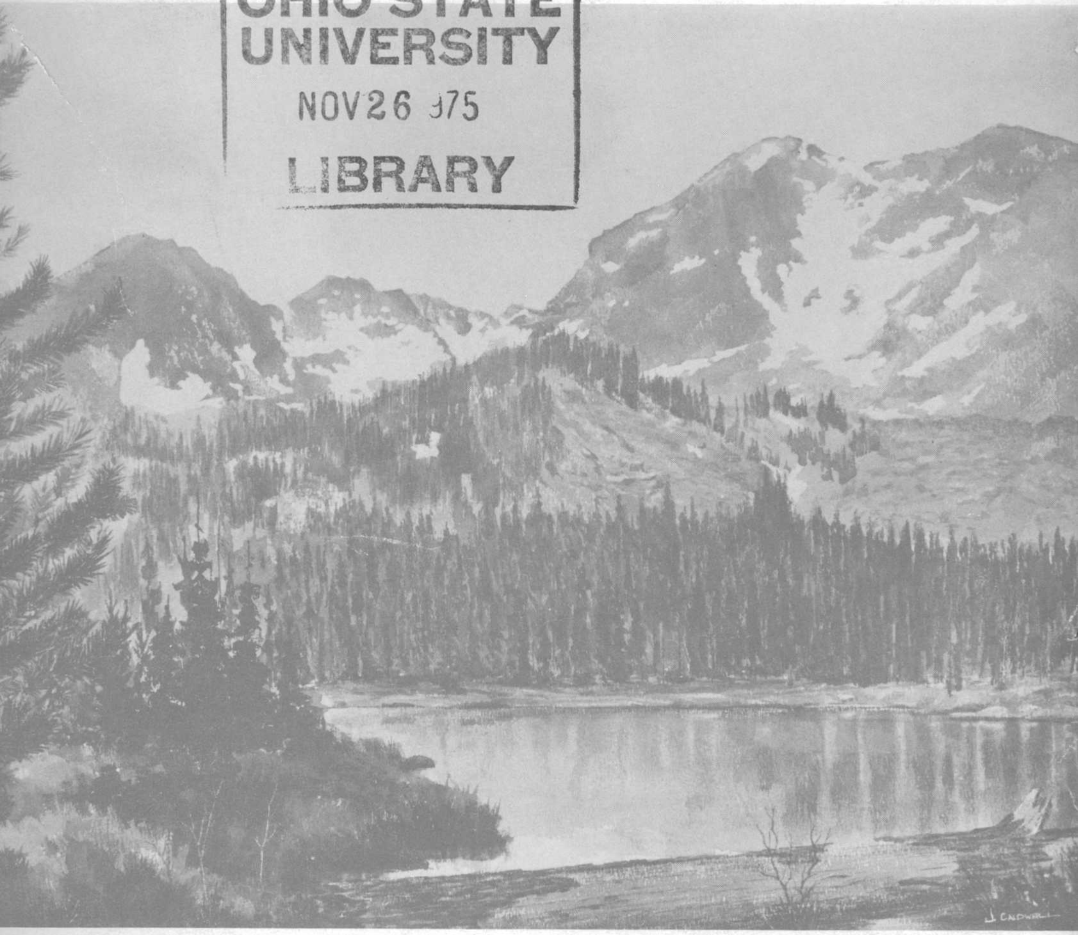
STUDIES RELATED TO WILDERNESS



TETON CORRIDOR, WYOMING

GEOLOGICAL SURVEY BULLETIN 1397-A

Mineral Resources of the Teton Corridor, Teton County, Wyoming

By J. D. Love *and* J. C. Antweiler, U.S. Geological Survey,
and F. E. Williams, U.S. Bureau of Mines

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An evaluation of the mineral potential of the area

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1975

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

V. E. McKelvey, *Director*

Library of Congress Cataloging in Publication Data
Love, John David, 1913-
Mineral resources of the Teton Corridor, Teton County, Wyoming.
(Studies related to wilderness)
(Geological Survey Bulletin 1397-A)
Bibliography: p.
Supt. of Docs. no.: I 19.3:1397-A
1. Mines and mineral resources–Wyoming–Teton Co.
I. Antweiler, J. C., 1918- joint author. II. Williams, Frank E., joint author. III. Title.
IV. Series. V. Series: United States Geological Survey Bulletin 1397-A.
QE75.B9 no. 1397-A [TN24.W8] 557.3'08s [553'.09787'55]

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington, D. C. 20402
Stock Number 024-001-02716-0

STUDIES RELATED TO WILDERNESS

In accordance with the provisions of the Wilderness Act (Public Law 88-577, September 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. The act provided that each area under consideration for wilderness designation should be studied for its suitability for incorporation into the Wilderness System. The mineral surveys constitute one aspect of the suitability studies. This report discusses the results of a mineral survey of some national forest lands in the Teton National Forest, Wyo., that may be considered for wilderness designation. The area studied is east of U.S. Highway 89-287, between Grand Teton and Yellowstone National Parks, and west of the Teton Wilderness.

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By J. D. LOVE and J. C. ANTWEILER, U.S. Geological Survey, and F. E. WILLIAMS, U.S. Bureau of Mines

SUMMARY

A mineral survey of the Teton Corridor, Teton County, Wyoming, was completed by the U.S. Geological Survey and the U.S. Bureau of Mines in 1972. An aeromagnetic and a partial gravity survey were made by the Geological Survey in 1964 and 1965. The Teton Corridor, established by the U.S. Forest Service, consists of 28,160 acres (114 sq km). It lies directly west of the Teton Wilderness and between Yellowstone and Grand Teton National Parks.

The rocks in the Teton Corridor consist of a variety of Mesozoic and Tertiary sedimentary strata overlain unconformably by Pleistocene welded tuffs. The Teton Corridor is unusual in that all but the youngest Pleistocene deposits are involved in major tectonic movements.

These tectonic movements are of two very different types, the first compressional, the second tensional. They were separated by about 65 million years. During the first episode, near the end of the Cretaceous Period, a series of northwest-trending anticlines and synclines, broken and overridden in places by thrust or reverse faults, developed in Cretaceous and underlying rocks. In addition, along the northern border of the Teton Corridor and extending into it for a mile is the southern flank of the Basin Creek uplift, a major upfold that developed in Late Cretaceous time. This fold is largely in the southern part of Yellowstone National Park.

During the Eocene large basalt masses were intruded through Cretaceous and older rocks in the southern part of the Teton Corridor; then about 7,000 feet (2,130 m) of Miocene volcaniclastic strata was deposited. Prior to Pleistocene time the Cretaceous anticlines were eroded but there is no evidence that pre-Cretaceous rocks were exposed in the anticlinal cores. Three miles or more west and southwest of the Teton Corridor, the Teton normal fault system developed, probably in Pliocene time.

About 2 million years ago, Pleistocene rhyolitic welded tuffs flowed southward, downhill, from one or more huge calderas in Yellowstone National Park. These welded tuffs, chiefly the Huckleberry Ridge Tuff, blanketed most of the Teton Corridor.

The second major tectonic event occurred after emplacement of the welded tuffs. Renewed movement took place along the Teton normal fault system, and as a result, the area of the Teton Corridor was tilted westward with the west edge down several thousand feet. The area can be likened to a giant trapdoor, with the hinge somewhere to the east and the down-dropping edge against the Teton fault. The welded tuffs that originally had been nearly horizontal now dip 10°-30° W. During and perhaps following the westward tilting, the welded tuff and underlying rocks were broken by a series of mostly northwest trending normal faults, which have a few tens to a few hundreds of feet displacement.

The entire Teton Corridor area was glaciated one or more times, and as a result, bedrock exposures are covered with extensive deposits of glacial debris, especially in the lower western part. Melt water saturated thick sequences of plastic shale and caused enormous landslides that further obscure the bedrock.

There never have been any lode mines that produced metallic or nonmetallic materials from the rock units cropping out in the Teton Corridor. Gold placer prospects have been worked from time to time along Pilgrim Creek and Snake River.

Six anticlines in the Teton Corridor have a possible oil and gas potential. Each has seven or eight possible producing horizons within a depth range of 1,000–9,800 feet (300–3,000 m). Critical parts of the anticlines are concealed by alluvial debris or by the overlapping Huckleberry Ridge Tuff. The structure beneath the covered areas has not been determined by refraction seismic surveys or core drilling, and as a result, the oil and gas potential is uncertain. The three largest anticlines—Wildcat, Bailey, and Arizona Creek—are considered to have the most favorable potential, and the smaller ones—Kitten, Reid, and Lizard Creek—a somewhat less favorable potential.

Bedrock, stream-sediment, and pan-concentrate samples were collected for chemical and spectrographic analyses. Nearly all samples were analyzed for gold, mercury, and cold extractable heavy metals, and a few were analyzed for platinum. There are minor amounts of gold in gravel along Pilgrim Creek. No appreciable amounts of other metals were found. Coal, bentonite, gypsum, pumicite, phosphate, glauconite, and building stone are in the area, but more accessible deposits of them are present elsewhere in Woming.

INTRODUCTION

This investigation consisted of two parts: the geological, geochemical and geophysical studies by the U.S. Geological Survey, and the evaluation of mining claims and oil and gas leases by the U.S. Bureau of Mines.

The name Teton Corridor (hereinafter referred to as the Corridor) is applied by the U.S. Forest Service (Summary analysis report, June 1, 1972) to an area of 28,160 (114 km^2) acres bounded by the Teton Wilderness, the John D. Rockefeller, Jr., Memorial Parkway (along U.S. Highway 89-287), Yellowstone National Park, and Grand Teton National Park (fig. 1). The north part of the west boundary, adjacent to the Memorial Parkway, had not been precisely established on the ground as of December 1972, but is a short distance east of the highway. As a matter of convenience, the area up to the highway is described in this report.

Details of elevations, topography, drainage, boundaries, and secondary roads are on the geologic map (pl. 1). The area is mountainous, with maximum relief of about 2,700 feet (825 m). U.S. Highway 89-287 skirts the western margin of the Corridor. Secondary roads, built for timber and hunting access, enter the Corridor along Pilgrim Creek, Arizona Lake, Bailey Creek, and Sheffield Creek. Timbering operations have been carried out in the latter three areas. In other parts of the Corridor, the only economic exploitation has been hunting and recreation.

The eastern part of the Corridor is rugged but easily accessible. It is sparsely vegetated, in part because soils lack the nutrients necessary for the growth of dense stands of coniferous trees. Exposures of the soft, rapidly eroding bedrock are good. In contrast, the western part has broad areas of rhyolite welded tuff that contains nutrients sufficient to support dense stands of conifers. As a result, streams are sparse, access is difficult, and exposures are poor. Precipitation in the Corridor ranges from about 30 inches to 45 inches (76–115 cm) (Mundorff and others, 1964, pl. 2). Winters are severe. The lowest temperature recorded at an official weather station in the region was -60°F (-51°C) at Moran, 5 miles south of the Corridor, and the highest was 90°F (32°C) (Becker and Alyea, 1964). Even in mid-July, winter snow remains in the areas near 9,000-foot (2,700-m) elevation.

PREVIOUS STUDIES

The oil and gas possibilities of this area were recognized in the early 1940's by the U.S. Geological Survey. Geologic mapping was begun in the Corridor by Love in 1945 as a part of the U.S. Geological Survey's fuels program. In 1948 and 1949, the Wildcat, Bailey, and Arizona Creek anticlines were mapped in detail, stratigraphic sections were measured, and extensive fossil collections were made (fig. 2; Love, Hose, and others, 1951). Generalized versions of the geologic mapping were published later (Love, Weitz, and Hose, 1955; Love, 1956). Additional mapping and stratigraphic studies were made as a part of the U.S. Geological Survey's gold program between 1965 and 1971 (Antweiler and Love, 1967; Love, 1973), although most of the regional work was done outside the Corridor. An integrated geophysical study comprising gravity, seismic refraction, and aeromagnetic surveys was conducted in 1964 (Behrendt and others, 1968) in Grand Teton National Park and included the Corridor area.

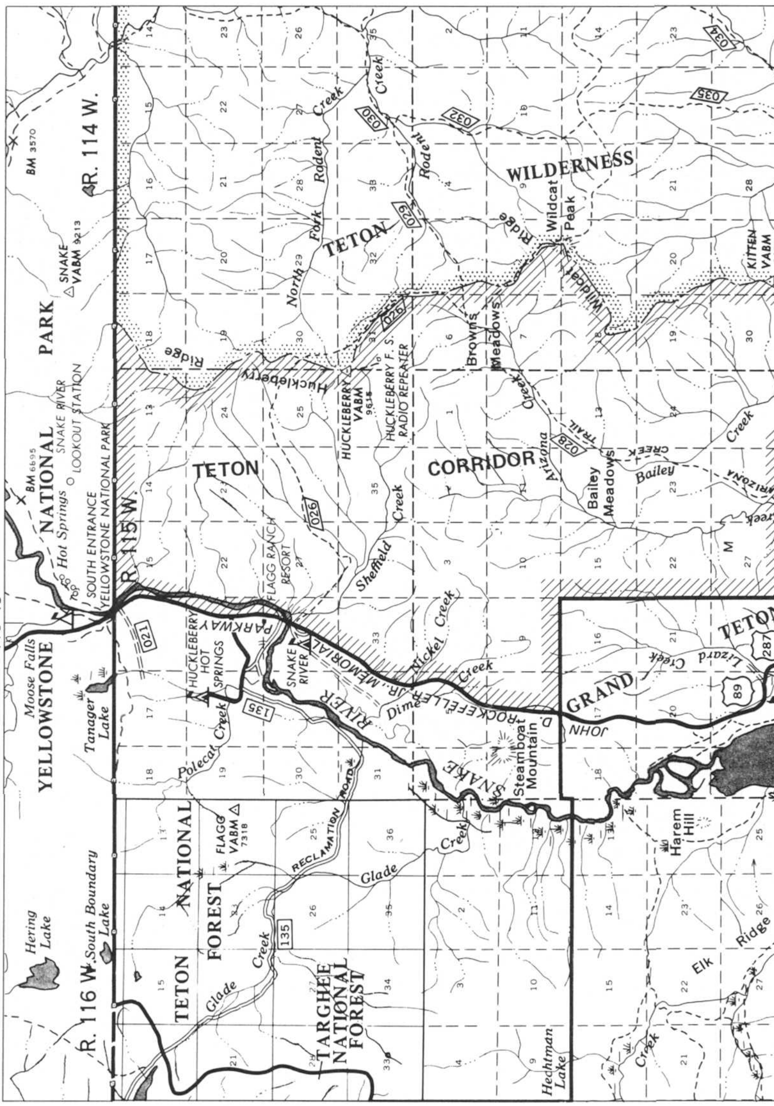
Rhyolitic welded tuffs in the Corridor were mapped and classified by Christiansen and Blank (1972) in connection with the Yellowstone National Park research program. Their classification was used without change in the present study but the mapping was modified.

PRESENT STUDIES

Field investigations specifically pertinent to the Wilderness Program were made in the summer of 1972. Primary emphasis was on obtaining adequate samples for chemical and spectrographic analysis from all mappable rock and alluvial units (pl. 1). These have a total combined thickness of about 17,000 feet (5,200 m). Gaps in geologic mapping and stratigraphic studies from previous work were filled in. In addition, samples of unconsolidated stream-channel debris were collected from many places on all major and most minor drainages. Details of the sampling and analytical program are discussed under that heading.

ACKNOWLEDGMENTS

We are indebted to W. B. Hall and Helaine Walsh for providing low-level stereo air oblique color photography that greatly facilitated location of stratigraphic sections as well as giving a new perspective to the intricate structure of the Corridor. Volunteer field assistance was provided by Ron Antweiler.


