-16	N	N	L	1,500	1	10	70	70	70	700	N	15	10
Z173	13-10-16	N	N	L	1,500	1	10	70	50	70	1,000	N	15	10

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	Remarks
	(ppm)								(percent)		
	Stream sediments--Continued										
Z020	20	15	N	300	70	30	N	300	5.0	0.7	
Z022	30	15	N	700	70	30	N	200	3	1	
Z023	30	15	N	300	70	50	N	300	7	.7	
Z025	30	15	N	300	70	50	N	150	5	.7	
Z027	30	10	N	300	50	20	N	150	7	.3	
Z029	30	10	N	300	50	30	N	300	5	.3	
Z031	30	7	N	300	30	20	N	200	5	.3	
Z033	30	7	N	150	50	50	N	200	3	.2	
Z035	15	7	N	300	70	20	N	300	5	.3	
Z037	20	10	N	200	70	30	N	200	3	.3	
Z039	20	5	N	N	15	70	N	300	2	.15	
Z040	30	7	N	N	20	70	N	300	2	.15	
Z042	30	15	N	500	70	70	N	200	7	.5	
Z043	50	15	N	500	70	30	N	200	7	.5	
Z044	30	15	N	500	100	15	N	200	7	.7	
Z045	30	15	N	500	70	20	N	150	7	.7	
Z046	20	7	N	300	100	20	N	300	7	.7	
Z048	20	10	N	700	70	20	N	300	5	.5	
Z049	30	10	N	300	70	30	N	150	5	.5	
Z051	15	7	N	300	70	15	N	150	3	.3	
Z052	20	10	N	200	70	30	N	150	5	.5	
Z054	15	15	N	500	70	20	N	200	5	.7	
Z056	30	10	N	200	70	50	N	150	5	.5	
Z058	30	10	N	150	70	30	N	200	3	.3	
Z060	30	7	N	N	30	50	N	300	2	.15	
Z063	20	7	N	150	20	30	N	200	3	.2	
Z064	20	10	N	200	70	50	N	200	3	.5	
Z065	30	5	N	N	15	50	N	300	2	.15	
Z066	20	5	N	N	15	30	N	300	1.5	.07	
Z067	30	15	N	100	50	70	N	300	3	.3	
Z069	50	15	N	150	70	70	N	300	5	.5	
Z071	50	7	N	L	30	50	N	150	1	.15	
Z072	30	10	N	L	50	30	N	200	3	.2	
Z074	30	15	N	L	70	70	N	500	5	.3	
Z076	30	15	N	N	20	100	N	150	2	.15	
Z077	30	15	N	N	20	50	N	200	3	.2	
Z078	50	10	N	L	30	50	N	300	3	.3	
Z080	50	20	N	700	70	70	N	300	10	1	
Z082	70	15	N	150	50	50	N	200	5	.5	
Z083	50	7	N	N	30	30	N	150	3	.5	
Z084	50	7	N	300	70	30	N	200	7	.5	
Z132	30	20	N	1,000	150	50	N	200	15	>1	
Z134	30	20	N	1,500	150	70	N	200	15	>1	
Z135	30	20	N	1,000	150	50	N	300	15	>1	
Z153	30	15	N	700	100	50	N	300	7	.7	
Z154	70	15	N	700	70	70	N	500	7	1	
Z155	50	15	N	1,000	70	70	N	300	10	>1	
Z156	70	15	N	1,500	100	70	N	300	7	>1	
Z157	50	15	N	500	70	50	N	300	10	.7	
Z159	20	15	N	300	70	30	N	300	5	.5	
Z160	150	15	N	300	70	30	N	300	7	.7	
Z161	30	15	N	300	100	30	N	300	7	1	
Z163	20	15	N	500	70	30	N	300	7	>1	
Z065	50	15	N	1,000	100	50	N	500	10	1	
Z166	50	10	N	500	70	30	N	300	5	.5	
Z167	50	15	N	500	200	50	N	300	15	1	
Z168	50	15	N	700	100	50	N	300	10	1	
Z169	30	7	N	300	70	50	N	150	5	.3	
Z171	20	15	N	300	70	30	N	300	7	.7	
Z173	30	15	N	500	70	50	N	200	7	.7	

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)[a]	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
							Stream sediments--Continued							
Z174	13-10-15	N	N	L	2,000	1	10	70	30	50	1,000	N	10	15
Z176	13-10-15	N	N	L	150	1	5	50	70	30	700	N	L	7
Z178	13-10-10	N	N	L	1,500	L	5	70	30	50	700	N	L	15
Z179	13-10-10	N	N	10	2,000	L	15	150	50	70	1,000	N	10	50
Z180	13-10- 3	N	N	15	700	1.5	7	50	30	70	1,000	N	15	10
Z181	13-10- 3	N	N	15	1,500	L	10	70	50	70	700	N	10	20
Z182	13-10-15	N	N	L	3,000	L	7	70	30	70	1,000	N	L	15
Z183	13-10-15	N	N	L	1,500	1	7	30	30	70	1,000	N	15	5
Z184	13-10-15	N	N	L	3,000	L	7	30	30	50	700	N	L	5
Z185	13-10-16	N	N	L	1,500	L	5	30	50	70	1,000	N	L	L
Z186	13-10-16	N	N	15	3,000	L	10	70	30	70	1,500	N	15	15
Z188	13-10-20	N	N	L	2,000	L	15	100	50	30	100	N	L	30
Z190	13-11-17	N	N	20	1,000	1.5	15	150	30	100	1,500	N	15	50
Z191	13-11-17	N	N	30	2,000	L	70	700	70	70	3,000	N	15	150
Z192	13-11-21	N	N	20	2,000	N	30	700	70	20	1,500	N	10	200
Z193	13-11-21	N	N	20	2,000	N	30	700	70	20	1,500	N	L	300
Z194	13-11-22	N	N	L	300	1.5	5	70	20	30	700	N	20	20
Z195	13-11-22	N	N	15	300	2	7	150	20	70	1,000	N	15	50
Z196	13-11-28	N	N	L	500	1	L	150	30	50	1,000	N	20	30
Z197	13-11-28	N	N	L	700	1	15	500	50	70	1,500	N	15	150
Z199	13-11-28	N	N	10	500	3	15	300	70	70	1,000	15	20	70
Z200	13-11-28	N	N	L	300	3	5	50	20	70	1,000	10	20	10
Z201	14-11- 8	N	N	L	1,000	L	20	150	70	50	700	L	15	70
Z202	14-11- 8	N	N	10	700	1	15	150	70	70	700	7	15	70
Z203	14-11- 9	N	N	10	1,500	L	30	300	100	70	1,000	N	L	150
Z204	14-11- 9	N	N	10	500	3	5	70	15	100	700	7	20	15
Z206	14-11- 9	N	N	15	1,000	1.5	10	150	30	70	700	5	20	70
Z208	14-11- 9	N	N	10	1,000	L	30	300	70	50	700	N	10	150
Z209	14-11- 9	N	N	10	1,500	L	30	300	150	30	700	N	L	150
Z210	14-11- 9	N	N	L	1,500	L	20	300	70	30	700	N	10	200
Z211	14-11- 4	N	N	15	200	3	L	15	10	70	700	7	20	7
Z213	14-11-16	N	N	10	3,000	L	20	200	100	50	700	N	10	150
Z214	14-11-20	N	N	L	5,000	L	15	150	50	100	1,000	N	10	70
Z215	14-11-20	N	N	L	5,000	L	20	150	150	70	700	N	10	150
Z216	12-10-22	N	N	20	70	3	N	7	10	50	700	10	15	L
Z217	12-10-22	N	N	30	70	3	N	10	30	150	1,000	10	20	L
Z218	12-10-22	N	N	30	50	3	N	100	70	70	700	15	15	L
Z219	12-10-22	N	N	30	50	3	N	10	10	200	700	10	15	L
Z220	12-10-22	N	N	30	100	3	N	20	10	200	1,000	7	15	5
Z221	12-10-22	N	N	20	70	3	N	15	20	70	700	7	15	L
Z222	12-10-21	N	N	20	30	3	N	5	10	50	500	5	15	5
Z224	12-10-21	N	N	20	1,000	2	10	70	30	70	700	L	15	30
Z226	12-10-28	N	N	L	150	2	N	15	15	70	1,000	7	20	L
Z228	12-10-28	N	N	L	700	2	5	20	30	150	1,000	L	20	7
Z229	12-10-20	N	N	L	2,000	L	15	15	30	150	1,500	N	20	7
Z231	12-10-29	N	N	L	3,000	L	10	5	70	150	1,500	N	15	L
Z233	12-10-29	N	N	15	1,000	1.5	5	30	30	100	1,000	N	15	7
Z234	12-10-29	N	N	20	1,500	1	15	50	30	150	1,500	N	10	7
Z235	12-10-30	N	N	20	5,000	L	15	30	50	150	2,000	N	15	5
Z236	12-10-30	N	N	L	1,000	L	7	15	10	50	700	L	15	5
Z237	12-10-30	N	N	10	3,000	L	10	30	50	150	2,000	N	15	5
Z238	12-10-30	N	N	20	3,000	L	10	50	30	150	2,000	N	15	5
Z239	12-10-30	N	N	L	3,000	1	5	15	20	150	1,000	L	15	L
Z240	12-10-30	N	N	10	1,500	1.5	7	30	30	150	2,000	N	20	L
Z241	12-11-36	N	N	10	5,000	L	5	10	30	150	1,000	5	15	L
Z242	12-11-35	N	N	L	3,000	1.5	5	30	20	150	1,000	L	20	L
Z243	12-10-29	N	N	15	1,000	1.5	L	10	50	70	1,000	7	15	5
Z244	12-10-28	N	N	50	300	2	L	15	15	150	700	7	20	7
Z245	12-10-28	N	N	30	150	1.5	L	30	15	70	1,000	10	20	5
Z246	12-10-28	N	N	20	100	2	N	50	15	100	700	7	20	7

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10) (ppm)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05) (percent)	Ti (0.002)	Remarks
					Stream sediments--Continued						
Z174	50	15	N	700	70	50	N	300	7.0	0.7	
Z176	50	7	N	500	70	20	N	200	5	.3	
Z178	70	10	N	300	70	30	N	200	5	.7	
Z170	50	15	N	700	100	30	N	300	10	1	
Z180	70	15	N	150	70	70	N	300	5	.7	
Z181	50	15	N	300	100	30	N	200	7	.7	
Z182	50	15	N	500	100	30	N	300	7	.7	
Z183	30	15	N	300	150	50	N	300	7	.7	
Z184	50	15	N	500	70	30	N	300	5	.5	
Z185	50	15	N	300	70	30	N	200	7	.7	
Z186	50	15	N	500	100	30	N	300	10	.7	
Z188	30	15	N	300	100	20	N	200	7	.7	
Z190	70	20	N	300	150	70	N	300	10	1	
Z191	50	30	N	300	200	50	N	300	15	>1	
Z192	50	30	N	300	200	30	N	300	15	>1	
Z193	30	30	N	500	300	30	N	300	20	>1	
Z194	70	7	N	N	70	50	N	200	3	.5	
Z195	70	15	N	N	70	70	N	200	5	.7	
Z196	50	15	N	N	70	50	N	200	5	.5	
Z197	70	15	N	200	150	50	N	300	7	.7	
Z199	70	15	N	100	100	70	N	300	7	.5	
Z200	100	15	N	N	70	50	N	300	5	.3	
Z201	30	10	N	700	100	50	N	150	7	.7	
Z202	30	15	N	500	100	50	N	300	7	.7	
Z203	30	20	N	700	200	30	N	200	10	1	
Z204	100	15	N	100	70	100	N	500	5	.7	
Z206	70	15	N	500	70	50	N	200	7	.7	
Z208	50	20	N	700	100	30	N	300	10	1	
Z209	50	20	N	700	100	20	N	200	15	1	
Z210	50	20	N	700	100	30	N	200	10	1	
Z211	100	7	N	N	20	50	N	200	3	.5	
Z213	30	15	N	1,000	100	30	N	300	10	1	
Z214	30	15	N	1,000	100	50	N	300	10	1	
Z215	30	20	N	1,000	200	30	N	300	15	1	
Z216	70	10	N	N	L	100	N	500	3	.2	
Z217	70	15	N	N	10	150	N	700	3	.3	
Z218	100	15	N	N	10	100	N	300	3	.2	
Z219	70	15	N	N	10	150	N	300	3	.15	
Z220	70	10	N	N	15	200	N	500	7	.2	
Z221	70	10	N	N	10	100	N	300	3	.15	
Z222	70	5	N	N	10	70	N	200	3	.2	
Z224	70	15	N	300	70	100	N	300	7	.7	
Z226	30	10	N	N	15	50	N	300	3	.7	
Z228	70	15	N	200	70	150	N	300	7	.5	
Z229	70	15	N	500	150	70	N	300	15	>1	
Z231	50	15	N	500	100	70	N	300	10	1	
Z233	50	15	N	150	70	100	N	300	7	.7	
Z234	30	15	N	500	150	70	N	500	10	1	
Z235	70	30	N	700	150	100	N	300	15	>1	
Z236	50	10	N	200	70	70	N	500	7	.7	
Z237	70	20	N	700	100	70	N	300	15	>1	
Z238	50	20	N	700	100	70	N	300	15	>1	
Z239	70	15	N	300	70	70	N	300	7	.7	
Z240	70	15	N	500	70	100	N	300	7	.7	
Z241	70	15	N	500	70	70	N	500	10	.7	
Z242	70	15	N	300	70	70	N	200	10	.7	
Z243	70	15	N	200	50	70	N	300	5	.5	
Z244	70	15	N	N	50	150	N	300	5	.3	
Z245	70	10	N	N	20	50	N	300	5	.3	
Z246	70	15	N	N	15	70	N	500	7	.5	

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
			Stream sediments--Continued											
Z247	12-10-27	N	N	20	150	3.0	N	30	20	150	1,500	7	20	7
Z248	12-10-27	N	N	20	70	3	N	15	10	30	1,000	7	20	7
Z249	12-10-27	N	N	20	1,000	5	N	30	20	150	1,500	7	30	7
Z250	12-10-12	N	N	20	5,000	2	N	15	20	150	1,000	5	20	5
Z251	12-10-12	N	N	20	70	5	N	15	15	150	500	5	20	10
Z252	12-10-13	N	N	20	70	5	N	15	15	50	700	5	20	7
Z253	12-10-14	N	N	L	70	1.5	N	20	5	50	500	5	15	7
Z254	12-10-14	N	N	10	50	3	N	10	15	100	700	5	20	5
Z255	12-10-14	N	N	L	70	2	N	10	10	100	300	5	15	7
Z256	12-10-14	N	N	L	70	2	N	7	15	70	300	L	15	7
Z257	12-10-11	N	N	15	700	1.5	20	200	30	50	700	N	10	50
Z259	12-10-16	N	N	10	500	1.5	10	70	15	70	700	L	15	30
Z260	12-10-16	N	N	L	150	2	N	10	20	30	700	L	15	15
Z261	12-10-16	N	N	15	300	1.5	7	70	10	50	700	L	20	50
Z262	12-10-21	N	N	L	500	1	5	30	20	30	700	N	15	10
Z263	12-10-21	N	N	20	700	1.5	15	150	30	100	1,000	5	15	150
Z265	13-10- 4	N	N	L	150	1	N	N	10	200	700	N	15	L
Z266	13-10- 4	N	N	L	100	1.5	N	L	20	500	1,000	N	15	L
Z267	13-10- 5	N	N	10	100	1.5	N	L	15	200	1,000	N	15	N
Z268	13-10- 5	N	N	L	50	1	N	L	20	500	500	N	10	N
Z271	13-10- 5	N	N	L	300	1.5	5	20	20	50	1,000	N	20	L
Z273	13-10- 5	N	N	L	500	1.5	5	30	15	100	2,000	N	20	N
Z274	13-10- 6	N	N	L	500	1	N	10	10	50	1,000	N	20	N
Z275	13-11- 1	N	N	10	500	1.5	5	L	20	50	1,000	N	50	L
Z276	12-12-14	N	N	10	700	1	15	100	30	100	3,000	N	70	50
Z278	12-11-31	<0.04	N	10	1,000	1	5	L	20	20	1,000	N	50	10
Z281	15-10-17	<.04	N	L	700	1	10	L	10	30	1,000	N	20	10
Z283	15-10-17	N	N	L	300	1	L	N	10	30	1,000	N	15	5
Z285	15-10-21	N	N	L	200	2	N	N	20	100	1,000	N	10	L
Z286	15-10-21	N	N	L	200	1.5	N	N	20	100	1,000	N	10	L
Z287	15-10-21	N	N	N	200	1.5	5	20	30	30	700	N	20	15
Z288	15-10-16	N	N	L	500	1	15	50	20	30	1,500	N	50	50
Z289	15-10-21	<.04	N	10	700	1.5	10	10	20	50	1,000	N	50	5
Z290	15-10-17	N	N	10	300	1	10	20	15	20	700	N	10	50
Z291	14-10-14	.02	N	L	700	1.5	5	20	30	30	500	N	30	10
Z292	14-10-14	.02	N	10	1,000	1	10	15	20	30	1,000	N	30	5
Z293	14-10-14	N	N	10	500	2	5	15	30	30	1,000	N	50	5
Z294	14-10-15	N	N	L	700	3	5	N	30	50	1,000	N	10	10
Z295	14-10-15	N	N	10	700	1	10	20	15	30	1,000	N	70	10
Z296	14-10-15	N	N	L	700	2	5	L	30	50	1,000	N	50	L
Z297	14-10-22	N	N	L	200	1.5	N	20	30	50	500	N	30	15
Z298	14-10-22	N	N	L	700	2	5	20	15	50	1,000	N	50	10
Z299	14-10-22	N	N	L	700	2	L	L	15	30	700	N	10	L
Z300	14-10-22	N	N	10	300	2	N	10	20	30	1,000	N	50	L
Z301	14-10-22	N	N	L	1,000	2	L	10	15	30	700	N	15	10
Z302	14-10-36	<.04	N	10	500	2	L	20	20	30	1,500	N	10	15
Z303	14-10-36	N	N	10	1,000	1.5	10	15	15	30	1,000	N	20	10
Z305	14-10-36	N	N	L	1,000	1.5	5	10	10	30	700	N	10	L
Z308	15- 9- 6	.02	N	L	1,000	1.5	7	N	10	50	1,000	N	20	10
Z309	15- 9- 6	N	N	L	1,000	1.5	7	10	10	30	1,500	N	15	20
Z311	15- 9- 6	N	N	L	1,000	2	L	N	5	20	500	N	10	5
Z312	15- 9- 6	N	N	10	1,000	2	10	10	10	30	1,000	N	20	50
Z314	15- 9- 6	.02	N	10	1,000	1.5	15	50	15	50	1,500	N	20	50
Z316	15-10- 1	.02	N	L	700	1	L	15	10	20	700	N	10	10
Z317	15-10- 1	N	N	L	500	2	L	N	20	50	1,000	N	20	10
Z318	15- 9-18	N	N	10	300	1.5	L	15	15	30	1,500	N	20	10
Z319	15- 9-18	N	N	10	500	2	L	L	20	30	1,000	N	10	10
Z320	15- 9-18	.02	N	10	1,000	1.5	15	30	20	70	2,000	N	20	20
Z321	15-10-13	N	N	15	1,000	1.5	20	50	20	70	3,000	N	20	50
Z322	15-10-13	N	N	10	700	1	7	30	30	20	500	N	10	20

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10) (ppm)	Sc (5) (ppm)	Sn (10) (ppm)	Sr (50) (ppm)	V (5) (ppm)	Y (5) (ppm)	Zn (200) (ppm)	Zr (10) (ppm)	Fe (0.05) (percent)	Ti (0.002) (percent)	Remarks
					Stream sediments--Continued						
Z247	70	10	N	N	15	70	N	300	3.0	0.7	
Z248	70	15	N	N	15	100	N	300	3	.15	
Z249	70	15	N	N	20	150	N	500	5	.5	
Z250	100	10	N	200	20	70	N	300	5	.3	
Z251	50	7	N	N	15	70	N	200	3	.2	
Z252	70	7	N	N	15	70	N	300	3	.15	
Z253	20	5	N	N	10	70	N	200	2	.15	
Z254	30	7	N	N	10	100	N	300	2	.15	
Z255	30	7	N	N	15	150	N	300	2	.15	
Z256	50	5	N	N	10	70	N	300	1.5	.15	
Z257	30	15	N	200	70	70	N	500	5	.5	
Z259	30	10	N	100	30	70	N	300	3	.3	
Z260	50	7	N	150	20	70	N	300	2	.15	
Z261	30	15	30	150	50	70	N	300	3	.3	
Z262	30	15	N	300	50	50	N	300	3	.3	
Z263	30	15	N	N	70	150	N	300	7	.7	
Z265	30	10	N	N	15	200	N	200	2	.2	
Z266	30	10	N	N	L	>200	N	200	1.5	.2	
Z267	20	10	N	N	10	200	N	300	2	.2	
Z268	20	5	N	N	L	>200	N	100	.5	.05	
Z271	30	15	50	200	50	100	N	300	5	.7	
Z273	20	15	N	200	50	150	N	300	5	1	
Z274	30	10	N	150	20	50	N	200	3	.7	
Z275	20	10	N	150	30	50	N	500	2	1	
Z276	20	20	10	200	200	100	N	1,000	10	>1	
Z278	15	10	N	200	50	20	N	500	3	1	
Z281	10	10	N	200	50	15	N	200	5	1	
Z283	20	5	N	100	30	20	N	150	2	.3	
Z285	30	5	N	100	15	50	N	150	1	.2	
Z286	30	5	N	L	10	50	N	150	.5	.15	
Z287	20	7	N	150	70	20	N	200	1	.3	
Z288	30	10	N	200	100	30	N	500	7	1	
Z289	15	5	N	200	150	30	N	500	7	>1	
Z290	10	7	N	200	100	10	N	200	5	.5	
Z291	20	7	N	200	70	20	N	200	2	.5	
Z292	20	5	N	200	70	20	N	200	2	.7	
Z293	20	5	N	200	100	30	N	500	3	1	
Z294	30	15	N	150	50	50	N	150	2	.5	
Z295	20	10	N	200	100	30	N	1,000	3	1	
Z296	50	10	N	200	50	70	N	1,000	5	.7	
Z297	20	5	N	200	50	15	N	200	3	.3	
Z298	20	5	N	200	50	20	N	500	1	.5	
Z299	30	5	N	150	30	15	N	100	2	.3	
Z300	15	5	N	200	20	20	N	1,000	1	.2	
Z301	20	5	N	150	50	20	N	1,500	2	.5	
Z302	20	5	N	150	50	50	N	100	1	.3	
Z303	20	10	N	500	100	20	N	500	5	>1	
Z305	20	7	N	500	70	20	N	500	5	1	
Z308	20	10	N	300	100	50	N	200	5	1	
Z309	20	5	N	200	150	20	N	300	5	1	
Z311	20	5	N	300	50	15	N	100	2	.7	
Z312	30	10	N	200	200	30	N	>1,000	10	>1	
Z314	20	10	N	500	150	30	N	>1,000	7	>1	
Z316	30	5	N	200	70	20	N	150	5	1	
Z317	30	5	N	150	70	50	N	500	2	1	
Z318	20	5	N	100	70	30	N	200	5	1	
Z319	20	5	N	150	70	20	N	150	2	.7	
Z320	20	10	10	200	150	20	N	500	7	>1	
Z321	30	10	N	200	300	30	N	>1,000	15	>1	
Z322	20	10	N	300	50	20	N	150	5	1	

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
						Stream sediments--Continued								
Z323	15-10-13	N	N	10	1,000	1	5	15	15	20	500	N	15	10
Z326	14- 9-19	N	N	10	300	1.5	L	N	30	30	500	N	L	15
Z327	15-10-24	N	N	L	1,000	1	10	10	15	50	1,000	N	10	10
Z328	15-10-24	N	N	L	1,000	1	7	10	30	30	700	N	10	20
Z329	15-10-24	N	N	L	1,000	2	7	10	20	70	1,000	N	10	10
Z330	15-10-13	<.04	N	10	1,000	1.5	10	N	20	50	1,500	N	15	10
Z331	15-10-13	N	N	10	1,000	1	10	20	20	50	2,000	N	10	10
Z332	15-10-13	N	N	L	1,000	1	7	15	15	30	700	N	10	20
Z342	16-10-21	L	N	N	1,000	1	10	10	L	50	1,500	N	20	7
Z343	16-10-21	L	N	L	1,000	1.5	5	N	15	20	1,000	N	15	7
Z352	11-11-34	L	N	L	700	3	7	5	5	30	1,000	N	20	7
Z357	11-11-26	L	N	10	300	3	5	5	5	50	1,000	7	30	10
Z358	11-11-26	L	N	10	700	3	N	N	5	50	1,000	5	50	7
Z359	11-10-31	L	N	L	1,000	3	5	N	L	50	1,000	N	15	5
Z361	11-10-31	L	N	15	200	5	N	N	10	30	700	N	30	5
Z369	11-10-34	L	N	10	150	3	N	N	5	50	1,000	10	20	10
Z370	11-10-27	L	N	15	200	3	N	N	10	50	1,000	N	30	10
Z371	11-10-27	L	N	10	500	3	N	N	7	30	1,000	5	20	7
Z372	11-10-35	L	N	N	1,000	1	10	10	20	30	1,000	N	10	15
Z373	11-10-35	L	N	L	300	2	N	N	5	50	1,000	N	15	5
Z378	11-11-36	L	N	L	1,000	2	50	10	15	70	5,000	5	20	10
Z379	11-11-35	L	N	L	1,000	2	20	5	7	50	2,000	5	30	5
Z381	12-11- 2	L	N	10	200	5	N	N	5	20	1,000	5	30	L
Z382	12-11- 2	L	N	10	300	5	N	N	5	50	1,500	10	50	L
Z413	14-10-28	L	N	10	1,000	1	7	20	10	30	700	N	10	15
Z414	14-10-28	L	N	N	1,000	L	10	50	7	30	1,000	L	10	30
Z418	15-10-35	L	N	N	1,000	L	15	10	L	30	1,000	N	20	5
Z419	15-10-34	L	N	N	1,000	1	7	N	10	50	1,500	N	20	5
Z420	16-10- 3	L	N	N	1,000	1	15	N	5	30	1,500	N	30	5
Z421	16-10- 3	L	N	N	1,000	1	15	10	5	30	1,500	N	30	5
Z423	16-10- 3	L	N	L	1,000	1.5	15	5	5	70	1,500	N	20	7
Z425	16-10-10	L	N	L	1,000	1	20	20	L	50	1,500	N	30	10
Z426	16-10-10	L	N	L	1,000	2	N	N	30	20	1,000	N	15	5
Z427	16-10-22	L	N	L	1,000	1.5	5	5	7	30	1,000	5	10	7
Z432	16-10- 2	L	N	10	1,000	1.5	5	N	10	30	1,000	N	15	L
Z433	16-10- 2	L	N	10	1,500	1.5	5	N	10	30	1,000	N	15	5
Z434	16-10-11	L	N	L	1,000	1.5	5	10	5	30	1,000	N	10	5
Z435	16-10-14	L	N	L	1,000	1	15	10	30	30	1,500	N	30	5
Z436	16-10-23	L	N	L	1,000	1.5	5	N	5	30	1,000	N	15	5
Z437	16-10-23	L	N	L	1,000	1	10	20	10	20	1,000	5	10	20
Z441	16-10-22	L	N	L	700	L	20	70	10	30	2,000	N	20	15
Z443	15-10-25	L	N	N	1,500	2	10	10	5	30	1,500	N	30	20
Z444	15-10-36	L	N	N	1,500	2	7	N	10	50	1,500	5	50	5
Z445	15-10-36	L	N	L	1,500	1	10	10	20	30	700	N	15	15
Z446	15-10-36	L	N	L	1,500	1.5	5	N	10	20	1,500	N	15	5
Z447	16-10- 1	L	N	L	1,500	1	10	5	20	20	1,500	N	15	10
Z448	16-10- 1	L	N	N	1,500	1	10	10	30	20	1,500	N	10	15
Z449	16-10- 1	L	N	N	1,500	1	5	N	50	20	1,500	N	10	L
Z450	16-10- 1	L	N	N	1,000	1	7	5	10	20	1,000	N	10	10
Z451	16-10-12	L	N	L	1,000	1	N	N	10	20	1,000	5	10	5
Z453	16-10-12	L	N	L	1,500	1	10	5	20	20	1,500	N	15	7
Z454	16- 9- 7	L	N	L	1,500	1	5	N	10	20	1,500	N	10	5
Z456	16- 9-18	L	N	L	1,000	1	5	N	10	20	1,000	N	15	7
Z462	12-11-25	L	N	L	2,000	3	N	N	7	70	1,500	N	20	N
Z463	12-11-25	L	N	L	2,000	2	N	N	5	70	1,000	N	20	N
Z465	12-11-26	L	N	L	1,500	2	N	N	7	100	1,000	5	15	L
Z468	16- 9- 6	L	N	N	1,500	1	10	10	10	30	1,000	5	15	20
Z470	16 -9- 6	L	N	N	1,500	1	7	15	10	30	700	N	10	15
Z472	16- 9- 6	L	N	N	1,500	1	10	15	10	30	700	N	15	20
Z474	16- 9- 7	L	N	N	1,500	1	10	20	10	30	1,000	N	20	20

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	Remarks
	(ppm)								(percent)		
	Stream sediments--Continued										
Z323	20	5	N	200	70	20	N	200	2.0	1.0	
Z326	20	5	N	200	20	10	N	100	2	.2	
Z327	20	10	N	500	70	15	N	500	7	>1	
Z328	30	10	N	500	30	20	N	300	5	1	
Z329	30	10	N	300	50	50	N	200	7	1	
Z330	20	10	N	200	100	50	N	>1,000	7	1	
Z331	20	10	N	200	100	50	N	1,000	10	>1	
Z332	20	7	N	300	50	30	N	300	5	.5	
Z342	15	5	N	200	150	50	N	200	5	.5	
Z343	30	L	N	300	50	20	N	200	3	.3	
Z352	20	10	N	300	70	50	N	200	5	.5	
Z357	30	5	N	100	70	70	N	200	3	.3	
Z358	30	L	N	100	50	50	N	300	2	.2	
Z359	30	5	N	300	70	50	N	200	3	.3	
Z361	50	L	N	N	20	50	N	200	1.5	.15	
Z369	30	N	N	N	10	50	N	100	1	.07	
Z370	50	5	N	100	20	70	N	200	2	.2	
Z371	30	5	N	200	30	50	N	200	2	.2	
Z372	15	10	N	700	100	20	N	200	5	.3	
Z373	20	L	N	500	20	20	N	100	1.5	.1	
Z378	70	10	N	150	150	70	N	500	7	.5	
Z379	50	10	N	200	150	50	N	500	7	.5	
Z381	20	5	10	N	20	30	N	200	2	.2	
Z382	20	7	15	N	50	70	N	500	3	.3	
Z413	20	7	N	200	100	15	N	200	3	.3	
Z414	20	10	N	500	100	20	N	300	5	.5	
Z418	20	10	N	200	200	30	N	700	7	.7	
Z419	20	5	N	200	100	30	N	200	5	.5	
Z420	20	10	N	200	200	30	N	1,000	10	.7	
Z421	20	10	N	150	150	50	N	700	10	.7	
Z423	20	7	N	200	150	30	N	500	7	.7	
Z425	20	10	N	200	200	30	200	1,000	10	1	
Z426	30	5	N	200	50	15	N	300	2	.3	
Z427	20	5	N	200	100	20	N	300	3	.5	
Z432	20	L	N	200	70	20	N	500	2	.3	
Z433	30	5	N	300	100	20	N	300	3	.5	
Z434	30	5	N	300	70	20	N	300	2	.5	
Z435	30	10	N	200	150	20	N	>1,000	7	1	
Z436	15	L	N	200	70	15	N	300	3	.5	
Z437	15	7	N	700	100	15	N	200	3	.5	
Z441	20	15	N	200	500	20	200	500	10	>1	
Z443	50	7	N	500	150	20	N	200	5	.7	
Z444	50	10	N	500	150	30	N	1,000	5	.7	
Z445	20	7	N	500	70	15	N	200	3	.7	
Z446	30	5	N	300	50	15	N	300	2	.5	
Z447	30	7	N	500	100	20	N	300	5	.7	
Z448	20	7	N	700	100	20	N	300	7	.7	
Z449	30	5	N	200	50	15	N	500	2	.5	
Z450	20	5	N	500	70	15	N	150	3	.5	
Z451	20	L	N	150	50	10	N	150	2	.3	
Z453	30	5	N	300	100	15	N	300	5	.7	
Z454	20	5	N	300	70	15	N	200	3	.5	
Z456	15	5	N	300	70	15	N	200	3	.5	
Z462	30	7	N	N	15	50	N	1,000	2	.5	
Z463	30	7	N	100	20	30	N	1,000	3	.3	
Z465	30	7	N	L	20	50	N	500	2	.3	
Z468	20	7	N	500	100	15	N	300	5	.5	
Z470	15	7	N	500	70	15	N	300	3	.5	
Z472	20	7	N	500	100	15	N	200	5	.5	
Z474	20	10	N	500	100	20	N	200	5	.5	

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
					Stream sediments--Continued									
Z475	16- 9- 7	L	N	N	1,000	2.0	7	10	10	50	1,000	N	20	10
Z477	16- 9- 8	L	N	L	1,000	1.5	5	N	7	30	1,000	5	15	5
Z478	16- 9- 7	L	N	N	1,500	1	10	20	20	50	1,000	N	20	15
Z480	12-11-26	L	N	N	1,500	3	N	N	5	70	1,000	N	20	L
Z482	12-11-23	L	N	N	2,000	3	N	N	10	70	1,000	10	30	L
Z483	12-11-23	L	N	N	3,000	2	N	N	L	100	1,500	N	20	N
Z484	12-11-23	L	N	N	2,000	2	N	N	5	100	1,000	5	30	L
Z488	12-11-22	L	N	N	2,000	2	N	N	5	100	1,000	N	20	L
Z489	12-11-27	L	N	N	2,000	2	10	N	5	100	1,500	N	20	L
Z491	12-11-22	L	N	N	2,000	2	5	N	7	100	1,000	N	30	L
Z492	12-11-21	L	N	N	2,000	2	5	5	5	100	1,000	N	30	L
Z493	12-11-21	L	N	N	2,000	1	15	10	7	100	1,000	N	30	5
Z494	12-11-21	L	N	L	1,500	2	N	N	5	100	1,000	N	30	L
Z496	12-11-22	L	N	L	2,000	2	N	N	5	100	1,000	10	30	5
Z497	12-11-22	L	N	L	2,000	2	N	N	7	70	1,000	N	30	L
X001	12-11-24	L	N	L	500	3	N	N	5	70	1,000	5	30	L
X002	12-11-24	L	N	20	1,500	7	N	N	15	150	2,000	7	150	5
X004	12-11-24	L	N	15	1,000	5	N	N	30	100	1,500	5	70	5
X005	12-11-24	L	N	15	5,000	5	N	N	20	200	2,000	N	100	5
X008	12-11-24	L	N	10	2,000	5	5	10	10	200	2,000	10	100	10
X009	12-11-24	L	N	20	3,000	5	N	N	15	200	2,000	N	150	5
X010	12-11-23	L	N	30	2,000	5	N	N	L	150	2,000	10	100	5
X012	12-11-23	L	N	30	2,000	5	5	5	10	200	3,000	10	150	10
X013	12-11-14	L	N	10	3,000	5	7	20	5	300	3,000	10	150	5
X021	14- 9-26	---	N	L	1,500	2	20	70	30	70	1,000	5	20	30
X043	13- 9-31	---	N	10	1,500	2	15	20	20	30	1,000	N	10	15
X045	16- 9-11	---	N	10	1,500	2	5	15	15	50	1,000	7	15	15
X048	14- 9-33	---	N	L	1,000	2	10	20	7	20	700	N	10	10
X053	15- 9-26	---	10.0	L	500	2	30	70	50	30	1,000	7	10	50
X055	15- 9-26	---	.7	L	500	2	20	70	50	30	1,000	N	15	50
X100	14- 9-33	L	N	L	700	1.5	10	70	5	50	1,000	N	15	10
X102	14- 9-34	<0.04	N	L	1,000	1.5	7	20	5	20	1,000	N	10	5
X106	11- 9-30	L	N	10	700	1	30	200	50	20	700	N	10	30
X107	11- 9-30	L	N	L	700	1	30	300	30	20	1,000	N	10	30
X108	11- 9-19	L	N	L	700	1	20	150	30	20	1,000	N	10	30
X110	11-10-24	L	N	L	500	1	7	150	10	20	700	N	10	20
X111	11-10-24	L	N	10	1,000	1.5	20	70	30	20	1,000	N	10	30
X112	11- 9-19	L	N	L	700	1.5	15	50	20	20	700	N	10	30
X115	14- 8-31	L	N	L	700	1.5	15	50	20	20	1,000	N	15	20
X117	14- 8-31	L	N	L	1,000	1.5	15	50	10	20	1,000	N	10	10
X119	14- 9-36	L	N	10	100	2	7	20	10	20	700	N	10	10
X121	14- 9-36	L	N	L	1,000	1	20	70	15	20	1,000	N	10	20
X123	14- 9-36	L	N	L	700	1	30	100	10	30	2,000	N	10	20
X125	14- 9-25	L	N	L	700	1	20	70	10	20	700	N	10	20
X127	14- 9-25	<.04	N	10	700	1	20	100	10	20	700	N	15	30
X130	14- 9-26	L	N	L	700	1.5	20	50	30	20	1,000	N	10	20
X131	14- 9-26	L	N	L	700	1.5	20	70	10	30	1,000	N	10	15
X132	14- 9-27	L	N	L	1,000	2	20	70	15	30	1,500	N	10	15
X133	14- 9-34	L	N	L	1,000	1.5	30	70	20	20	700	N	10	20
X134	14- 9-33	L	N	L	1,000	1.5	7	20	5	20	1,000	N	10	7
X135	14- 9-33	L	N	10	1,000	1.5	7	30	20	20	1,000	N	10	10
X136	14- 9-33	L	N	10	1,000	1	20	70	10	20	200	N	20	15
X137	14- 9-32	L	N	L	1,000	1	20	70	10	30	1,000	N	10	30
X138	14- 9-32	L	N	10	700	1.5	10	50	15	20	700	N	10	20
X139	14- 9-32	L	N	10	700	1.5	30	70	5	100	1,000	N	20	20
X140	14- 9-32	L	N	L	1,000	1.5	10	50	5	30	1,500	N	20	15
X141	14- 9-32	L	N	10	700	2	10	5	7	20	700	N	20	10
X142	14- 9-32	L	N	10	1,000	1.5	10	30	5	150	1,000	N	20	15
X143	15- 9- 5	L	N	10	700	2	10	20	20	50	700	N	15	15
X144	15 -9 6	L	N	L	1,000	2	10	20	5	20	1,000	N	20	10

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10) (ppm)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05) (percent)	Ti (0.002)	Remarks
					Stream sediments--Continued						
Z475	50	7	N	200	70	20	N	200	5.0	0.5	
Z477	30	5	N	150	70	10	N	150	3	.3	
Z478	20	10	N	700	150	30	N	300	7	1	
Z480	50	5	N	N	20	50	N	500	2	.3	
Z482	30	5	N	N	20	50	N	500	2	.3	
Z483	50	7	N	100	30	70	N	1,000	2	.3	
Z484	50	5	N	L	30	50	N	300	2	.3	
Z488	50	5	N	100	30	50	N	500	2	.3	
Z489	70	10	N	500	150	70	N	700	5	.5	
Z491	50	10	N	300	100	70	N	500	3	.5	
Z492	50	10	N	300	100	70	N	500	5	.7	
Z493	30	15	N	700	150	70	N	500	5	1	
Z494	50	5	N	100	30	70	N	500	3	.3	
Z496	50	7	N	100	30	50	N	1,000	3	.3	
Z497	50	5	N	200	30	50	N	500	2	.3	
X001	50	5	N	N	20	50	N	500	1.5	.2	
X002	70	10	N	N	50	100	N	>1,000	5	.7	
X004	70	5	N	N	30	70	N	1,000	3	.5	
X005	70	10	N	100	70	100	N	>1,000	5	1	
X008	100	7	N	L	150	70	N	1,000	7	.5	
X009	70	10	N	100	30	100	N	>1,000	5	.5	
X010	70	7	N	N	30	100	N	>1,000	5	.5	
X012	100	10	N	L	150	100	N	>1,000	7	.7	
X013	100	10	N	100	200	100	N	>1,000	10	1	
X021	50	15	N	500	200	50	N	500	7	.7	
X043	30	15	N	500	200	50	N	200	7	.7	
X045	30	7	N	300	100	15	N	300	2	.3	
X048	20	7	N	2,000	150	30	N	150	3	.7	
X053	100	30	N	100	300	100	200	500	7	1	
X055	50	20	N	100	200	50	N	300	7	1	
X100	15	7	N	1,000	200	50	N	500	10	.7	
X102	20	7	N	700	150	20	N	70	7	.5	
X106	20	15	N	700	200	20	L	150	10	.7	
X107	30	15	N	700	300	20	L	150	10	.7	
X108	30	10	N	500	200	15	L	150	10	.7	
X110	20	7	N	300	100	15	L	150	5	.3	
X111	15	15	N	300	150	30	N	200	7	.5	
X112	15	10	N	200	100	20	N	150	5	.3	
X115	20	10	N	300	150	30	N	150	5	.3	
X117	20	10	N	500	100	20	N	150	10	.7	
X119	20	10	N	300	150	30	N	200	5	.3	
X121	20	15	N	300	200	30	N	150	10	.7	
X123	20	15	N	300	300	30	500	150	20	.7	
X125	20	5	N	500	200	20	N	300	10	.5	
X127	30	15	N	500	300	30	N	200	15	.7	
X130	30	7	N	300	100	20	N	150	1	.3	
X131	20	10	N	300	300	30	L	500	.7	.7	
X132	30	10	N	500	100	30	N	300	2	.5	
X133	20	15	N	700	200	20	N	150	1	.7	
X134	20	10	N	500	150	50	N	150	.7	.7	
X135	20	10	N	500	100	30	N	200	1	.5	
X136	50	10	N	500	300	30	L	200	.7	1	
X137	15	10	N	1,000	200	30	L	150	7	.5	
X138	20	10	N	500	150	20	N	300	5	.3	
X139	15	15	N	300	300	20	200	200	15	1	
X140	15	7	N	700	100	30	N	100	3	.3	
X141	20	7	N	300	70	20	N	150	3	.3	
X142	20	10	N	300	300	30	N	150	10	.7	
X143	20	10	N	300	100	20	N	150	3	.3	
X144	20	7	N	500	150	15	N	150	5	.7	

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
						Stream sediments--Continued								
X145	15- 9- 6	L	N	10	700	1.5	7	7	5	20	200	N	10	10
X146	15- 9- 6	L	N	10	700	2	10	70	15	20	500	N	10	20
X147	15- 9- 6	L	N	10	700	2	10	30	20	20	500	N	10	15
X148	15- 9- 6	L	N	10	700	1.5	7	N	5	20	300	N	10	10
X149	15- 9- 7	L	N	10	500	5	7	7	10	30	1,000	N	30	10
X150	15- 9- 7	L	N	10	700	1.5	10	50	5	20	500	N	20	15
X151	15- 9- 7	L	N	10	700	5	10	30	30	20	1,000	N	20	20
X152	15- 9- 7	L	N	10	700	5	10	20	20	20	1,000	N	30	15
X153	15- 9- 7	L	N	L	700	1.5	20	70	10	30	500	N	20	20
X154	15- 9-18	<0.04	N	10	300	3	7	20	10	20	700	N	50	10
X155	15- 9-18	<.04	N	L	700	2	15	30	10	20	1,500	N	20	15
X156	15- 9-18	<.04	N	10	700	1	30	150	20	70	1,000	N	30	30
X157	14- 9-34	<.04	N	L	1,000	2	20	70	20	50	300	N	20	30
X158	15- 9- 3	L	N	L	1,000	2	20	100	20	50	300	N	20	30
X159	15- 9- 3	L	N	L	1,000	2	30	100	30	50	1,500	N	20	30
X160	15- 9- 3	<.04	N	L	700	N	20	70	10	20	1,000	N	10	30
X161	15- 9- 3	<.1	N	L	700	N	30	100	20	20	2,000	N	20	30
X162	15- 9-10	<.04	N	L	700	1.5	10	30	20	50	1,500	N	20	15
X163	15- 9-15	L	N	L	700	1.5	20	50	30	50	2,000	N	30	30
X164	15- 9-15	L	N	L	1,000	1.5	15	20	20	50	2,000	N	30	10
X168	15- 9-20	L	N	10	700	2	10	50	30	50	1,500	N	20	15
X170	14- 9-31	L	N	10	700	2	10	10	10	30	2,000	N	20	10
X171	14- 9-30	L	N	10	700	2	10	30	10	20	1,500	N	20	10
X172	14- 9-30	L	N	L	700	2	30	50	10	20	2,000	N	20	10
X173	14- 9-30	L	N	10	700	2	10	20	5	20	1,500	N	20	10
X174	14- 9-30	L	N	L	700	1.5	20	20	5	20	2,000	N	20	10
X175	14- 9-30	L	N	10	700	1.5	10	10	5	20	1,500	N	20	10
X176	14- 9-30	L	N	10	700	1.5	30	70	20	100	2,000	N	20	20
X177	14- 9-30	L	N	20	700	1	10	30	30	30	2,000	N	20	20
X178	14- 9-30	L	N	10	700	2	20	50	50	30	2,000	N	20	30
X179	14- 9-29	L	N	10	700	1.5	20	150	L	30	2,000	N	20	50
X182	14- 9-28	<.04	N	L	700	1.5	15	10	L	20	2,000	N	20	10
X185	14- 9-28	L	N	L	700	1	10	10	L	20	1,500	N	20	10
X186	14- 9-27	L	N	L	700	1.5	10	10	30	30	1,500	N	20	10
X190	14- 9-31	L	N	10	700	1.5	5	5	15	50	2,000	L	20	10
X191	14- 9-31	<.04	N	10	700	1.5	15	100	20	30	1,500	L	20	30
X192	14- 9-31	L	N	10	700	1.5	10	10	15	30	1,500	L	20	15
X194	14- 9-11	L	N	L	700	1	20	50	10	20	700	N	10	20
X195	14- 9-10	L	N	L	700	1	10	50	5	20	700	N	10	20
X196	14- 9-10	L	N	L	700	1.5	10	20	15	50	700	N	10	10
X197	14- 9-13	L	N	L	700	1	15	50	10	30	700	N	10	15
X199	14- 9-13	<.1	N	L	700	1	20	200	30	50	700	N	10	50
X200	14- 9-23	<.1	N	L	700	1	20	50	20	30	700	N	10	30
X201	14- 9-23	L	N	L	700	1	15	70	10	30	700	N	10	30
X202	14- 9-22	<.04	N	L	700	1	20	50	5	150	1,000	N	15	20
X203	14- 9-22	L	N	L	700	1	20	70	20	50	700	N	10	30
X205	14- 9-22	L	N	L	700	1	30	70	30	150	700	N	10	50
X206	14- 8-19	<.04	N	L	700	1	30	100	5	20	1,000	N	15	30
X207	14- 8-19	<.04	N	10	700	2	10	20	20	20	1,000	N	10	20
X209	15- 9- 1	L	N	L	700	2	10	20	10	30	1,000	N	15	20
X210	15- 9-12	L	N	L	700	1	50	50	5	30	1,500	N	15	30
X211	15- 9-12	L	N	L	700	1.5	10	30	15	L	700	N	10	20
X212	15- 9-12	L	N	L	700	1	20	50	20	20	700	N	10	20
X214	15- 9-12	L	N	L	700	1.5	10	20	20	20	500	N	15	30
X215	15- 9-12	L	N	L	700	2	10	30	5	30	700	N	20	20
X220	15- 9-12	L	N	L	700	1.5	20	50	10	100	1,000	N	20	20
X224	15- 9- 6	L	N	L	700	3	5	15	15	30	1,000	N	10	7
X225	15- 9- 6	L	N	L	700	3	5	5	10	30	700	N	10	7
X226	15- 9- 6	L	N	L	700	2	15	30	5	20	1,000	N	20	15
X228	15- 9-18	L	N	L	200	5	5	10	20	50	1,000	N	20	10

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

	(ppm)								(percent)		
Sample	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	Remarks
Stream sediments--Continued											
X145	15	5	N	300	70	15	N	300	3	.2	
X146	15	10	N	500	100	50	N	150	3	.3	
X147	15	7	N	500	70	20	N	150	3	.3	
X148	15	5	N	300	50	10	N	200	2	.2	
X149	70	7	N	300	70	50	N	500	3	.3	
X150	10	7	N	700	150	20	N	150	5	.3	
X151	50	7	N	500	100	30	L	200	3	.3	
X152	30	7	N	500	70	30	L	150	3	.3	
X153	15	7	N	500	200	30	L	200	7	.5	
X154	20	7	N	200	100	30	N	150	3	.3	
X155	15	7	N	300	200	30	L	100	10	.7	
X156	20	10	N	500	300	30	N	200	15	1	
X157	20	10	N	500	200	20	N	200	7	.7	
X158	15	10	N	500	150	20	N	200	5	.7	
X159	15	30	N	500	200	20	N	200	7	1	
X160	20	10	N	500	300	15	L	100	10	.7	
X161	20	15	N	200	500	50	200	100	20	1	
X162	20	10	N	300	200	30	N	150	10	.7	
X163	20	10	N	200	300	30	200	200	15	.7	
X164	30	10	N	300	200	30	L	200	10	.7	
X168	30	7	N	300	100	20	N	150	3	.3	
X170	30	7	N	300	100	20	N	200	3	.5	
X171	20	5	N	300	200	15	N	200	10	.7	
X172	20	10	N	300	300	20	L	300	10	.7	
X173	20	7	N	300	200	20	N	500	7	.7	
X174	20	7	N	300	200	15	L	500	10	.7	
X175	20	7	N	300	200	20	N	700	5	.7	
X176	15	7	N	300	300	20	200	700	15	1	
X177	30	15	N	300	100	20	N	150	5	.5	
X178	30	10	N	500	100	20	N	150	5	.5	
X179	30	10	N	500	150	20	N	150	5	.5	
X182	20	10	N	300	300	30	L	500	10	.7	
X185	20	15	N	300	100	20	N	150	5	.5	
X186	20	5	N	300	100	30	N	500	5	.7	
X190	30	7	N	200	100	20	N	150	5	.5	
X191	20	5	N	500	150	20	N	200	5	.7	
X192	20	10	N	300	100	20	N	300	5	.7	
X194	15	10	N	500	200	15	N	150	5	.7	
X195	10	7	N	300	150	30	N	150	5	.5	
X196	15	5	N	300	150	30	N	200	3	.3	
X197	15	10	N	300	200	20	N	150	5	.3	
X199	15	10	N	500	200	20	N	150	10	.5	
X200	15	10	N	500	200	20	N	150	7	.3	
X201	15	7	N	300	200	15	N	150	5	.3	
X202	15	10	N	300	200	30	L	150	10	.5	
X203	15	10	N	500	150	30	N	200	7	.5	
X205	15	10	N	500	200	30	N	150	10	.5	
X206	15	7	N	300	300	20	L	150	10	.7	
X207	15	5	N	500	100	30	N	150	2	.2	
X209	20	7	N	200	150	20	N	200	5	.5	
X210	30	20	N	200	300	30	300	150	15	>1	
X211	15	7	N	300	100	15	N	150	3	.3	
X212	15	7	N	500	150	15	N	150	5	.5	
X214	20	7	N	500	150	15	N	200	5	.5	
X215	20	10	N	300	150	70	N	200	5	.7	
X220	20	15	N	300	200	100	N	200	10	1	
X224	20	5	N	300	100	30	N	200	5	.5	
X225	20	5	N	300	70	20	N	100	3	.2	
X226	20	10	N	300	200	20	L	200	10	1	
X228	30	5	N	200	50	30	N	200	2	.2	