YELLOWSTONE NATIONAL PARK
R. 114 W.
R. 115 W.
R. 116 W.
110°40'
TETON WILDERNESS
TETON CORRIDOR
TETON NATIONAL FOREST
TARGHEE NATIONAL FOREST
GRAND TETON
JOHN D. ROCKEFELLER, JR. MEMORIAL PARKWAY
SNAKE RIVER
SOUTH ENTRANCE YELLOWSTONE NATIONAL PARK
SNAKE RIVER LOOKOUT STATION
Hot Springs
Moose Falls
Tanager Lake
Hering Lake
South Boundary Lake
HUCKLEBERRY HOT SPRINGS
FLAGG RANCH RESORT
FLAGG VABM 7318
HUCKLEBERRY VABM 9615
HUCKLEBERRY F. S. RADIO REPEATER
SNAKE VABM 9213
KITTEN VABM 9177
BM 3570
BM 6695
Huckleberry Ridge
Wildcat Peak
Wildcat Ridge
North Fork Rodent Creek
Browns Meadows
Bailey Meadows
Arizona Creek
Bailey Creek
Sheffield Creek
Nickel Creek
Dime Creek
Polecat Creek
Glade Creek
Lizard Creek
Steamboat Mountain
Harem Hill
Elk Ridge
Heckman Lake
RECLAMATION ROAD
TRAIL
ARIZONA CREEK
89
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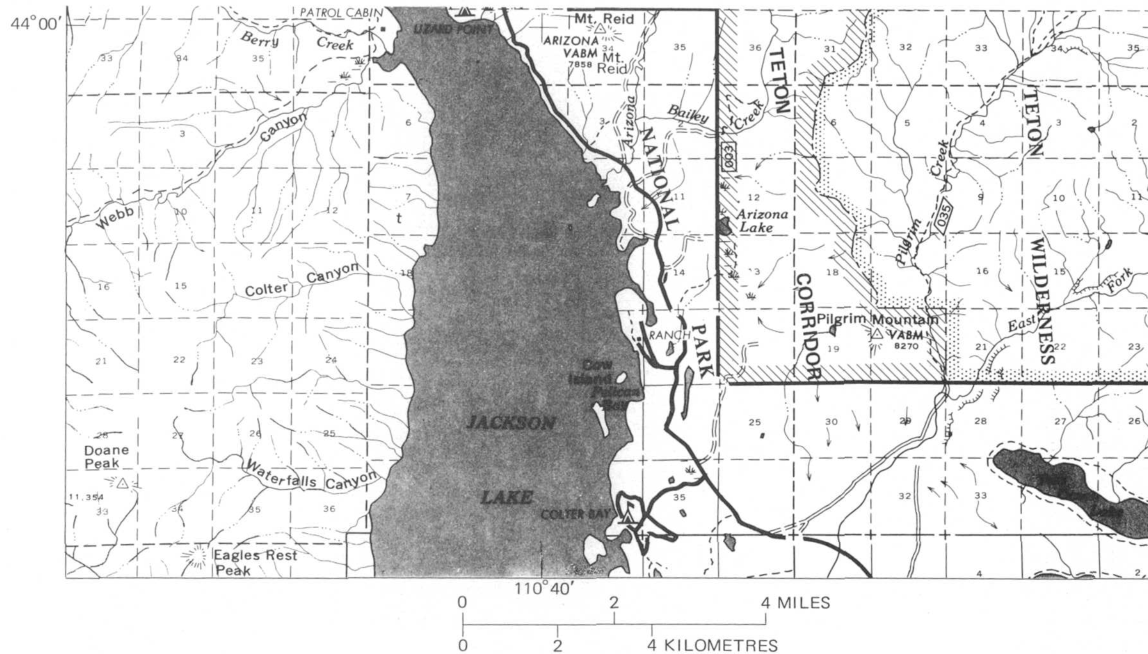


FIGURE 1. Teton Corridor. Base map, east boundary of Teton Corridor, and arbitrary land grid (unsurveyed) are from U.S. Forest Service map of Teton National Forest, 1966. West boundary of report area north of Grand Teton National Park is U.S. Highway 89-287. The west boundary of the Corridor was not precisely established on the ground as of December 1972, but is a short distance east of the highway.

The samples were analyzed in mobile field laboratories of the U.S. Geological Survey by J. G. Viets, A. J. Toevs, G. W. Day, W. D. Crim, and M. A. Lisboa and in the Denver laboratories of the U.S. Geological Survey by J. D. Hoffman, E. F. Cooley, E. Welsch, J. G. Frisken, R. M. O'Leary, and Leon Bradley. Fire assays for the platinum metals were made by R. R. Carlson and E. F. Cooley. Analyses of the coal and black shale samples were made by D. R. Norton, Wayne Mountjoy, I. C. Frost, T. L. Yager, V. E. Shaw, H. G. Neiman, and G. D. Shipley. Mineralogical examinations and identifications on pan-concentrate samples were made by Richard Tripp; this work included precise counting of gold flakes in several samples. The analytical data were computerized and retrieved under the supervision of L. O. Wilch and G. H. Allcott.

We are indebted to R. L. Christiansen for providing unpublished geologic data on the rhyolitic welded tuffs in the Corridor area.

GEOLOGY

By J. D. Love and J. C. Antweiler, U.S. Geological Survey

GEOLOGIC SETTING

A map showing the geology of Yellowstone National Park, directly north of the Corridor, was recently published (U.S. Geol. Survey, 1972). The Teton County geologic map (Love, 1956), though considerably out of date, shows the regional geology south of Yellowstone National Park. A block diagram and cross sections that include the entire Corridor area have also been published (Love, Reed, and others, 1973).

In summary, this is an area of northwest-trending anticlines and synclines of Laramide (Late Cretaceous-early Tertiary) age, etched in Cretaceous rocks. These folds lie between the Basin Creek uplift (the south margin of which is in the northernmost part of the Corridor) and the ancestral Teton Range to the southwest. These structures are overlapped by westward-tilted rhyolite welded tuffs of Pleistocene age that have been considerably faulted as Jackson Hole sank and the Teton Range rose in Pleistocene time.

ROCKS

Descriptions and thicknesses of exposed sedimentary rocks, welded tuffs, and unconsolidated deposits are given on plate 1, and measured sections of Upper Cretaceous rocks are shown in figure 2. Subsurface rocks (those not exposed in the Corridor) are of interest in evaluating the oil and gas, phosphate, and trace elements potential of the Corridor. They are, from youngest to oldest:

Dinwoody Formation (Triassic): siltstone, brown, hard, thin-bedded, marine; 200 feet (61 m) thick.

Phosphoria Formation and related rocks (Permian): Dolomite, gray, cherty, sandy; some black shale and phosphate beds; marine; 200 feet (61 m) thick.

Tensleep Sandstone (Pennsylvanian): Sandstone, light-gray, hard, fine-grained, brittle, cherty, marine; 380 feet (116 m) thick.

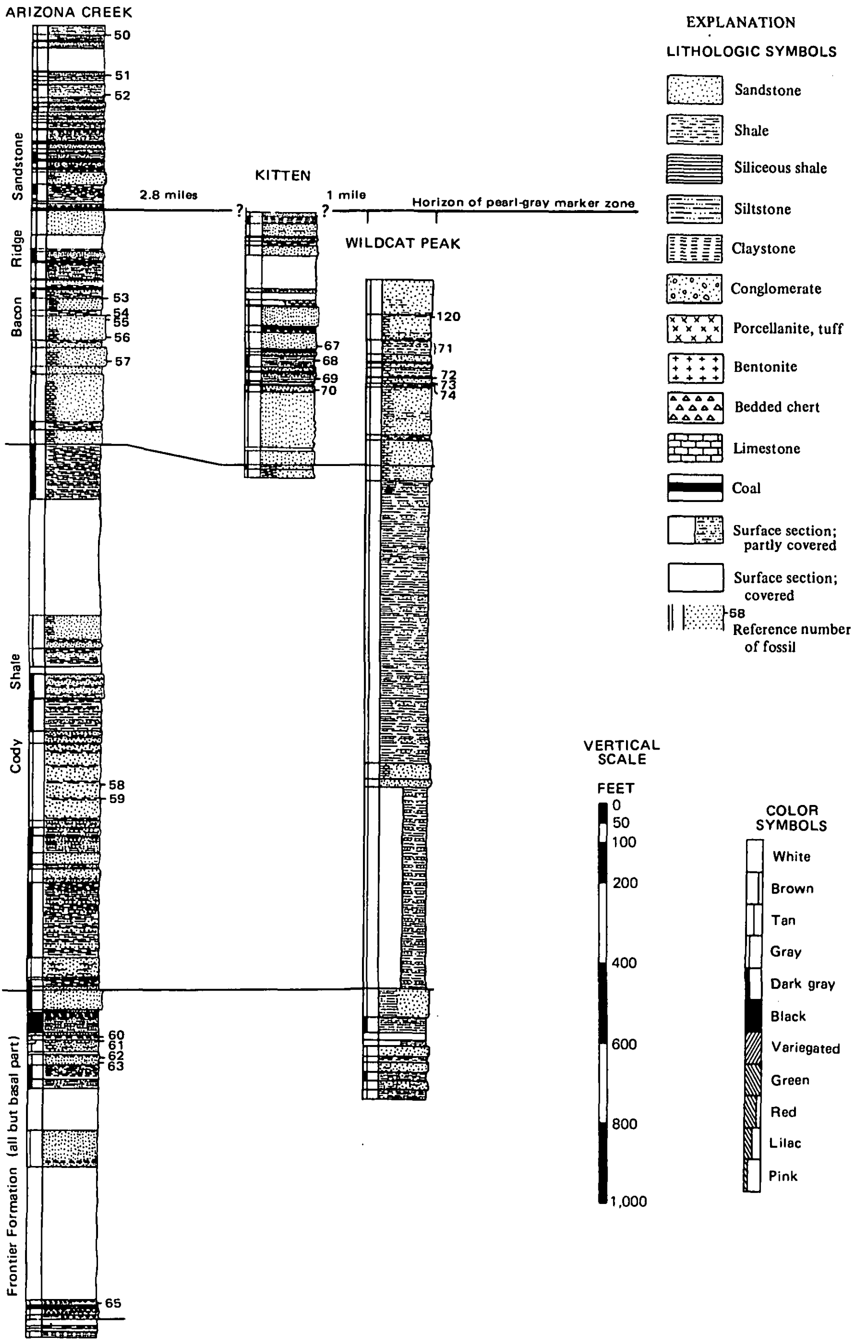


FIGURE 2.—Measured sections of Upper Cretaceous rocks in Teton Corridor, showing correlation, lithology, thickness, and positions of major sandstones, coals, and bentonite beds. Locations of sections are shown on geologic map (pl. 1). Modified from Love, Hose, Weitz, Duncan, and Bergquist (1951); fossil list is shown in original publication.

Amsden Formation (Pennsylvanian and Mississippian): Dolomite, red and green shale, chert, and sandstone; marine; 230 feet (70 m) thick.
Madison Limestone (Mississippian): Limestone, blue-gray, hard, porous, cavernous in part, marine; 1,100 feet (335 m) thick.
Darby Formation (Devonian): Dolomite, dark-gray to brown, fetid, hard, and brown, black, and yellow shale; marine; 250 feet (76 m) thick.
Bighorn Dolomite (Ordovician): Dolomite, light-gray, siliceous, very hard, marine; 400 feet (122 m) thick.
Cambrian rocks: Blue-gray limestone at top, green shale and thick hard limestone in middle; red-brown hard sandstone at base; marine; about 1,000 feet (305 m) thick.

STRUCTURE

Two very different types of major structural episodes involved rocks of the Corridor. The first, and more important for oil and gas potential, was Laramide compressional folding; the second, in late Cenozoic time, was tensional. The age of the compressional folding (fig. 3) is not certain but it was probably latest Cretaceous, although some of it could be early Tertiary. A series of six anticlines—five of them trending northwest, and

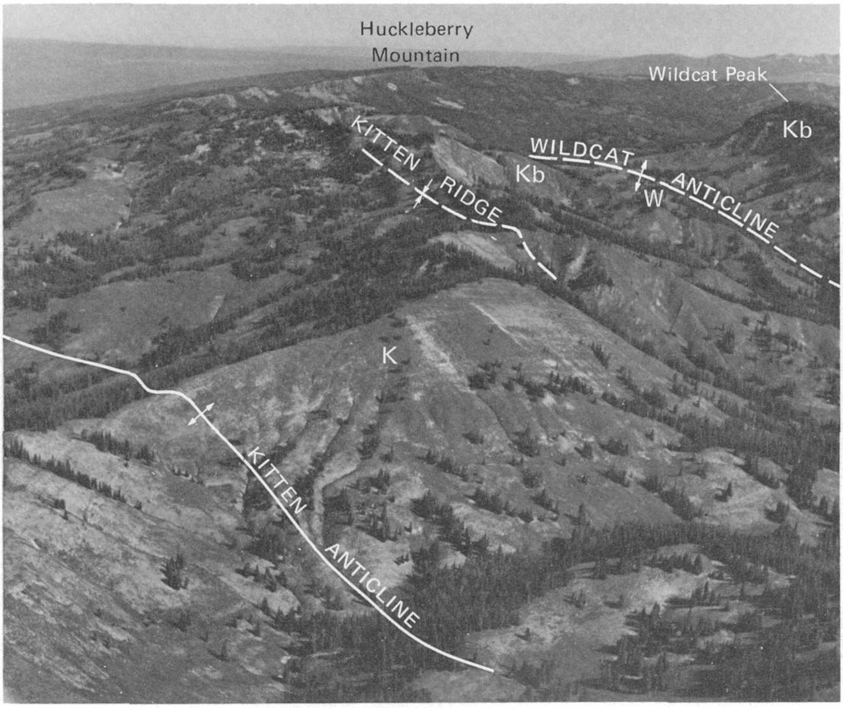


FIGURE 3.—Air oblique view north at folded Cretaceous rocks in the south-central part of the Teton Corridor. Indicated are: K, Kitten anticline in post-Bacon Ridge Cretaceous unnamed lenticular sandstone and shale sequence. W, crestline of Wildcat anticline, with Bacon Ridge Sandstone (Kb) outlining flanks of the fold. Huckleberry Mountain is composed of the Pleistocene Huckleberry Ridge Tuff. Photograph by J. D. Love, July 31, 1965.

one, the Lizard Creek, trending northeast—developed. The three largest and best exposed are the Wildcat (fig. 4), Bailey, and Arizona Creek anticlines. They are asymmetric, with the southwest flanks generally steeper and in places overturned. Thrust or reverse faults developed on the southwest flanks of both Wildcat and Bailey anticlines.

The Late Cretaceous–early Tertiary structural history of the Basin Creek uplift along and, in part, within the northern margin of the Corridor has previously been described (Love and Keefer, 1969) and is similar to that farther south in the Corridor.

The second (tensional) structural episode is of Pleistocene age. Before emplacement of the rhyolite welded Huckleberry Ridge Tuff 2 million years ago (Christiansen and Blank, 1972), the Laramide anticlines were eroded. Plate 1 shows the oldest rocks now exposed in their cores. Probably none was older than Cretaceous.

Basalt intrusive masses, originally thought to be Miocene but now dated as Eocene by a K/Ar age determination received after this report was prepared, rose through Cretaceous and older rocks in the southern part of the Corridor and farther to the east and south; no evidence has been found of significant ore-bearing solutions related to these intrusives. Mafic volcaniclastic rocks, at least 7,000 feet (2,130 m) thick, constituting the Colter Formation were deposited during the Miocene.

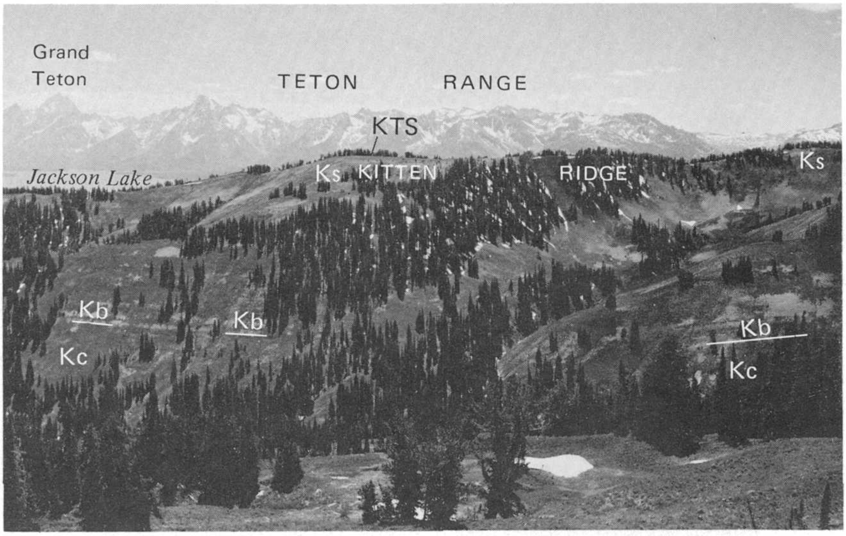


FIGURE 4.—View southwest from Wildcat Peak across southern part of the Teton Corridor toward the Teton Range. Kc, Cody Shale; Kb, basal sandstones in Bacon Ridge Sandstone; Ks, unnamed lenticular sandstone and shale sequence of Cretaceous age, several thousand feet thick; KTS, Kitten triangulation station. The Cretaceous strata dip westward (away from the camera) on the west flank of the Wildcat anticline. Photograph by J. D. Love, July 16, 1972.