TABLE 7.—*Analyses of samples from the Black*

		Atomic absorption (ppm)	Semiquantitative spectrographic analyses (ppm)											
Sample	T. R. S. (pl. 2)	Au (0.02)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
						Stream sediments--Continued								
X229	15- 9-19	<0.04	N	L	700	2.0	5	10	10	20	300	N	10	10
X230	15- 9-19	L	N	L	1,500	1	15	70	10	50	500	N	15	20
X231	15- 9-19	<.04	N	L	700	2	20	30	30	50	500	N	15	20
X232	15- 9-30	<.04	N	L	700	1	15	30	10	30	500	N	15	15
X233	15- 9-30	L	N	L	700	1	15	50	30	30	500	N	15	20
X234	15- 9-30	<.04	N	L	700	1	15	50	10	50	500	N	15	50
X235	15- 9-19	<.04	N	L	700	1	50	150	10	50	700	N	15	30
X236	15- 9-19	L	N	L	700	1	15	50	15	50	500	N	15	15
X237	14- 9-34	L	N	L	700	1	10	30	10	50	300	N	20	15
X238	14- 9-33	L	N	L	1,000	L	10	30	20	150	700	N	15	10
X239	15- 9- 5	L	N	L	1,000	1	7	15	10	20	500	N	15	15
X244	14- 9-32	L	N	10	500	L	20	70	20	20	500	N	10	20
X247	15- 9-13	L	N	10	300	1	7	50	15	20	500	N	10	15
X248	15- 9-13	L	N	10	300	1	5	20	15	20	300	N	15	10
X254	15- 9-13	L	N	10	300	1	5	15	15	20	500	N	20	10
X257	15- 9-14	L	N	L	700	1	5	10	L	20	1,000	N	20	5
X258	15- 9-14	L	N	10	700	2	5	5	10	30	700	N	15	5
X260	15- 9-26	L	2.0	10	300	1	30	70	70	20	1,000	5	15	30
X262	15- 9-26	L	1.5	L	300	1	20	50	30	20	1,000	L	20	20
X265	15- 9-27	L	.5	L	200	1	20	70	70	30	1,000	5	15	30
X267	15- 9-27	<.04	1.5	L	500	1	10	30	30	30	1,000	5	20	10
X268	15- 9-22	L	N	L	700	1	7	20	L	50	700	N	20	5
X269	15- 9-22	L	N	L	700	2	5	15	10	20	700	N	20	5
X270	15- 9-21	L	N	10	300	3	5	20	30	20	700	N	20	10
X271	15- 9-21	L	N	10	700	3	7	30	20	30	700	N	30	10
X272	15- 9-21	L	N	10	700	1	7	30	10	20	700	N	15	10
X274	15- 9-28	<.04	N	10	700	1	7	50	30	20	500	N	15	20
X275	15- 9-28	L	N	L	700	2	7	70	30	50	700	N	15	20
X276	15- 9-21	L	N	10	700	2	7	30	10	20	700	N	20	10
X277	15- 9-21	L	N	15	300	3	5	30	20	30	1,000	N	30	10
X279	15- 9-23	L	N	L	300	1	30	70	70	20	1,000	7	15	20
X280	15- 9-23	<.1	N	30	300	2	10	50	20	30	700	L	30	15
X281	15- 9-27	L	N	L	700	2	10	30	30	20	1,000	N	30	15
X283	15- 9-34	L	N	L	700	1	10	30	20	20	500	N	30	15
X290	15- 9-26	L	20	10	300	3	50	150	150	50	5,000	10	10	30
X291	16- 9- 3	L	N	L	700	2	10	30	30	20	200	N	10	10
X292	16- 9- 3	L	N	L	500	2	7	20	30	20	700	N	10	10
X301	16- 9- 4	<.1	N	L	500	3	7	10	15	70	700	N	10	10
X302	16- 9- 4	L	N	L	300	2	7	15	10	20	700	N	10	10
X303	16- 9- 8	L	N	10	300	2	15	30	10	20	1,000	N	15	10
X304	16-10-27	L	N	10	500	1	30	150	10	20	1,000	N	15	20
X305	16-10-27	L	N	L	700	1	7	30	10	20	500	N	15	15
X308	16-10-24	L	N	L	300	2	5	N	30	20	700	N	10	5
X309	16-10-24	L	N	10	300	1	30	150	5	20	2,000	N	15	30
X314	16- 9-17	L	N	15	200	2	20	150	50	20	1,500	10	15	50
X315	16- 9-18	L	N	10	700	2	20	70	10	20	1,500	N	20	20
X316	16- 9-17	L	N	10	500	2	30	50	10	20	1,500	N	20	10
X317	16- 9-11	L	N	15	500	1	30	70	10	20	700	N	15	20
X318	16- 9-12	L	N	20	700	1	20	50	30	20	700	N	15	20
X326	11- 9-34	.02	N	10	1,000	L	30	20	20	30	1,000	N	15	50
X327	11- 9-33	.02	N	L	1,000	N	30	30	30	20	1,000	N	L	50
X328	11- 9-33	L	N	L	1,000	L	30	30	30	30	1,000	N	10	50
X329	11- 9-33	.02	N	L	1,000	L	30	20	20	30	1,000	N	10	50
X330	11- 9-28	L	N	L	1,000	L	30	30	30	30	1,000	N	10	50
X331	11- 9-28	L	N	L	1,000	L	30	30	30	20	1,000	N	10	50
X332	11- 9-31	L	N	L	1,000	L	30	30	30	30	1,000	N	10	50
X333	11- 9-32	L	N	L	1,000	L	30	20	20	30	700	N	10	70
X334	11- 9-32	L	N	L	1,000	L	30	20	20	30	1,000	N	10	50
X335	11- 9-32	L	N	L	1,000	L	30	30	30	20	1,000	N	10	50
X336	11- 9-31	L	N	L	1,000	L	30	20	20	20	1,000	N	10	50

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10) (ppm)	Sc (5) (ppm)	Sn (10) (ppm)	Sr (50) (ppm)	V (5) (ppm)	Y (5) (ppm)	Zn (200) (ppm)	Zr (10) (ppm)	Fe (0.05) (percent)	Ti (0.002) (percent)	Remarks
Stream sediments--Continued											
X229	15	5	N	700	50	10	N	100	3.0	0.15	
X230	15	10	N	700	200	15	N	200	7	.7	
X231	15	7	N	500	200	20	N	150	7	.3	
X232	10	7	N	700	150	20	N	100	3	.3	
X233	15	10	N	500	150	20	N	150	3	.3	
X234	10	10	N	700	200	20	N	300	5	.5	
X235	15	10	N	700	500	20	300	300	15	.7	
X236	15	5	N	700	150	20	N	100	5	.3	
X237	15	7	N	700	150	30	N	100	3	.3	
X238	15	10	N	500	150	20	N	150	5	.5	
X239	15	5	N	500	70	20	N	100	3	.3	
X244	15	7	N	300	100	15	N	150	3	.3	
X247	30	7	N	100	100	20	N	150	3	.2	
X248	30	7	N	150	70	20	N	150	2	.2	
X254	20	7	N	200	50	15	N	150	1.5	.2	
X257	20	7	N	300	150	20	N	300	3	.5	
X258	15	5	N	200	50	20	N	70	2	.3	
X260	30	20	N	200	300	50	200	200	7	1	
X262	30	15	N	200	200	30	L	150	5	.7	
X265	30	15	N	100	200	30	N	150	5	.7	
X267	30	15	N	200	150	30	N	150	3	.5	
X268	15	7	N	500	150	50	N	200	5	.7	
X269	20	5	N	300	100	30	N	100	3	.3	
X270	30	5	N	300	50	20	N	100	2	.2	
X271	30	7	N	500	70	30	N	200	3	.3	
X272	15	5	N	500	100	15	N	300	3	.3	
X274	20	7	N	500	70	15	N	200	3	.3	
X275	20	10	N	500	150	30	N	300	3	.3	
X276	20	7	N	500	70	20	N	150	3	.3	
X277	50	7	N	300	50	20	N	150	2	.3	
X279	20	30	N	100	300	30	L	150	10	1	
X280	30	15	N	L	150	20	N	200	5	.7	
X281	20	10	N	100	100	30	N	200	3	.7	
X283	30	7	N	500	150	20	N	200	5	.7	
X290	300	30	N	100	300	100	1,000	150	7	1	
X291	15	5	N	100	100	20	N	100	3	.15	
X292	30	5	N	300	100	20	N	150	3	.3	
X301	30	5	N	200	100	30	N	100	3	.15	
X302	20	5	N	200	150	15	N	150	3	.3	
X303	30	10	N	200	200	20	N	200	7	.7	
X304	20	10	N	200	300	20	200	150	7	.7	
X305	15	10	N	700	150	20	N	100	5	.3	
X308	20	5	N	100	50	15	N	70	1.5	.15	
X309	20	7	N	200	300	30	300	200	7	.7	
X314	70	10	N	200	150	50	700	100	5	.3	
X315	20	10	N	300	200	20	N	150	7	.5	
X316	20	7	N	200	300	30	N	300	7	.7	
X317	15	15	N	300	200	20	N	100	10	.7	
X318	70	15	N	200	150	30	N	150	5	.5	
X326	30	30	N	700	300	30	N	300	10	1	
X327	30	30	N	700	300	20	N	200	10	1	
X328	30	30	N	1,000	300	30	N	200	10		
X329	20	30	N	700	300	20	N	200	10	1	
X330	30	20	N	1,000	200	20	N	200	10	1	
X331	30	20	N	700	200	20	N	200	7	1	
X332	20	20	N	700	200	20	N	200	10	1	
X333	20	20	N	700	300	20	N	200	10	1	
X334	30	20	N	700	300	20	N	200	10	1	
X335	20	20	N	700	300	20	N	150	10	1	
X336	20	20	N	700	200	20	N	150	7	.7	

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
			Stream sediments--Continued											
X337	11- 9-31	L	N	L	1,000	L	30	30	30	20	1,000	N	10	50
X338	11- 9-33	L	N	L	1,000	L	50	30	30	20	1,000	N	10	70
X339	11- 9-33	L	N	L	1,000	L	30	30	30	20	1,000	N	10	70
X345	12- 9-28	L	N	15	700	2.0	N	10	10	70	500	N	30	5
X346	12- 9-21	L	N	10	700	2	N	10	10	70	1,000	N	30	5
X347	12- 9-21	L	N	15	700	2	N	15	15	70	1,000	N	20	5
X352	12- 9-27	L	N	10	700	1	15	10	10	50	1,000	N	30	30
X353	12- 9-27	L	N	10	700	1.5	N	5	5	50	500	N	20	5
X365	13-11-23	L	N	10	1,000	L	20	15	15	30	1,000	N	15	50
X367	13-11-24	L	N	10	700	L	20	15	15	20	700	N	15	50
X368	13-11-24	L	N	10	700	1	20	15	15	20	700	N	15	30
X369	13-11-24	L	N	10	700	1.5	15	20	20	50	1,000	N	20	20
X370	13-11-24	L	N	15	1,000	1	30	200	20	50	1,000	N	15	50
X374	13-10-19	L	N	20	1,000	1.5	20	150	20	70	1,000	N	15	30
X375	13-10-19	L	N	15	1,000	1	30	200	30	70	1,000	N	20	50
X377	13-11-23	L	N	10	1,000	1	30	500	30	50	1,000	N	15	50
X378	13-11-23	L	N	10	1,000	1	20	100	30	70	1,000	N	20	20
X379	13-11-23	L	N	10	700	1	20	150	30	70	1,000	N	20	30
X380	13-11-26	L	N	20	1,000	1	30	300	30	70	1,000	N	20	50
X381	13-11-26	L	N	10	1,000	L	50	500	50	30	1,000	N	10	70
X382	13-11-23	0.02	N	20	1,000	1	30	200	20	70	1,000	N	15	50
X383	13-11-25	L	N	10	1,000	L	50	500	50	20	1,000	N	10	70
X384	13-11-25	L	N	10	1,000	L	50	300	50	30	1,000	N	10	50
X385	13-11-25	.02	N	10	1,000	L	30	500	30	20	700	N	10	70
X386	13-11-25	.02	N	10	1,000	L	30	300	30	100	1,000	N	15	70
X387	13-11-26	L	N	15	1,000	1.5	20	150	30	70	1,000	N	50	30
X388	13-11-26	.02	N	20	700	2	15	50	20	50	1,000	N	30	15
X389	13-11-35	L	N	10	1,000	L	50	300	30	20	1,000	N	20	70
X390	13-11-35	L	N	15	1,000	L	50	700	50	50	1,000	N	20	70
X391	13-11-35	.02	N	10	500	1.5	15	200	10	70	1,500	N	70	15
X392	13-11-35	.02	N	20	700	3	20	100	30	100	1,500	N	30	50
X393	13-11-35	L	N	15	300	2	10	150	10	100	1,500	7	70	10
X394	14-11- 2	.02	N	15	1,000	L	50	500	50	20	1,000	N	15	70
X395	14-11- 2	L	N	15	1,000	1	30	300	50	70	1,000	N	20	50
X396	14-11- 1	L	N	15	1,000	L	30	300	50	50	700	N	10	70
X397	14-11- 1	L	N	20	1,000	L	30	300	30	30	1,000	N	15	50
X399	14-11- 2	L	N	15	1,000	L	50	300	50	30	1,000	N	15	50
X400	14-11- 2	L	N	15	1,000	1	30	300	30	70	1,000	N	30	50
X401	13-10-20	L	N	10	1,000	1	20	100	30	100	1,000	N	20	20
X402	13-10-20	L	N	L	1,000	1	20	100	20	70	700	N	20	20
X403	13-10-29	L	N	10	1,000	2	30	200	30	70	1,000	N	20	50
X404	13-10-20	L	N	15	1,000	L	50	200	50	50	1,000	N	20	50
X405	13-10-29	L	N	10	1,000	L	30	200	30	50	1,000	N	20	50
X407	13-10-28	L	N	15	1,000	L	30	150	50	50	1,000	N	15	50
X408	13-10-28	L	N	10	1,000	L	30	150	50	70	1,000	N	15	50
X409	13-10-28	L	N	20	1,000	1.5	30	100	50	100	1,000	N	20	50
X410	13-10-29	L	N	20	1,000	2	20	100	30	70	1,000	N	20	30
X411	13-10-29	L	N	20	1,000	5	15	70	30	200	1,000	N	20	30
X412	13-10-29	L	N	20	1,000	1.5	15	100	30	70	1,000	N	20	30
X413	13-10-29	L	N	20	1,000	2	15	70	30	70	1,000	N	20	30
X414	14-10- 2	L	N	20	700	L	50	500	50	20	700	N	20	70
X415	14-10- 2	L	N	20	1,000	1	30	150	50	50	1,000	N	20	70
X416	14-10- 2	L	N	15	1,000	1.5	30	150	50	70	1,000	N	20	70
X417	14-10- 2	L	N	15	1,000	2	50	150	50	100	2,000	5	20	70
X419	13-11- 7	.02	N	10	1,000	1	30	300	15	70	1,000	N	30	50
X421	13-11-18	L	N	L	1,000	L	30	150	15	50	700	N	20	30
X422	13-11-18	<.04	N	10	1,000	1	30	300	30	30	700	N	20	100
X424	13-11-17	L	N	10	1,000	L	50	500	30	30	1,000	N	20	100
X425	13-11-36	L	N	L	500	1	15	70	30	20	500	N	10	50
X426	13-11-36	L	N	L	1,000	L	30	300	30	20	700	N	20	70

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	Remarks
	(ppm)								(percent)		
				Stream sediments--Continued							
X337	30	20	N	700	200	20	N	150	7.0	0.7	
X338	20	30	N	1,000	300	20	N	150	10	1	
X339	20	20	N	700	200	20	N	150	10	.7	
X345	50	5	N	100	30	50	N	150	2	.2	
X346	50	7	N	100	20	50	N	200	3	.2	
X347	50	5	N	150	30	30	N	200	2	.2	
X352	30	15	N	500	150	30	N	200	5	.7	
X353	30	5	N	N	20	30	N	200	1.5	.2	
X365	30	20	N	700	200	30	N	300	7	1	
X367	20	20	N	500	200	20	N	300	7	1	
X368	30	15	N	500	150	20	N	200	5	.5	
X369	50	15	N	500	100	50	N	200	3	.5	
X370	50	15	N	700	200	30	N	300	7	1	
X374	30	15	N	500	150	50	N	200	5	.5	
X375	50	20	N	700	200	50	N	200	10	1	
X377	30	20	N	700	300	50	N	300	7	>1	
X378	30	15	N	700	150	50	N	300	5	1	
X379	30	15	N	700	150	50	N	200	5	1	
X380	50	20	N	700	200	70	N	200	10	>1	
X381	30	20	N	700	300	30	N	200	10	>1	
X382	30	20	N	700	200	50	N	300	10	>1	
X383	30	20	N	700	300	20	N	200	10	>1	
X384	50	20	N	700	200	30	N	200	10	>1	
X385	30	20	N	700	200	30	N	200	7	1	
X386	30	20	N	700	200	50	N	300	7	>1	
X387	50	20	N	700	150	70	N	300	5	>1	
X388	50	10	N	300	100	70	N	200	3	.7	
X389	30	20	N	700	200	30	N	200	10	>1	
X390	30	30	N	700	200	50	N	200	15	>1	
X391	50	15	10	200	150	70	N	300	5	1	
X392	50	15	N	500	150	200	N	300	5	1	
X393	50	15	15	150	100	150	N	700	5	1	
X394	30	20	N	700	200	30	N	200	10	>1	
X395	30	20	N	500	150	100	N	200	7	>1	
X396	30	20	N	700	150	30	N	150	10	>1	
X397	30	20	N	500	150	30	N	300	10	>1	
X399	30	20	N	500	200	30	N	200	10	>1	
X400	30	20	N	500	200	100	N	500	10	>1	
X401	50	20	N	700	150	50	N	500	7	1	
X402	50	15	N	500	150	50	N	300	7	1	
X403	50	20	N	500	150	50	N	200	7	1	
X404	30	20	N	700	150	70	N	200	10	>1	
X405	30	20	N	700	200	50	N	200	7	>1	
X407	50	20	N	500	150	50	N	200	7	>1	
X408	50	20	N	500	150	50	N	200	7	1	
X409	50	20	N	300	150	50	N	200	7	1	
X410	50	15	N	300	150	70	N	200	7	.7	
X411	30	20	N	300	150	70	N	150	5	.7	
X412	50	15	N	300	150	150	N	150	5	.7	
X413	50	15	N	500	150	70	N	200	5	1	
X414	30	20	N	300	200	70	N	150	10	>1	
X415	30	20	N	500	200	30	N	200	7	>1	
X416	50	20	N	700	150	50	N	200	10	1	
X417	50	20	N	500	150	70	N	150	10	>1	
X419	20	20	N	700	300	50	N	300	10	>1	
X421	15	20	N	400	200	50	N	300	7	1	
X422	15	20	N	300	200	50	N	300	7	1	
X424	15	30	N	500	300	50	N	300	10	>1	
X425	15	15	N	300	100	30	N	100	3	.5	
X426	15	20	N	500	200	20	N	200	7	1	

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
					Stream sediments--Continued									
X427	13-11-36	L	N	10	1,000	1.0	30	300	50	30	700	N	20	70
X428	13-11-36	L	N	10	700	L	50	700	50	20	700	N	20	100
X430	13-11-36	L	N	10	1,000	L	30	500	50	50	1,000	N	20	70
X431	13-11-36	L	N	10	1,000	N	50	700	30	N	1,000	N	20	100
X432	13-11-36	L	N	10	700	L	30	200	30	30	700	N	20	70
X433	13-11-36	L	N	10	700	L	30	300	50	30	1,000	N	20	70
X435	13-10-31	L	N	10	1,000	L	30	300	50	20	1,000	N	20	70
X437	11-11-29	L	N	15	1,000	1	10	50	7	50	700	N	30	20
X438	11-11-29	L	N	10	1,000	1	20	100	10	50	1,000	N	50	30
X439	11-11-29	L	N	10	1,000	1	15	70	30	50	1,000	N	30	30
X441	11-11-28	L	N	10	1,000	1	20	100	20	300	1,500	N	50	30
X442	11-11-21	L	N	10	1,000	1.5	20	100	20	20	1,000	N	30	50
X443	11-11-21	<0.04	N	10	1,000	2	10	50	15	30	1,000	N	30	20
X444	11-11-22	<.04	N	10	1,000	2	10	50	20	N	700	N	30	15
X445	11-11-22	L	N	15	1,000	1.5	20	50	20	30	700	N	30	15
X446	11-11-22	L	N	10	1,000	2	10	20	20	50	1,000	N	30	10
X447	11-11-22	.08	N	15	700	2	10	70	20	30	700	N	30	30
X448	11-11-25	.08	N	10	700	5	15	100	50	30	1,000	10	50	30
X449	11-11-25	<.04	N	10	700	1	15	150	15	30	1,000	N	20	30
X450	11-10-19	L	N	15	300	7	10	50	10	30	1,000	5	100	20
X451	11-10-19	<.04	N	15	1,000	2	20	70	30	50	1,000	N	30	30
X452	11-10-18	L	N	15	1,000	1.5	20	150	30	50	1,500	N	30	50
X453	11-10-18	L	N	15	700	2	20	100	30	50	1,000	N	30	50
X454	11-11-24	<.04	N	20	1,000	3	20	70	30	50	1,000	N	30	30
X455	11-11-24	---	N	15	500	3	10	10	10	50	1,000	5	50	5
X457	11-10-31	L	N	15	700	5	10	10	15	50	1,000	N	50	5
X458	12-10- 5	.02	N	15	700	5	5	N	10	30	700	5	70	5
X459	12-10- 5	---	N	10	1,000	3	20	70	20	50	1,000	N	30	15
X461	12-10- 5	.02	N	10	1,500	2	20	20	15	50	1,000	N	30	5
X462	12-10- 8	L	N	10	1,000	3	15	70	20	50	700	N	20	30
X463	12-10- 8	.02	N	10	1,500	2	20	10	10	100	1,500	N	50	5
X464	12-10- 8	.02	N	10	1,500	2	15	10	7	70	1,000	N	20	L
X465	12-10- 8	.02	N	L	1,000	2	15	5	15	70	1,000	N	20	5
X467	12-11- 5	.02	N	20	1,000	2	15	70	15	50	1,000	N	50	30
X468	12-11- 5	.02	N	15	700	2	10	20	7	100	1,500	N	100	10
X469	12-11- 8	L	N	15	700	3	10	30	15	50	1,000	N	70	15
X470	12-11- 9	.08	N	20	200	3	5	100	10	50	1,000	N	100	15
X472	12-11- 9	L	N	20	70	5	N	10	5	50	300	N	50	5
X473	12-11- 8	L	N	15	700	3	10	15	10	30	700	N	50	15
X474	12-11- 8	.02	N	15	1,000	2	15	70	10	30	7,000	N	50	20
X475	12-10-11	.02	N	10	150	5	5	50	15	150	500	N	15	20
X477	12-10-11	.02	N	20	200	5	N	10	15	150	1,000	5	50	7
X478	12-10- 2	.02	N	15	200	5	5	50	15	200	1,000	N	50	20
X479	12-10- 1	L	N	15	500	3	N	5	10	70	500	5	30	5
X480	12-10- 1	L	N	10	300	5	N	5	10	70	500	5	30	5
X481	12-10- 2	L	N	15	200	5	5	10	20	70	1,000	5	20	10
X482	11-10-27	<.04	N	15	300	3	10	70	15	50	1,000	N	50	30
X483	11-10-33	L	N	15	500	3	15	150	20	70	700	N	30	50
X484	11-10-28	L	N	10	300	3	7	50	20	50	700	N	20	20
X485	11 10-33	L	N	15	1,000	2	7	10	10	70	1,000	N	30	10
X487	11-10-29	L	N	20	20	7	N	5	7	20	1,000	10	100	5
X488	11-10-29	L	N	20	15	10	N	5	5	20	1,000	5	100	5
X489	11-10-29	L	N	20	150	7	N	5	10	50	1,000	N	70	10
X490	11-10-29	<.04	N	20	50	10	N	20	10	30	1,000	5	100	10
X492	12-11-12	L	N	15	700	3	5	15	10	150	1,500	N	50	7
X493	12-11-12	<.04	N	10	300	3	5	10	15	150	1,000	N	50	10
X494	12-11-11	<.04	N	15	700	2	5	10	7	70	1,000	N	50	5
X495	12-11-11	<.04	N	15	700	2	5	30	10	100	1,500	N	50	10
X496	12-11-11	L	N	15	700	2	5	15	10	100	1,500	7	50	7
X498	12-11-11	L	N	15	50	3	15	5	10	150	>5,000	10	200	5

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	(ppm)								(percent)		Remarks
	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	
					Stream sediments--Continued						
X427	30	15	N	500	200	30	N	150	5.0	0.7	
X428	20	20	N	500	300	20	N	200	10	>1	
X430	20	20	N	500	300	30	N	200	10	>1	
X431	20	20	N	700	500	30	N	200	10	>1	
X432	20	20	N	500	200	30	N	150	7	1	
X433	20	20	N	500	200	30	N	200	10	>1	
X435	20	20	N	300	200	30	N	300	10	>1	
X437	30	10	N	300	150	30	N	300	5	.5	
X438	20	20	N	500	200	50	N	700	7	>1	
X439	20	15	N	300	150	30	N	500	7	1	
X441	30	15	N	500	300	100	N	700	10	>1	
X442	20	15	N	300	100	50	N	200	5	.5	
X443	20	15	N	200	100	50	N	500	5	.5	
X444	20	15	N	200	100	50	N	500	5	.5	
X445	50	15	N	300	150	50	N	700	5	1	
X446	30	10	N	300	100	50	N	500	3	.7	
X447	30	10	N	200	70	50	N	200	3	.3	
X448	30	15	N	150	100	50	N	200	5	1	
X449	30	15	N	200	150	50	N	700	5	1	
X450	30	10	N	100	70	50	N	300	3	.5	
X451	50	15	N	300	150	70	N	300	5	1	
X452	50	15	N	300	150	50	N	300	5	1	
X453	50	15	10	300	100	50	N	300	3	.7	
X454	50	15	N	300	100	50	N	300	5	.7	
X455	30	10	N	200	100	100	N	200	3	.7	
X457	30	10	N	200	100	100	N	300	3	.7	
X458	30	7	N	100	70	70	N	300	3	3	
X459	30	15	N	300	150	100	N	500	7	1	
X461	30	20	N	500	150	70	N	500	7	>1	
X462	30	15	N	300	70	50	N	300	5	.5	
X463	30	20	N	500	150	70	N	700	7	1	
X464	30	15	N	500	100	70	N	300	5	1	
X465	30	15	N	300	100	70	N	200	5	.7	
X467	20	15	10	300	150	100	N	500	5	1	
X468	20	20	15	200	100	100	N	500	5	1	
X469	20	15	10	300	70	70	N	300	5	.5	
X470	20	10	10	100	50	70	N	200	3	.3	
X472	20	N	N	N	20	30	N	150	1.5	.15	
X473	20	10	N	300	70	50	N	200	3	.5	
X474	30	15	N	500	100	50	N	200	5	.7	
X475	20	10	N	L	30	200	N	150	1.5	.15	
X477	50	7	L	N	30	200	N	200	1.5	.15	
X478	50	15	L	N	50	200	N	200	3	.2	
X479	30	5	N	N	30	50	N	300	2	.2	
X480	30	5	N	N	20	70	N	300	2	.2	
X481	30	7	N	100	20	70	N	200	1.5	.2	
X482	30	10	N	150	100	70	N	300	3	.3	
X483	30	15	N	100	100	100	N	200	3	.3	
X484	30	10	N	150	50	70	N	200	2	.3	
X485	30	10	N	200	100	70	N	300	3	.5	
X487	20	L	N	N	15	70	N	150	2	.1	
X488	30	N	N	N	15	100	N	200	2	.1	
X489	50	L	10	N	30	100	N	150	1.5	.1	
X490	30	L	10	N	20	100	N	200	2	.15	
X492	50	15	L	300	50	100	N	700	3	.5	
X493	30	10	L	N	30	100	N	500	3	.2	
X494	30	15	L	100	70	100	N	700	3	.5	
X495	30	15	N	100	70	100	N	700	3	.5	
X496	30	15	N	100	50	100	N	700	3	.3	
X498	30	50	1,000	N	30	150	1,000	500	20	1	

TABLE 7.—*Analyses of samples from the Black*

		Atomic absorption (ppm)	Semiquantitative spectrographic analyses (ppm)											
Sample	T. R. S. (pl. 2)	Au (0.02)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
					Stream sediments--Continued									
X499	12-11-11	L	N	20	150	5	N	N	7	50	700	5	50	L
X500	12-11- 3	L	N	20	150	3	N	N	10	30	1,000	5	70	L
X502	12-11- 3	L	N	20	300	3	5	10	10	50	500	5	50	10
X504	11-11-34	---	N	20	300	7	N	10	30	50	700	N	50	10
X506	11-11-33	---	N	20	150	5	N	5	20	50	1,000	5	70	7
X507	11-11-33	L	N	20	100	5	15	5	30	70	1,000	5	100	7
X508	12-11-17	L	N	15	1,000	1	20	50	10	50	1,000	N	20	20
X509	12-11-20	L	N	15	1,000	1	15	70	10	50	1,000	N	50	10
X510	12-11-20	L	N	10	1,000	1	20	50	20	70	1,000	5	50	10
X511	12-11-20	L	N	10	1,000	1	20	70	20	50	1,500	N	50	10
X512	12-11-29	L	N	15	1,000	1.5	20	70	15	30	1,000	N	50	15
X513	12-11-28	0.02	N	20	1,000	1	20	70	20	70	700	5	50	15
X514	12-11-27	L	N	15	1,000	1.5	20	30	20	50	1,000	N	30	15
X515	12-11-27	L	N	15	1,000	1	20	30	20	50	1,000	N	30	15
X516	12-11-19	L	N	20	1,000	1.5	20	70	15	50	700	N	20	20
X517	12-11-19	L	N	15	1,000	1	15	70	20	50	1,000	N	30	10
X519	12-11-14	<.04	N	20	700	2	10	20	20	100	1,000	N	50	10
X521	12-11-15	<.04	N	20	700	2	15	20	20	100	1,000	N	70	7
X524	12-11-15	<.04	N	15	700	2	15	20	30	70	1,500	5	70	5
X525	12-11-15	<.04	N	15	700	2	5	15	10	70	1,500	5	50	5
X526	12-11-16	L	N	15	700	2	5	10	10	50	1,000	N	50	5
X527	12-11-16	L	N	10	1,000	1.5	10	10	5	200	1,000	N	50	5
X528	11-10-30	L	N	30	30	10	N	N	10	N	700	5	150	5
X530	11-10-30	L	N	30	20	10	N	N	7	N	500	5	100	5
X531	11-10-30	L	N	30	50	10	N	N	7	30	1,000	7	150	5
X533	11-10-20	L	N	10	300	3	5	20	15	30	500	N	15	5
X534	11-10-20	<.04	N	15	1,500	2	20	70	30	70	1,500	N	30	20
X535	11-10-20	.02	N	15	1,500	2	15	30	20	70	1,000	N	30	15
X536	13-10-26	.02	N	10	1,000	2	15	20	30	70	1,000	N	20	20
X537	13-10-26	.02	N	10	700	2	15	20	20	50	700	N	30	10
X538	13-10-27	L	N	10	1,000	1	20	100	15	50	1,000	N	20	20
X539	13-10-34	L	N	10	1,000	1.5	20	50	20	50	1,000	N	20	20
X540	13-10-34	L	N	10	1,000	1	15	50	20	70	1,000	N	30	15
X541	13-10-34	L	N	10	1,000	1.5	20	70	20	50	1,000	N	30	15
X542	13-10-34	L	N	10	1,000	1.5	20	100	30	50	1,000	N	20	30
X543	14-10- 5	<.04	N	10	1,000	1.5	20	100	20	50	1,000	N	20	50
X545	14-11-21	L	N	10	1,500	1	20	100	20	70	1,000	N	20	10
X546	14-11-16	L	N	10	1,000	1	30	200	30	50	700	N	20	70
X552	13-11-21	L	N	20	1,000	1.5	50	500	50	30	1,000	N	20	100
H812	11- 8-20	---	N	100	700	2	50	70	30	N	1,500	N	10	70
H813	11- 8-20	---	L	30	700	1.5	50	150	30	70	1,000	N	15	70
H814	11- 8-20	---	N	30	700	1.5	50	70	30	50	1,500	N	10	70
H815	11- 8-20	---	N	20	700	1.5	50	70	50	30	1,500	15	10	70
H816	11- 8-20	---	N	20	1,000	1	30	150	30	50	1,500	15	L	70
H817	11- 8-20	---	N	20	1,000	1.5	50	150	50	50	1,500	N	L	70
H818	11- 8-19	---	N	50	700	1.5	30	100	30	50	1,500	7	L	70
H819	11- 8-19	---	N	20	1,000	2	30	70	30	50	1,000	N	L	70
H820	11- 8-19	---	N	30	1,000	1.5	50	70	30	50	1,500	N	10	70
H821	11- 8-19	---	N	15	700	1.5	50	150	30	50	1,500	N	15	70
H822	11- 8-19	---	1.5	30	1,500	N	70	300	150	100	3,000	5	L	70
H823	11- 8-19	---	2	20	1,000	2	50	100	50	70	1,500	N	15	100
H824	11- 8-19	---	.7	20	1,500	2	50	70	70	30	1,500	15	L	70
H825	11- 8-19	---	N	15	1,000	1.5	30	200	30	70	1,500	20	10	50
H826	11- 8-19	---	N	20	1,000	2	30	70	30	50	1,500	15	10	30
H827	11- 8-19	---	N	15	700	1.5	30	150	30	50	1,500	N	15	70
H828	11- 8-19	---	L	30	1,000	3	30	100	50	70	1,500	N	15	30
H829	11- 9-19	---	1.5	15	1,000	2	70	150	70	50	1,000	N	15	70
H830	11- 9-19	---	20	20	1,000	3	50	200	500	50	1,500	N	15	100
H831	11- 9-19	---	2,000	10	1,500	1	30	150	>20,000	20	3,000	700	L	70
H832	11- 9-19	---	15	15	1,000	2	30	200	700	30	1,500	N	15	100

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10) (ppm)	Sc (5) (ppm)	Sn (10) (ppm)	Sr (50) (ppm)	V (5) (ppm)	Y (5) (ppm)	Zn (200) (ppm)	Zr (10) (ppm)	Fe (0.05) (percent)	Ti (0.002) (percent)	Remarks
Stream sediments--Continued											
X499	30	5	20	N	20	100	N	200	1.5	0.15	
X500	30	7	30	N	20	70	N	300	3	.2	
X502	20	10	N	L	70	100	N	200	2	.3	
X504	30	7	N	N	30	100	N	150	1.5	.2	
X506	30	10	30	N	30	70	N	200	2	.2	
X507	20	10	15	N	20	70	N	200	2	.2	
X508	20	15	N	500	150	70	N	300	5	.7	
X509	20	15	N	300	150	70	N	500	7	.7	
X510	20	15	N	300	150	70	N	700	7	1	
X511	30	15	10	500	150	70	200	700	10	1	
X512	20	15	N	300	100	50	N	500	7	1	
X513	20	15	N	100	150	50	N	300	7	1	
X514	20	15	N	200	100	50	N	300	5	.7	
X515	20	15	N	200	100	50	N	100	5	.7	
X516	20	15	N	200	150	30	N	500	5	.7	
X517	20	15	N	300	150	50	N	500	5	1	
X519	30	15	N	100	70	100	N	500	3	.7	
X521	50	15	N	300	100	100	N	700	5	1	
X524	30	15	15	200	100	100	N	700	7	1	
X525	50	7	L	N	30	70	N	700	3	.5	
X526	30	10	L	150	70	70	N	300	3	.5	
X527	30	15	10	150	100	70	N	1,000	7	.1	
X528	30	N	L	N	15	50	N	150	2	.1	
X530	20	N	L	N	10	30	N	150	1.5	.15	
X531	30	5	L	N	20	70	N	200	3	.3	
X533	20	5	N	100	50	30	N	200	2	.3	
X534	50	15	10	200	150	70	N	500	5	1	
X535	50	15	N	500	150	70	N	300	5	1	
X536	30	15	N	500	150	70	N	300	5	.7	
X537	30	10	N	300	100	50	N	500	3	.7	
X538	20	15	N	500	200	50	N	500	7	1	
X539	30	15	N	500	150	50	N	500	5	1	
X540	30	15	N	500	150	100	N	700	5	1	
X541	30	20	N	500	200	70	N	1,000	10	>1	
X542	30	15	N	500	150	30	N	200	5	.7	
X543	30	15	N	500	150	30	N	150	5	1	
X545	20	15	N	500	200	30	N	500	7	1	
X546	20	15	N	700	150	20	N	200	5	.7	
X552	20	20	N	200	200	30	N	200	10	1	
H812	30	20	N	700	300	50	N	300	7	.7	
H813	70	30	N	1,000	300	70	N	300	7	>1	
H814	30	30	N	1,500	300	50	N	500	7	.7	
H815	20	20	N	700	200	50	N	300	5	1	
X816	30	30	N	1,000	300	50	N	200	10	1	
H817	70	30	N	1,000	300	70	N	500	7	>1	
H818	100	20	N	1,000	200	50	N	200	5	.7	
H819	100	15	N	1,000	200	30	N	300	3	1	
H820	50	20	N	1,500	300	70	N	300	7	>1	
H821	30	20	N	1,000	300	70	N	700	7	>1	
H822	70	30	N	1,500	300	30	N	300	15	>1	
H823	20	30	N	1,500	200	50	N	500	7	>1	
H824	70	30	N	1,000	300	50	N	300	7	>1	
H825	20	20	N	700	300	70	N	300	7	>1	
H826	70	30	N	1,000	300	30	N	300	7	>1	
H827	70	20	N	700	300	30	N	500	7	>1	
H828	100	30	N	1,500	300	70	N	500	10	>1	
H829	50	20	N	700	300	30	N	300	7	>1	
H830	50	30	N	1,000	500	50	N	300	10	>1	<10 ppm Bi.
H831	300	20	N	700	300	30	300	100	7	1	
H832	70	30	N	1,000	300	30	N	700	7	>1	

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm)	Semiquantitative spectrographic analyses (ppm)											
		Au (0.02)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
					Stream sediments--Continued									
H833	11- 9-19	---	N	15	1,000	1.5	30	150	70	50	2,000	N	20	150
H834	11- 9-19	---	15.0	15	1,000	1	70	300	500	30	1,500	N	20	70
H835	11- 9-19	---	1	20	1,000	1	70	300	50	30	1,500	10	15	70
H836	11- 9-19	---	3	20	1,000	1.5	50	300	500	30	1,500	N	20	100
H837	11- 9-19	---	N	20	1,000	1.5	50	300	70	30	1,500	20	20	70
H838	11- 9-20	---	1.5	20	1,000	1	100	300	100	30	1,500	15	20	70
H839	11- 9-20	---	N	30	1,000	2	30	200	70	70	1,500	N	15	300
H840	11- 9-20	---	1	10	1,500	1.5	50	300	200	50	1,500	5	15	50
H841	11- 9-20	---	L	15	1,500	1.5	50	300	70	50	1,500	N	15	70
H842	11- 9-20	---	1.5	20	1,000	3	70	300	200	70	1,500	15	15	150
H843	11- 9-20	---	3	30	1,500	1.5	50	500	200	50	1,500	15	20	100
H844	11- 9-20	---	L	20	1,500	1	70	300	70	50	1,500	N	15	70
H845	11- 9-21	---	.7	20	1,500	L	50	300	70	30	1,500	N	15	70
H846	11- 9-21	---	N	10	1,500	1.5	50	500	50	70	1,500	N	15	70
H847	11- 9-21	---	1.5	30	1,500	1.5	70	300	300	70	1,500	N	15	100
					Panned concentrates									
A015	11- 8-20	---	N	10	300	2.0	70	500	70	500	5,000	N	50	150
A017	11- 8-17	---	N	10	500	2	70	700	100	200	5,000	N	20	100
A019	11- 8-18	---	N	10	500	2	70	500	70	500	5,000	10	70	100
A020	11- 8-18	---	50.0	10	300	L	100	700	100	200	1,500	N	50	150
A024	11- 8-18	---	N	10	500	1	70	500	100	200	3,000	5	50	150
A027	11- 8-18	---	N	10	300	2	70	150	100	200	2,000	N	30	50
A029	11- 8-18	---	1	10	300	1.5	70	300	100	500	2,000	10	50	100
A031	11- 8-18	---	1	N	500	1	100	500	100	300	2,000	5	20	100
A033	11- 8-18	---	N	N	150	L	50	300	50	30	1,000	N	20	70
A035	11- 8- 7	---	50	15	700	5	50	150	100	300	2,000	N	30	50
A039	11- 9-12	---	N	10	500	1	100	500	100	300	2,000	N	50	150
A041	11- 9-12	---	2	N	300	1	70	150	100	200	2,000	N	30	100
A043	11- 9-12	---	1.5	N	500	1	100	500	50	300	2,000	N	20	150
A045	11- 9-11	---	N	N	2,000	5	100	150	100	500	1,500	N	30	70
A047	11- 9-11	---	N	10	500	1	100	700	100	300	2,000	N	30	100
A049	11- 9-11	---	N	10	1,500	2	70	500	100	300	1,500	N	15	50
A051	11- 9-11	---	N	10	500	1	100	700	100	500	2,000	N	50	200
A053	11- 9-11	---	300	10	2,000	2	70	500	150	300	2,000	N	10	50
A055	11- 9-14	---	1	N	300	L	100	1,500	70	500	3,000	10	50	200
A057	11- 9-14	---	N	10	500	L	100	500	100	300	2,000	N	30	100
A059	11- 9-10	---	N	10	700	1	100	700	100	300	2,000	5	50	100
A063	11- 9-24	---	100	N	300	L	150	700	100	100	2,000	N	20	200
A064	11- 9-27	---	N	N	300	N	70	1,500	100	100	1,500	N	15	200
A071	11- 9-35	---	N	N	5,000	1	70	1,000	200	150	1,500	10	30	200
A073	11- 9-35	---	N	N	500	1	150	700	100	150	2,000	5	100	150
A080	11- 9-36	---	N	10	2,000	L	150	1,500	150	100	2,000	N	20	200
A085	12- 8- 6	---	1	N	300	N	100	1,000	150	70	2,000	N	15	150
A143	16- 8- 5	---	7	N	500	2	150	500	100	500	5,000	5	50	100
A148	16- 8- 6	---	100	N	300	2	150	500	100	500	5,000	N	30	70
A151	15- 9-35	---	N	N	300	1	150	700	100	70	5,000	N	50	50
A164	15- 9-36	---	1	N	500	2	100	700	150	200	2,000	N	50	70
A166	15- 9-25	---	5	N	1,000	2	150	500	150	200	3,000	10	30	70
A170	15- 9-24	---	100	N	300	1	200	300	200	1,000	>5,000	10	50	150
A176	15- 8- 7	---	2	N	1,000	N	200	500	150	500	3,000	N	50	30
A178	15- 8-18	---	2	N	1,000	1	200	500	100	100	>5,000	5	50	30
A201	16- 8-18	---	150	N	3,000	1	150	500	300	1,000	>5,000	10	20	70
A211	16- 9-14	---	1	N	>5,000	L	200	500	150	1,000	5,000	N	20	50
A213	16- 9-14	---	500	N	200	2	50	200	150	100	5,000	70	15	200
A215	16- 9-14	---	N	N	200	L	100	700	150	50	2,000	5	20	150
A220	16- 8-18	---	100	N	700	1	100	500	200	1,000	>5,000	10	50	100

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10) (ppm)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05) (percent)	Ti (0.002)	Remarks
					Stream sediments--Continued						
H833	70	30	N	1,000	300	50	200	700	10.0	>1.0	
H834	50	30	N	1,000	300	30	N	500	7	>1	
H835	100	30	N	1,000	300	30	N	200	7	>1	
H836	70	30	N	1,000	700	70	300	700	10	>1	
H837	50	30	N	1,000	300	30	N	500	7	>1	
H838	70	30	N	1,000	300	30	N	300	7	>1	
H839	50	50	N	700	700	100	300	>1,000	20	>1	
H840	50	15	N	1,000	300	30	N	500	7	1	
H841	70	30	N	1,000	300	30	N	500	10	>1	
H842	100	30	N	1,500	300	50	N	1,000	10	>1	
H843	70	20	N	1,500	300	50	N	700	10	>1	
H844	50	20	N	1,500	300	30	N	300	10	>1	
H845	50	30	N	1,000	500	30	N	200	10	>1	
H846	70	20	N	2,000	300	30	N	300	7	>1	
H847	70	30	N	1,500	300	50	N	700	7	>1	
					Panned concentrates						
A015	100	50	100	300	700	>200	1,000	>1,000	>20.0	>1.0	
A017	200	50	150	1,000	700	200	700	>1,000	>20	>1	
A019	70	50	70	N	500	>200	1,000	>1,000	>20	>1	
A020	200	50	70	N	700	200	700	>1,000	>20	>1	
A024	200	70	100	1,000	1,000	200	500	>1,000	>20	>1	
A027	150	30	70	1,000	500	100	300	1,000	>20	>1	
A029	200	50	100	1,000	700	200	500	>1,000	>20	>1	
A031	200	50	70	200	1,000	200	500	>1,000	>20	>1	
A033	150	L	100	N	500	50	300	1,000	>20	1	
A035	300	100	70	N	500	>200	500	>1,000	>20	>1	
A039	200	50	70	500	700	200	500	>1,000	>20	>1	
A041	200	10	100	100	700	200	700	>1,000	>20	>1	
A043	300	30	150	700	500	200	700	>1,000	>20	>1	
A045	100	50	100	N	500	>200	500	>1,000	>20	>1	
A047	500	50	50	500	500	200	300	>1,000	>20	>1	
A049	200	50	70	1,000	500	200	200	>1,000	>20	>1	
A051	300	50	100	500	700	200	500	>1,000	>20	>1	
A053	5,000	50	100	1,000	700	200	700	>1,000	>20	>1	
A055	150	50	150	700	700	200	700	>1,000	>20	>1	
A057	500	50	100	500	700	200	500	>1,000	>20	>1	
A059	500	70	150	1,000	700	200	200	>1,000	>20	>1	
A063	200	50	70	1,000	1,000	70	300	>1,000	>20	>1	
A064	50	100	100	150	1,000	70	500	1,000	>20	>1	
A071	300	50	300	300	700	200	300	>1,000	>20	>1	
A073	200	100	100	N	1,000	200	1,000	>1,000	>20	>1	
A080	300	100	100	100	1,500	>200	700	>1,000	>20	>1	
A085	300	100	200	1,500	1,000	100	200	1,000	20	>1	
A143	700	100	200	N	1,000	>200	1,000	>1,000	>20	>1	
A148	3,000	100	150	N	1,500	>200	1,000	>1,000	>20	>1	
A151	200	100	70	N	1,000	>200	700	>1,000	>20	>1	
A164	500	100	200	N	1,000	>200	500	>1,000	>20	>1	
A166	300	100	200	N	70	200	500	>1,000	>20	>1	
A170	300	100	150	N	70	>200	1,500	>1,000	>20	>1	50 ppm Bi.
A176	200	>100	100	N	1,000	>200	1,500	>1,000	>20	>1	
A178	100	100	50	N	1,000	200	2,000	>1,000	>20	>1	100 ppm Bi.
A201	10,000	100	200	200	1,000	200	1,500	>1,000	>20	>1	200 ppm W.
A211	200	100	200	300	1,000	200	1,000	>1,000	>20	>1	100 ppm Bi; 50 ppm Cd.
A213	>20,000	10	150	500	100	100	10,000	700	>20	.5	
A215	2,000	100	150	N	500	200	N	>1,000	>20	1	
A220	10,000	100	200	200	700	>200	2,000	>1,000	>20	>1	

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
					Panned concentrates--Continued									
A231	12- 9-24	---	N	10	500	L	70	700	50	150	2,000	N	20	100
A233	12- 9-24	---	N	10	700	1	70	700	50	100	2,000	N	30	150
A240	12- 9-15	---	N	L	300	L	100	700	50	200	2,000	5	70	100
A242	12- 9-15	---	N	L	700	1	70	1,000	50	20	1,500	N	20	150
A244	12- 9-16	---	N	10	300	L	70	500	50	150	2,000	5	30	100
A246	12- 9-16	---	N	10	300	L	70	700	50	50	2,000	5	70	100
A255	11-12-35	---	N	10	300	1.5	50	200	50	1,000	>5,000	30	300	50
A291	11-10- 4	---	N	10	300	1	50	100	50	200	3,000	10	150	100
A325	11-11-12	---	N	L	300	L	70	300	50	200	3,000	N	100	150
A392	14-11-34	---	N	10	500	L	70	300	50	150	3,000	N	50	100
A412	11-12-10	---	N	10	200	5	20	50	50	200	>5,000	50	500	10
A416	11-12- 2	---	N	10	300	2	5	20	15	150	5,000	30	200	N
A419	11-12- 2	---	N	L	50	3	10	20	30	500	>5,000	10	200	N
A421	11-12- 2	---	N	10	70	7	30	30	50	300	>5,000	50	500	N
A423	11-12- 2	---	N	10	200	1	30	50	30	300	>5,000	20	200	N
A455	11-12-10	---	N	10	200	N	50	100	50	500	5,000	5	100	N
A483	11-12-36	---	N	L	300	2	50	150	50	300	>5,000	30	500	10
A491	11-11-33	---	N	L	150	3	30	30	50	300	>5,000	20	500	N
A493	11-11-33	---	N	L	200	5	50	70	50	300	>5,000	30	300	10
A505	14-11-27	---	N	L	300	1	70	700	70	200	5,000	N	100	200
A507	14-11-27	---	N	L	200	L	100	300	50	300	3,000	N	100	50
A509	14-11-23	---	N	L	300	L	100	300	50	200	3,000	N	100	50
A513	14-11-23	---	N	L	300	L	100	300	50	300	3,000	N	70	70
A517	14-11-13	---	N	L	300	N	100	150	50	300	3,000	N	50	50
A519	14-11-13	---	N	L	300	N	150	200	50	300	3,000	N	100	70
A521	14-11-13	---	N	L	500	L	70	700	30	30	1,500	N	20	300
A524	14-11-27	---	N	L	300	N	150	300	50	300	3,000	N	100	100
A526	14-10- 9	---	N	L	300	L	100	100	50	300	2,000	N	100	50
A528	14-10- 9	---	N	L	300	L	100	100	50	150	3,000	N	70	50
A535	14-10-10	---	N	L	300	L	100	100	50	200	3,000	N	150	50
A537	14-10-10	---	N	L	300	L	70	70	50	200	2,000	N	100	20
A539	14-10-10	---	N	L	300	L	100	100	50	200	3,000	N	50	50
A552	16- 9-23	---	N	10	300	1	70	700	70	100	1,500	N	20	100
A554	16- 9-23	---	300.0	10	300	1	30	300	10,000	70	2,000	300	20	70
A556	16- 9-23	---	20	10	300	1	50	200	2,000	70	1,500	100	20	50
A558	16- 9- 1	---	N	L	300	2	70	200	50	300	2,000	N	50	50
A560	16- 9- 1	---	N	L	300	2	70	300	70	200	2,000	5	70	70
A570	13-10-33	<0.04	N	15	300	L	30	150	30	300	1,500	N	20	50
A596	14-10-20	L	N	10	300	N	30	1,000	50	>1,000	700	N	20	150
A600	14-11-25	N	N	L	300	N	30	700	30	70	700	N	15	200
A608	14-10-18	---	N	L	300	L	100	150	50	200	3,000	N	100	50
A610	14-10-18	---	N	L	300	N	150	100	50	500	3,000	N	100	50
A630	14-11-13	---	N	L	1,500	1	15	150	20	150	1,000	N	15	50
A632	14-11-13	---	N	L	1,500	L	15	500	30	30	700	N	15	70
A641	13- 8-19	.10	3	15	300	1.5	50	150	30	150	1,500	N	20	200
A643	13- 8-19	---	2,000	30	150	L	20	50	700	L	500	70	L	50
A644	13- 8-19	---	L	20	200	2	50	300	100	200	2,000	N	15	300
A646	13- 8-19	.20	>5,000	L	1,000	L	L	10	7,000	L	300	500	L	7
A648	13- 8-19	N	20	20	300	L	30	150	70	150	1,500	N	20	200
A650	13- 9-16	L	1	15	300	L	30	70	10	150	2,000	N	15	10
A652	13- 9-16	.02	5	30	500	L	30	100	50	150	1,000	N	30	50
A657	13- 9-16	L	L	30	300	L	30	200	30	200	1,000	N	20	50
A663	13- 9-15	L	N	30	300	1.5	30	150	30	300	1,500	N	20	50
A667	13- 9-23	L	N	30	700	L	30	150	30	150	700	N	20	50
A669	13- 9-23	---	N	10	1,000	1	10	70	30	200	700	L	30	30
A671	13- 9-23	L	N	30	300	1	20	150	30	300	1,500	N	30	20
A673	13- 9-24	L	N	30	300	1	30	150	30	300	1,500	N	30	10
A675	13- 9-24	L	N	30	500	L	20	500	30	150	700	N	30	70
A677	13- 9-24	---	N	15	500	L	20	700	50	150	700	10	20	70
A679	13- 9-24	<.01	N	30	300	L	30	300	50	300	1,000	N	20	50

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	(ppm) Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	(percent) Fe (0.05)	Ti (0.002)	Remarks
					Panned concentrates--Continued						
A231	20	70	100	300	1,000	70	N	N	>20.0	>1.0	
A233	30	20	30	100	1,000	70	N	>1,000	>20	>1	
A240	15	50	30	100	1,000	100	N	>1,000	>20	>1	
A242	10	10	10	500	700	20	N	500	20	>1	
A244	15	30	20	200	500	100	N	>1,000	>20	>1	
A246	10	50	10	150	700	50	1,000	1,000	>20	>1	
A255	30	100	150	N	500	>200	N	N	>20	>1	
A291	20	30	100	200	150	>200	N	>1,000	20	>1	
A325	10	50	100	200	200	200	N	>1,000	>20	>1	
A392	10	20	100	300	500	100	N	>1,000	>20	>1	
A412	10	70	300	N	100	>200	N	>1,000	>20	>1	
A416	15	20	50	L	50	200	N	>1,000	15	>1	
A419	30	50	70	N	100	>200	N	>1,000	>20	>1	
A421	10	70	700	N	100	>200	N	>1,000	>20	>1	
A423	20	70	200	N	100	>200	N	>1,000	>20	>1	
A455	10	70	500	N	500	>200	N	>1,000	>20	>1	
A483	15	100	300	N	200	>200	N	>1,000	>20	>1	
A491	15	70	700	N	100	>200	N	>1,000	>20	>1	
A493	20	70	500	N	200	>200	N	>1,000	>20	>1	
A505	20	30	50	150	500	200	N	>1,000	20	>1	
A507	L	50	20	N	700	150	N	>1,000	>20	>1	
A509	10	70	30	100	700	100	N	>1,000	>20	>1	
A513	10	30	20	100	700	100	N	>1,000	>20	>1	
A517	10	30	20	L	700	70	N	>1,000	>20	>1	
A519	L	30	20	L	1,000	100	N	>1,000	>20	>1	
A521	10	10	N	500	300	70	N	700	15	1	
A524	L	30	20	L	1,000	100	N	>1,000	>20	>1	
A526	10	30	20	100	1,000	100	N	>1,000	>20	>1	
A528	L	20	20	100	700	70	N	>1,000	>20	>1	
A535	L	30	20	100	700	100	N	>1,000	>20	>1	
A537	15	20	15	150	500	100	N	>1,000	>20	>1	
A539	L	20	15	150	700	70	N	>1,000	>20	>1	
A552	100	20	N	150	1,000	50	N	1,000	>20	>1	
A554	20,000	15	N	200	300	30	10,000	1,000	20	1	
A556	10,000	10	20	300	200	50	1,000	>1,000	>20	1	50 ppm Cd.
A558	100	15	10	N	1,000	200	N	>1,000	>20	>1	
A560	100	20	50	N	700	200	N	>1,000	>20	>1	
A570	L	70	N	150	150	150	500	>1,000	20	>1	
A596	L	70	N	100	150	100	300	300	20	>1	
A600	L	20	N	200	150	30	300	300	15	1	
A608	20	20	20	L	700	100	N	>1,000	>20	>1	
A610	L	30	15	L	1,000	150	N	>1,000	>20	>1	
A630	15	30	N	300	100	50	200	1,000	15	>1	
A632	15	30	N	700	150	20	200	30	15	>1	
A641	3,000	70	15	300	300	70	500	>1,000	20	>1	30 ppm Cd.
A643	>20,000	7	N	150	70	10	2,000	L	15	.15	50 ppm Cd.
A644	1,500	>100	20	200	300	100	500	>1,000	>20	>1	<20 ppm Cd.
A646	>20,000	5	N	200	50	L	>10,000	50	7	.15	150 ppm Cd.
A648	1,500	50	30	300	300	70	700	500	20	>1	<20 ppm Cd.
A650	70	30	15	200	150	50	300	200	15	>1	Do.
A652	150	30	15	200	300	100	700	>1,000	>20	>1	Do.
A657	70	>100	20	L	700	150	300	>1,000	>20	>1	
A663	50	70	20	L	300	100	700	>1,000	>20	>1	
A667	50	30	10	300	100	70	500	700	20	>1	Do.
A669	70	30	L	700	100	70	N	>1,000	15	>1	Do.
A671	70	50	20	300	300	100	500	>1,000	>20	>1	
A673	70	70	20	200	500	100	700	1,000	>20	>1	
A675	30	30	L	300	700	150	500	300	>20	>1	
A677	70	70	L	300	300	100	300	1,000	20	>1	10 ppm Cd.
A679	70	>100	20	300	700	150	500	>1,000	>20	>1	<20 ppm Cd.