Pleistocene welded tuffs, chiefly the Huckleberry Ridge Tuff, flowed southward from a source in Yellowstone National Park (Christiansen and Blank, 1972) and buried most of the Corridor to a depth of several hundred feet. An angular unconformity—locally overturned beds are truncated on the southwest limb of the Wildcat anticline—separates the Laramide folds in Cretaceous rocks from the Huckleberry Ridge Tuff (fig. 5).

After emplacement, the Huckleberry Ridge Tuff was tilted westward (figs. 3, 5) as a result of several thousand feet of downdropping of the Jackson Hole crustal block (the valley block east of the Teton Range) along the Teton normal fault system southwest of the Corridor. At the same time, the Teton Range rose several thousand feet. The Huckleberry Ridge Tuff was broken by many normal faults, most with only a few tens to a few hundreds of feet displacement. Their general trend is northwestward or northward, roughly parallel to the Laramide folds and faults but not coincident with them.

Westward tilting and faulting during Pleistocene time significantly distorted the Laramide structures. To determine their original conformation requires a hypothetical rotation upward and clockwise as much as 30°. The effect of this secondary tilting on oil and gas accumulation and possible tilted water tables is discussed under "Mineral Resources."

GEOMORPHOLOGY AND POST-HUCKLEBERRY RIDGE TUFF QUATERNARY GEOLOGY

After emplacement of the Huckleberry Ridge Tuff 2 million years ago and its subsequent tilting and faulting, came several episodes of glaciation. The glacial deposits in the northern part of the Corridor have been mapped by Richmond and Pierce (1973). Most of the older and larger ice masses moved from centers of accumulation in Yellowstone National Park southward into Jackson Hole (Love, 1961) and cut many conspicuous south-trending, giant, undrained grooves; some are 2–3 miles (3–5 km) long and as much as several hundred feet deep. The ice in some parts of the Corridor must have been more than 2,000 feet (610 m) thick. Somewhere along its pathway outside the Corridor, the ice picked up quartzite cobbles and finer gold-bearing material associated with quartzite conglomerates and scattered this debris in all the drainages of the Corridor. These occurrences are discussed in connection with mineral commodities.

The glacial debris obscures bedrock geology in large areas in the northwestern and southern parts of the Corridor. Another effect of the extensive glaciation was the development of enormous landslides over large areas where soft Cretaceous shales were tilted westward in Pleistocene time. This could be expected, for the oversteepened ice-scoured soft shale slopes saturated with glacial melt water are ideal sites for mass earth movements.

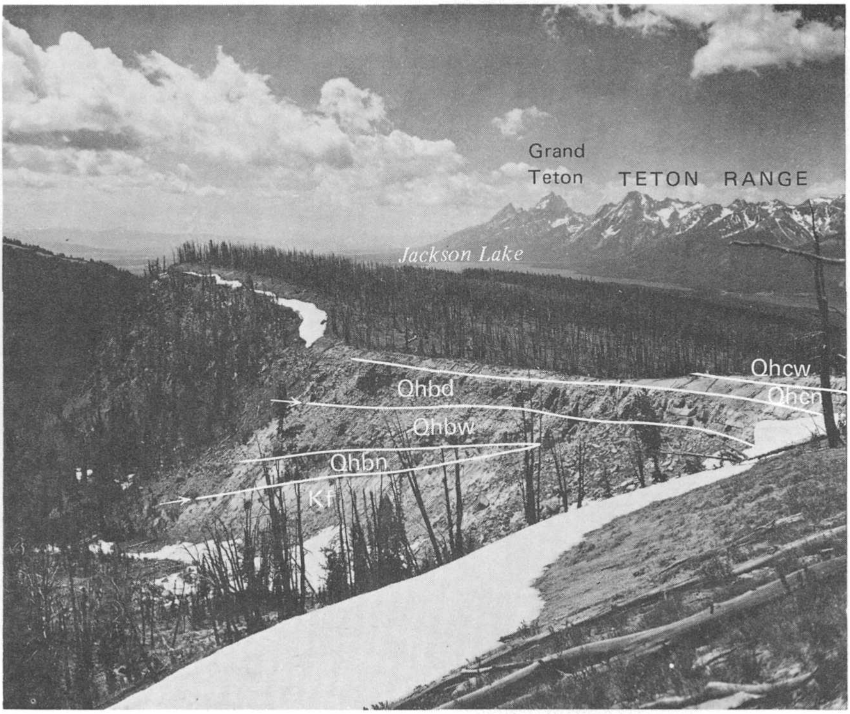


FIGURE 5.—View southwest at the angular unconformities (shown by arrows) between marine sandstone in the Upper Cretaceous Frontier Formation (Kf) and the Pleistocene Huckleberry Ridge Tuff (Qhbn) and within member B of the Huckleberry Ridge Tuff on Huckleberry Mountain. Qhbn, white nonwelded soft crystal-vitric tuff at base of member B; Qhbw, less densely welded rhyolite tuff in member B; Qhbd, more densely welded tuff in member B; Qhcn, nonwelded white tuff at base of member C; Qhcw, welded tuff of member C. Photograph by J. D. Love, July 19, 1972.

The combination of the large remnants of Huckleberry Ridge Tuff, extensive glacial deposits, and large landslides, all in the same general area, has made it impossible to determine the northwestward extent of the Wildcat, Bailey, and Arizona Creek anticlines, and to locate more precisely the Lizard Creek and Reid anticlines.

GEOPHYSICAL DATA

A geophysical study of Grand Teton National Park and adjacent areas was made in 1964 and 1965 (Behrendt and others, 1968). The airborne magnetometer part of the survey covered the entire Corridor and showed no significant anomalies. The results of a gravity traverse up Sheffield Creek, past Huckleberry Mountain and down Bailey Creek, and another along the crest of the Wildcat anticline were not significantly anomalous. Seismic surveys have not been conducted by either the U.S. Geological Survey or oil companies.

MINERAL RESOURCES

SCOPE OF INVESTIGATION

Mineral commodities and nonmetallic materials whose resource potential in the Teton Corridor was investigated are grouped into four categories: (1) oil and gas; (2) metallic mineral deposits, particularly those that may occur in placers, such as gold, platinum, mercury, tin, titanium, and rare earths; (3) bedded deposits of nonmetallic materials such as coal, bentonite, gypsum, phosphorite, glauconite, pumicite, and building stone; and (4) surficial deposits of sand and gravel. In addition, the geothermal resources of the area were evaluated.

HISTORY OF RESOURCE EXPLORATION AND DEVELOPMENT IN THE REGION

There are not now, and never have been, any lode mines that produce metallic or nonmetallic materials from the rock units cropping out in the Corridor. Gold placer prospects have been worked from time to time along Pilgrim Creek and Snake River. (See section by F. E. Williams, this report.) The U.S. Bureau of Reclamation operated a coal mine, in about 1910, in the Mesaverde Formation on Pilgrim Creek, 1 mile (1.6 km) upstream from the Corridor boundary. The Mesaverde does not occur in the Corridor. The coal was used to power equipment for construction of the Jackson Lake dam, 4 miles (6.5 km) south of the Corridor. Later, the U.S. Bureau of Reclamation and private individuals also opened coal mines in the Bacon Ridge Sandstone along Buffalo Fork, 9 miles (14.5 km) southeast of the Corridor.

The crystal-poor part of the Huckleberry Ridge Tuff has, for many years, been used locally for building stone, but all the quarries are south of the Corridor. A large volume of this welded tuff was used as riprap by the U.S. Bureau of Reclamation in construction of the Jackson Lake dam.

No wells have been drilled for oil and gas in the Corridor, although the presence of several of the anticlines shown on plate 1 has long been known. An oil and gas lease was issued in 1946 and relinquished in 1954 along Bailey Creek in the W½SE¼ sec. 13, all of sec. 14, and all of sec. 25 in T. 47 N., R. 115 W. (projected). No drilling was done. According to U.S. Bureau of Land Management records, an oil and gas lease application was still pending as of October 1972, for the S½ sec. 12, all of sec. 13, and the E½ sec. 24 in T. 46 N., R. 115 W. (projected). (See fig. 1.)

One small flammable gas seep is present on the east flank of the Bailey anticline along the east side of Bailey Meadows (indicated on pl. 1). The nearest hole drilled for oil is about 8 miles (13 km) southeast of the Corridor in sec. 29, T. 45 N., R. 113 W. It was drilled to a depth of 4,367 feet (1,331 m) in the Cloverly-Morrison(?) sequence. The five lower potential producing horizons listed in table 1 were not tested.

Prolific oil and gas production has been obtained from anticlines similar to those in the Corridor and from rocks that are lateral equi-

TABLE 1 —*Estimated depths to potential oil and gas reservoir rocks in subsurface parts of anticlines in the Teton Corridor*

[No wells have been drilled on any of these anticlines and no seismic surveys have been made in the area, so the subsurface structure is unknown. Therefore, all figures on thicknesses of rock units in the subsurface and depths to possible reservoir rocks are very tentative estimates. Subsurface dips are not known, and the intervals listed must be considered minimal. They represent stratigraphic thickness at the crestline of the fold and, in the absence of data to the contrary, the arbitrary assumption is made that there has been no flowage or faulting of incompetent beds. Depth figures are computed at the structurally highest visible part of the anticline. Cambrian, Ordovician, and Devonian rocks, having a combined thickness of 1,650 feet (500 m), are not included in this table, because their reservoir characteristics are variable and their production is small in the Bighorn Basin. This does not imply that these rocks have no oil and gas potential in the Corridor area]

Formation or Member	Thickness		Anticlines — Possible depth to top (to nearest 50 feet) of reservoir rocks											
			Wildcat		Bailey		Arizona Creek		Kitten		Reid		Lizard Creek	
	(ft)	(m)	(ft)	(m)	(ft)	(m)	(ft)	(m)	(ft)	(m)	(ft)	(m)	(ft)	(m)
Frontier	1,000	305	Exposed		Exposed		1,000	305	4,900	1,495	1,200	365	Exposed outside Corridor.	
Thermopolis (Muddy Sandstone Member)	50	15	1,400	425	750	230	2,650	810	6,550	1,995	2,850	870	1,150	350
Cloverly (rusty bed member)	150	45	1,550	470	900	275	2,800	855	6,700	2,040	3,000	915	1,300	395
Chugwater (Crow Mountain Sandstone Member)	85	25	2,750	840	2,100	640	4,000	1,220	7,900	2,410	4,200	1,280	2,500	760
Phosphoria and related rocks	200	60	3,850	1,175	3,200	975	5,100	1,555	9,000	2,745	5,300	1,615	3,600	1,100
Tensleep Sandstone	380	115	4,050	1,235	3,400	1,035	5,300	1,615	9,200	2,805	5,550	1,675	3,800	1,160
Amsden (Darwin Sandstone Member)	50	15	4,600	1,400	3,950	1,205	5,850	1,785	9,750	2,970	6,050	1,845	4,350	1,330
Madison Limestone	1,100	335	4,650	1,415	4,000	1,220	5,900	1,800	9,800	2,990	6,100	1,860	4,400	1,340

valents, in the Bighorn Basin, 60 miles (100 km) and more to the east. This, however, does not necessarily mean that oil and gas can be expected in the anticlines in the Corridor. Even larger anticlines 10–25 miles (16–40 km) farther southeast in Jackson Hole have more closure, more potential producing horizons, and bigger flammable gas seeps, and have been tested by about a dozen drill holes. Some of these holes were adequately located from a structural standpoint, and although several encountered oil and gas shows, none were productive. The reasons for the apparent lack of oil and gas accumulation are not known as of 1972, but most of these anticlines have not been adequately tested.

Vitrain reflectance (a measure of the amount of metamorphism of vitrain) studies of many samples of Cretaceous carbonaceous shales in the Corridor area show that none were even moderately metamorphosed, and therefore they have the potential for yielding oil and gas.

The oil and gas potential of the anticlines in the Corridor and of the currently unproductive ones to the southeast in Jackson Hole is probably comparable, because the rocks and geologic history of the structures are approximately the same. If, after thorough surface and geophysical studies and adequate new drilling, the anticlines southeast of the Corridor remain unproductive, those in the Corridor can also probably be considered barren. On the other hand, if oil and gas are eventually produced from the anticlines to the southeast, the potential of those in the Corridor should be reevaluated.

ANTICLINES WITH POSSIBLE OIL AND GAS POTENTIAL

Six anticlines in the Corridor may have some oil and gas potential. As stated previously, this is why the largest ones were mapped in detail by the U.S. Geological Survey in 1948 and 1949 (Love, 1956). Table 1 summarizes the most promising oil and gas reservoir rocks, their thicknesses, and rough estimates as to their depths on each anticline.

Evaluating the oil and gas potential of these anticlines must take many variables into consideration, such as:

1. Age of folding. In general, throughout intermontane basins of the Rocky Mountain region, the old folds (early Laramide) tend to be more prolific producers than the younger. It is postulated that the Corridor anticlines were formed early in the Laramide Revolution, near the end of Cretaceous time, on the basis of data from the Basin Creek uplift along the north margin of the Corridor (Love and Keefer, 1969), and data from the Spread Creek and adjacent anticlines to the southeast (Love, Keefer, and others, 1951).
2. Effects of later tilting. The entire Corridor area was tilted westward 10°–30° in Pleistocene time. To determine the original site of oil and gas accumulation, which is generally on the apex of an anti-

cline, one must rotate each fold in this area upward and clockwise (in a model oriented in the conventional northward direction). The amount of tilting of the original water-oil interface (if any), the amount of oil and gas migration after Pleistocene tilting, and the nature and effects of water drive cannot be determined in an undrilled area. Further complicating the situation is the fact that the anticlines have been involved in two very different types of tectonism widely separated in time. Whether this time interval was sufficient to stabilize the sites of any oil and gas accumulation that may have occurred, and to prevent any Pleistocene migration, is not known. Information on these subjects is critical to correctly evaluate the oil and gas potential of the anticlines.

3. Depth of erosion. None of these anticlines is eroded so deeply that all or most of the oil and gas could have leaked out.
4. Competence of folds. In thrust belt areas of the Rocky Mountain region, some anticlines are formed in incompetent Mesozoic rocks, whereas the underlying Paleozoic rocks are undeformed and have no oil and gas potential. Without drilling, the presence or absence of roots under the Corridor anticlines cannot be confirmed, but the thrust or reverse faults each have displacements of only a few hundred to a few thousand feet. The Basin Creek uplift to the north has exposed roots, and all the anticlines to the southeast in Jackson Hole that have been drilled have Paleozoic rocks in their cores.
5. Adequate source rocks. Devonian, Mississippian, and Permian carbonate rocks exposed on the south flank of the Basin Creek uplift contain conspicuous amounts of hydrocarbons. Cretaceous black shales likewise have a hydrocarbon content adequate for them to be classed as source rocks. Representative of these are thick sections of marine gray Cody Shale that underlie the Arizona Creek, Kitten, and Reid anticlines.
6. Adequate structural traps. The northwestern parts of the Wildcat, Bailey, and Arizona Creek anticlines disappear under the Huckleberry Ridge Tuff. If they are not structurally closed on their northwest ends, one would expect pre-Cretaceous rocks to appear along the Snake River where the tuff cover has been breached but none are known. In addition, the Snake River fault (pl. 1) cuts nearly at right angles across the projected trends of these anticlines. The major movement along this fault, down on the northwest block, is, insofar as can be determined from surface evidence, of Pleistocene age. Therefore, the faulting may be of doubtful significance in establishing meaningful closure on the anticlines. Any oil and gas in the northwest ends of these anticlines might long since have leaked out before development of the Snake River fault if

fault movement were entirely Pleistocene. On the other hand, if the fault followed a Laramide line of weakness (the direction of trend, however, is not typical of the Laramide faults), the Pleistocene movement could merely increase the amount of preexisting closure.