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
						Panned concentrates--Continued								
A682	13- 9-24	L	N	15	300	L	7	150	15	20	500	15	15	70
A684	13- 9-28	<0.04	N	30	500	L	20	150	30	70	1,000	N	L	30
A686	13- 9-28	<.04	N	30	300	L	15	100	30	300	700	N	20	20
A688	13- 9-28	<.01	N	50	300	L	20	100	30	100	1,000	N	20	30
A690	13- 9-28	.02	N	30	1,000	1	20	70	30	150	1,500	N	30	10
A723	13- 9-18	---	N	30	300	L	30	150	30	150	1,500	N	20	30
A725	13- 9- 7	.10	N	70	500	L	50	200	30	150	1,000	N	20	70
A727	13- 9- 7	<.01	N	30	500	L	30	100	50	150	1,500	N	15	20
A729	12-10-36	<.01	N	15	500	L	15	300	50	300	1,000	N	20	30
A731	12-10-35	.10	N	15	500	L	15	100	30	300	1,500	N	30	30
A733	12-10-36	<.04	N	L	700	L	10	500	70	70	700	N	30	100
A735	13- 9- 6	<.04	N	30	500	L	30	300	50	200	1,500	N	20	70
A738	13-10- 1	L	N	50	500	L	20	150	30	150	1,000	N	30	50
A740	13-10- 1	<.04	N	30	500	L	30	200	30	150	1,500	N	20	70
A743	13- 9- 7	<.04	N	30	500	L	30	150	30	200	1,500	N	15	50
A745	13- 9- 7	.03	N	50	500	L	50	300	30	500	1,000	N	20	50
A747	13- 9- 6	.04	N	15	1,000	L	20	700	70	150	1,000	N	15	100
A750	13- 9- 7	L	N	50	500	L	30	150	30	200	1,000	N	30	30
A756	13- 9- 7	L	N	30	700	L	50	100	30	100	700	N	20	30
A767	13- 9-30	<.04	N	20	700	N	30	150	30	100	1,000	N	30	30
A769	13- 9-30	.03	N	30	300	L	50	100	20	70	3,000	N	L	20
A772	13- 9-19	.10	N	10	1,000	L	20	70	20	150	1,000	N	20	30
A774	13- 9-19	L	N	L	700	L	15	50	30	150	1,000	N	20	10
A776	13- 9-32	.02	N	L	300	L	20	100	30	100	3,000	N	15	20
A780	14- 9- 4	.02	N	L	700	L	15	70	30	150	3,000	N	20	15
A782	14- 9- 4	.02	N	20	700	L	30	70	30	70	5,000	N	20	15
A786	14- 9- 9	.02	N	20	300	L	20	70	50	100	5,000	N	15	20
A788	14- 9- 9	L	N	30	300	L	50	150	50	50	3,000	N	20	50
A789	13- 9-33	L	N	30	300	L	30	70	30	300	3,000	N	20	15
A790	13- 9-33	L	N	10	300	L	20	70	30	500	2,000	N	10	15
A795	14- 9- 8	.03	N	15	500	L	50	150	30	500	2,000	N	L	20
A797	14- 9- 8	L	N	30	300	L	70	150	30	70	2,000	N	30	30
A802	13-10-13	<.04	N	30	700	L	70	50	30	150	1,000	N	30	30
A804	13-10-13	<.04	N	L	700	L	15	70	30	150	1,000	N	20	15
A806	13-10-13	<.04	N	20	700	N	20	70	50	100	2,000	N	20	L
A808	13- 9-30	N	N	15	700	L	20	150	70	100	2,000	N	30	10
A810	13- 9-30	N	N	50	700	L	30	70	30	100	2,000	N	30	10
A812	13- 9-30	N	N	15	700	N	20	150	30	70	2,000	N	15	10
A814	13- 9-28	---	N	30	500	1.5	15	70	30	150	1,500	N	15	20
A816	13- 9-28	L	N	30	300	L	30	150	30	150	2,000	N	30	10
A818	13- 9-20	L	N	30	700	L	30	100	50	30	1,500	N	15	10
A824	14- 9-19	L	N	30	500	L	30	100	30	70	2,000	N	15	30
A826	14- 9-19	.03	N	30	500	L	70	150	30	150	3,000	N	30	50
A833	14- 9-18	.02	N	L	700	L	15	300	20	20	1,500	N	15	50
A835	14- 9-18	.03	N	20	500	L	30	300	30	30	1,500	N	30	100
A842	14- 9- 7	N	N	L	700	L	15	150	30	30	1,000	N	20	30
A844	14- 9- 7	.02	N	L	500	L	20	70	20	150	2,000	N	L	15
A847	14- 9- 7	.03	N	L	300	1	30	150	50	200	3,000	N	30	30
A849	14- 9- 7	.02	N	L	500	L	15	200	30	100	2,000	N	30	20
A851	14- 9- 7	N	N	L	700	N	15	150	50	100	2,000	N	30	30
A853	14- 9- 7	N	N	30	700	L	50	500	30	30	1,500	N	10	150
A859	14- 9- 6	.03	N	15	300	L	15	150	30	150	2,000	N	30	30
A861	14- 9- 6	.02	N	L	700	L	15	150	30	150	1,500	N	30	20
A866	12- 9-31	.04	N	30	300	L	30	300	30	100	1,500	N	30	70
A869	12- 9-31	.08	N	20	500	L	20	300	50	100	1,500	N	30	70
A871	12- 9-31	---	N	20	300	1.5	20	1,000	30	300	2,000	N	30	100
A873	12- 9-31	---	N	L	500	L	10	700	20	100	1,000	N	20	70
A875	12- 9-30	---	N	10	300	L	15	1,500	70	200	1,500	N	30	300
A878	12- 9-32	---	N	30	300	L	30	500	30	70	1,500	N	30	150
A880	12- 9-19	.06	N	L	1,000	L	10	300	30	1,000	1,500	N	15	70

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	Remarks
	(ppm)								(percent		
					Panned concentrates--Continued						
A682	70	15	N	300	70	300	N	150	7.0	0.5	
A684	30	50	L	300	500	150	300	300	>20	>1	10 ppm Cd.
A686	30	30	N	300	500	100	300	200	>20	>1	<20 ppm Cd.
A688	50	50	L	150	500	70	300	300	>20	>1	Do.
A690	50	50	30	300	200	100	300	700	20	>1	Do.
A723	30	50	20	300	300	70	300	200	>20	>1	Do.
A725	30	30	15	300	300	50	700	300	>20	>1	
A727	20	50	15	300	200	70	700	300	>20	>1	
A729	30	50	10	500	150	200	300	300	15	>1	
A731	30	50	20	300	150	150	500	300	20	>1	
A733	30	30	N	500	150	50	L	300	10	>1	
A735	20	70	15	300	200	70	700	300	>20	>1	
A738	15	30	15	300	200	100	700	300	>20	>1	
A740	15	50	20	200	150	70	700	300	>20	>1	10 ppm Cd.
A743	15	50	15	150	200	150	700	300	>20	>1	<20 ppm Cd.
A745	20	50	10	200	300	70	700	300	>20	>1	
A747	30	70	10	500	300	150	300	500	20	>1	
A750	50	30	20	200	300	100	700	300	>20	>1	<20 ppm Cd.
A756	70	30	15	300	300	70	500	300	20	>1	Do.
A767	30	50	L	300	300	70	200	200	20	>1	Do.
A769	15	150	N	200	500	30	300	300	20	>1	
A772	30	70	30	500	150	200	L	>1,000	15	>1	
A774	20	30	N	300	150	70	L	300	15	>1	
A776	10	150	N	300	200	70	N	300	10	>1	
A780	20	150	N	300	300	50	N	700	15	>1	
A782	30	100	N	300	500	30	L	300	20	>1	
A786	20	150	N	300	300	100	L	700	20	>1	
A788	15	200	N	N	500	70	300	700	>20	>1	
A789	30	100	N	200	300	150	200	500	20	>1	
A790	30	150	N	300	200	100	L	700	15	>1	
A795	20	150	N	300	300	100	300	300	>20	>1	
A797	20	150	N	300	500	70	300	700	>20	>1	20 ppm Cd.
A802	15	50	10	300	500	70	500	500	>20	>1	
A804	30	20	N	300	300	30	L	300	15	>1	
A806	30	20	15	300	300	50	300	300	20	>1	
A808	20	30	N	300	200	50	L	300	15	>1	
A810	20	50	10	300	500	150	700	700	>20	>1	10 ppm Cd.
A812	30	30	10	300	300	70	300	300	15	>1	<20 ppm Cd.
A814	50	70	N	300	300	100	200	>1,000	20	>1	10 ppm Cd.
A816	50	50	10	300	700	150	300	300	>20	>1	15 ppm Cd.
A818	30	30	L	200	300	70	300	300	>20	>1	Do.
A824	20	50	N	300	500	50	300	300	20	>1	
A826	20	100	N	200	500	70	500	300	>20	>1	20 ppm Cd.
A833	10	50	N	500	150	30	L	200	15	.7	
A835	L	100	N	300	100	30	300	150	20	>1	
A842	15	70	N	300	100	50	L	500	15	>1	
A844	15	100	N	300	150	30	L	300	15	>1	
A847	20	200	N	150	300	150	200	>1,000	20	>1	
A849	20	70	N	300	100	70	L	300	15	>1	
A851	20	30	10	200	150	100	300	1,000	15	>1	
A853	15	20	N	700	200	30	300	500	>20	>1	
A859	20	50	10	150	200	150	300	700	15	>1	
A861	30	30	L	300	150	70	200	500	15	>1	
A866	50	30	10	200	300	70	700	500	20	>1	
A869	30	30	L	150	300	70	500	1,000	15	>1	
A871	10	100	20	100	300	150	500	>1,000	20	>1	
A873	20	20	N	300	150	50	200	300	15	>1	
A875	10	30	L	300	200	70	200	300	15	>1	
A878	30	50	10	200	500	70	500	700	20	>1	
A880	30	50	15	500	70	150	L	300	15	>1	

TABLE 7.—*Analyses of samples from the Black*

		Atomic absorption (ppm)	Semiquantitative spectrographic analyses (ppm)											
Sample	T. R. S. (pl. 2)	Au (0.02)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
			Panned concentrates--Continued											
A882	12- 9-19	---	N	L	700	L	10	700	50	200	1,500	N	15	50
A884	12- 9-30	---	N	15	1,000	L	10	150	30	200	1,000	N	30	20
A887	12- 9-30	---	N	L	700	L	7	150	30	150	1,000	N	15	10
A890	12- 9-30	---	N	15	700	1	15	500	50	300	1,000	N	30	70
A893	13- 9- 4	---	N	15	500	1.5	15	300	30	150	1,000	N	15	50
A894	13- 9- 3	---	N	15	300	1	15	300	30	150	1,500	N	15	50
A895	13- 9- 3	N	N	30	500	L	50	700	150	500	3,000	N	15	70
A897	13- 8- 6	---	N	15	500	L	15	700	30	150	1,000	N	20	50
A903	12- 9-29	---	N	20	3,000	L	10	70	30	500	2,000	5	30	10
A905	12- 9-32	---	N	10	500	L	7	150	30	200	3,000	7	30	10
A907	12- 9-33	---	N	L	1,500	L	L	30	20	150	1,500	10	30	L
A911	12- 9-36	.06	N	10	1,000	L	20	700	30	L	1,000	N	L	70
A913	12- 9-36	---	N	20	2,000	L	50	2,000	30	300	1,500	N	L	150
A915	12- 9-35	.07	N	15	300	L	30	500	30	200	1,000	N	15	50
A917	12- 9-23	---	N	L	3,000	2	L	700	30	70	5,000	10	30	15
A919	12- 9-23	---	N	20	700	1	20	2,000	50	50	1,000	N	20	300
A921	12- 9-22	---	N	L	1,500	1.5	L	15	15	30	700	7	15	15
A923	12- 9-22	---	N	L	2,000	3	L	15	10	70	>5,000	20	20	5
A925	12- 9-18	---	.5	L	700	L	7	150	30	300	1,500	L	10	10
A927	12- 8-31	.02	N	L	700	L	10	500	30	30	700	N	10	70
A930	12- 8-31	.03	N	20	500	N	20	300	50	L	2,000	N	15	70
A935	12- 9-36	.04	N	10	700	L	7	700	30	100	1,500	N	10	70
A937	12- 8-31	.02	N	20	300	L	15	500	50	150	3,000	N	15	70
A939	12- 9-25	.03	N	L	1,500	L	15	700	30	100	2,000	N	15	70
A941	12- 9-18	---	N	L	1,000	L	10	1,500	30	100	2,000	N	10	30
A943	12- 9-18	.02	N	L	1,000	L	10	300	30	150	1,500	N	20	70
A945	12- 9-18	---	N	10	1,000	L	10	300	30	200	700	N	15	70
A952	12- 9-18	N	N	L	700	L	5	150	15	700	500	N	L	10
A956	12- 9-17	.02	.5	L	1,000	L	15	700	50	30	1,000	N	10	70
A958	12- 9-17	.02	N	L	2,000	L	10	200	30	30	700	N	L	50
A960	12- 9- 8	---	N	20	700	L	15	500	30	30	700	N	L	50
A965	12- 9- 7	.02	N	L	1,000	L	15	300	50	20	700	N	10	30
A970	12- 9-22	---	N	30	500	5	15	300	50	300	3,000	N	30	100
A972	12- 9-27	---	N	L	700	1.5	N	15	30	30	700	15	20	L
A979	12- 9-22	.04	N	15	1,000	1	L	10	10	70	500	10	20	N
A982	12- 9-22	---	N	20	>5,000	1.5	5	70	15	50	2,000	15	30	L
A984	12- 9-22	---	N	10	>5,000	1.5	L	30	30	100	1,500	15	20	L
A988	12- 9-22	---	N	10	>5,000	L	N	20	7	30	200	5	15	L
Z009	13-11- 9	.02	N	30	300	L	15	150	150	300	>5,000	7	L	15
Z011	13-11- 9	N	N	20	700	N	50	200	100	150	3,000	N	L	30
Z013	13-11- 9	.02	N	10	1,000	L	15	300	150	150	2,000	N	30	70
Z019	13-11-15	.02	N	20	700	L	30	500	100	200	3,000	N	20	70
Z024	13-11- 8	---	N	15	1,000	L	20	150	100	150	5,000	N	20	L
Z026	13-11- 8	N	N	15	500	L	15	200	100	200	3,000	N	15	20
Z028	13-10-16	.02	N	15	700	L	30	150	100	300	2,000	N	30	15
Z030	13-10-16	N	N	20	700	L	30	200	150	300	3,000	N	20	15
Z032	13-10-20	.02	N	15	700	L	30	200	100	300	3,000	N	15	15
Z034	13-10-17	.02	N	15	300	L	30	200	100	500	3,000	15	50	100
Z036	13-10-18	.02	N	30	500	L	70	200	50	30	1,500	N	20	70
Z038	13-10-18	.04	.5	L	700	L	15	150	50	100	1,000	7	30	70
Z041	13-10- 8	---	N	30	500	1.5	5	70	70	150	3,000	20	100	L
Z047	13-10-18	.02	N	70	1,000	N	70	200	30	150	5,000	N	20	50
Z050	13-11-13	.1	N	30	500	1.5	70	300	50	150	1,500	N	20	70
Z053	13-11-14	N	N	20	300	L	70	300	50	200	2,000	N	20	70
Z055	13-11-14	N	N	30	700	L	70	700	50	200	2,000	N	20	70
Z057	13-11-14	.1	N	20	700	N	50	200	50	150	3,000	N	30	30
Z059	13-10- 7	.04	N	30	200	L	20	150	100	300	>5,000	20	30	L
Z061	13-10- 7	---	N	30	30	L	7	70	100	200	>5,000	15	150	L
Z068	13-11-12	.04	N	30	200	L	15	150	100	300	>5,000	15	100	L
Z070	13-11-12	---	N	30	300	L	15	70	100	300	>5,000	7	70	L

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (ppm) (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (percent) (0.05)	Ti (0.002)	Remarks
				Panned concentrates--Continued							
A882	30	30	N	300	100	70	L	300	15.0	>1.0	
A884	20	30	N	500	150	70	L	300	15	>1	
A887	30	20	N	300	100	70	L	300	15	>1	
A890	30	70	L	300	100	100	L	700	15	>1	
A893	30	70	N	300	150	100	L	>1,000	15	>1	
A894	30	50	N	200	200	100	300	>1,000	20	>1	
A895	20	30	30	700	300	150	500	700	20	>1	
A897	30	70	N	300	300	70	L	300	15	>1	
A903	30	70	50	100	100	150	300	700	15	>1	
A905	30	30	20	L	100	150	300	500	15	>1	
A907	20	15	20	100	50	70	200	300	7	.7	
A911	30	30	N	300	300	30	L	150	15	>1	
A913	30	20	15	300	300	30	500	200	20	>1	
A915	20	30	L	300	200	70	700	300	20	>1	
A917	100	20	N	N	70	100	L	>1,000	10	>1	
A919	50	15	N	150	300	70	700	>1,000	15	>1	
A921	30	15	N	N	15	50	N	>1,000	3	.3	
A923	70	15	N	100	20	70	L	700	7	.5	
A925	30	30	N	300	70	150	N	1,000	7	>1	
A927	20	20	N	300	200	30	L	300	15	1	
A930	20	30	N	300	200	30	300	200	20	>1	
A935	30	30	N	300	100	30	200	500	15	>1	
A937	15	30	N	300	300	50	300	300	20	>1	
A939	15	20	N	500	300	30	L	200	15	>1	
A941	15	20	N	300	70	100	200	200	15	>1	
A943	30	30	N	300	150	150	N	700	15	>1	
A945	20	50	N	300	100	150	N	>1,000	15	>1	
A952	20	15	N	500	70	50	N	150	3	.5	
A956	20	30	N	500	200	20	N	150	10	1	
A958	15	20	N	500	50	20	N	150	7	.7	
A960	20	30	N	300	300	20	L	100	15	1	
A965	15	30	N	700	100	20	L	1,000	10	.7	
A970	70	>100	20	N	100	>200	700	>1,000	20	>1	
A972	150	15	N	N	30	30	L	200	7	.5	
A979	30	10	N	L	20	30	N	300	3	.3	
A982	70	50	N	L	70	100	200	>1,000	15	>1	
A984	150	30	N	L	70	200	N	>1,000	15	>1	
A988	70	15	N	100	50	70	N	300	5	.7	
Z009	30	100	150	N	70	>200	700	>1,000	>20	>1	
Z011	L	70	20	L	300	>200	700	700	>20	>1	
Z013	30	20	N	1,500	150	100	300	>1,000	15	>1	
Z019	L	70	100	500	300	100	700	>1,000	>20	>1	
Z024	70	>100	30	L	150	>200	700	>1,000	>20	>1	
Z026	15	70	30	300	150	150	500	>1,000	20	>1	
Z028	10	70	20	300	150	70	700	>1,000	>20	>1	
Z030	10	70	20	300	150	70	700	>1,000	>20	>1	
Z032	L	100	20	300	200	100	700	>1,000	>20	>1	
Z034	10	>100	30	L	150	150	700	>1,000	>20	>1	
Z036	10	20	30	150	200	70	700	300	>20	>1	
Z038	30	15	10	300	70	70	L	300	10	>1	
Z041	30	50	100	L	70	200	700	>1,000	20	>1	
Z047	10	50	15	200	200	100	700	1,000	>20	>1	
Z050	15	70	20	150	150	100	700	>1,000	>20	>1	
Z053	15	70	30	150	100	>200	700	1,000	>20	>1	
Z055	15	70	20	200	300	150	700	700	>20	>1	
Z057	20	70	30	500	100	>200	500	700	>20	>1	
Z059	70	70	70	N	70	>200	1,500	>1,000	>20	>1	
Z061	30	>100	100	N	10	200	1,000	>1,000	>20	>1	
Z068	20	70	150	N	150	200	1,000	>1,000	>20	>1	
Z070	30	70	70	N	100	>200	700	>1,000	>20	>1	

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
			Panned concentrates--Continued											
Z073	13-11-12	0.1	N	30	200	L	15	150	70	300	>5,000	7	50	15
Z075	13-11-12	<.1	N	50	200	L	20	70	150	300	>5,000	7	100	L
Z079	13-11-11	---	N	30	200	N	15	150	100	300	>5,000	15	150	L
Z081	13-11-11	---	N	30	1,500	L	30	300	100	200	5,000	N	30	70
Z133	13-11-23	N	N	L	500	N	20	700	70	150	2,000	N	20	150
Z136	13-11-23	.1	N	10	700	N	20	300	50	300	>5,000	N	15	50
Z162	13-11- 4	N	N	30	500	L	20	150	30	300	>5,000	N	15	15
Z170	13-11- 3	N	N	20	200	N	20	200	30	500	3,000	N	20	20
Z172	13-10-16	N	N	N	500	N	70	150	20	L	2,000	N	L	50
Z175	13-10-15	N	N	N	300	L	70	150	20	150	3,000	N	10	30
Z177	13-10-15	N	N	N	300	L	50	150	30	150	3,000	N	L	20
Z187	13-10-16	N	N	N	500	L	70	150	30	150	2,000	7	10	20
Z205	14-11- 9	---	N	N	200	L	10	300	30	200	>5,000	10	50	70
Z207	14-11- 9	---	N	N	200	L	30	1,000	30	200	5,000	15	70	150
Z212	14-11- 4	---	N	N	150	L	15	150	30	300	5,000	15	50	70
Z223	12-10-21	N	N	N	30	L	N	30	30	150	3,000	N	50	N
Z225	12-10-21	N	N	N	700	L	10	500	50	100	3,000	20	20	30
Z227	12-10-28	---	N	N	50	L	5	70	30	200	3,000	N	50	N
Z230	12-10-20	N	N	N	500	L	7	20	20	70	3,000	N	20	N
Z232	12-10-29	N	N	N	1,000	L	10	15	20	50	3,000	N	10	N
Z269	13-10- 5	N	N	30	20	1	10	20	100	150	5,000	N	70	5
Z272	13-10- 5	N	N	20	50	1	70	30	50	100	5,000	N	50	10
Z277	12-12-14	N	N	30	50	1.5	100	500	50	150	5,000	N	70	50
Z279	12-11-31	N	N	20	200	1	100	100	30	100	5,000	N	50	30
Z282	15-10-17	N	N	30	200	1	100	150	50	150	3,000	N	50	70
Z284	15-10-17		N	20	150	1	70	100	20	70	3,000	N	50	50
Z304	14-10-36	N	N	20	150	1	70	150	20	20	5,000	N	50	100
Z306	14-10-36	N	N	20	100	2	100	100	20	20	5,000	N	70	100
Z310	15- 9- 6	N	N	30	100	1	70	100	20	30	3,000	N	50	50
Z313	15- 9- 6	N	N	50	150	5	70	100	50	50	5,000	N	50	50
Z315	15- 9- 6	N	N	50	150	3	100	300	70	30	>5,000	N	50	100
Z324	15-10-13	N	N	30	500	2	70	200	70	20	5,000	N	30	50
Z325	15-10-13	N	N	30	300	5	70	100	50	50	>5,000	N	70	50
Z341	16-10-21	L	N	10	500	L	100	200	10	500	>5,000	N	150	20
Z356	11-11-26	L	N	10	500	2	100	300	20	500	>5,000	10	200	20
Z360	11-10-31	L	N	10	700	2	100	500	20	200	>5,000	10	200	20
Z362	11-10-31	L	N	10	500	3	50	200	10	500	>5,000	10	200	15
Z374	11-10-35	L	N	10	1,000	1	100	150	10	500	5,000	7	200	15
Z422	16-10- 3	L	N	10	1,000	L	150	200	5	200	>5,000	N	70	30
Z424	16-10- 3	L	N	10	700	L	150	200	10	300	>5,000	N	100	20
Z428	16-10-22	L	N	10	1,000	L	150	300	10	200	>5,000	N	100	30
Z442	16-10-22	L	N	10	700	L	150	500	10	200	>5,000	N	100	50
Z452	16-10-12	L	N	10	700	L	150	200	10	300	>5,000	N	100	30
Z455	16- 9- 7	L	N	10	700	L	150	300	10	200	>5,000	N	100	50
Z457	16- 9-18	L	N	10	1,000	L	150	300	10	200	>5,000	N	100	30
Z471	16- 9- 6	L	N	10	2,000	L	100	300	10	150	5,000	N	70	50
Z473	16- 9- 7	L	N	L	3,000	1	150	150	20	100	3,000	N	100	50
Z476	16- 9- 7	L	N	10	1,500	1	70	150	10	150	>5,000	N	100	20
Z479	16- 9- 7	L	N	N	300	L	100	300	20	200	5,000	N	50	50
X049	14- 9-33	<.1	N	L	700	L	30	100	10	200	2,000	N	30	20
X101	14- 9-33	L	N	10	300	L	70	150	10	200	3,000	N	50	30
X103	14- 9-34	<.04	N	10	700	L	30	100	L	150	2,000	N	30	20
X116	14- 8-31	<.04	N	10	1,000	1	50	150	10	150	3,000	N	30	50
X118	14- 8-31	<.04	N	L	1,000	1	70	150	10	150	2,000	N	30	30
X122	14- 9-36	<.04	N	10	1,500	1	30	100	15	100	2,000	N	20	20
X124	14- 9-36	L	N	10	200	1	70	150	10	70	3,000	N	50	30
X126	14- 9-25	L	N	L	1,000	L	30	100	10	100	2,000	N	20	20
X128	14- 9-25	<.04	N	10	1,500	1	30	150	10	70	2,000	N	20	30
X261	15- 9-26	---	20.0	N	500	N	70	150	50	100	2,000	N	30	50
X284	15- 9-34	.04	N	N	500	L	50	150	15	100	2,000	N	50	50

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	Remarks
	(ppm)								(percent)		
	Panned concentrates--Continued										
Z073	20	70	100	N	150	>200	700	>1,000	>20.0	>1.0	
Z075	15	>100	300	N	100	>200	1,000	>1,000	>20	>1	
Z079	15	100	100	N	70	>200	700	>1,000	>20	>1	
Z081	10	100	70	700	200	>200	500	>1,000	>20	>1	
Z133	L	20	15	300	150	150	300	700	>20	>1	
Z136	15	30	20	500	150	>200	700	300	>20	>1	
Z162	30	30	70	700	70	>200	700	200	>20		
Z170	L	30	50	N	100	>200	500	500	15	>1	
Z172	N	15	N	300	150	50	700	500	>20	>1	
Z175	N	15	50	300	150	50	700	>1,000	>20	>1	
Z177	7	15	70	N	200	70	700	1,000	>20	>1	
Z187	N	20	300	N	200	50	700	700	>20	>1	
Z205	10	20	30	N	70	>200	700	>1,000	>20	>1	
Z207	N	20	20	150	100	>200	1,000	>1,000	>20	>1	
Z212	N	15	70	N	50	>200	1,500	>1,000	>20	>1	
Z223	15	15	30	200	20	>200	500	700	20	>1	
Z225	20	30	N	700	70	>200	300	>1,000	15	>1	
Z227	20	15	N	N	50	>200	700	1,000	>20	>1	
Z230	20	15	N	700	70	70	300	700	15	>1	
Z232	20	15	N	700	100	50	300	700	15	>1	
Z269	20	100	70	N	20	>200	1,500	>1,000	>20	>1	
Z272	30	100	10	100	700	200	1,000	>1,000	>20	>1	
Z277	10	100	50	N	700	200	1,000	>1,000	>20	>1	
Z279	15	50	100	N	1,000	100	1,000	>1,000	>20	>1	
Z282	15	30	N	100	700	70	500	>1,000	>20	>1	
Z284	10	20	N	L	1,000	70	500	>1,000	>20	>1	
Z304	10	20	N	N	1,000	70	500	>1,000	>20	>1	
Z306	10	20	N	N	1,000	70	300	>1,000	>20	>1	
Z310	15	20	N	N	700	50	300	>1,000	>20	>1	
Z313	30	50	N	N	1,000	50	1,000	>1,000	>20	>1	
Z315	15	50	N	N	1,500	100	1,000	>1,000	>20	>1	
Z324	30	30	N	200	700	50	500	>1,000	20	>1	
Z325	20	30	N	100	1,500	70	700	>1,000	>20	>1	
Z341	30	20	N	100	1,000	>200	1,500	>1,000	>20	>1	
Z356	50	50	100	N	1,000	>200	2,000	>1,000	>20	>1	
Z360	70	50	50	100	1,000	200	2,000	>1,000	>20	>1	
Z362	70	50	200	N	300	>200	1,500	>1,000	>20	>1	
Z374	70	50	50	200	200	>200	200	>1,000	20	>1	
Z422	30	50	N	100	2,000	200	2,000	>1,000	>20	>1	
Z424	50	50	N	N	2,000	100	2,000	>1,000	>20	>1	
Z428	50	50	N	100	2,000	200	2,000	>1,000	>20	>1	
Z442	50	50	N	N	2,000	70	2,000	>1,000	>20	>1	
Z452	50	70	N	L	2,000	200	1,500	>1,000	>20	>1	
Z455	50	100	N	N	2,000	100	2,000	>1,000	>20	>1	
Z457	50	50	N	150	2,000	100	1,500	>1,000	>20	>1	
Z471	70	20	N	1,000	1,500	100	500	700	>20	>1	
Z473	70	15	N	1,000	500	100	200	500	20	>1	
Z476	100	20	N	200	1,000	100	500	1,000	>20	>1	
Z479	50	20	N	100	1,000	100	1,000	>1,000	>20	>1	
X049	50	15	N	300	300	150	N	>1,000	1	1	
X101	30	20	N	150	700	150	N	>1,000	>20	>1	
X103	50	10	N	500	700	150	N	1,000	>20	>1	
X116	30	10	N	500	500	100	N	1,000	>20	1	
X118	20	10	N	300	500	150	N	>1,000	>20	>1	
X122	30	10	N	300	300	100	N	700	>20	>1	
X124	20	10	N	300	500	70	N	>1,000	>20	>1	
X126	20	5	N	500	300	70	N	1,000	15	1	
X128	30	5	N	300	500	70	N	1,000	20	>1	
X261	70	30	30	100	500	100	300	700	20	>1	
X284	50	20	20	200	500	70	300	1,000	>20	>1	

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm)	Semiquantitative spectrographic analyses (ppm)											
		Au (0.02)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
					Panned concentrates--Continued									
X429	13-11-36	0.02	N	L	700	N	50	1,000	30	70	1,000	N	20	100
X434	13-11-36	.04	N	L	700	N	50	1,000	30	20	1,000	N	20	100
X436	13-11-36	L	N	N	700	N	50	700	20	150	1,500	N	15	70
X501	12-11- 3	.04	N	10	100	3	N	N	L	70	2,000	7	200	L
X503	12-11- 3	.04	N	10	100	3	N	N	L	70	1,000	10	100	L
X505	11-11-34	.04	N	10	100	7	N	N	5	20	1,500	10	150	L
X529	11-10-30	.04	N	10	10	50	N	N	L	L	2,000	30	300	L
C181	11- 8-20	---	0.7	30	500	L	50	700	100	50	1,500	N	20	50
C182	11- 8-20	---	.5	50	500	1	20	200	100	70	1,500	5	10	20
C183	11- 8-20	---	1	L	500	2	100	700	150	200	2,000	N	50	200
C184	11- 8-20	---	N	L	300	1	100	700	100	200	1,500	N	30	100
C185	11- 8-20	---	.5	L	300	1	70	500	150	100	1,500	N	20	70
C186	11- 8-20	---	N	L	300	2	70	700	100	100	1,500	N	10	100
C187	11- 8-20	---	1.5	L	300	1	70	700	200	100	1,500	N	30	100
C188	11- 8-19	---	1	50	200	2	50	300	100	100	2,000	5	20	30
C189	11- 8-19	---	50	L	500	L	100	1,000	500	200	2,000	N	50	200
C190	11- 8-19	---	2	50	300	1	70	500	100	100	2,000	N	20	100
C191	11- 8-19	---	1	L	500	L	100	1,000	200	200	2,000	N	70	200
C192	11- 8-19	---	7	50	300	1	70	500	1,000	20	1,500	N	10	50
C193	11- 8-19	---	20	L	700	L	100	1,500	200	200	2,000	N	50	200
C194	11- 8-19	---	15	L	500	1	70	500	150	100	2,000	N	20	50
C195	11- 8-19	---	.5	L	700	1	70	1,000	500	200	2,000	N	50	150
C196	11- 8-19	---	N	L	200	1	70	300	150	100	1,500	N	20	100
C197	11- 8-19	---	N	L	700	L	100	1,500	200	200	2,000	N	50	200
C198	11- 8-19	---	1	L	300	L	50	150	100	100	2,000	N	15	50
C199	11- 9-19	---	20	L	150	L	100	200	1,000	500	3,000	N	50	200
C200	11- 9-19	---	30	L	200	N	70	1,000	150	50	2,000	N	10	150
C201	11- 9-19	---	200	L	200	L	100	1,000	2,000	500	200	N	70	200
C202	11- 9-19	---	N	L	300	N	100	500	150	500	2,000	N	100	200
C203	11- 9-19	---	100	L	300	N	100	1,500	2,000	500	2,000	N	70	200
C204	11- 9-19	---	10	L	300	N	100	1,000	500	50	1,000	10	20	150
C205	11- 9-19	---	20	L	300	N	100	700	200	200	2,000	N	100	150
C206	11- 9-20	---	50	L	300	L	100	1,000	1,000	500	5,000	N	100	200
C207	11- 9-20	---	1	L	1,000	L	150	300	100	100	3,000	N	100	150
C208	11- 9-20	---	100	70	200	1	70	700	500	200	2,000	N	70	100
C209	11- 9-20	---	10	L	700	L	100	1,000	200	100	3,000	N	100	200
C210	11- 9-20	---	70	L	200	L	100	700	300	200	5,000	N	100	200
C211	11- 9-20	---	50	L	700	N	150	1,000	1,000	150	5,000	N	50	70
C212	11- 9-20	---	5	L	500	N	150	1,000	500	200	>5,000	N	70	150
C213	11- 9-20	---	5	L	500	N	100	2,000	300	200	5,000	N	30	200
C214	11- 9-21	---	70	L	200	N	100	1,000	500	200	>5,000	N	70	200
C215	11- 9-21	---	.5	L	300	N	100	1,500	100	300	>5,000	N	50	200
C216	11- 9-21	---	10	L	200	N	150	2,000	1,000	200	>5,000	N	70	200
C217	11- 9-21	---	1.5	L	700	N	100	1,500	100	500	>5,000	N	200	200
C218	11- 9-22	---	7	L	300	N	100	1,500	500	500	>5,000	N	30	200
C219	11- 9-22	---	2	L	500	N	100	1,000	150	500	>5,000	20	500	200
C220	11- 9-22	---	10	L	300	L	100	1,000	700	300	>5,000	N	30	150
C221	11- 9-22	---	1.5	L	300	L	150	3,000	200	100	2,000	N	20	300
C222	11- 9-23	---	1	L	300	L	100	1,500	200	100	5,000	N	30	150
C223	11- 9-23	---	2	L	300	N	150	2,000	200	500	5,000	N	50	500
C224	11- 9-23	---	1	L	500	N	100	1,000	150	300	5,000	N	50	200
C225	11- 9-23	---	10	L	300	N	100	1,000	300	200	3,000	N	50	200
C226	11- 9-13	---	2	L	500	N	100	1,500	300	200	3,000	N	30	200
C227	11- 9-13	---	2	L	500	N	100	1,000	100	100	2,000	N	50	100

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	Remarks
	(ppm)								(percent)		
					Panned concentrates--Continued						
X429	10	20	N	500	500	30	200	500	20.0	>1.0	
X434	15	20	N	500	300	30	N	300	15	1	
X436	15	20	N	300	500	50	500	500	20	>1	
X501	15	15	100	N	30	100	L	700	7	1	
X503	10	15	30	N	30	70	N	500	5	.7	
X505	20	10	15	N	30	50	N	300	5	.5	
X529	15	15	15	N	10	50	300	700	7	.7	
C181	100	50	70	1,500	500	50	L	1,000	20	1	
C182	100	30	150	2,000	300	30	N	500	15	.7	
C183	300	100	70	1,000	500	200	700	>1,000	>20	>1	
C184	200	70	50	1,000	700	100	300	>1,000	>20	>1	100 ppm W.
C185	700	70	150	2,000	500	100	200	>1,000	>20	>1	
C186	700	70	150	2,000	1,000	100	200	>1,000	>20	>1	
C187	500	70	70	1,500	700	150	500	>1,000	>20	>1	
C188	500	50	50	2,000	700	70	200	>1,000	>20	1	
C189	2,000	>100	200	1,500	1,000	200	1,000	>1,000	>20	>1	
C190	200	100	100	3,000	700	100	L	>1,000	>20	>1	
C191	300	>100	150	500	1,000	200	2,000	>1,000	>20	>1	
C192	20,000	50	70	1,500	1,000	50	1,500	500	>20	1	
C193	200	100	100	500	1,000	>200	500	>1,000	>20	>1	
C194	200	100	100	2,000	1,000	100	200	>1,000	>20	>1	200 ppm W.
C195	200	100	200	1,000	700	200	N	>1,000	>20	>1	
C196	200	50	50	1,000	1,000	50	200	300	>20	>1	
C197	200	>100	50	N	1,000	>200	500	>1,000	>20	>1	
C198	300	50	100	1,500	500	70	L	>1,000	>20	1	
C199	30	100	30	N	500	200	1,000	>1,000	>20	>1	
C200	150	100	100	300	700	150	N	500	>20	1	
C201	200	>100	150	N	700	200	500	>1,000	>20	>1	
C202	50	>100	30	N	1,000	200	1,000	>1,000	>20	>1	
C203	200	>100	150	N	1,000	200	1,000	>1,000	>20	>1	
C204	200	50	20	200	700	30	500	200	>20	>1	300 ppm W.
C205	200	50	50	N	1,000	150	1,000	>1,000	>20	>1	
C206	300	100	50	100	1,000	200	1,000	>1,000	>20	>1	
C207	100	30	20	N	1,000	100	1,000	>1,000	>20	>1	
C208	150	30	50	N	700	150	1,500	>1,000	>20	>1	
C209	300	30	70	N	1,000	100	1,000	>1,000	>20	>1	
C210	100	50	30	N	1,000	200	2,000	>1,000	>20	>1	
C211	300	20	20	N	2,000	100	1,000	>1,000	>20	>1	
C212	300	50	50	100	1,500	200	1,500	>1,000	>20	>1	
C213	100	100	50	150	1,500	150	700	>1,000	>20	>1	
C214	150	70	200	100	1,500	150	700	>1,000	>20	>1	
C215	100	>100	50	N	2,000	200	700	>1,000	>20	>1	
C216	200	70	150	100	1,500	200	1,000	>1,000	>20	>1	
C217	500	70	200	N	1,500	>200	2,000	>1,000	>20	>1	
C218	200	100	100	200	1,500	200	1,000	>1,000	>20	>1	
C219	200	100	700	N	2,000	>200	2,000	>1,000	>20	>1	
C220	300	100	70	200	1,000	200	500	>1,000	>20	>1	
C221	300	20	150	300	2,000	100	500	>1,000	>20	>1	
C222	150	100	10	300	1,500	150	500	>1,000	>20	>1	
C223	150	50	70	200	2,000	200	1,500	>1,000	>20	>1	
C224	100	70	50	100	2,000	200	1,000	>1,000	>20	>1	
C225	200	>100	150	200	1,000	200	500	>1,000	>20	>1	
C226	200	100	200	100	1,500	200	700	>1,000	>20	>1	
C227	100	10	50	N	1,000	100	1,500	>1,000	>20	>1	

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
						Unmineralized[1] rock								
A004	16-10-26	L	N	10	200	7	N	L	5	20	1,500	N	10	5
A011	16- 9-17	L	N	100	50	1.5	N	300	5	100	100	7	20	50
A012	16- 9-17	L	N	100	70	2	10	300	10	50	50	15	20	50
A013	16- 9-17	L	N	N	30	N	N	20	L	N	500	N	N	L
A277	13-11- 6	---	N	L	1,500	N	50	L	30	70	2,000	N	20	L
A314	11-10-13	---	N	L	700	N	50	30	100	50	1,500	N	20	70
A344	12-11-35	---	N	10	500	1.5	10	20	30	30	1,000	N	15	15
A345	12-11-35	---	N	10	200	5	N	10	5	70	1,000	10	30	5
A366	11-10-23	---	N	10	700	1	15	20	20	50	1,000	N	10	20
A414	11-12-10	---	N	50	100	5	N	L	15	L	700	L	50	5
A432	11-11-17	---	N	30	700	1.5	N	N	15	20	700	L	20	7
A435	12-11-16	---	N	20	5,000	1.5	N	5	15	100	1,000	N	30	L
A436	12-11-16	---	N	20	3,000	L	N	5	20	70	1,500	N	20	L
A437	12-11-16	---	N	20	500	L	15	50	15	30	700	N	15	50
A496	11-11-15	---	N	20	700	1	10	5	15	30	700	N	15	5
A500	11-11-21	---	N	20	700	N	70	20	30	20	700	N	15	50
A522	14-11-13	---	N	15	700	L	15	30	15	30	1,500	N	15	30
A543	14-11-20	---	N	15	500	N	70	150	70	L	2,000	N	15	70
A546	14-11-24	---	N	20	1,000	N	20	30	30	30	700	N	15	20
A576	14-10- 6	---	10	20	300	7	L	L	70	30	1,500	7	30	15
A581	14-11-11	---	2	10	1,000	L	70	200	50	50	1,500	L	10	100
A616	14-10- 7	---	L	10	1,500	1.5	30	30	20	70	1,500	L	10	20
A617	15-10- 2	---	L	10	1,000	1.5	30	10	30	70	1,000	L	15	15
A618	15-10- 2	---	N	10	1,000	1	50	20	30	50	1,000	N	15	15
A619	15-10-11	---	L	20	1,000	1	50	20	30	70	1,000	N	15	30
A620	15-10-11	---	L	15	1,000	L	50	30	30	70	1,000	N	10	20
A621	15-10-10	---	.5	70	3,000	7	N	7	30	70	700	7	30	15
A622	15-10- 8	---	L	15	1,000	L	70	70	30	150	1,000	N	20	100
A710	13- 9-34	L	N	L	300	1	L	L	5	30	200	N	10	L
A758	13-10-26	0.02	N	L	1,500	L	10	10	150	30	500	N	15	5
A864	14- 9- 4	.02	N	L	N	N	N	N	7	N	150	N	N	N
A901	12- 9-29	N	N	L	700	L	N	L	50	30	700	N	15	N
A962	12- 9- 8	.03	N	L	1,500	L	10	50	30	30	700	N	L	70
A991	12- 9-35	.02	N	L	1,500	1.5	N	L	5	50	70	N	15	5
A994	12- 9-35	L	N	L	50	2	L	15	20	50	70	N	20	5
Z003	13- 9-10	N	N	L	700	L	L	N	5	30	150	N	10	L
Z006	13- 9- 9	N	N	L	1,000	L	15	150	30	L	500	N	L	70
Z007	13- 9-33	N	N	L	1,500	L	5	10	30	30	700	N	10	7
Z014	13-11- 9	N	N	L	150	1	N	N	20	50	300	N	15	L
Z021	13-11- 9	N	N	L	70	2	L	N	10	30	300	N	10	L
Z062	13-10- 7	N	N	L	20	2	N	N	30	50	300	L	20	L
Z158	13-11- 5	N	N	L	3,000	1	15	5	30	150	1,000	N	15	N
Z164	12-11-33	N	N	10	30	3	N	N	10	30	300	N	30	N
Z189	13-11- 5	N	N	20	70	3	N	L	20	20	500	N	20	L
Z198	13-11-28	N	N	15	150	2	N	15	30	70	700	N	20	7
Z258	12-10-18	N	N	L	700	1	N	7	5	150	500	5	15	N
Z264	12-10-25	N	N	20	70	2	N	5	15	N	700	N	15	N
Z270	13-10- 5	N	N	20	70	2	N	5	15	N	700	N	15	N
Z280	15-10- 9	N	N	L	1,000	L	20	100	50	20	1,000	N	10	100
Z307	14-10-36	N	N	L	1,500	1.5	7	N	7	50	500	N	10	10
Z333	16- 9- 4	L	N	L	1,000	1	10	50	10	30	500	5	10	15
Z334	11-10-29	L	N	20	10	10	N	N	7	N	700	7	50	L
Z335	14- 9-20	L	N	L	1,000	L	15	50	20	50	500	N	L	20
Z336	14- 9-20	L	N	N	700	L	15	50	30	20	500	N	L	30
Z337	14- 9-15	L	N	N	1,000	L	10	70	10	50	300	5	10	30
Z338	14- 9-15	L	N	N	1,000	1	20	100	20	50	700	5	10	50
Z339	14-11-13	L	N	N	1,000	1	L	N	10	30	500	N	10	5
Z340	13-10-32	L	N	L	1,000	L	20	100	30	30	700	5	10	50
Z344	16-10-17	L	N	N	20	L	N	N	5	N	50	10	N	5
Z345	16-10-17	L	N	N	500	1.5	N	N	30	30	500	N	10	L

[1] Includes some altered but not mineralized rocks, as noted under remarks; rock designated as rhyolite

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	Remarks
	(ppm)								(percent)		
					Unmineralized[1/] rock						
A004	30	5	N	N	20	10	N	70	1.0	0.1	Rhyolite Tuff.
A011	30	20	N	N	300	100	N	500	5	>1	Shale.
A012	30	30	N	N	300	100	N	500	5	>1	Do.
A013	20	N	N	300	30	20	N	20	2	.05	Limestone.
A277	15	15	L	700	200	70	N	700	15	>1	Andesite.
A314	15	15	N	700	200	30	N	700	15	>1	Do.
A344	15	7	N	700	70	30	N	300	7	.7	Sandstone.
A345	50	L	30	N	10	50	N	300	3	.15	Rhyolite.
A366	15	10	N	300	70	30	N	300	10	.7	Sandstone.
A414	30	L	N	N	20	70	N	200	3	.1	Rhyolite.
A432	20	L	N	L	15	50	N	1,000	3	.1	Do.
A435	30	20	N	150	30	70	N	700	10	>1	Rhyolite tuff.
A436	30	15	N	700	50	70	N	300	15	1	Andesite.
A437	15	15	N	700	50	50	N	500	10	.5	Sandstone.
A496	10	15	N	300	70	50	N	300	7	.7	Rhyolite.
A500	10	20	L	700	100	50	N	200	15	>1	Andesite.
A522	15	15	N	500	150	30	N	200	10	.7	Sandstone.
A543	L	30	L	700	150	50	N	300	20	>1	Rhyolite tuff.
A546	15	15	N	700	100	30	N	150	10	.7	Andesite.
A576	500	L	N	N	30	50	N	200	2	.15	Rhyolite tuff.
A581	100	15	N	700	200	30	L	200	15	>1	Andesite.
A616	70	10	N	500	150	50	N	300	10	.7	Sandstone.
A617	50	15	N	500	150	50	N	300	7	1	Andesite.
A618	30	15	N	500	200	50	N	300	7	1	Do.
A619	20	20	N	700	200	50	N	300	15	>1	Do.
A620	20	20	N	700	200	50	N	300	15	>1	Do.
A621	70	10	N	L	30	30	N	300	2	.15	Rhyolite.
A622	15	20	N	500	150	50	N	300	15	>1	Sandstone.
A710	30	L	N	300	20	15	N	150	1.5	.15	Rhyolite tuff.
A758	15	7	N	300	50	30	N	100	5	.5	Andesite.
A864	L	N	N	100	10	N	N	N	.05	.015	Limestone.
A901	30	15	N	L	15	30	N	150	1.5	.15	Spherulitic glass.
A962	20	20	N	500	100	20	N	150	7	.7	Andesite.
A991	20	L	N	100	10	30	N	150	1.5	.15	Rhyolite dike.
A994	30	5	N	N	10	30	N	150	2	.1	Rhyolite plug.
Z003	30	L	N	300	10	L	N	100	1	.07	Rhyolite tuff.
Z006	15	15	N	500	70	20	N	150	7	.5	Andesite.
Z007	30	10	N	300	70	20	N	150	3	.5	Rhyolite tuff.
Z014	50	L	N	N	10	50	N	150	2	.15	Rhyolite.
Z021	15	L	N	N	15	50	N	300	5	.1	Do.
Z062	30	7	N	N	15	50	N	300	1.5	.15	Rhyolite.
Z158	30	20	N	1,500	100	50	N	300	5	1	Andesite.
Z164	30	7	N	N	10	50	N	300	3	.1	Rhyolite.
Z189	70	15	N	N	30	70	N	300	3	.15	Do.
Z198	150	5	N	N	70	70	N	200	2	.15	Do.
Z258	30	7	N	N	15	70	N	300	2	.3	Do.
Z264	50	5	N	200	5	50	N	500	5	.15	Do.
Z270	50	5	N	200	5	50	N	500	5	.15	Do.
Z280	L	20	N	500	100	10	N	100	7	>1	Sandstone.
Z307	20	7	N	300	100	20	N	100	5	.7	Rhyolite plug.
Z333	20	5	N	500	70	10	N	100	2	.3	Latite.
Z334	30	N	N	N	L	10	N	70	1	.05	Rhyolite.
Z335	10	10	N	700	70	20	N	100	5	.5	Rhyolite tuff.
Z336	10	15	N	700	100	20	N	100	5	.5	Andesite.
Z337	15	10	N	500	100	15	N	300	5	.5	Do.
Z338	20	10	N	500	150	20	N	200	5	.5	Do.
Z339	70	L	N	150	30	20	N	70	1.5	.2	Rhyolite tuff.
Z340	10	15	N	700	150	20	N	200	5	.7	Andesite.
Z344	70	N	N	N	L	N	N	10	.2	.02	Pegmatite.
Z345	20	N	N	150	15	15	N	50	1.5	.2	Rhyolite plug.

includes rhyolite and quartz latite; some of rock designated as andesite is basaltic andesite or latite.