7. Effect of igneous intrusions. No intrusive igneous rocks were observed in the Corridor except for the Eocene basalts in the southernmost part. These rocks are several miles south of the nearest anticlines and probably had no destructive effect on any oil and gas accumulations.

The oil and gas possibilities of the six anticlines are summarized as follows:

Wildcat (fig. 4): The best possibility of the six; broad crest, seven potential reservoir horizons, adequate exposed closure of many thousand feet on three sides; Mowry Shale at northwest end; thrust fault along southwest flank has small displacement; on some similar structures, the faults are conduits for upward migration of oil and gas from overridden source rocks.

Bailey: Fair; similar to Wildcat but narrower; thrust fault along southwest flank apparently increases in displacement northwestward; closure at northwest and southeast ends not clear cut; small flammable gas seep on east flank.

Arizona Creek: Probably second best possibility of the six; not so deeply eroded as Bailey and Wildcat; adequate closure on flanks; northwest and southeast ends not exposed.

Kitten (fig. 3): Problematical; more work should be done on southeast end outside Corridor; northwest end becomes indefinite under large landslide area; less eroded than other anticlines in Corridor.

Reid: Problematical; northern part poorly exposed; southern part disappears under Huckleberry Ridge Tuff in Grand Teton National Park.

Lizard Creek: Problematical; mostly in Grand Teton National Park and barely extends into Corridor; structurally anomalous because trend is at right angle to all other Laramide folds in area; significance of this trend in terms of oil and gas potential is not known.

SAMPLING AND ANALYTICAL PROGRAM

A total of 450 samples were collected and analyzed. Of this number, 316 were selected bedrock samples, 22 were pan concentrates of crushed bedrock, 64 were stream sediments, and 48 were concentrates of stream sediments. Sample localities are shown on plate 2. The complete analyzed data have been published elsewhere (Love and Antweiler, 1973, 1974); selected analyses are in table 2. Sampled rock types were welded tuff, pumicite, limestone, dolomite, conglomerate, sandstone, shale, and claystone. Bedded deposits of coal, phosphorite, gypsum, and glauconite-rich sandstone are exposed in or underlie the area and were sampled wherever they were found.

Samples were collected from all the stratigraphic units that crop out in and adjacent to the Corridor. The only place where satisfactory exposures of upper Paleozoic and lower Mesozoic rocks occur is on the northern slope of Huckleberry Ridge, along and just north of the common boundary between the Teton Corridor and Yellowstone National Park. Inasmuch as these rocks underlie the Corridor, they were sampled in detail even though some sample localities were outside the Corridor boundary.

Most bedrock samples consisted of 1-5 pounds (0.5-2 kg) of chips or rock fragments that were selected because they seemed to have the strongest possibility of containing minerals of economic interest. For example, sandstones having visible magnetite layers or numerous pyrite concretions were preferentially sampled, as were conglomeratic rocks, glauconitic sandstones, and black shales. In places where strata were cut by igneous intrusives, the rocks on both sides of the contact were sampled in detail.

Except in a few areas, systematic channel sampling was not done, but many samples are composites of a succession of chips taken across an outcrop. Many bedrock samples were pulverized either in the field or in the laboratory and then panned to determine if gold or other heavy minerals, that are not routinely detectable in spectrographic or chemical analyses of small samples, occurred in amounts great enough to be of interest.

Stream-sediment samples were taken along all major streams and most minor ones in the area. Silt, particularly that caught by moss or roots of vegetation at the edges of streams, was preferentially sampled, but stream sediments such as gravel and sand from bars in low- and high-water channels were also sampled. At most places where stream sediments were collected, one or more pans of the same kind of material were concentrated by panning to obtain material for gold analysis or mineralogical examination or both. Analyses of the unconcentrated stream-sediment samples were made of the minus-80-mesh material obtained by bulk sieving the sample. Gold analyses of the panned samples (table 2) were made by analyzing the entire pan concentrate that was left after using 10 mg for spectrographic analysis, 100 mg for mercury determination, and 100 mg for cold-extractable heavy-metals analysis.

Quartzite conglomerate and related sedimentary rocks of northwestern Wyoming are known to be gold bearing (Antweiler and Love, 1967). Moreover, placer claims were filed in 1970 (see section by F. E. Williams, this report) along U.S. Highway 89-287 that borders the western margin of the Corridor. All but 16 of the samples, whether bedrock, stream sediment, or panned concentrate, were analyzed for gold and all but 4 for mercury, by atomic-absorption techniques.

Eighteen samples were collected specifically for platinum assays from localities thought most likely to be favorable for platinum occurrences. These samples were assayed by a combination fire-assay-spectrographic technique. By this technique the platinum metals are collected in a gold bead by conventional fire-assay procedures; the bead is then analyzed by semiquantitative spectrographic analysis.

The cold-extractable heavy-metals test (cxHM) was used to detect unusual amounts of copper, lead, zinc, and cobalt. Sodium and potassium were determined by flame photometry on about half the samples. These determinations may be useful in correlation of trace elements, in comparison of marine versus nonmarine sediments, and in specific units, for suggestions of metasomatism. All samples were scanned for anomalous radioactivity to detect the possible presence of uranium or thorium, but no samples were found that suggested the desirability of testing further for these metals. Coal and black shale samples were analyzed for ash, sulfur, mercury, and carbon content, and semiquantitative spectrographic analyses were made on the ash. Detailed mineralogical examinations were made on about 20 pan-concentrate samples to determine whether any placer minerals were present in sufficient amounts to enhance low values in gold.

The chemical and spectrographic data were stored on magnetic tape and are available from the National Technical Information Service (Love and Antweiler, 1973); they have also been published elsewhere (Love and Antweiler, 1974). The analytical results of most samples are within the ranges of data from the analyses of similar rock types elsewhere around the earth, but some elements in some samples, as might be anticipated, exceed crustal-abundance averages (Taylor, 1964). The analyses of most interest for resource potential are compiled in table 2, in which the value for at least one of the following 19 elements or the cxHM test is equal to or exceeds the amount listed:

Ti	1 percent	Be	20 ppm	Ni	100 ppm	Zn	500 ppm
Mn	3,000 ppm	Cr	500 ppm	Pb	70 ppm	Zr	1,000 ppm
Ag	1 ppm	Cu	70 ppm	Sn	15 ppm	Au	.05 ppm
B	200 ppm	Mo	15 ppm	V	200 ppm	Hg	.10 ppm
Ba	3,000 ppm	Nb	70 ppm	Y	100 ppm	cxHM	7 ppm

The figures for the above elements mostly exceed crustal abundances (Taylor, 1964), but the presence of these or greater amounts in a sample does not necessarily indicate resource value. Generally, continuity of values much higher than these must be established to suggest resource potential.

GOLD

No evidence was found of economic deposits of gold within the Teton Corridor, except possibly on Pilgrim Creek, where stream gravels contain small (10–60 microns) ragged thin flakes of gold (fig. 6). Finely divided gold occurs in small amounts in gravel along the Snake River and many of its tributaries. These streams have been prospected unsuccessfully for more than 100 years. The source of gold in these gravels is quartzite conglomerate and sandstone in the Harebell Formation, Pinyon Conglomerate, and other formations (Antweiler and Love, 1967). No bedrock occurrences of gold-bearing quartzite conglomerate have been found in the Corridor.

Quaternary deposits, such as terrace gravel along the Snake River, alluvium and fan deposits along Arizona and Bailey Creeks, and some glacial debris, have quartzite cobbles and therefore may be expected to have some gold. However, the nearest bedrock outcrops of quartzite conglomerate upstream along the Snake River and its tributaries are more than 20 stream miles (32 km) distant from where the Quaternary samples were taken. It seems unlikely that there would be stream transport of enough gold to produce economic deposits from these extremely low grade outcrops.

Our sampling and analytical results bear out this assumption. Even at Snake River Hot Springs, 6 stream miles (10 km) upstream from the northwest corner of the Corridor, a natural concentration of heavy minerals (visible concentrations of magnetite and garnet) along the Snake River yielded only 131 flakes of gold per pan. The weight of 131 flakes of gold at this locality was 1.10 mg (milligrams). At this rate of recovery, a cubic yard of this naturally concentrated gold-bearing magnetite would

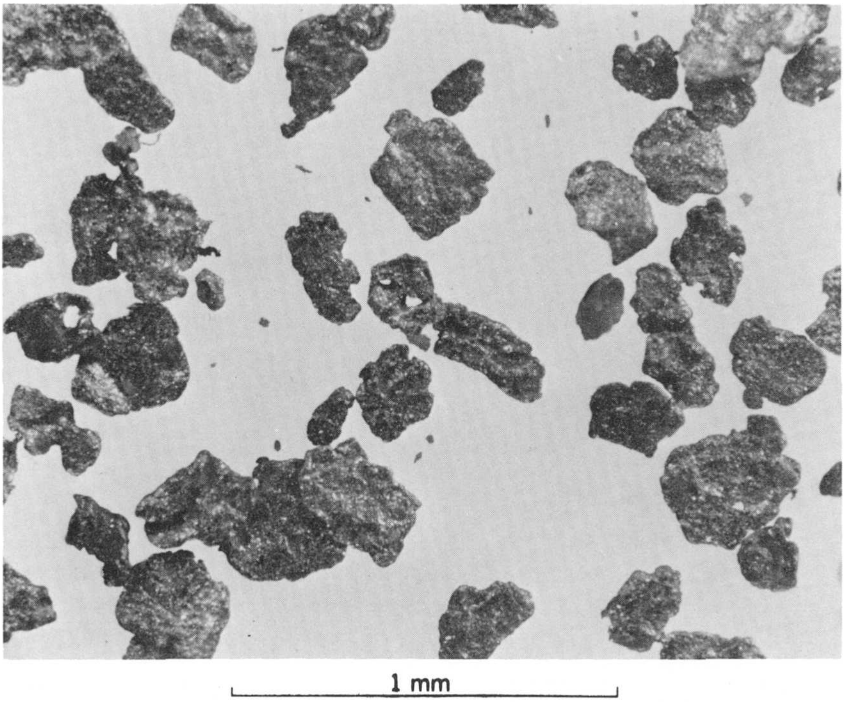


FIGURE 6.—Typical flakes of placer gold from alluvial gravel derived chiefly from the Harebell Formation. Locality is on East Fork of Pilgrim Creek, 2 miles (3 km) east of Corridor. Gold in gravel on Pilgrim Creek within Corridor has same size and appearance. Note ragged edges, pitted surfaces, and holes in the thin flakes. Magnification X50.

TABLE 2.—*Selected chemical and spectrographic analyses of samples from the Teton Corridor and adjacent areas*

[Values shown are in parts per million, except titanium, which is in percent. G, greater than; N, not detected at lower limits of detection; L, less than lower limit of detection as shown; and B, not determined. Gold and mercury analyses were made by atomic-absorption spectrometry; cold-extractable heavy-metals test (cxHM) by colorimetric comparison; other elements by six-step semiquantitative spectrographic analyses. These elements 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 bedrock samples are arranged in stratigraphic order by formation or other mappable unit with the youngest listed first. (See explanation accompanying geologic map, plate 1.)]

SAMPLE	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-CR	S-CU	S-MO	S-NB
BEDROCK SAMPLES. IGNEOUS + PYROCLASTICS										
B-20	0.50	500.00	0.50N	10.00L	1000.00	2.00	100.00	150.00	5.00N	10.00N
B-51	0.10	500.00	0.50N	10.00L	1000.00	2.00	10.00N	5.00	5.00N	50.00
B-53	0.10	200.00	0.70	10.00L	1000.00	2.00	10.00N	5.00	5.00N	70.00
B-19	0.70	500.00	0.50N	10.00L	2000.00	1.00	100.00	200.00	5.00N	10.00N
L72-37A	0.20	100.00	0.50N	10.00L	1000.00	2.00	10.00N	10.00	5.00N	70.00
L72-62-5	0.15	500.00	0.50N	10.00L	700.00	3.00	10.00N	20.00	5.00L	70.00
L72-62-3	0.10	200.00	0.50N	10.00L	300.00	3.00	10.00N	70.00	5.00L	30.00
L72-62-6	0.15	500.00	1.50	10.00L	2000.00	1.50	10.00N	20.00	5.00N	20.00
L72-62-2	0.10	500.00	1.50	10.00L	200.00	5.00	10.00N	10.00	5.00L	70.00
L72-62-7	0.10	200.00	1.50	10.00L	700.00	1.50	10.00N	10.00	5.00L	30.00
L72-62-1	0.20	1000.00	0.50N	10.00	500.00	2.00	30.00	5.00	5.00N	10.00N
L72-77-1	0.10	150.00	0.50N	10.00L	500.00	2.00	10.00L	10.00	5.00N	30.00
B-94	0.10	2000.00	1.00	30.00	200.00	10.00	100.00	10.00	5.00N	30.00
B-95GLAS	0.10	1000.00	1.00	30.00	150.00	10.00	70.00	10.00	5.00N	30.00
B-102	0.10	70.00	0.50N	30.00	70.00	1.00	70.00	15.00	5.00N	10.00N
B-103	0.50	3000.00	0.50N	100.00	150.00	7.00	70.00	50.00	5.00	10.00
B-106	0.02	1500.00	0.50N	20.00	20.00N	10.00	10.00N	50.00	5.00N	30.00
B-209	0.50	1000.00	0.50	10.00L	2000.00	1.00N	300.00	50.00	5.00N	10.00
B-210	0.50	1000.00	0.50	10.00L	2000.00	1.00N	300.00	50.00	5.00N	10.00
B-235	0.10	300.00	0.50N	10.00L	700.00	2.00	15.00	5.00	5.00N	30.00
B-240	0.10	300.00	1.00	10.00L	700.00	2.00	10.00N	5.00	5.00N	30.00
B-267	0.10	300.00	0.50N	10.00	1500.00	5.00	10.00N	5.00	5.00	30.00
B-268	0.10	300.00	0.50N	20.00	1000.00	5.00	10.00N	5.00L	10.00	50.00
B-269	0.10	300.00	0.50N	10.00	1000.00	7.00	10.00N	10.00	10.00	70.00
B-271	0.10	300.00	0.50N	10.00	700.00	7.00	10.00N	10.00	5.00	50.00
B-294	0.20	500.00	0.50N	10.00	700.00	5.00	10.00N	5.00	10.00	70.00
B-295	0.10	500.00	0.50N	20.00	700.00	5.00	10.00N	20.00	10.00	50.00
B-296	0.10	300.00	0.50N	20.00	700.00	7.00	10.00N	20.00	10.00	70.00
B-296A	0.10	300.00	0.50N	20.00	700.00	5.00	10.00N	15.00	5.00	70.00
B-297	0.10	300.00	0.50N	20.00	500.00	7.00	10.00N	15.00	10.00	70.00
L72-216	0.50	300.00	0.50N	50.00	1000.00	2.00	150.00	15.00	5.00N	20.00N
L72-140	0.10	300.00	0.50N	15.00	500.00	5.00	10.00N	7.00	10.00	50.00
L72-198A	0.10	300.00	0.50N	20.00	500.00	5.00	10.00N	20.00	10.00	50.00
L72-198B	0.10	1000.00	0.50N	10.00	2000.00	5.00	10.00N	10.00	5.00	30.00
L72-198C	0.07	300.00	0.50N	20.00	700.00	5.00	10.00N	20.00	10.00	50.00
L72-198D	0.10	300.00	0.50N	10.00	700.00	3.00	10.00N	20.00	10.00	50.00
L72-198E	0.10	300.00	0.50N	10.00	700.00	3.00	10.00N	5.00	5.00	30.00
L72-149C	0.10	300.00	0.50N	10.00	300.00	7.00	10.00N	15.00	5.00N	70.00