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
					Unmineralized[1] rock--Continued									
Z346	13- 9- 4	L	N	L	1,000	L	20	70	20	30	700	N	L	50
Z347	11- 9-29	L	N	L	1,500	L	15	150	20	30	700	N	10	30
Z348	12- 9- 4	L	N	N	700	3	L	N	7	50	1,000	N	20	10
Z349	12- 9-33	L	N	N	1,000	1	L	N	10	30	500	N	10	5
Z350	13- 9-21	L	N	L	1,000	L	20	30	15	30	1,000	5	L	50
Z351	13- 9-21	L	N	30	1,000	1	5	5	5	30	500	N	10	5
Z353	11-11-33	L	N	N	50	7	N	N	5	50	500	5	30	10
Z354	11-11-27	L	N	N	700	1.5	N	N	15	30	500	5	10	5
Z355	11-11-26	L	N	N	700	2	N	N	30	30	500	5	10	5
Z363	11-10-31	L	N	N	20	5	N	N	5	N	700	L	50	5
Z364	11-10-16	L	N	N	200	5	N	N	5	50	500	L	70	5
Z365	11-10-26	L	N	L	1,000	L	15	10	20	30	1,000	L	L	15
Z366	12-10- 9	L	N	N	2,000	2	N	N	5	100	700	L	20	L
Z367	11-10-34	L	N	20	100	5	N	N	7	30	700	5	20	L
Z368	11-10-34	L	N	20	100	3	N	N	5	30	500	N	20	5
Z375	11-10-35	L	N	N	500	3	5	N	5	20	200	N	15	7
Z376	11-10-33	L	N	10	2,000	L	20	N	5	70	1,000	N	15	L
Z377	11-10-33	L	N	10	2,000	2	N	N	10	70	1,000	5	30	L
Z380	11-11-35	L	N	15	50	5	N	N	5	50	700	L	50	5
Z383	12-11- 2	L	N	15	70	5	N	N	5	50	500	L	50	5
Z384	12-11-14	L	N	10	700	3	N	N	5	100	1,000	5	30	L
Z385	12-11- 3	L	N	20	100	5	N	N	7	50	700	L	50	5
Z386	12-11-15	L	N	20	150	5	N	N	5	30	500	5	50	5
Z387	12-11-24	L	N	N	2,000	1.5	20	N	10	70	1,000	L	10	5
Z388	12-11-24	L	N	10	2,000	2	N	N	7	70	700	N	20	L
Z389	12-11-15	L	N	10	700	3	N	N	5	100	1,000	5	30	L
Z390	12-10-31	L	N	N	2,000	1	10	N	L	50	1,000	5	20	5
Z391	13-10- 7	L	N	20	10	5	N	N	5	30	500	L	50	L
Z392	13-10- 3	L	N	20	50	5	N	N	7	20	1,000	5	30	L
Z393	13-10- 4	L	N	20	50	5	N	N	10	30	1,000	5	50	L
Z394	13-10- 4	L	N	20	100	5	N	N	5	50	1,500	5	50	L
Z395	12-10-33	L	N	20	10	3	N	N	5	20	500	N	30	L
Z396	12-10-33	L	N	20	10	5	N	N	5	30	500	5	50	L
Z397	13-11-25	L	N	N	700	L	30	150	20	N	1,000	5	N	70
Z398	13-10-19	L	N	30	100	2	N	N	L	50	700	N	50	5
Z399	13-10-19	L	N	20	20	3	N	N	5	70	1,000	L	50	L
Z400	13-10-19	L	N	20	10	5	N	N	7	50	300	L	50	L
Z401	13-11-26	L	N	L	70	5	N	N	7	50	700	L	50	10
Z402	14-11- 2	L	N	10	100	3	N	N	5	70	1,000	L	30	5
Z403	14-11- 4	L	N	10	100	5	N	N	7	70	1,000	N	50	L
Z404	12-10-25	L	N	20	50	5	N	N	5	30	1,000	L	20	L
Z405	13-10-23	L	N	10	1,000	1.5	7	N	7	50	500	N	10	5
Z406	14-11-10	L	N	N	1,000	L	15	100	15	20	700	5	N	70
Z407	15-10-25	L	N	10	1,000	2	5	N	5	50	700	N	15	7
Z408	15-10-21	L	N	15	10	3	N	N	5	50	1,000	N	20	5
Z409	15-10-30	L	N	N	1,000	L	20	50	15	20	1,000	5	L	50
Z410	14-10-33	L	N	N	1,000	1	15	70	15	50	500	5	15	50
Z411	14-10-33	L	N	N	1,000	L	20	70	15	50	1,000	N	15	50
Z412	14-10-33	L	N	10	1,000	1	5	N	5	50	1,000	N	10	7
Z415	14-10-17	L	N	L	1,000	1	15	50	15	50	500	N	10	50
Z416	15-10-35	L	N	10	1,000	3	5	N	7	50	1,000	N	15	7
Z417	15-10-34	L	N	10	1,000	2	5	N	10	30	500	5	15	7
Z429	16-10- 3	L	N	20	1,000	2	5	N	5	30	1,000	N	10	15
Z430	16-10- 3	L	N	20	1,500	2	N	N	100	100	300	N	15	L
Z431	16-10- 2	L	N	N	1,000	2	5	N	7	50	300	L	15	5
Z438	16-10-23	L	N	N	1,000	L	50	200	20	20	1,000	N	L	100
Z439	16-10-23	L	N	N	1,500	L	7	20	10	30	500	N	L	10
Z440	16-10-23	L	N	L	2,000	2	7	15	10	20	500	N	10	10
Z458	13-11-14	L	N	N	2,000	1	10	N	10	70	1,500	N	10	L
Z459	13-11-14	L	N	N	2,000	L	30	50	30	20	1,000	N	L	50

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	(ppm)								(percent)		Remarks
	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	
					Unmineralized[1] rock--Continued						
Z346	10	15	N	1,000	150	20	N	100	5.0	0.5	Andesite.
Z347	15	15	N	1,000	150	15	N	200	5	.5	Do.
Z348	20	L	N	300	20	20	N	100	1.5	.15	Rhyolite tuff.
Z349	20	5	N	200	70	20	N	100	2	.3	Do.
Z350	15	15	N	500	200	30	N	100	5	.5	Andesite
Z351	20	5	N	200	50	20	N	100	2	.3	Rhyolite.
Z353	50	L	20	L	10	70	N	100	.7	.07	Rhylite tuff.
Z354	30	L	N	100	L	20	N	70	1	.1	Obsidian.
Z355	30	L	N	L	L	20	N	70	.1	.1	Rhyolite.
Z363	20	N	N	N	N	30	N	100	1	.1	Rhyolite tuff.
Z364	50	L	L	100	20	70	N	100	1.5	.2	Do.
Z365	15	10	N	1,000	100	20	N	100	5	.5	Andesite.
Z366	30	7	N	150	20	70	N	500	2	.3	Rhyolite
Z367	30	5	N	N	L	20	N	70	.7	.1	Do.
Z368	30	N	N	N	L	15	N	70	.5	.1	Do.
Z375	15	5	N	500	50	15	N	70	2	.3	Andesite.
Z376	20	20	N	1,000	200	50	N	300	7	1	Do.
Z377	30	7	N	200	20	70	N	500	2	.3	Rhyolite.
Z380	20	N	N	N	30	70	N	70	1	.1	Do.
Z383	20	N	N	N	10	50	N	200	1	.15	Do.
Z384	50	5	N	N	10	70	N	500	1.5	.2	Rhyolite
Z385	30	N	N	N	10	50	N	150	1	.1	Rhyolite tuff.
Z386	30	N	30	N	30	70	N	100	1.5	.15	Do.
Z387	30	15	N	1,000	150	50	N	200	5	1	Andesite.
Z388	30	5	N	100	15	50	N	300	1.5	.2	Rhyolite.
Z389	30	5	N	N	20	70	N	1,000	1.5	.2	Do.
Z390	20	15	N	1,000	150	50	N	300	7	1	Andesite
Z391	15	5	10	N	L	50	N	300	1.5	.1	Rhyolite.
Z392	70	5	10	N	N	50	N	200	1.5	.1	Do.
Z393	50	5	10	N	10	70	N	300	2	.15	Do.
Z394	20	5	N	N	L	70	N	500	1.5	.15	Do.
Z395	15	L	15	N	15	50	N	200	1	.1	Do.
Z396	20	5	10	N	10	50	N	300	1.5	.15	Do.
Z397	20	15	N	700	150	20	N	100	7	.7	Andesite.
Z398	20	L	L	N	10	50	N	100	1	.15	Rhyolite tuff.
Z399	50	5	20	N	L	70	N	200	1.5	.15	Rhyolite
Z400	30	5	L	N	N	70	N	500	1.5	.1	Do.
Z401	50	L	N	N	L	50	N	200	1	.15	Do.
Z402	50	L	N	N	L	50	N	200	1.5	.15	Do.
Z403	50	L	N	N	L	70	N	200	1.5	.1	Do.
Z404	20	5	N	N	L	50	N	300	2	.1	Do.
Z405	30	5	N	300	70	20	N	200	3	.3	Rhyolite tuff.
Z406	10	15	N	1,000	150	20	N	200	5	.5	Andesite.
Z407	20	5	N	300	100	30	N	100	3	.3	Rhyolite tuff.
Z408	20	L	N	N	L	50	N	150	1	.1	Rhyolite.
Z409	10	15	N	1,000	150	20	N	150	5	.5	Andesite.
Z410	10	15	N	1,000	150	20	N	300	5	.7	Do.
Z411	15	15	N	1,000	150	20	N	300	5	.5	Do.
Z412	20	5	N	200	50	10	N	100	3	.2	Rhyolite.
Z415	20	10	N	1,000	100	20	N	300	5	.5	Andesite.
Z416	30	L	N	200	50	20	N	100	2	.2	Rhyolite tuff.
Z417	30	5	N	300	50	15	N	300	3	.3	Do.
Z429	15	5	N	300	100	20	N	100	3	.2	Do.
Z430	50	7	N	100	30	50	N	500	2	.2	Rhyolite glass.
Z431	30	5	N	200	70	20	N	150	3	.2	Rhyolite tuff.
Z438	20	20	N	700	200	20	N	100	7	.5	Do.
Z439	20	5	N	700	100	20	N	100	5	.3	Do.
Z440	20	5	N	1,000	70	15	N	70	3	.3	Agglomerate.
Z458	30	15	N	1,000	100	70	N	300	7	1	Andesite.
Z459	10	20	N	1,000	200	50	N	50	7	1	Do.

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
			Unmineralized[1] rock--Continued											
Z460	13-11- 2	L	N	N	1,000	1	10	N	7	70	1,000	N	20	L
Z461	12-11-24	L	N	10	1,000	2	N	N	5	70	700	N	20	L
Z464	12-11-25	L	N	10	1,500	2	N	N	5	50	700	N	20	L
Z466	15- 9-31	L	N	N	1,500	2	10	10	20	50	1,000	5	20	20
Z467	16- 9- 6	L	N	L	1,500	1.5	5	N	5	30	700	N	15	5
Z469	16- 9- 6	L	N	L	700	1	7	N	7	20	700	N	10	7
Z481	12-11-26	L	N	10	200	3	N	N	5	50	700	N	30	L
Z485	12-11-23	L	N	10	300	3	N	N	7	70	1,000	N	20	L
Z486	12-11-23	L	N	10	300	3	N	N	10	70	700	5	30	L
Z487	12-11-23	L	N	10	3,000	1.5	N	N	7	70	700	N	15	L
Z490	12-11-22	L	N	10	1,500	3	N	N	5	150	700	5	20	L
Z495	12-11-21	L	N	L	5,000	1.5	N	N	L	70	1,000	N	20	L
Z498	14- 9- 5	L	N	30	1,000	2	5	N	10	50	700	5	15	5
Z499	14- 9-30	L	N	10	1,500	1	5	N	5	50	100	5	15	5
Z500	14- 9-30	L	N	10	100	5	N	N	5	30	700	5	50	L
X003	12-11-24	L	N	10	700	2	N	N	5	100	1,000	N	20	L
X006	12-11-24	L	N	10	700	3	N	N	5	70	500	N	15	L
X007	12-11-24	L	N	10	1,500	2	N	N	L	100	1,000	N	15	L
X011	12-11-24	L	N	10	1,500	2	N	N	5	70	700	N	20	L
X014	12-11-14	L	N	L	2,000	1.5	N	N	L	70	700	5	20	L
X015	12-11-15	L	N	10	200	3	N	N	L	70	1,000	5	20	L
X016	12-11-15	L	N	10	700	3	N	N	7	150	1,000	N	20	L
X017	12-11-15	L	N	10	700	3	N	N	5	70	1,000	N	20	L
X018	12-11-15	L	N	N	1,000	L	15	50	10	20	1,000	N	L	20
X019	14- 9-26	---	N	L	1,500	L	5	N	10	70	500	N	10	5
X020	14- 9-26	---	N	L	1,500	L	7	20	15	20	200	5	L	15
X022	14- 9-26	---	N	L	2,000	L	20	100	50	50	500	N	10	30
X023	14- 9-26	---	N	N	3,000	L	20	100	50	70	500	N	L	50
X024	14- 9-27	---	N	N	2,000	L	20	70	30	50	1,000	N	L	30
X025	14- 9-34	---	N	10	1,500	1	5	15	15	50	300	N	L	10
X026	15- 9-16	---	N	L	2,000	2	15	5	30	70	1,000	N	30	10
X027	15- 9-16	---	N	L	1,000	1.5	10	30	20	50	500	N	L	20
X028	15- 9- 2	---	N	10	1,000	3	N	N	10	70	500	5	20	L
X029	15- 9- 2	---	N	N	2,000	1	7	N	30	70	500	5	50	15
X030	14- 9-15	---	N	L	2,000	L	L	N	7	50	300	N	L	5
X031	14- 9-15	---	N	L	1,500	L	20	50	50	30	700	N	L	50
X032	14- 9-23	---	N	L	1,500	1	15	30	20	50	700	N	10	20
X033	14- 9-15	---	N	L	2,000	1	15	100	20	70	500	N	L	30
X034	14- 9- 3	---	N	L	2,000	1	15	70	50	50	500	N	10	50
X035	16- 8- 7	---	N	L	1,000	3	N	N	5	70	300	N	10	L
X036	15- 9-35	---	N	N	70	N	N	N	5	N	2,000	N	N	L
X038	15- 9-35	---	N	N	70	1	L	30	20	N	500	7	L	5
X039	15- 8- 6	---	N	N	1,000	L	50	200	50	30	1,000	5	20	100
X040	15- 8- 6	---	N	L	5,000	1.5	L	N	10	150	500	N	10	L
X041	13- 9-31	---	N	10	20	5	N	N	5	20	1,000	N	50	L
X042	13- 9-31	---	N	N	1,500	L	30	100	20	50	700	10	10	70
X046	15- 9-29	---	N	N	1,500	2	7	30	15	50	500	7	10	20
X047	15- 9-20	---	N	L	50	10	L	5	L	30	1,000	N	70	L
X050	14- 9-33	L	N	L	700	1	7	10	10	20	150	N	10	15
X051	15- 9-36	---	0.5	L	10	1.5	15	5	15	N	700	N	L	7
X052	15- 9-36	---	N	L	500	L	50	300	30	N	1,000	N	L	100
X054	15- 9-26	---	N	100	50	3	10	5	L	N	2,000	10	L	10
X056	13-10-14	L	N	L	3,000	5	20	70	20	50	1,000	N	10	50
X057	13-10-14	L	N	10	2,000	1.5	10	10	5	50	500	N	15	5
X058	13-11- 9	L	N	L	3,000	1.5	20	10	5	100	1,000	5	10	L
X059	13-11- 9	L	N	L	2,000	1.5	20	L	5	100	2,000	N	15	L
X060	13-10-17	L	N	15	1,500	1.5	5	10	10	100	700	N	10	7
X061	13-11-13	L	N	L	2,000	1	30	100	20	70	1,000	N	10	70
X062	13-11-13	0.40	N	L	1,500	L	20	100	20	50	200	N	10	30
X063	13-11-14	L	N	L	700	L	30	100	20	30	500	N	L	70

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	(ppm) Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	(percent) Fe (0.05)	Ti (0.002)	Remarks
					Unmineralized[1] rock--Continued						
Z460	30	20	N	1,000	150	70	N	500	7.0	1.0	Andesite.
Z461	30	5	N	N	20	70	N	300	1.5	.2	Rhyolite
Z464	30	5	N	150	20	50	N	300	2	.3	Do.
Z466	30	10	N	700	150	15	N	300	5	.7	Rhyolite tuff.
Z467	20	5	N	200	70	20	200	150	3	.3	Do.
Z469	10	5	N	300	50	10	N	150	3	.3	Do.
Z481	30	L	N	N	L	50	N	200	1	.15	Rhyolite.
Z485	50	L	N	N	L	50	N	150	1.5	.15	Do.
Z486	100	N	N	N	L	50	N	200	1	.1	Do.
Z487	50	7	N	200	20	50	N	500	3	.3	Latite.
Z490	50	10	N	N	10	100	N	300	2	.2	Obsidian.
Z495	30	7	N	300	30	70	N	1,000	3	.5	Latite.
Z498	30	5	N	500	70	30	N	150	3	.3	Rhyolite tuff.
Z499	30	5	N	500	100	30	N	200	2	.5	Do.
Z500	50	N	N	N	20	30	N	200	1	.15	Rhyolite dike.
X003	30	5	N	N	10	50	N	300	1.5	.2	Rhyolite tuff.
X006	30	L	N	N	10	30	N	200	1.5	.15	Rhyolite.
X007	20	7	N	N	20	70	N	300	1.5	.2	Do.
X011	30	5	N	N	15	50	N	500	1.5	.2	Do.
X014	30	5	N	100	20	70	N	300	2	.3	Latite.
X015	30	L	N	N	10	50	N	300	1.5	.15	Rhyolite.
X016	50	10	N	N	10	100	N	300	2	.2	Obsidian.
X017	20	5	N	N	10	50	N	300	1.5	.15	Chalcedony.
X018	15	15	N	700	200	20	N	100	5	.5	Andesite(?).
X019	20	7	N	300	150	50	N	70	3	.2	Agglomerate.
X020	10	5	N	700	70	N	N	70	3	.2	Sandstone.
X022	20	15	N	500	150	30	N	300	5	.5	Andesite.
X023	30	15	N	700	200	30	N	300	7	.5	Do.
X024	30	15	N	500	150	20	N	300	5	.5	Do.
X025	30	7	N	500	100	20	N	200	3	.3	Latite tuff.
X026	10	10	N	1,500	70	20	N	200	5	.3	Do.
X027	20	7	N	700	70	20	N	200	5	.3	Rhyolite tuff.
X028	50	5	N	200	20	30	N	300	1.5	.15	Obsidian.
X029	20	10	N	1,000	100	20	N	300	5	.3	Latite.
X030	20	5	N	300	100	15	N	100	2	.2	Rhyolite tuff.
X031	20	20	N	700	200	20	N	200	5	.5	Latite.
X032	20	15	N	1,000	150	20	N	300	5	.5	Do.
X033	20	15	N	500	150	20	N	200	7	.5	Do.
X034	20	15	N	700	100	20	N	300	7	.5	Do.
X035	10	5	N	N	N	100	N	500	2	.15	Granite.
X036	L	5	N	200	20	20	N	20	2	.07	Limestone.
X038	L	10	N	N	100	50	N	100	20	.2	Quartzite.
X039	N	20	N	1,000	200	30	N	200	10	1	Andesite.
X040	30	7	N	500	50	70	N	300	3	.3	Rhyolite.
X041	30	5	N	N	10	50	N	300	1.5	.1	Rhyolite tuff.
X042	15	20	N	1,000	100	30	N	300	7	.7	Andesite.
X046	20	10	N	700	70	20	N	200	3	.3	Latite.
X047	70	5	10	N	15	50	N	700	1.5	.07	Rhyolite tuff.
X050	20	5	N	150	50	10	N	100	1.5	.15	Latite.
X051	N	7	N	N	70	50	N	70	7	.2	Sandstone.
X052	N	50	N	N	500	30	200	100	15	1	Greenstone.
X054	L	7	N	N	20	50	N	20	10	.1	Quartzite.
X056	20	10	N	700	70	20	N	200	3	.3	Andesite.
X057	20	5	N	300	50	20	N	200	2	.2	Rhyolite.
X058	30	20	N	1,000	100	70	N	500	5	.5	Andesite.
X059	30	20	N	1,000	100	70	N	500	5	.5	Do.
X060	30	7	N	150	30	50	N	200	1	.15	Latite.
X061	20	20	N	1,000	100	20	N	300	3	.3	Andesite.
X062	20	15	N	1,000	100	20	N	200	2	.3	Do.
X063	15	20	N	1,000	100	20	N	150	2	.3	Do.

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
			Unmineralized[1] rock--Continued											
X064	13-11-14	L	N	L	700	L	30	150	20	30	700	N	L	50
X065	13-10- 7	L	N	20	20	5.0	N	N	L	30	200	N	50	L
X066	13-11-12	L	N	20	50	3	N	10	5	100	700	N	50	L
X067	13-11-11	L	N	20	30	5	N	N	L	70	700	N	50	L
X068	13-11-10	L	N	L	150	3	N	N	L	100	200	N	30	L
X069	13-11-36	L	N	L	1,000	N	50	200	30	20	1,000	N	L	100
X070	13-11-36	L	N	L	2,000	1	30	100	20	50	500	N	10	50
X071	14-10- 6	L	N	L	2,000	1.5	5	10	5	100	700	N	10	5
X072	14-10- 6	L	N	L	2,000	1	10	10	5	70	700	N	10	5
X073	13-11-35	L	N	L	1,000	N	50	150	20	30	1,000	N	L	70
X074	13-11-26	L	N	L	1,000	L	30	150	20	30	700	N	10	70
X075	13-11-23	0.30	N	L	1,000	L	30	100	20	30	500	N	L	70
X076	13-10-19	.04	N	L	3,000	1	10	10	7	70	1,000	N	10	5
X077	13-10-19	L	N	L	1,000	1	20	50	15	50	500	N	10	20
X078	13-10-20	L	N	L	2,000	1	30	100	20	50	1,000	N	15	50
X079	13-11-14	L	N	L	500	1	20	70	15	30	300	N	L	50
X080	13-11-14	L	N	L	500	1	20	70	20	30	500	N	L	50
X081	13-11-14	L	N	L	1,000	1	30	100	20	70	200	N	10	50
X082	12-10-33	L	N	20	50	5	N	N	5	30	300	N	30	7
X083	13-11-15	L	N	L	1,500	2	30	L	5	100	1,000	N	L	L
X084	14-11- 9	L	N	L	700	1	50	200	20	50	500	N	L	100
X085	12- 9- 7	L	N	10	200	2	N	L	L	50	300	N	20	L
X086	12- 9- 6	L	N	L	500	2	N	N	L	70	200	N	20	L
X087	13-10-16	L	N	L	1,000	1.5	10	10	L	70	300	N	L	7
X088	14-10-13	L	N	N	1,000	1	10	10	L	70	300	N	10	7
X089	14-10-26	L	N	L	500	3	20	50	10	50	300	N	L	30
X090	14-10-24	L	N	L	1,000	1.5	20	50	15	100	300	N	10	30
X091	14-10-35	L	N	L	1,000	1	20	50	15	100	500	N	10	30
X092	15- 9- 6	L	N	L	500	2	10	10	L	70	150	N	10	7
X093	14-10-13	L	N	L	700	1.5	15	L	L	70	500	N	L	10
X094	14-10- 2	L	N	L	1,000	1.5	15	10	10	50	500	N	L	10
X095	14-10- 2	L	N	L	1,000	1.5	15	10	5	70	300	N	20	10
X096	15-10-14	0.02	N	L	700	1	30	50	10	50	700	N	L	50
X097	15- 9-31	L	N	L	700	1.5	20	20	10	70	700	N	10	30
X098	15- 9-31	L	N	L	700	1	15	20	5	50	300	N	10	20
X099	13- 9-31	L	N	N	500	1.5	5	N	L	30	200	N	L	L
X109	11-10-24	L	0.5	L	700	L	10	N	30	20	200	N	10	10
X114	14- 8-31	L	N	L	700	1	10	20	10	30	300	N	10	10
X120	14- 9-36	L	N	L	700	1	7	10	7	20	150	N	10	5
X129	14- 9-25	L	N	10	70	1.5	L	N	5	N	50	70	L	L
X165	15- 9-15	L	N	L	700	1	7	15	15	20	700	N	10	10
X166	15- 9-21	L	N	L	700	1	10	20	15	30	500	N	10	15
X167	15- 9-20	L	N	10	N	7	5	N	L	N	1,000	N	30	5
X169	15- 9-18	L	N	10	70	3	5	N	L	50	1,000	N	20	5
X180	14- 9-29	L	N	L	1,500	1	15	10	30	20	500	N	10	15
X181	14- 9-29	L	N	10	100	3	N	N	L	L	500	N	10	5
X183	14- 9-28	L	N	10	1,000	1.5	7	N	7	20	500	N	10	5
X184	14- 9-28	L	N	L	1,000	1.5	7	5	10	20	300	N	10	5
X187	14- 9-34	L	N	L	2,000	2	7	5	5	20	700	N	15	5
X188	14- 9-31	L	N	L	700	1.5	5	5	5	20	70	N	10	5
X189	14- 9-31	L	N	30	500	2	5	5	5	L	100	5	10	5
X198	14- 9-13	L	N	L	1,500	1	15	70	30	30	200	N	10	30
X204	14- 9-22	L	N	L	1,500	1	20	150	30	50	300	N	10	30
X208	14- 9-36	L	.5	10	150	1.5	5	5	5	N	70	N	10	L
X213	15- 9-12	.3	N	N	N	N	100	300	L	200	1,500	N	L	150
X223	15- 9- 2	L	N	N	1,500	2	5	N	L	50	700	N	10	10
X227	15- 9- 6	L	N	N	700	2	5	N	5	20	500	N	15	10
X240	15- 9- 4	L	N	L	700	2	7	20	15	20	500	N	10	15
X241	14- 9-34	L	N	N	200	1.5	N	N	10	N	20	15	10	10
X242	14- 9-25	L	N	10	1,000	2	5	N	5	100	500	5	20	5

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	Remarks
	(ppm)								(percent)		
				Unmineralized[1] rock--Continued							
X064	15	20	N	1,000	100	20	N	150	2.0	0.3	Andesite.
X065	20	5	N	N	10	70	N	200	1	.05	Rhyolite.
X066	30	5	N	N	10	100	N	200	1.5	.07	Do.
X067	30	5	N	N	15	100	N	200	1	.05	Do.
X068	30	L	N	N	15	100	N	150	1	.1	Do.
X069	15	20	N	1,500	100	30	N	150	5	.5	Andesite.
X070	20	15	N	1,000	70	20	N	150	3	.3	Do.
X071	30	10	N	200	50	50	N	150	2	.2	Latite.
X072	30	7	N	300	30	20	N	150	1.5	.2	Rhyolite tuff.
X073	20	30	N	1,000	100	20	N	150	5	.7	Andesite.
X074	15	20	N	1,000	100	20	N	150	3	.5	Do.
X075	20	20	N	1,000	100	20	N	150	3	.5	Do.
X076	30	10	N	500	30	50	N	150	2	.3	Rhyolite tuff.
X077	20	10	N	700	70	15	N	150	2	.3	Andesite.
X078	20	15	N	700	100	20	N	200	5	.5	Do.
X079	10	20	N	1,000	70	20	N	100	3	.3	Do.
X080	10	15	N	1,000	70	20	N	150	2	.2	Do.
X081	15	20	N	1,000	70	30	N	200	3	.3	Do.
X082	10	7	N	N	10	150	N	200	1	.07	Rhyolite.
X083	20	20	N	1,000	100	100	N	200	5	.7	Andesite.
X084	15	20	N	1,000	100	30	N	150	3	.5	Do.
X085	20	L	N	100	10	30	N	100	.5	.05	Rhyolite.
X086	20	L	N	200	15	50	N	150	.7	.05	Do.
X087	15	5	N	300	30	20	N	100	1.5	.2	Rhyolite tuff.
X088	20	7	N	700	50	20	N	100	1	.15	Do.
X089	20	15	N	700	100	30	N	150	2	.3	Andesite.
X090	20	10	N	1,000	70	20	N	150	2	.5	Latite.
X091	20	15	N	1,000	70	30	N	150	3	.5	Do.
X092	20	5	N	150	50	15	N	70	1.5	.1	Rhyolite tuff.
X093	20	10	N	300	50	30	N	100	2	.2	Do.
X094	20	10	N	500	70	30	N	150	2	.2	Do.
X095	20	7	N	500	70	30	N	150	2	.2	Do.
X096	15	20	N	1,000	100	30	N	100	3	.3	Andesite.
X097	20	10	N	700	70	20	N	100	2	.3	Latite.
X098	20	10	N	700	100	20	N	100	2	.2	Latite tuff.
X099	10	5	N	300	50	15	N	100	1	.1	Rhyolite tuff.
X109	10	5	N	300	100	10	N	150	1.5	.15	Sandstone.
X114	20	5	N	300	70	15	N	100	1.5	.2	Rhyolite tuff.
X120	15	5	N	150	30	10	N	100	1.5	.15	Do.
X129	10	N	N	L	20	N	N	10	.2	.02	Silicified limestone.
X165	15	5	N	300	50	10	N	100	1.5	.2	Latite.
X166	15	7	N	300	70	10	N	100	2	.3	Do.
X167	100	L	10	N	L	10	200	200	1.	.07	Rhyolite tuff.
X169	70	L	10	N	20	30	N	150	1	.15	Do.
X180	10	10	N	700	150	20	N	150	2	.2	Andesite.
X181	20	N	L	L	10	L	N	70	.5	.07	Rhyolite tuff.
X183	15	5	N	200	50	15	N	150	3	.3	Do.
X184	15	5	N	300	50	10	N	150	3	.2	Rhyolite dike.
X187	10	5	N	500	50	20	N	100	3	.2	Rhyolite tuff.
X188	20	5	N	200	50	15	N	70	2	.2	Do.
X189	10	5	N	N	30	15	N	100	3	.15	Rhyolite tuff.
X198	15	10	N	500	150	15	N	150	3	.5	Andesite.
X204	15	10	N	500	100	15	N	150	2	.3	Do.
X208	N	L	N	N	30	20	N	150	1.5	.2	Quartz monzonite.
X213	N	30	N	200	300	50	500	70	15	1	Greenstone.
X223	30	7	N	500	50	50	N	200	2	.5	Latite.
X227	20	5	N	200	50	30	N	150	1.5	.3	Rhyolite tuff.
X240	20	7	N	500	70	20	N	150	3	.3	Latite.
X241	50	L	15	700	70	N	N	100	1	.15	Rhyolite tuff.
X242	15	5	N	200	50	30	N	150	2	.3	Latite.

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
						Unmineralized[1] rock--Continued								
X243	14- 9-25	L	N	10	700	1.0	10	20	20	20	500	5	15	15
X245	14- 9-33	L	N	10	1,000	2	7	10	10	30	500	N	15	10
X259	15- 9-14	L	N	100	500	10	10	70	30	100	150	N	20	15
X273	15- 9-21	L	0.7	L	700	2	5	N	5	30	500	N	20	5
X278	15- 9-21	L	.7	L	700	2	7	N	10	30	500	N	20	5
X282	15- 9-27	L	N	L	500	7	15	N	10	30	500	5	30	15
X285	15- 9-34	L	N	L	1,000	1	7	30	15	20	700	N	15	10
X293	16- 9- 3	L	.7	10	1,000	1	5	10	5	30	200	N	15	5
X294	16- 9-15	L	.5	10	1,500	1	10	N	5	30	700	N	10	5
X295	16- 9-15	L	1	10	700	1	5	N	5	30	300	N	10	5
X296	16- 9-15	L	.7	10	700	1	5	N	5	30	1,500	N	10	5
X297	16- 9- 9	L	L	10	700	1	5	N	L	30	1,000	N	20	5
X298	16- 9- 4	L	L	10	700	1	5	5	L	30	700	N	20	5
X299	16- 9- 4	L	L	10	700	1	10	30	10	30	500	N	15	15
X300	16- 9- 4	L	.5	10	1,000	1	10	50	15	30	700	N	15	20
X319	16- 9-16	L	N	10	70	15	N	N	L	30	1,500	N	70	20
X320	16- 9-16	L	L	10	50	10	N	N	L	30	1,500	10	50	5
X321	16- 9-16	L	L	L	1,500	7	7	10	7	30	2,000	N	70	10
X322	16- 9-16	L	L	L	1,000	15	10	100	10	30	2,000	N	30	30
X323	16- 9-23	L	.5	L	70	2	30	7	20	30	1,500	5	15	5
X324	16 -9-23	L	L	L	1,500	1	30	7	5	30	2,000	7	15	5
X325	16- 9-24	L	N	L	70	1	N	30	L	L	1,000	N	10	5
X340	11- 9-33	L	N	L	1,500	N	70	500	50	20	500	N	L	70
X341	11- 9-36	L	N	10	1,500	L	30	N	20	20	500	N	10	5
X343	12- 9-22	L	.5	L	1,000	1.5	N	N	15	70	70	7	20	L
X344	12- 9-22	L	N	L	1,000	1.5	N	N	5	100	100	5	50	L
X348	12- 9-28	0.02	N	20	1,000	1.5	N	N	5	70	70	N	30	L
X349	12- 9-28	L	N	10	700	2	N	N	7	100	500	5	30	L
X350	12- 9-27	L	N	10	1,000	2	N	N	7	70	70	5	30	5
X351	12- 9-34	L	N	10	70	3	N	N	5	30	100	5	50	L
X354	12- 9-27	.02	N	10	1,000	2	N	N	5	70	1,000	N	20	5
X355	12- 9-26	L	N	N	1,500	L	30	150	20	70	700	N	20	70
X356	12- 9-31	L	N	50	150	5	N	5	7	70	1,500	5	50	L
X357	12- 9-31	L	N	20	30	5	N	N	5	20	70	5	50	L
X359	12- 9-31	L	N	20	30	3	N	N	7	70	500	10	50	5
X361	12- 9-31	L	N	50	30	2	N	N	7	70	500	5	50	L
X362	12- 9-31	L	N	N	700	N	50	300	30	20	1,000	N	10	70
X363	12- 9-32	L	N	N	1,000	L	15	20	7	50	500	N	15	10
X364	11- 9-36	L	N	L	1,000	N	30	300	30	20	700	N	15	50
X366	13-11-23	L	N	N	1,000	N	50	300	30	20	1,000	N	10	70
X371	13-11-24	L	N	10	1,500	1	N	20	L	70	1,000	N	20	5
X372	13-11-24	L	N	N	1,500	N	50	200	20	70	700	N	10	50
X373	13-11-24	L	N	N	2,000	N	30	150	20	70	700	N	20	50
X376	13-10-19	L	N	L	2,000	L	N	N	5	70	1,000	N	20	L
X398	14-11- 1	L	N	L	1,500	N	30	150	20	30	1,000	N	20	50
X406	13-10-29	L	N	L	1,000	N	30	150	50	20	1,500	N	15	50
X418	13-11-14	L	N	N	1,000	N	30	150	30	30	700	N	15	50
X420	13-11- 7	L	N	10	100	1	N	N	L	N	50	N	N	5
X423	13-11-18	.06	N	L	1,500	1	10	N	L	70	700	N	20	L
X440	11-11-29	.06	N	N	1,000	1.5	20	N	L	70	700	N	20	L
X456	11-11-24	.06	N	L	2,000	1.5	N	N	L	70	300	5	30	L
X460	12-10- 5	.08	N	20	70	7	N	N	L	20	300	5	30	5
X466	12-10-18	.02	N	10	700	1.5	N	N	L	100	500	L	20	L
X471	12-11- 9	.04	N	30	15	7	N	N	L	50	300	L	50	5
X476	12-10-11	.04	N	20	10	3	N	N	L	20	500	L	30	L
X486	11-10-28	.08	N	15	30	5	N	N	L	30	300	L	30	L
X491	12-11-12	.04	N	L	2,000	1.5	10	N	L	100	500	5	30	L
X497	12-11-11	L	N	30	100	5	N	N	L	70	500	5	30	5
X518	12-11-14	.02	N	10	300	3	N	N	L	100	300	5	30	L
X520	12-11-14	.04	N	10	200	2	N	N	L	70	500	L	20	L

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10) (ppm)	Sc (5) (ppm)	Sn (10) (ppm)	Sr (50) (ppm)	V (5) (ppm)	Y (5) (ppm)	Zn (200) (ppm)	Zr (10) (ppm)	Fe (0.05) (percent)	Ti (0.002) (percent)	Remarks
Unmineralized[1/] rock--Continued											
X243	10	5	N	L	50	10	N	100	2.0	0.2	Siltstone.
X245	15	5	N	1,500	70	20	N	100	5	.3	Rhyolite tuff.
X259	20	15	N	1,000	200	100	N	150	10	.3	Sandstone.
X273	20	7	N	300	50	20	N	150	3	.3	Rhyolite dike.
X278	20	7	N	300	150	30	N	150	3	.3	Do.
X282	15	7	N	N	50	30	N	150	5	.3	Greenstone gouge.
X285	15	7	N	700	200	15	N	150	3	.3	Latite.
X293	20	7	N	300	70	30	N	150	3	.3	Rhyolite tuff.
X294	20	7	N	700	100	20	N	150	3	.3	Latite.
X295	30	L	N	200	50	15	N	100	1.5	.15	Rhyolite tuff.
X296	20	5	N	300	50	30	N	150	1.5	.15	Rhyolite dike.
X297	15	5	N	200	50	30	N	150	1.5	.15	Rhyolite tuff.
X298	15	5	N	200	50	15	N	150	2	.15	Do.
X299	20	7	N	700	70	15	N	150	3	.2	Latite.
X300	20	7	N	500	70	15	N	150	3	.2	Do.
X319	70	7	10	700	10	30	N	200	.7	.05	Gouge at dike contact.
X320	50	5	L	700	L	15	N	150	.7	.03	Rhyolite dike.
X321	70	10	10	700	70	70	200	700	3	.15	Gouge at dike contact.
X322	70	15	N	700	150	50	L	200	5	.3	Iron oxide at contact.
X323	15	10	N	200	100	30	N	150	7	.3	Quartz monzonite gouge.
X324	15	15	N	500	200	100	L	200	7	.5	Do.
X325	10	5	N	150	50	30	N	30	1.5	.07	Do.
X340	15	30	N	1,000	300	20	N	150	10	.7	Andesite.
X341	20	15	N	700	300	20	N	150	7	.5	Do.
X343	50	5	N	N	15	30	N	300	2	.15	Kaolinized rhyolite.
X344	15	7	N	N	10	70	N	500	1.5	.15	Do.
X348	30	L	N	N	10	30	N	200	.7	.15	Altered rhyolite.
X349	30	7	L	N	10	50	N	300	1.5	.15	Rhyolite.
X350	50	5	30	N	10	50	N	200	1	.15	Do.
X351	30	10	10	N	10	70	N	500	1.5	.15	Rhyolite plug.
X354	30	L	L	N	10	30	N	150	1	.15	Rhyolite.
X355	20	20	N	1,500	200	30	N	300	7	1	Andesite.
X356	100	10	10	N	100	150	N	300	2	.1	Rhyolite dike.
X357	30	10	10	N	15	70	N	500	1.5	.15	Do.
X359	30	10	10	N	L	70	N	300	2	.15	Do.
X361	30	10	10	N	L	100	N	300	2	.15	Do.
X362	15	30	N	700	200	30	N	150	10	1	Lamprophyre dike.
X363	20	10	N	500	150	30	N	200	3	.5	Andesite.
X364	20	30	N	1,000	200	30	N	200	7	.7	Sandstone.
X366	15	30	N	1,500	200	30	N	200	10	1	Andesite.
X371	30	15	N	500	70	50	N	200	3	.5	Rhyolite dike.
X372	20	20	N	1,500	300	30	N	150	15	>1	Andesite.
X373	20	20	N	1,500	150	30	N	300	7	1	Do.
X376	50	15	N	700	50	50	N	300	3	.5	Rhyolite tuff.
X398	20	20	N	1,500	200	30	N	200	7	1	Andesite.
X406	15	20	N	1,500	300	30	N	200	10	>1	Do.
X418	15	20	N	1,000	150	30	N	200	7	.7	Andesite gouge.
X420	N	N	N	N	10	N	N	30	.3	.07	Chalcedony.
X423	15	15	N	1,000	150	50	N	300	5	.7	Andesite.
X440	15	15	N	700	150	50	N	300	5	1	Do.
X456	30	10	N	300	50	50	N	500	3	.3	Latite.
X460	30	N	L	N	L	70	N	200	1	.07	Rhyolite tuff.
X466	30	5	L	N	20	50	N	300	2	.15	Rhyolite.
X471	20	N	N	N	20	50	N	100	1	.07	Do.
X476	30	5	10	N	10	70	N	200	1.5	.1	Do.
X486	30	N	N	N	15	50	N	100	.7	.07	Sandstone.
X491	30	15	N	700	150	70	N	500	5	.7	Andesite.
X497	30	N	15	300	10	70	N	150	1	.1	Rhyolite tuff.
X518	30	5	10	N	10	50	N	500	2	.15	Rhyolite.
X520	30	N	10	N	10	30	N	300	1	.1	Rhyolite glass.

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
			Unmineralized[1/] rock--Continued											
X523	12-11-15	0.04	N	20	70	3.0	N	N	L	70	500	5	50	L
X532	11-10-30	.06	N	20	20	10	N	N	L	70	500	L	70	5
X544	13-10-32	.04	N	10	1,500	1	7	10	L	50	500	N	10	7
X547	11-10-30	.04	N	20	10	7	N	N	L	30	300	N	50	5
X548	11-10-30	.04	N	30	30	5	N	N	5	50	500	5	50	5
X549	11-10-29	.02	N	50	20	10	N	N	L	30	500	10	50	5
X551	11-10-29	---	N	30	20	7	N	N	5	50	500	N	100	5
X553	13-11-27	.06	N	10	1,000	L	50	1,000	50	20	700	N	10	200
X554	11-10- 2	.04	N	15	10	5	N	N	L	20	200	N	20	L
X555	11- 9-18	.06	N	15	10	5	N	N	L	50	200	5	30	L
X561	11-12- 2	.04	N	20	70	5	N	N	L	50	500	N	30	7
			Vein material and mineralized rock											
A023	11- 8-18	L	0.5	10	1,500	3.0	20	20	30	50	1,500	N	10	7
A026	11- 8-18	0.04	7	10	500	3	N	50	30	20	2,000	N	L	15
A061	11- 9-10	L	.5	10	1,000	1	30	100	100	N	1,000	5	10	70
A062	11- 9-25	24	3,000	10	200	2	N	5	10,000	50	>5,000	N	N	10
A116	12- 9-13	L	7	50	1,500	1.5	50	50	100	20	2,000	5	L	50
A117	12- 9-13	L	2	10	1,500	N	10	300	700	N	5,000	20	10	30
A152	15- 9-35	L	N	L	2,000	5	15	10	15	70	5,000	N	10	5
A183	15- 9-13	L	N	N	100	50	50	700	100	>1,000	>5,000	N	500	20
A186	16- 9-24	L	N	20	300	3	N	200	20	50	200	N	15	20
A192	16- 9-23	L	1	10	1,000	3	5	70	10	N	1,000	N	N	50
A212	16- 9-14	---	5	L	300	2	20	300	30	N	>5,000	20	10	100
A222	16- 9-12	.3	1,000	N	20	3	N	30	2,000	N	>5,000	100	N	7
A417	11-12- 2	---	N	30	100	5	N	N	15	L	1,000	L	50	5
A551	16- 9-23	---	10,000	L	70	2	10	10	15,000	N	5,000	150	L	15
A665	13- 9-22	---	.7	20	700	L	10	50	30	L	70	100	10	150
A977	12- 9-21	.02	N	L	700	1.5	N	L	30	50	70	N	20	L
Z980	12- 9-22	---	N	L	1,500	L	N	L	10	70	200	10	15	L
Z985	12- 9-22	.02	.5	10	700	L	N	L	30	30	150	L	L	5
A986	12- 9-22	.03	N	N	700	1.5	N	L	7	50	100	N	15	5
A037	15- 9-35	---	7	10	100	1	20	10	700	N	200	7	N	50
X044	13- 9-28	---	N	N	1,000	2	L	5	15	30	500	5	10	7
X104	11- 9-30	.2	1,000	L	2,000	N	15	100	20,000	20	2,000	N	10	30
X105	11- 9-30	L	10	L	1,000	N	20	70	7,000	30	2,000	N	10	30
X216	15- 9-12	.02	2	L	50	2	10	5	30	50	100	5	10	20
X217	15- 9-12	.02	2	L	30	5	20	70	20	20	1,000	10	10	30
X218	15- 9-12	.04	1.5	L	70	5	7	N	50	N	1,000	15	L	15
X219	15- 9-12	L	5	N	100	3	5	50	20	N	500	20	10	20
X221	15- 9-12	.02	.5	10	50	3	5	N	5	20	70	N	10	10
X222	15- 9-12	L	10	20	50	3	N	5	50	N	70	15	10	10
X246	15- 9-13	1.4	300	10	70	2	5	5	70	L	150	70	10	10
X249	15- 9-13	.08	15	10	70	2	5	5	15	L	100	70	15	10
X250	15- 9-13	.4	500	L	70	3	5	N	700	L	300	200	10	10
X251	15- 9-13	.4	70	L	100	10	5	N	100	L	300	300	15	10
X252	15- 9-13	.6	200	L	70	3	5	N	150	L	150	150	10	10
X253	15- 9-13	.2	20	L	100	2	7	15	30	L	150	100	30	10
X255	15- 9-13	.08	10	L	50	7	30	20	30	L	>5,000	15	20	20
X256	15- 9-14	L	.5	L	70	1	L	10	10	L	150	15	15	10
X263	15- 9-27	.02	200	L	150	2	5	150	50	20	3,000	70	20	15
X264	15- 9-27	.02	30	L	50	2	L	20	30	L	>5,000	50	15	20
X266	15- 9-27	L	70	L	50	1	20	20	30	L	150	50	15	20
X286	15- 9-27	.1	1,500	10	70	1	5	20	70	20	100	10	30	10
X287	15- 9-27	L	70	10	700	1	L	10	20	L	200	5	20	5
X288	15- 9-26	L	5	10	700	2	20	70	50	20	2,000	N	15	20
X289	15- 9-26	L	2	10	100	2	30	70	20	20	>5,000	10	15	30
X306	16- 9-13	.3	150	N	N	L	N	N	3,000	N	>5,000	50	L	N

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	Remarks
	(ppm)								(percent)		
					Unmineralized[1] rock--Continued						
X523	50	L	10	N	15	70	N	150	1.0	0.1	Rhyolite tuff.
X532	30	N	10	N	10	200	N	150	1	.1	Topaz rhyolite.
X544	20	7	N	300	70	20	N	100	3	.15	Rhyolite tuff.
X547	30	N	20	N	L	100	N	100	1	.05	Topaz rhyolite.
X548	30	N	L	N	10	150	N	150	.7	.05	Do.
X549	30	N	15	N	10	70	N	100	1	.05	Do.
X551	30	N	15	N	10	150	N	200	1	.07	Do.
X553	10	20	N	700	200	30	N	100	7	.7	Andesite.
X554	20	N	10	N	10	50	N	200	1.5	.1	Rhyolite.
X555	30	5	10	N	10	70	N	300	3	.1	Rhyolite tuff.
X561	70	N	70	N	10	70	N	100	1	.05	Tin rhyolite.
					Vein material and mineralized rock						
A023	70	15	N	500	150	50	N	300	5.0	0.7	
A026	500	5	N	300	70	10	300	100	1	.2	
A061	70	15	N	700	200	20	L	150	7	.7	
A062	15,000	N	N	N	15	N	>10,000	N	2	.1	
A116	2,000	15	N	150	300	30	1,000	100	7	.5	
A117	15,000	15	N	200	200	10	2,000	150	10	.7	
A152	200	5	N	N	15	>200	>10,000	200	1.5	.1	
A183	300	>100	70	5,000	1,000	>200	N	>1,000	.7	>1	200 ppm Bi.
A186	10	20	N	N	150	100	N	700	5	.7	
A192	30	10	N	500	200	30	N	70	5	.3	
A212	20,000	15	N	100	300	50	7,000	150	15	.5	<10 ppm Bi, 20 ppm Cd.
A222	>20,000	L	N	N	50	20	>10,000	300	5	.5	200 ppm Cd.
A417	30	L	N	N	30	70	N	200	2	.1	
A551	20,000	N	N	N	30	10	>10,000	30	7	.07	<10 ppm Bi, 300 ppm Cd.
A665	30	10	N	200	70	20	N	150	15	.15	
A977	20	5	N	N	10	30	N	300	1.5	.15	
A980	30	7	N	100	10	30	N	300	3	.15	
A985	30	7	N	100	10	20	N	300	3	.15	
A986	15	7	N	N	L	30	N	200	.7	.15	
X037	200	L	N	N	20	N	N	N	>20	.01	
X044	10	5	N	150	100	20	N	500	2	.2	
X104	70	10	N	500	200	10	200	100	3	.2	
X105	10	7	N	200	150	10	500	70	2	.2	
X216	15	5	N	N	10	50	300	10	2	.03	
X217	15	15	N	N	100	15	N	50	3	.2	
X218	20	5	N	N	50	20	700	20	3	.005	
X219	100	10	N	N	50	20	L	100	2	.15	
X221	15	L	N	N	20	20	N	100	.5	.02	
X222	500	L	30	N	30	L	300	10	7	.02	
X246	1,000	L	N	N	L	N	1,500	15	7	.02	30 ppm Cd.
X249	500	L	N	N	L	L	1,500	N	5	.005	20 ppm Cd.
X250	>20,000	L	N	N	15	10	>10,000	10	1.5	.02	>500 ppm Cd.
X251	2,000	L	N	N	L	10	>10,000	30	3	.02	150 ppm Cd.
X252	3,000	L	N	N	10	15	10,000	N	1.5	.01	100 ppm Cd.
X253	500	10	N	100	50	30	1,000	100	3	.3	20 ppm Cd, 50 ppm W.
X255	700	15	N	N	300	30	1,500	N	20	.03	20 ppm Cd, 200 ppm W.
X256	70	5	N	N	200	70	N	15	3	.015	
X263	1,000	10	N	N	200	20	1,000	150	5	.3	
X264	700	5	N	N	20	15	3,000	50	7	.05	20 ppm Cd.
X266	200	7	N	N	20	L	700	70	2	.7	<20 ppm Cd, <50 ppm W.
X286	1,500	7	N	N	50	30	2,000	1,000	5	.5	20 ppm Cd.
X287	500	5	N	N	70	50	200	500	5	.1	
X288	100	15	N	N	150	50	300	200	5	.7	
X289	30	15	N	100	100	30	200	150	7	.3	
X306	>10,000	L	N	300	N	15	>10,000	N	1	.02	500 ppm Cd.

TABLE 7.—*Analyses of samples from the Black*

Sample	T. R. S. (pl. 2)	Atomic absorption (ppm) Au (0.02)	Semiquantitative spectrographic analyses (ppm) Ag (0.5)	B (10)	Ba (20)	Be (1)	Co (5)	Cr (5)	Cu (5)	La (20)	Mn (20)	Mo (5)	Nb (10)	Ni (5)
			Vein material and mineralized rock--Continued											
X307	16- 9-13	.2	70	L	N	L	N	30	70	N	>5,000	5	L	N
X310	16- 9-17	.1	N	15	150	L	30	50	70	L	2,000	5	10	20
X311	16- 9-17	L	3	20	20	1	50	150	50	150	3,000	5	15	30
X312	16- 9-17	.1	70	L	100	1	30	30	100	50	3,000	20	15	30
X313	16- 9-17	.04	2	15	200	2	30	150	70	70	2,000	7	20	50
X342	11- 9-36	.4	100	10	70	5	N	N	3,000	N	300	N	N	5
X522	12-11-15	.06	N	30	50	3	N	N	L	50	300	20	30	L

Range Primitive Area, New Mexico—Continued

Semiquantitative spectrographic analyses--Continued

Sample	Pb (10)	Sc (5)	Sn (10)	Sr (50)	V (5)	Y (5)	Zn (200)	Zr (10)	Fe (0.05)	Ti (0.002)	Remarks
	(ppm)								(percent)		
	Vein material and mineralized rock--Continued										
X307	1,500	L	N	300	10	N	2,000	N	1.5	0.01	
X310	30	5	N	L	150	70	1,500	100	15	.1	20 ppm Cd.
X311	50	10	N	100	70	100	7,000	150	15	.3	150 ppm Cd.
X312	20,000	7	N	L	70	70	>10,000	70	7	.1	500 ppm Cd.
X313	500	20	N	100	200	150	3,000	200	10	.5	100 ppm Cd.
X342	200	N	N	N	150	N	500	20	.5	.05	
X522	2,000	N	700	N	10	30	500	200	1	.1	15 ppm Bi.

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