BEDROCK SAMPLES. COLTER FORMATION

L72-36	0.50	1000.00	0.50N	10.00L	2000.00	1.00	500.00	50.00	5.00N	10.00N
B-263A	0.70	1500.00	0.50N	10.00	2000.00	1.00	300.00	70.00	5.00N	20.00N
B-272	0.10	300.00	0.50N	20.00	1000.00	7.00	10.00N	20.00	5.00	30.00
B-273	0.70	1000.00	0.50N	10.00	2000.00	1.00	500.00	50.00	5.00N	20.00
B-274	0.70	1000.00	0.50N	30.00	2000.00	1.00	500.00	50.00	5.00N	20.00N

BEDROCK SAMPLES. PINYON CONGLOMERATE

B-16	0.20	100.00	2.00	10.00	500.00	1.00N	20.00	30.00	5.00N	10.00N
L71-150A	0.20	3000.00	0.50N	50.00	700.00	1.00	70.00	20.00	5.00N	20.00N

BEDROCK SAMPLES. HAREBELL FORMATION

B-29	0.50	5000.00G	0.50N	10.00	500.00	1.00N	150.00	5.00	5.00N	10.00
L72-43CL	0.50	500.00	1.50	20.00	700.00	1.00	70.00	30.00	5.00N	10.00
B-236	0.50	5000.00	0.50N	10.00L	300.00	1.00N	100.00	7.00	5.00N	10.00N
B-239	0.50	5000.00G	0.50N	10.00L	200.00	1.00N	70.00	10.00	5.00N	10.00N
B-241	0.30	5000.00G	0.50N	10.00L	300.00	1.00N	70.00	5.00	5.00N	10.00N
B-28	1.00G	5000.00G	0.50N	10.00N	300.00	1.00N	1000.00	70.00	5.00N	20.00

BEDROCK SAMPLES MESAVERDE FORMATION

B-2	0.20	200.00	1.00	10.00	200.00	1.00L	30.00	10.00	5.00N	10.00N
B-4	0.10	50.00	0.50	20.00	200.00	1.00N	20.00	10.00	30.00	10.00N
B-11	0.20	300.00	0.50N	10.00	500.00	1.00	30.00	5.00	5.00N	10.00N
B-13	0.10	30.00	0.50	20.00	300.00	1.00N	10.00	10.00	7.00	10.00N
B-1A	0.10	30.00	0.50N	20.00	500.00	1.00N	10.00	10.00	15.00	10.00N
L72-21	0.05	5000.00G	0.50N	10.00L	200.00	1.00	10.00	5.00	5.00N	10.00N
B-25	0.30	3000.00	0.50N	100.00	700.00	2.00	100.00	20.00	5.00N	20.00L
L71-150B	0.30	1500.00	0.50N	50.00	500.00	2.00	70.00	5.00	5.00N	20.00L
L72-226	0.30	700.00	0.50N	100.00	700.00	1.00	150.00	20.00	5.00N	20.00N
B26	0.20	300.00	0.0 N	50.00	700.00	0.0 N	50.00	20.00	0.0 N	0.0 N
B-5	0.20	300.00	0.0 N	500.00	3000.00	10.00	70.00	70.00	20.00	0.0 N

BEDROCK SAMPLES BACON RIDGE SS AND LENTICULAR SS AND SHALE SEQUENCE

B-32	0.10	2000.00	0.50N	10.00	500.00	1.00L	20.00	5.00	5.00N	10.00N
B-36	0.10	200.00	1.50	10.00	300.00	1.00N	20.00	7.00	5.00N	10.00N
L-72-42	0.30	300.00	0.0 N	500.00	7000.00	50.00	50.00	100.00	0.0 N	0.0 N

BEDROCK SAMPLES. CODY SHALE

L72-214	0.50	700.00	0.50N	300.00	1000.00	2.00	100.00	20.00	5.00N	20.00

BEDROCK SAMPLES. FRONTIER FORMATION

B-46	0.20	700.00	1.00	10.00	300.00	1.00L	15.00	5.00	5.00N	10.00N
B-72	0.20	50.00	0.50	10.00L	700.00	1.00L	15.00	30.00	5.00N	10.00N
B-178	0.10	150.00	1.50	10.00	1000.00	2.00	10.00	5.00L	5.00N	30.00
B-290	0.30	500.00	0.50N	150.00	1000.00	2.00	100.00	20.00	10.00	20.00L
B-291	0.20	300.00	0.50N	200.00	700.00	5.00	10.00N	5.00L	20.00	30.00
B-293	0.30	5000.00G	0.50N	150.00	700.00	3.00	10.00N	5.00L	10.00	70.00
L72-205	0.10	1000.00	0.50N	100.00	500.00	2.00	50.00	5.00L	5.00N	20.00N
L72-152	0.20	500.00	0.50N	20.00	1000.00	1.00	20.00	5.00L	5.00N	20.00L

TABLE 2.—*Analyses of samples*—Continued

SAMPLE	S-NI	S-PB	S-SN	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	INST-HG	CM-CX-HM
BEDROCK SAMPLES. IGNEOUS + PYROCLASTICS										
B-20	30.00	30.00	10.00N	150.00	15.00	200.00N	200.00	0.05N	0.03	1.00L
B-51	5.00L	30.00	10.00N	10.00	70.00	200.00N	200.00	0.15	0.03N	1.00L
B-53	5.00L	30.00	10.00N	10.00	50.00	200.00N	200.00	0.05N	0.03N	1.00L
B-19	30.00	50.00	10.00N	200.00	10.00	200.00N	200.00	0.05N	0.03	1.00L
L72-37A	5.00	30.00	10.00N	10.00	70.00	200.00N	300.00	0.05N	0.03	1.00L
L72-62-5	5.00	70.00	15.00	10.00	100.00	200.00N	200.00	0.05N	0.03	5.00
L72-62-3	5.00	70.00	15.00	10.00	70.00	200.00N	200.00	0.05N	0.03L	5.00
L72-62-6	5.00L	30.00	10.00L	10.00	50.00	200.00L	200.00	0.05L	0.06	1.00
L72-62-2	10.00	100.00	15.00	15.00	70.00	200.00N	200.00	0.05L	0.03N	9.00
L72-62-7	5.00L	15.00	10.00L	10.00	70.00	200.00N	200.00	0.05N	0.03	1.00
L72-62-1	7.00	15.00	10.00N	100.00	30.00	200.00N	200.00	0.05N	0.03	7.00
L72-77-1	5.00	50.00	15.00	10.00	70.00	200.00N	150.00	0.05N	0.03	1.00
B-94	20.00	20.00	10.00N	30.00	70.00	200.00N	100.00	0.05N	0.06	9.00
B-95GLAS	10.00	30.00	10.00	30.00	70.00	200.00N	70.00	0.05N	0.03N	7.00
B-102	5.00	10.00L	10.00N	30.00	50.00	200.00L	70.00	0.05N	0.03	7.00
B-103	50.00	70.00	10.00N	100.00	50.00	700.00	200.00	0.05N	0.10	100.00G
B-106	5.00	10.00	10.00	10.00	20.00	200.00N	10.00	0.05N	0.03L	7.00
B-209	100.00	20.00	10.00N	100.00	20.00	200.00N	150.00	0.05L	0.03	3.00
B-210	100.00	10.00	10.00N	100.00	20.00	200.00N	100.00	0.05N	0.06	3.00
B-235	5.00	30.00	10.00	10.00	70.00	200.00N	200.00	0.06	0.03L	3.00
B-240	5.00L	20.00	10.00	10.00	70.00	200.00N	200.00	0.05N	0.03N	1.00
B-267	10.00	50.00	10.00N	10.00	70.00	200.00N	200.00	0.05N	0.24	1.00L
B-268	15.00	50.00	15.00	10.00	100.00	200.00N	200.00	0.05N	0.02	1.00N
B-269	15.00	70.00	15.00	70.00	100.00	200.00N	200.00	0.05N	0.06	1.00N
B-271	15.00	70.00	10.00	10.00	70.00	200.00N	200.00	0.05N	0.02L	1.00N
B-294	5.00	50.00	10.00N	10.00	70.00	200.00N	300.00	0.05N	0.02L	3.00
B-295	5.00	70.00	15.00	10.00	100.00	200.00N	200.00	0.05N	0.06	1.00N
B-296	10.00	100.00	10.00	10.00	100.00	200.00N	300.00	0.05N	0.02L	1.00N
B-296A	5.00	70.00	10.00	10.00	100.00	200.00N	200.00	0.05N	0.02	1.00N
B-297	5.00	70.00	10.00	10.00	100.00	200.00N	150.00	0.05N	0.02L	1.00N
L72-216	70.00	30.00	10.00N	200.00	30.00	200.00N	200.00	0.05N	0.02N	1.00
L72-140	5.00	70.00	10.00	10.00L	100.00	200.00N	200.00	0.05N	0.02N	1.00N
L72-198A	10.00	100.00	10.00	10.00	100.00	200.00N	150.00	0.05N	0.02N	1.00L
L72-198B	10.00	50.00	10.00N	15.00	100.00	200.00	150.00	0.05N	0.02L	4.00
L72-198C	10.00	70.00	10.00	10.00L	100.00	200.00N	150.00	0.05N	0.02N	3.00
L72-198D	10.00	70.00	15.00	10.00L	100.00	200.00N	150.00	0.05N	0.02N	1.00N
L72-198E	10.00	50.00	10.00	10.00L	70.00	500.00	150.00	0.05N	0.02N	3.00
L72-149C	10.00	70.00	10.00	10.00	50.00	200.00N	300.00	0.05N	0.02L	1.00N
BEDROCK SAMPLES. COLTER FORMATION										
L72-36	70.00	15.00	10.00N	200.00	20.00	200.00N	70.00	0.05N	0.03	1.00L
B-263A	50.00	50.00	10.00N	150.00	30.00	200.00N	200.00	0.05N	0.02L	1.00
B-272	15.00	50.00	15.00	10.00	100.00	200.00N	300.00	0.05N	0.02	1.00N
B-273	70.00	30.00	10.00N	200.00	30.00	200.00N	150.00	0.05N	0.02	1.00N
B-274	70.00	30.00	10.00N	200.00	30.00	200.00N	150.00	0.05N	0.02	1.00N

BEDROCK SAMPLES. PINYON CONGLOMERATE

B-16	5.00	10.00N	10.00N	30.00	15.00	200.00N	300.00	0.05N	0.06	1.00L
L71-150A	30.00	20.00	10.00N	70.00	30.00	200.00N	150.00	0.05N	0.06	1.00

BEDROCK SAMPLES. HAREBELL FORMATION

B-29	5.00	10.00	10.00N	200.00	30.00	200.00N	300.00	0.30	0.03	3.00
L72-43CL	20.00	30.00	10.00N	100.00	30.00	200.00N	200.00	0.05N	0.03N	1.00L
B-236	5.00	15.00	10.00	200.00	20.00	200.00N	500.00	0.05L	0.03L	25.00
B-239	5.00	15.00	10.00	200.00	30.00	200.00N	500.00	0.16	0.03	14.00
B-241	7.00	15.00	10.00	200.00	20.00	200.00N	500.00	0.28	0.03L	40.00
B-28	50.00	20.00	10.00N	2000.00	150.00	200.00N	500.00	0.05N	0.02L	7.00

BEDROCK SAMPLES MESAVERDE FORMATION

B-2	10.00	15.00	10.00N	70.00	15.00	200.00N	200.00	0.05N	0.03L	3.00
B-4	20.00	20.00	10.00N	50.00	10.00	200.00N	100.00	0.05N	0.80	3.00
B-11	5.00	10.00	10.00N	100.00	20.00	200.00N	200.00	0.05N	0.06	10.00
B-13	70.00	10.00	10.00N	30.00	10.00	200.00N	100.00	0.05N	1.80	3.00
B-1A	70.00	15.00	10.00N	70.00	10.00	200.00N	50.00	0.05N	2.30	2.00
L72-21	5.00	10.00	10.00N	20.00	30.00	200.00N	10.00	0.05L	0.03N	1.00L
B-25	70.00	30.00	10.00N	200.00	70.00	200.00N	200.00	0.05N	0.18	5.00
L71-150B	50.00	30.00	10.00N	150.00	70.00	200.00N	150.00	0.05N	0.08	7.00
L72-226	50.00	50.00	10.00N	150.00	50.00	200.00	150.00	0.05N	0.10	3.00
B26	10.00	30.00	0.0 N	100.00	0.0 N	0.0 N	100.00	0.0 B	0.12	0.0 B
B-5	50.00	30.00	0.0 N	100.00	100.00	0.0 N	150.00	0.0 B	0.06	0.0 B

BEDROCK SAMPLES BACON RIDGE SS AND LENTICULAR SS AND SHALE SEQUENCE

B-32	5.00	10.00	10.00N	50.00	15.00	200.00N	200.00	0.05	0.03	1.00L
B-36	5.00	15.00	10.00N	50.00	20.00	200.00N	200.00	0.05N	0.03	1.00L
L-72-42	30.00	30.00	0.0 N	100.00	150.00	0.0 N	150.00	0.0 B	0.09	0.0 B

BEDROCK SAMPLES. CODY SHALE

L72-214	70.00	30.00	10.00N	200.00	30.00	200.00	150.00	0.05N	0.06	5.00

BEDROCK SAMPLES. FRONTIER FORMATION

B-46	5.00	10.00	10.00N	70.00	10.00	200.00N	200.00	0.05N	0.03	1.00
B-72	5.00L	15.00	10.00N	30.00	10.00	200.00N	200.00	0.05	0.06	1.00
B-178	5.00L	20.00	10.00	20.00	30.00	200.00N	200.00	0.05N	0.03	3.00
B-290	30.00	30.00	10.00N	100.00	30.00	200.00N	200.00	0.05N	0.04	7.00
B-291	50.00	50.00	10.00	50.00	70.00	200.00N	200.00	0.05N	0.04	9.00
B-293	5.00	30.00	10.00N	20.00	70.00	200.00N	700.00	0.05N	0.02L	1.00N
L72-205	20.00	15.00	10.00N	200.00	30.00	200.00L	70.00	0.05N	0.02L	3.00
L72-152	20.00	15.00	10.00N	70.00	20.00	200.00L	100.00	0.05N	0.45	3.00

TABLE 2.—*Analyses of samples*—Continued

SAMPLE	S-TI %	S-MN	S-AG	S-B	S-BA	S-BE	S-CR	S-CU	S-MO	S-NB
BEDROCK SAMPLES. MOWRY SHALE										
B-64	0.20	70.00	0.50N	20.00	500.00	1.00	20.00	5.00	5.00N	10.00N
B-65	0.05	2000.00	0.50N	10.00L	2000.00	2.00	10.00	7.00	5.00N	10.00N
B-66	0.10	1000.00	0.50N	10.00L	500.00	1.00	10.00	7.00	5.00N	10.00N
B-68	0.20	5000.00	0.50	10.00	700.00	1.00	15.00	10.00	5.00N	10.00N
B-163	0.30	200.00	1.00	50.00	500.00	2.00	20.00	7.00	5.00N	10.00
B-165	0.20	700.00	0.50	70.00	500.00	2.00	10.00N	5.00L	5.00N	30.00
B-173	0.20	100.00	0.50L	50.00	300.00	2.00	10.00N	5.00L	5.00N	15.00
B-281	0.10	300.00	0.50N	200.00	700.00	7.00	10.00	5.00L	15.00	30.00
B-283	0.20	150.00	0.50N	100.00	500.00	3.00	70.00	15.00	5.00	20.00L
B-284	0.10	2000.00	0.50N	20.00	5000.00G	2.00	10.00N	5.00L	5.00N	20.00
B-285	0.10	1000.00	0.50N	70.00	700.00	7.00	10.00N	5.00L	5.00N	30.00
BEDROCK SAMPLES. MUDDY SANDSTONE MEMBER										
B-158	0.20	5000.00	0.50N	20.00	1500.00	1.00L	20.00	5.00	5.00N	10.00N
B-162	0.20	1000.00	0.50N	70.00	300.00	1.00L	10.00	10.00	5.00N	10.00N
L72-154-5	0.20	5000.00G	0.50N	50.00	700.00	1.00	70.00	5.00	5.00N	20.00L
BEDROCK SAMPLES. THERMOPOLIS SHALE										
B-83	0.10	5000.00G	0.50N	10.00N	150.00	1.00N	15.00	5.00	5.00N	10.00N
B-84	0.50	150.00	0.50N	70.00	500.00	2.00	70.00	20.00	5.00N	10.00
B-155	0.50	5000.00	0.50N	100.00	700.00	2.00	100.00	50.00	5.00N	10.00
B-157	0.30	500.00	1.00	100.00	500.00	1.00	70.00	10.00	5.00N	10.00N
BEDROCK SAMPLES. CLOVERLY AND MORRISON(?) FORMATIONS										
B-85	0.70	150.00	0.50N	70.00	300.00	1.00L	50.00	10.00	5.00N	10.00
B-134	0.50	2000.00	0.50N	20.00	500.00	1.00	20.00	20.00	5.00N	10.00
B-135	0.20	5000.00	0.50N	10.00	150.00	1.00N	20.00	5.00	5.00N	10.00N
B-146	0.20	3000.00	5.00	10.00L	1000.00	1.00N	10.00	5.00	5.00N	10.00N
B-147	0.05	5000.00	0.50N	10.00L	150.00	1.00N	10.00	5.00	5.00N	10.00N
B-148	0.30	200.00	0.50N	70.00	200.00	1.00	30.00	15.00	5.00N	10.00N
B-149	0.10	5000.00	0.50N	10.00L	200.00	1.00N	15.00	5.00	5.00N	10.00N
B-151	0.20	500.00	2.00	20.00	150.00	1.00N	10.00	5.00	5.00N	10.00N
L72-154-7	0.30	5000.00G	0.50N	20.00	1500.00	1.00	50.00	10.00	5.00N	20.00
BEDROCK SAMPLES "UPPER SUNDANCE"										
B-74	0.10	1000.00	0.50N	10.00L	500.00	1.00N	15.00	5.00	5.00N	10.00N
B-75	0.20	1000.00	1.00	50.00	200.00	1.00L	70.00	7.00	5.00N	10.00N
B-132	0.20	150.00	0.50	20.00	200.00	1.00	30.00	10.00	5.00N	10.00N
B-190	0.20	700.00	1.00	70.00	150.00	1.00	50.00	10.00	5.00N	10.00N
B-194	0.30	2000.00	1.50	30.00	300.00	1.00	50.00	20.00	5.00N	10.00N
B-204	0.02	2000.00	0.50N	10.00N	150.00	1.00N	10.00N	5.00L	5.00L	10.00N

				BEDROCK SAMPLES. "LOWER SUNDANCE"						
B-128	0.10	700.00	0.50N	10.00L	1500.00	1.00N	10.00	5.00	15.00	10.00N
B-205	0.05	300.00	1.00	10.00L	20.00	1.00N	10.00	5.00L	5.00N	10.00N
				BEDROCK SAMPLES. GYPSUM SPRING FORMATION						
B-215	0.01	20.00	1.00	10.00N	20.00N	1.00N	10.00N	5.00N	5.00N	10.00N
				BEDROCK SAMPLES. POPO AGIE MEMBER OF CHUGWATER FORMATION						
B-118	0.50	300.00	0.50N	200.00	200.00	1.00	70.00	10.00	5.00N	10.00
B-119	0.10	5000.00	0.50N	10.00	150.00	1.00N	10.00	10.00	5.00N	10.00N
				BEDROCK SAMPLES. CROW MOUNTAIN SANDSTONE MEMBER OF CHUGWATER FORMATION						
B-218	0.20	500.00	0.50N	10.00	200.00	1.00L	15.00	5.00	5.00N	10.00N
				BEDROCK SAMPLES. ALCOVA LIMESTONE MEMBER OF CHUGWATER FORMATION						
B-224	0.20	200.00	1.50	10.00	150.00	1.00L	15.00	15.00	5.00N	10.00N
				BEDROCK SAMPLES. RED PEAK MEMBER OF CHUGWATER FORMATION						
B-112	0.50	300.00	0.70	30.00	200.00	1.00L	50.00	20.00	5.00N	10.00
B-216	0.50	300.00	1.00	20.00	200.00	1.00L	50.00	7.00	5.00N	10.00N
				BEDROCK SAMPLES. DINWOODY FORMATION						
B-107	0.20	5000.00G	0.50N	50.00	200.00	1.00	50.00	10.00	5.00N	10.00N
B-108	0.20	2000.00	0.50N	50.00	200.00	1.00	50.00	20.00	5.00N	10.00N
				BEDROCK SAMPLES. PHOSPHORIA FORMATION						
B-93	0.05	700.00	0.50N	10.00	70.00	1.00	20.00	5.00	5.00N	10.00N
				BEDROCK SAMPLES. TENSLEEP SANDSTONE						
B-90	0.10	200.00	0.50N	10.00L	50.00	1.00N	10.00	7.00	5.00N	10.00N
				BEDROCK SAMPLES. AMSDEN FORMATION						
B-87	0.30	2000.00	0.50N	20.00	200.00	1.00N	70.00	100.00	5.00N	10.00N
				CONCENTRATES OF BEDROCK SAMPLES						
B-3C	0.20	200.00	0.50N	10.00L	150.00	1.00N	10.00	5.00L	5.00N	10.00N
B-8C	0.70	150.00	0.50N	10.00L	150.00	1.00N	10.00	5.00L	5.00N	10.00
B-10C	0.30	1000.00	0.50N	10.00L	200.00	1.00N	2000.00	10.00	5.00N	10.00N
B-11C	1.00G	2000.00	0.50N	50.00	150.00	1.00N	200.00	15.00	5.00N	50.00

TABLE 2.—*Analyses of samples*—Continued

SAMPLE	S-NI	S-PB	S-SN	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	INST-HG	CM-CX-HM
BEDROCK SAMPLES. MOWRY SHALE										
B-64	5.00	10.00	10.00N	100.00	10.00	200.00N	100.00	0.05L	0.03L	9.00
B-65	5.00	10.00	10.00N	50.00	200.00	200.00N	70.00	0.05N	0.03L	5.00
B-66	5.00	10.00L	10.00N	20.00	30.00	200.00N	200.00	0.05	0.03	3.00
B-68	7.00	10.00	10.00N	50.00	30.00	200.00N	200.00	0.10	0.03	60.00
B-163	7.00	15.00	10.00N	100.00	30.00	200.00N	300.00	0.05N	0.03L	1.00
B-165	5.00L	70.00	15.00	10.00	30.00	200.00N	150.00	0.05N	0.06	1.00
B-173	5.00L	50.00	15.00	20.00	30.00	200.00N	200.00	0.05N	0.06	1.00
B-281	20.00	70.00	10.00	30.00	70.00	200.00N	200.00	0.05N	0.16	5.00
B-283	30.00	30.00	10.00	150.00	30.00	200.00N	150.00	0.05N	0.10	7.00
B-284	15.00	30.00	10.00N	10.00	20.00	200.00N	200.00	0.05N	0.10	3.00
B-285	20.00	30.00	10.00	30.00	20.00	200.00N	100.00	0.05N	0.08	7.00
BEDROCK SAMPLES. MUDDY SANDSTONE MEMBER										
B-158	7.00	10.00	10.00N	70.00	20.00	200.00N	200.00	0.05N	0.03	3.00
B-162	5.00	10.00N	10.00N	20.00	30.00	200.00N	1000.00G	0.05N	0.03L	1.00
L72-154-5	30.00	20.00	10.00N	70.00	30.00	200.00N	200.00	0.05N	0.04	1.00
BEDROCK SAMPLES. THERMOPOLIS SHALE										
B-83	5.00	10.00L	10.00N	20.00	10.00	200.00N	10.00	0.05N	0.03	3.00
B-84	20.00	15.00	10.00N	200.00	30.00	200.00N	200.00	0.05N	0.10	11.00
B-155	50.00	30.00	10.00N	200.00	50.00	200.00N	200.00	0.05N	0.06	7.00
B-157	20.00	15.00	10.00N	200.00	30.00	200.00N	200.00	0.05N	0.10	3.00
BEDROCK SAMPLES. CLOVERLY AND MORRISON(?) FORMATIONS										
B-85	5.00	10.00L	10.00N	70.00	50.00	200.00N	1000.00	0.05N	0.03	1.00
B-134	5.00	10.00L	10.00N	30.00	30.00	200.00N	1000.00	0.05N	0.03L	7.00
B-135	5.00	10.00	10.00N	30.00	20.00	200.00N	70.00	0.05N	0.03L	1.00
B-146	5.00L	10.00	10.00N	20.00	20.00	200.00N	70.00	0.05N	0.06	1.00
B-147	5.00L	10.00N	10.00N	20.00	10.00N	200.00N	10.00	0.05N	0.03	1.00
B-148	15.00	10.00	10.00N	150.00	20.00	200.00N	100.00	0.05N	0.06	7.00
B-149	5.00	10.00	10.00N	50.00	10.00	200.00N	50.00	0.05N	0.03	1.00
B-151	5.00	10.00N	10.00N	20.00	20.00	200.00N	300.00	0.05N	0.03	7.00
L72-154-7	20.00	30.00	10.00N	70.00	30.00	200.00N	150.00	0.05N	0.02L	3.00
BEDROCK SAMPLES "UPPER SUNDANCE"										
B-74	5.00	10.00	10.00N	20.00	20.00	200.00N	70.00	0.05	0.03	1.00
B-75	5.00	15.00	10.00N	500.00	50.00	200.00N	300.00	0.05	0.03L	1.00
B-132	5.00	10.00L	10.00N	70.00	20.00	200.00N	700.00	0.05N	0.03	7.00
B-190	30.00	10.00	10.00N	70.00	20.00	200.00N	70.00	0.05N	0.03L	1.00
B-194	20.00	100.00	10.00N	100.00	20.00	200.00N	200.00	0.05N	0.03	1.00
B-204	5.00N	10.00N	10.00N	10.00	10.00	200.00N	10.00	0.05N	0.03N	7.00

				BEDROCK SAMPLES. "LOWER SUNDANCE"						
B-128	20.00	70.00	10.00N	10.00	10.00	200.00L	10.00	0.05N	0.06	5.00
B-205	5.00L	10.00L	10.00N	10.00	10.00N	200.00N	10.00	0.05N	0.03L	3.00
				BEDROCK SAMPLES. GYPSUM SPRING FORMATION						
B-215	5.00N	10.00N	10.00N	10.00	10.00N	200.00N	10.00N	0.05L	0.10	1.00
				BEDROCK SAMPLES. POPO AGIE MEMBER OF CHUGWATER FORMATION						
B-118	20.00	10.00	10.00N	70.00	50.00	200.00N	700.00	0.05L	0.03	1.00
B-119	5.00	10.00	10.00N	70.00	50.00	200.00N	70.00	0.05L	0.03	7.00
				BEDROCK SAMPLES. CROW MOUNTAIN SANDSTONE MEMBER OF CHUGWATER FORMATION						
B-218	5.00	10.00L	10.00N	20.00	10.00	200.00N	200.00	0.05L	0.03L	7.00
				BEDROCK SAMPLES. ALCOVA LIMESTONE MEMBER OF CHUGWATER FORMATION						
B-224	5.00	15.00	10.00N	30.00	20.00	200.00N	100.00	0.05N	0.03N	3.00
				BEDROCK SAMPLES. RED PEAK MEMBER OF CHUGWATER FORMATION						
B-112	15.00	10.00N	10.00N	200.00	30.00	200.00N	500.00	0.05N	0.03N	1.00
B-216	10.00	10.00	10.00N	70.00	30.00	200.00N	500.00	0.05N	0.03N	1.00
				BEDROCK SAMPLES. DINWOODY FORMATION						
B-107	15.00	15.00	10.00N	70.00	15.00	200.00N	70.00	0.05N	0.03N	7.00
B-108	20.00	10.00	10.00N	70.00	10.00	200.00N	70.00	0.05N	0.03	9.00
				BEDROCK SAMPLES. PHOSPHORIA FORMATION						
B-93	5.00	10.00L	10.00N	10.00	20.00	200.00N	70.00	0.05N	0.03N	9.00
				BEDROCK SAMPLES. TENSLEEP SANDSTONE						
B-90	5.00L	10.00N	10.00N	10.00	10.00N	200.00N	500.00	0.05N	0.03L	9.00
				BEDROCK SAMPLES. AMSDEN FORMATION						
B-87	15.00	10.00	10.00N	30.00	50.00	200.00N	1000.00	0.05L	0.03L	7.00
				CONCENTRATES OF BEDROCK SAMPLES						
B-3C	5.00	10.00N	10.00N	20.00	20.00	200.00N	150.00	0.35	0.05L	3.00
B-8C	5.00	10.00N	10.00N	50.00	20.00	200.00N	1000.00G	16.00	0.05	1.00
B-10C	100.00	10.00N	10.00N	200.00	20.00	200.00N	50.00	0.20	0.05	1.00
B-11C	5.00	10.00	10.00N	150.00	500.00	200.00N	1000.00G	0.05L	0.05L	5.00

TABLE 2.—*Analyses of samples*—Continued

SAMPLE	S-TI%	S-MN	S-AG	S-B	S-BA	S-BE	S-CR	S-CU	S-MO	S-NB
CONCENTRATES OF BEDROCK SAMPLES										
B-14C	0.70	150.00	0.50N	10.00L	150.00	1.00N	10.00	5.00L	5.00N	10.00
B-22C	0.20	2000.00	0.50N	10.00L	1000.00	1.00N	1500.00	10.00	5.00N	10.00N
B-2C	0.20	150.00	0.50	10.00L	200.00	1.00L	30.00	5.00	5.00N	10.00N
C-71	0.70	1000.00	0.50N	10.00L	500.00	1.00N	300.00	5.00	5.00N	20.00L
C-73	1.00G	2000.00	0.50N	30.00	300.00	1.00N	300.00	30.00	5.00N	30.00
C-75	0.70	1000.00	0.50N	10.00L	1000.00	1.00L	700.00	10.00	7.00	20.00L
B-265C	0.70	1500.00	0.50N	10.00	500.00	1.00N	1500.00	30.00	5.00N	20.00N
B-266C	1.00	1000.00	0.50N	10.00	300.00	1.00N	70.00	5.00	5.00N	30.00
B-273C	0.30	1000.00	0.50N	10.00L	700.00	1.00N	2000.00	30.00	5.00N	20.00N
B-285C	0.20	500.00	0.50N	50.00	1000.00	2.00	70.00	15.00	5.00N	20.00
B-286C	0.10	500.00	0.50N	70.00	700.00	2.00	70.00	5.00	5.00N	20.00L
B-287C	0.50	500.00	0.50N	70.00	1000.00	1.00	70.00	50.00	5.00N	20.00
B-288C	0.20	300.00	0.50N	70.00	700.00	1.00	70.00	5.00	5.00N	20.00
B-268C	0.20	300.00	0.50N	50.00	700.00	5.00	200.00	15.00	15.00	70.00
B-269C	1.00	700.00	0.50N	50.00	1500.00	2.00	500.00	30.00	30.00	70.00
B-17C	1.00	1000.00	0.50N	70.00	300.00	1.00N	70.00	15.00	5.00N	30.00
B-23C	0.50	1000.00	0.50N	50.00	700.00	1.00	500.00	30.00	5.00N	20.00N
STREAM SEDIMENT SAMPLES										
A-1	0.50	300.00	0.70	10.00	700.00	1.00L	70.00	5.00	5.00N	10.00
A-3	0.50	500.00	0.50	10.00	500.00	1.00L	50.00	10.00	5.00N	10.00
A-4	1.00	1500.00	0.50	10.00L	500.00	1.00N	100.00	5.00	5.00N	20.00
A-5	0.20	300.00	1.00	30.00	500.00	1.00L	15.00	5.00	5.00N	10.00N
A-13	0.50	500.00	0.50N	10.00	500.00	1.00L	30.00	5.00	5.00N	20.00
A-14	0.30	200.00	0.50N	10.00	500.00	1.00N	30.00	15.00	5.00N	10.00
A-15	0.20	300.00	0.50N	10.00	500.00	1.00N	15.00	7.00	5.00N	10.00N
A-16	0.20	200.00	0.70	10.00	500.00	1.00N	15.00	5.00	5.00N	10.00N
A-18	0.50	500.00	0.50N	10.00	500.00	1.00	70.00	10.00	5.00N	20.00
A-20	0.50	1500.00	0.50N	10.00L	500.00	1.00L	50.00	10.00	5.00N	10.00
A-19M	0.50	500.00	0.50N	10.00	500.00	1.00N	30.00	7.00	5.00N	10.00
A-19G	0.50	300.00	0.50N	20.00	500.00	1.00L	70.00	10.00	5.00N	10.00
A-9	0.50	500.00	0.50N	10.00	500.00	1.00L	30.00	10.00	5.00N	10.00
A-2	0.70	500.00	0.50N	10.00	500.00	1.00N	30.00	15.00	5.00N	20.00
L72-122	0.70	300.00	2.00	10.00L	2000.00	1.00N	100.00	50.00	5.00N	30.00
A-24	0.20	200.00	0.50N	20.00	500.00	1.00L	20.00	5.00	5.00N	10.00N
A-26	0.30	200.00	0.50N	30.00	500.00	1.00	20.00	5.00	5.00N	10.00
A-27	0.20	1000.00	1.00	20.00	700.00	1.00	20.00	7.00	5.00N	10.00
A-31	0.30	500.00	0.50N	50.00	700.00	1.00L	50.00	15.00	5.00N	20.00
A-33	0.50	1500.00	0.50N	50.00	500.00	1.00	70.00	20.00	5.00N	10.00
A-38	0.30	1000.00	0.50N	20.00	700.00	1.00	70.00	20.00	5.00N	20.00
A-39	0.20	500.00	0.50N	20.00	500.00	1.00	30.00	5.00	5.00N	10.00
A-41	0.30	200.00	0.50N	50.00	700.00	3.00	70.00	20.00	5.00N	10.00
A-43	0.50	300.00	0.50N	10.00	700.00	1.00L	100.00	10.00	5.00N	30.00
A-47	0.20	150.00	0.50N	10.00	500.00	1.00L	10.00	5.00	5.00N	10.00N
A-52	0.20	500.00	0.50	10.00L	1000.00	1.00	10.00	7.00	5.00N	20.00
A-53	0.20	300.00	0.50N	10.00	700.00	1.50	15.00	7.00	5.00N	10.00

A-56	0.50	500.00	0.50N	15.00	500.00	1.00L	200.00	20.00	5.00N	10.00
A-8	0.20	5000.00G	0.50N	10.00	3000.00	2.00	20.00	15.00	20.00	10.00N
A-86	0.70	1000.00	0.50N	50.00	700.00	1.00	100.00	20.00	5.00N	30.00
A-87	1.00	1000.00	0.50N	50.00	700.00	2.00	500.00	20.00	20.00	70.00
					CONCENTRATES					
A-1C	1.00G	5000.00	0.50N	10.00	70.00	1.00N	300.00	30.00	5.00N	30.00
A-4C	1.00G	5000.00	0.50N	10.00L	70.00	1.00N	300.00	50.00	5.00N	50.00
A-5C	1.00G	2000.00	0.50N	10.00L	150.00	1.00N	200.00	30.00	5.00N	30.00
A-6C	1.00	300.00	0.50N	10.00L	150.00	1.00N	10.00	5.00L	5.00N	30.00
A-6C MG	1.00G	5000.00	100.00	20.00	100.00	1.00N	200.00	20.00	5.00N	30.00
A-7C	1.00G	3000.00	0.50N	10.00	200.00	1.00N	300.00	5.00	5.00N	50.00
A-8C	1.00G	2000.00	0.50N	20.00	200.00	1.00N	70.00	5.00	5.00N	30.00
A-9C	1.00G	5000.00	0.50N	10.00L	70.00	1.00N	200.00	10.00	5.00N	30.00
A-11C	1.00	1500.00	0.50N	10.00L	300.00	1.00N	150.00	5.00	5.00N	20.00
A-13C	1.00G	3000.00	70.00	10.00L	70.00	1.00N	200.00	50.00	5.00N	10.00
A-14C	1.00G	5000.00	0.50N	20.00	70.00	1.00N	300.00	50.00	5.00N	50.00
A-15C	1.00G	2000.00	0.50N	10.00L	200.00	1.00N	200.00	20.00	5.00N	30.00
A-16C	1.00	700.00	0.50N	10.00	2000.00	1.00N	100.00	5.00	5.00N	10.00
A-17C	1.00	1000.00	0.50N	10.00	300.00	1.00N	70.00	5.00	5.00N	30.00
A-20C	1.00G	5000.00	0.50N	10.00L	100.00	1.00N	500.00	50.00	5.00N	30.00
A-21C	1.00G	2000.00	0.50N	10.00L	150.00	1.00N	100.00	5.00	5.00N	50.00
A-22C	0.70	500.00	0.50N	10.00L	1000.00	1.00N	300.00	5.00L	5.00N	10.00
A-23C	1.00G	1500.00	0.50N	20.00	5000.00G	1.00N	100.00	10.00	5.00N	30.00
C-24	1.00G	5000.00	0.50N	10.00	500.00	1.00N	200.00	50.00	50.00	150.00
C-25	0.70	500.00	0.50N	15.00	1500.00	1.00N	150.00	10.00	5.00N	20.00
C-26	1.00	500.00	0.50N	10.00	700.00	1.00N	50.00	5.00	5.00N	20.00
C-30	1.00G	2000.00	0.50N	10.00L	500.00	1.00N	20.00	5.00	20.00	100.00
C-32	1.00	500.00	0.50N	30.00	2000.00	1.00N	300.00	5.00	5.00N	30.00
C-33	1.00G	1000.00	0.50N	30.00	500.00	1.00	70.00	20.00	20.00	100.00
C-34	0.10	700.00	1.00	70.00	5000.00	1.00N	15.00	20.00	10.00	10.00N
C-35	0.50	2000.00	0.50N	10.00	5000.00G	1.00	70.00	50.00	70.00	10.00
C-36	1.00G	1000.00	0.50N	100.00	5000.00	1.00N	300.00	10.00	5.00N	20.00
C-37	1.00G	1000.00	0.50N	100.00	700.00	1.00N	100.00	100.00	10.00	50.00
C-42	1.00G	1500.00	0.50N	10.00L	500.00	1.00N	500.00	20.00	5.00	70.00
C-44	1.00G	2000.00	0.50N	10.00L	500.00	1.00N	1000.00	20.00	7.00	70.00
C-45	1.00G	2000.00	0.50N	10.00L	300.00	1.00N	500.00	15.00	5.00	30.00
C-47	1.00G	1000.00	0.50N	20.00	200.00	1.00N	30.00	30.00	7.00	70.00
C-49	1.00	1000.00	0.50N	10.00	500.00	1.00L	50.00	30.00	15.00	100.00
C-50	1.00G	2000.00	0.50N	10.00	150.00	1.00N	70.00	30.00	20.00	70.00
C-51	1.00G	3000.00	0.50N	10.00L	150.00	1.00N	300.00	30.00	15.00	70.00
C-52	0.70	1500.00	0.50N	10.00L	1000.00	1.00L	10.00	5.00	15.00	100.00
C-53	1.00	1500.00	0.50N	10.00L	500.00	1.00L	100.00	5.00	15.00	70.00
C-54	1.00	500.00	0.50N	10.00L	700.00	1.00L	10.00	10.00	5.00N	70.00
C-55	1.00G	3000.00	0.50N	10.00L	300.00	1.00N	50.00	50.00	30.00	100.00
P-18	1.00G	1500.00	0.50N	10.00L	100.00	1.00N	300.00	15.00	30.00	70.00
C-80	1.00G	2000.00	0.50N	10.00L	150.00	1.00N	700.00	30.00	30.00	70.00
C-81	1.00G	2000.00	0.50N	10.00L	200.00	1.00N	700.00	30.00	30.00	70.00
C-82	1.00G	2000.00	0.50N	10.00L	150.00	1.00N	700.00	15.00	30.00	70.00
C-84	1.00	1000.00	0.50N	10.00	5000.00G	1.00L	50.00	30.00	30.00	70.00
C-89	1.00G	3000.00	0.50N	30.00	2000.00	1.00N	100.00	30.00	30.00	150.00
C-92	1.00G	2000.00	0.50N	10.00L	150.00	1.00N	700.00	30.00	5.00N	70.00
C-95	1.00G	1500.00	0.50N	10.00N	70.00	1.00N	300.00	70.00	5.00N	30.00
C-96	1.00G	5000.00	0.50N	20.00	150.00	1.00N	700.00	30.00	15.00	10.00N

TABLE 2.—*Analyses of samples*—Continued

SAMPLE	S-NI	S-PB	S-SN	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	INST-HG	CM-CX-HM
CONCENTRATES OF BEDROCK SAMPLES										
B-14C	5.00	10.00N	10.00N	30.00	20.00	200.00N	1000.00	0.05L	0.05L	3.00
B-22C	70.00	10.00	10.00N	200.00	15.00	200.00N	50.00	0.05L	0.05N	1.00
B-2C	5.00	10.00	10.00N	50.00	20.00	200.00N	1000.00	1.30	0.05	5.00
C-71	10.00	20.00	10.00N	100.00	50.00	200.00N	700.00	0.60	0.08	2.00
C-73	10.00	10.00	10.00N	300.00	70.00	200.00N	1000.00G	5.50	0.04	3.00
C-75	70.00	30.00	10.00N	150.00	30.00	200.00N	500.00	0.10N	0.02L	1.00
B-265C	70.00	30.00	10.00N	200.00	50.00	200.00N	500.00	0.10N	0.02L	4.00
B-266C	5.00	30.00	10.00	200.00	150.00	200.00N	700.00	0.25N	0.02L	2.00
B-273C	100.00	20.00	10.00N	200.00	30.00	200.00N	150.00	0.15	0.02	1.00
B-285C	20.00	30.00	10.00N	70.00	50.00	200.00N	300.00	0.0 B	0.04	7.00
B-286C	20.00	30.00	10.00N	70.00	20.00	200.00N	150.00	0.25N	0.06	7.00
B-287C	20.00	30.00	10.00N	70.00	70.00	200.00N	1000.00	0.0 B	0.02L	5.00
B-288C	20.00	30.00	10.00N	70.00	30.00	200.00N	1000.00	0.25N	0.06	5.00
B-268C	30.00	200.00	10.00	70.00	70.00	200.00	150.00	0.30	0.02L	1.00N
B-269C	30.00	200.00	20.00	150.00	100.00	200.00N	300.00	0.10N	0.02	1.00N
B-17C	20.00	30.00	10.00N	150.00	70.00	200.00N	700.00	1.50	0.02L	1.00N
B-23C	50.00	30.00	10.00N	200.00	30.00	200.00N	200.00	0.10	0.02	1.00
STREAM SEDIMENT SAMPLES										
A-1	7.00	10.00	10.00N	100.00	50.00	200.00N	1000.00	0.05	0.03	1.00L
A-3	10.00	15.00	10.00N	100.00	20.00	200.00N	300.00	1.20	0.06	1.00L
A-4	7.00	15.00	10.00N	200.00	50.00	200.00N	1000.00	0.85	0.03L	1.00L
A-5	5.00	10.00	10.00N	100.00	15.00	200.00N	500.00	0.40	0.03	1.00L
A-13	10.00	15.00	10.00N	150.00	20.00	200.00N	700.00	0.65	0.10	1.00
A-14	10.00	15.00	10.00N	100.00	20.00	200.00N	500.00	0.10	0.10	3.00
A-15	10.00	10.00	10.00N	70.00	15.00	200.00N	500.00	0.05N	0.10	3.00
A-16	7.00	15.00	10.00N	70.00	15.00	200.00N	300.00	0.05N	0.10	3.00
A-18	10.00	20.00	10.00N	150.00	30.00	200.00N	1000.00	3.00	0.10	3.00
A-20	10.00	20.00	10.00N	150.00	20.00	200.00N	500.00	1.30	0.06	5.00
A-19M	7.00	10.00	10.00N	100.00	20.00	200.00N	1000.00	0.05N	0.06	3.00
A-19G	7.00	15.00	10.00N	100.00	20.00	200.00N	500.00	0.80	0.06	3.00
A-9	7.00	15.00	10.00N	100.00	30.00	200.00N	700.00	3.80	0.03	3.00
A-2	7.00	10.00	10.00N	100.00	30.00	200.00N	1000.00	0.05L	0.03L	1.00
L72-122	100.00	15.00	10.00N	150.00	20.00	200.00N	300.00	0.05N	0.02	5.00
A-24	7.00	10.00N	10.00N	50.00	20.00	200.00N	1000.00	0.05N	0.04	1.00
A-26	5.00	15.00	10.00N	100.00	30.00	200.00N	1000.00	0.05N	0.08	3.00
A-27	10.00	15.00	10.00N	70.00	20.00	200.00N	300.00	0.10N	0.08	1.00
A-31	10.00	15.00	10.00N	100.00	30.00	200.00N	500.00	0.05N	0.10	5.00
A-33	30.00	20.00	10.00N	100.00	30.00	200.00N	200.00	0.12N	0.08	7.00
A-38	10.00	15.00	10.00N	70.00	30.00	200.00N	700.00	0.05N	0.14	1.00
A-39	7.00	10.00	10.00N	50.00	20.00	200.00N	500.00	0.05N	0.10	1.00
A-41	15.00	30.00	10.00N	100.00	30.00	200.00N	200.00	0.05N	0.40	1.00
A-43	20.00	15.00	10.00N	150.00	30.00	200.00N	1000.00	0.05N	0.04	1.00L
A-47	7.00	10.00L	10.00N	30.00	20.00	200.00N	200.00	0.05N	0.10	3.00
A-52	5.00	20.00	10.00N	30.00	50.00	200.00N	200.00	0.05N	0.10	11.00
A-53	5.00	15.00	10.00N	50.00	20.00	200.00N	200.00	0.05N	0.10	5.00

A-56	20.00	10.00	10.00N	150.00	30.00	200.00N	1000.00	0.05L	0.06	3.00
A-8	100.00	20.00	10.00N	70.00	20.00	200.00N	200.00	0.94	0.10	22.00
A-86	50.00	20.00	10.00N	150.00	70.00	200.00N	1000.00	0.05N	0.04	3.00
A-87	50.00	30.00	10.00N	150.00	70.00	300.00	700.00	0.05N	0.02	3.00
CONCENTRATES										
A-1C	5.00	10.00L	10.00N	300.00	300.00	200.00N	1000.00G	170.00	0.05	5.00
A-4C	5.00	10.00	10.00N	300.00	150.00	200.00N	1000.00G	18.00	0.05	3.00
A-5C	5.00	10.00N	10.00N	300.00	70.00	200.00N	1000.00G	28.00	0.05N	3.00
A-6C	5.00	10.00N	10.00N	70.00	20.00	200.00N	1000.00G	0.62	0.05L	1.00
A-6C MG	5.00	10.00	10.00N	300.00	70.00	200.00N	1000.00G	86.00	0.05L	1.00
A-7C	5.00	10.00N	10.00N	300.00	70.00	200.00N	1000.00G	190.00	0.07	1.00
A-8C	5.00	10.00N	10.00N	150.00	70.00	200.00N	1000.00G	28.00	0.05	1.00
A-9C	5.00	15.00	10.00N	200.00	70.00	200.00N	1000.00G	32.00	0.07	1.00
A-11C	5.00	10.00N	10.00N	200.00	70.00	200.00N	1000.00G	1.30	0.07	1.00
A-13C	5.00	10.00	150.00	500.00	150.00	200.00N	1000.00G	53.00	0.05N	1.00
A-14C	5.00	10.00	10.00N	500.00	150.00	200.00N	1000.00G	48.00	0.07	1.00
A-15C	5.00	15.00	70.00	150.00	200.00	200.00N	1000.00G	12.00	0.07	1.00
A-16C	5.00	15.00	10.00N	100.00	100.00	200.00N	1000.00G	1.60	0.10	1.00
A-17C	5.00	10.00L	10.00N	150.00	50.00	200.00N	1000.00G	14.00	0.12	1.00
A-20C	5.00	10.00	10.00N	700.00	150.00	200.00N	1000.00G	9.50	0.07	3.00
A-21C	5.00	30.00	10.00N	100.00	150.00	200.00N	1000.00G	0.10	0.05	5.00
A-22C	5.00	10.00	10.00N	70.00	30.00	200.00N	1000.00G	0.15L	0.08	1.00
A-23C	5.00	10.00N	10.00N	150.00	70.00	200.00N	1000.00G	0.50N	0.05	1.00
C-24	5.00	30.00	30.00	200.00	200.00	700.00	1000.00G	0.12	0.03N	1.00
C-25	5.00	10.00	10.00N	70.00	150.00	200.00N	1000.00G	0.15N	0.06	1.00L
C-26	5.00	15.00	10.00N	100.00	150.00	200.00N	1000.00G	0.15N	0.03	1.00
C-30	5.00	20.00	70.00	70.00	70.00	200.00N	1000.00G	0.15N	0.03L	1.00
C-32	5.00	10.00	10.00N	100.00	150.00	200.00N	1000.00G	0.50N	0.03L	1.00
C-33	10.00	30.00	10.00N	100.00	70.00	500.00	1000.00G	0.20N	0.06	1.00L
C-34	30.00	15.00	10.00N	50.00	20.00	200.00N	300.00	0.08N	0.03	1.00L
C-35	5.00	15.00	10.00N	70.00	20.00	200.00N	1000.00G	0.06N	0.10	1.00L
C-36	5.00	15.00	10.00N	150.00	300.00	200.00N	1000.00G	0.10N	0.03L	1.00L
C-37	20.00	30.00	10.00N	100.00	150.00	200.00N	1000.00G	0.12N	0.06	1.00L
C-42	70.00	10.00	10.00N	200.00	150.00	200.00N	1000.00G	0.08	0.03L	1.00
C-44	50.00	10.00	10.00N	200.00	70.00	300.00	1000.00G	0.15L	0.03L	1.00L
C-45	70.00	10.00	10.00N	500.00	70.00	700.00	1000.00G	0.06	0.03L	1.00L
C-47	150.00	10.00	30.00	70.00	150.00	300.00	1000.00G	0.06L	0.06	1.00
C-49	5.00	10.00	10.00N	50.00	30.00	700.00	1000.00G	0.05N	0.10	1.00
C-50	5.00	20.00	15.00	70.00	150.00	1000.00	1000.00G	0.80	0.10	1.00
C-51	5.00	15.00	10.00	100.00	300.00	700.00	1000.00G	0.45	0.03	1.00
C-52	5.00	20.00	30.00	50.00	30.00	700.00	1000.00	0.03L	0.06	1.00
C-53	5.00	20.00	10.00N	70.00	70.00	500.00	1000.00G	0.20N	0.06	1.00
C-54	5.00	20.00	10.00N	30.00	100.00	200.00L	1000.00G	0.03N	0.06	1.00
C-55	5.00	15.00	30.00	100.00	150.00	1000.00	1000.00G	0.05N	0.03L	1.00
P-18	10.00	20.00	10.00	300.00	30.00	1000.00	150.00	0.0 B	0.0 B	0.0 B
C-80	30.00	15.00	10.00	200.00	150.00	200.00N	1000.00G	3.00	0.02N	2.00
C-81	70.00	20.00	15.00	200.00	150.00	200.00N	1000.00G	3.00	0.02L	3.00
C-82	70.00	20.00	15.00	200.00	150.00	200.00N	1000.00G	2.00	0.02L	2.00
C-84	20.00	30.00	15.00	70.00	70.00	200.00N	1000.00	0.10N	0.10	3.00
C-89	30.00	20.00	30.00	70.00	150.00	200.00N	1000.00G	0.10	0.02L	3.00
C-92	70.00	30.00	10.00N	200.00	200.00	200.00N	1000.00G	2.00	0.02N	2.00
C-95	30.00	30.00	30.00	70.00	150.00	700.00	1000.00G	2.40	0.0 B	0.0 B
C-96	20.00N	10.00	10.00N	700.00	200.00	500.00	1000.00G	7.70	0.0 B	0.0 B

contain about 250 mg gold, which at $35 per troy ounce would have a value of 25 cents. (We arbitrarily use $35 per troy ounce in this report because gold was stabilized at this price from 1933 until March 1968 and has fluctuated since then.) Admittedly, this is not a representative sample; representative samples of river and bank alluvium at this same locality (samples C-42, C-44, C-45, A-42, A-44, A-45) indicate a gold value of less than 1 cent per cubic yard. Natural concentrations of heavy minerals at the Corridor margin along the Snake River half a mile south of the Yellowstone National Park boundary (samples C-79, C-85, C-88) carry only 5 percent as much gold as those at the Snake River Hot Springs (6 or 7 flakes per pan), whereas samples of gravel or sand bars indicate a gold value no greater than a few tenths of a cent per cubic yard.

Small amounts of gold were found in pan concentrates from Bailey (samples C-24, C-46, C-47, C-49) and Arizona Creeks (samples C-50, C-51) but the average yield is about one flake of gold per pan, having an average weight of 10 μg (micrograms). At this rate of recovery, the value of the gold is about one-fourth cent per cubic yard. Some quartzite cobbles, whose immediate source is glacial till, occur in the streambeds of both Arizona and Bailey Creeks and are the most probable source of gold in Quaternary debris along these streams. Other possible sources for gold include sandstones in the Bacon Ridge (sample B-32) and Frontier Formations (sample B-72) and the rhyolitic welded tuffs in the Huckleberry Ridge Tuff (sample B-51), as is shown by the analyses (table 2). Nevertheless, the amounts are so small in the bedrock sources that an economic deposit of gold except where it can be concentrated in alluvium is virtually impossible. Our regional studies of more than 10,000 samples during 1965–72 show that, with rare exceptions, such concentrations occur only in those alluvial deposits derived directly from nearby formations containing quartzite conglomerates. As already mentioned, such deposits are not present in the Corridor. It is interesting to note, however, that high concentrations of gold occur in the mile-long stretch of Pilgrim Creek, at the southeast corner of the Corridor. This creek drains extensive outcrops of quartzite conglomerate that are outside the Corridor.

Gold values in the pan concentrates presented in table 2 dramatically suggest interesting amounts of gold in some samples. It must be remembered, however, that each pan-concentrate analysis represents only a small percentage of alluvium in place—the bulk of alluvium having been washed away during panning. Table 3 gives a comparison of pan-concentrate gold values of interest converted to the actual gold values in the original alluvium, along with analyses of gold in unconcentrated samples taken at the same site at the same time.

The possibility of economic gold deposits in alluvium along the 1-mile course of Pilgrim Creek at the southeast corner of the Corridor cannot be dismissed without more detailed exploration. The thickness of gold-bearing gravel at this locality is not known, nor are gold values known at, and a short distance above, the alluvium-bedrock interface. Samples A-1C through A-20C (table 3) are samples from this mile-long stretch along Pilgrim Creek.

PLATINUM

Rumors of occurrence of platinum in northwestern Wyoming circulate from time to time, and platinum "discoveries" were mentioned in connection with mining claims filed as recently as 1970 along the Snake River near the western boundary of the Corridor. (See section by F. E. Williams, this report.) Pan-concentrate samples were collected specifically for platinum assay at localities A-3C (Pilgrim Creek), A-10C (meadows along Pilgrim Creek, upstream from the Corridor boundary), B-28 (near Wildcat Peak), C-85 (east side of Snake River north of Flagg Ranch) and the gravel quarry 0.5 mile southwest of Flagg Ranch (west of boundary of map area). None of the platinum metals were detected in any of these assays.

TABLE 3.—*Comparison of gold content in panned concentrates with that in unconcentrated samples, and approximate conversion of high concentrate gold values to in-place values of gold*

[ppm, parts per million; - - -, not determined]

Sample	Locality	Gold in concentrate value		In-place content of gold computed from concentrate analyses		Gold indicated by analysis of unconcentrated sample	
		(ppm)	(Dollars per ton)[1]	(ppm)	(Dollars per cubic yard)[1]	(ppm)	(Dollars per cubic yard)[1]
		Stream-sediment samples					
A-1C	Pilgrim Creek------------	170	170	0.120	0.18	0.05	0.08
A-4C	----do-------------------	18	18	.157	.24	.85	1.28
A-5C	----do-------------------	28	28	.040	.06	.40	.60
A-6C	----do-------------------	.62	.62	.008	.01	----	----
A-6Cmg	----do-------------------	86	86	.043	.07	----	----
A-7C	----do-------------------	190	190	.950	1.43	----	----
A-8C	----do-------------------	28	28	.050	.08	.94	1.41
A-9C	----do-------------------	32	32	.100	.15	3.8	5.70
A-11C	----do-------------------	1.3	1.30	.001	<.01	<.05	<.08
A-13C	----do-------------------	53	53	.060	.09	.65	.98
A-14C	----do-------------------	48	48	.080	.12	.10	.15
A-15C	----do-------------------	12	12	.004	<.01	<.05	<.08
A-16C	----do-------------------	1.6	1.60	.003	<.01	<.05	<.08
A-17C	----do-------------------	14	14	.009	.01	<.05	<.08
A-20C	----do-------------------	9.5	9.50	.013	.02	1.3	1.95
A-21C	----do-------------------	.10	.10	<.001	<.01	<.05	<.08
A-24C	----do-------------------	.12	.12	<.001	<.01	<.05	<.08
C-42	Snake River--------------	.08	.08	<.001	<.01	<.05	<.08
C-45	----do-------------------	.06	.06	<.001	<.01	<.05	<.08
C-50	Arizona Creek------------	.8	.80	.003	<.01	<.05	<.08
C-51	----do-------------------	.45	.45	.002	<.01	<.05	<.08
C-67	Emma Matilda Lake Creek--	.78	.78	.008	.01	----	----
C-68	----do-------------------	.28	.28	.002	<.01	----	----
C-69	----do-------------------	1.4	1.40	.007	.01	----	----
C-80	Snake River--------------	3	3	.003	<.01	----	----
C-81	----do-------------------	3	3	.006	.01	----	----
C-82	----do-------------------	2	2	.002	<.01	----	----
C-89	Creek out of Flagg Ranch Lake--------------------	.10	.10	<.001	<.01	<.05	<.08
C-92	Snake River--------------	2	2	.001	<.01	<.05	<.08
		Bedrock samples					
A-73, C-73	White River Formation----	5.5	5.50	0.002	<0.01	<0.05	<0.08
B-17C	Pinyon Conglomerate------	1.5	1.50	.010	.02	----	----
B-8C	Mesaverde Formation------	16	16	.020	.03	----	----

[1]At gold price $35.00 per ounce.

MERCURY

Mercury, like platinum, is frequently rumored to exist in northwestern Wyoming, and occurrences associated with Tertiary and later igneous activity are not implausible. However, the mercury content of all our samples was consistent with estimates of crustal abundance of mercury (about 0.05–0.10 ppm) except for the samples of pyrite concretions taken from the Mesaverde Formation (B-1A, B-13), which exceeded 1 ppm (part per million). No mercury resource is indicated.

COPPER, LEAD, AND ZINC

The resource potential of the base metals was evaluated from the results of the cold extractable heavy metals test (cxHM) and six-step semiquantitative analyses. The lower satisfactory measurement limit for zinc is 200 ppm by routine spectrographic analyses, but the cxHM test is particularly sensitive to zinc; therefore, a combination of the two tests provides a suitable method for reconnaissance testing for copper, lead, and zinc because the spectrographic detection limit for both copper and lead is low (5–10 ppm). In the absence of spectrographic indication of anomalous values for copper and lead, high values in cxHM are attributed to zinc.

Zinc was detected spectrographically in only a few samples other than pan-concentrate samples, but values of at least 10 ppm in cxHM were obtained on 10 samples. Sample B-103 evidently contains greater amounts of base metals than any other sample. According to the spectrographic results (table 2), this sample is enriched not only in zinc but also in copper (50 ppm compared to about 5–20 ppm for most samples) and lead (70 ppm compared to 10–20 ppm for most samples). Sample B-103 represents a 12-inch (30 cm) clay zone between crushed and altered Phosphoria wallrock (B-101) and a fractured green obsidian zone (B-104) along the margin of a 40-foot-thick sill of felsic igneous rock. The opposite side of the sill is in contact with siltstone of the Dinwoody Formation (sample B-107). Except for the top of the sill (sample B-106), which is somewhat enriched in copper (50 ppm), neither this sill nor another similar neighboring sill (samples B-94–B-100) nor the enclosing sedimentary strata are enriched in copper or lead. Probably fluids associated with the igneous intrusion were slightly enriched in zinc, and, to a lesser extent, lead and copper. No surface indications at this locality, however, suggest the presence of an ore deposit.

Comparison of high cxHM values with spectrographic analyses suggests that these values are the result of higher zinc content rather than higher copper or lead; higher zinc content for these samples is geochemically reasonable. According to Goldschmidt (1954), marine shales and marine organisms are likely to have high concentrations of zinc; ilmenite and magnetite often have from one to several thousand parts per million zinc as a primary constituent; and soluble zinc salts formed in weathering processes are frequently precipitated with manganese and iron in the presence of carbonate. Sample B-68 with 60 ppm cxHM is black marine shale from the Mowry Shale, rich in *Lingula* (a phosphatic-shelled fossil brachiopod); sample B-84 with 11 ppm cxHM is black marine shale from the Thermopolis Shale; samples B-29 (3 ppm), B-236 (25 ppm), B-239 (14 ppm), and B-241 (40 ppm) are from manganiferous sandstone in the Harebell Formation; sample B-11 (Mesaverde Formation) with 10 ppm cxHM is from a sandstone with magnetite partings visible in hand specimen; and alluvial samples A-8 (Pilgrim Creek with 22 ppm cxHM) and A-52 (Dime Creek with 11 ppm cxHM) are rich in magnetite-ilmenite.

Zinc was detected in 14 of 59 spectrographic analyses of stream-sediment pan concentrates. The presence of zinc is readily explained by the abundance of magnetite and ilmenite, as mentioned above. In addition, gahnite ($ZnAl_2O_4$, a zinc spinel) occurs in several pan concentrates.

Although zinc occurrences are scientifically interesting, their resource potential, as well as that of copper and lead in the Corridor, is nil.

SILVER

The spectrographic detection limit of silver is excellent (0.5 ppm), and silver was recognized in more than 10 percent of the samples. The highest silver values are in pan-concentrate samples rich in gold: A6C-MG, with 86 ppm gold and 100 ppm silver, and A-13C with 53 ppm gold and 70 ppm silver. Both samples came from Pilgrim Creek upstream from the Corridor boundary. The high silver values are undoubtedly from gold-silver alloy grains. No high silver values were obtained on pan concentrates from the Corridor.

A silver value of interest in bedrock samples was from white limestone concretions in the Cloverly and Morrison(?) Formations (sample B-146 with 5 ppm). The amount in all other bedrock samples in which silver was detected was no more than 2 ppm. A resource potential for silver in bedrock is not indicated.

OTHER METALLIC MINERAL RESOURCES

Beryllium, rare earths, tin, titanium, uranium, and zirconium were searched for in spectrographic analyses, and mineral identifications were made in pan-concentrate samples. None of these is present in sufficient quantity to constitute an economic resource. Coal sample L72-42 (Bacon Ridge Sandstone, table 2) carried 50 ppm beryllium in its ash (which amounted to only 7.88 percent of the coal); if this coal were to be used industrially, the beryllium content of the ash might be of interest. However, because experiments to extract beryllium from coal ash have so far had only mediocre success, ash with only 50 ppm beryllium does not now have a resource potential (W. R. Griffitts, oral commun., 1972).

Tin was detected in many of the spectrographic analyses, but the amount is too small to be of any economic importance. Indeed, it is doubtful that enough tin occurs to be of importance even if other minerals were mined. Small amounts of the "wood tin" variety of cassiterite were found in the mineralogical examinations, and yellow garnet in some pan concentrates (specifically those from sediments derived from Paleozoic and Mesozoic rocks) carried as much as 300 ppm tin (E. L. Mosier, written commun., 1972).

Rutile-rich sands are in demand for their titanium content. Many of the concentrate samples contain more than 1.0 percent titanium, but mineral examinations show the major titanium source to be ilmenite rather than rutile, although rutile is present. Recovering titanium from ilmenite is too costly for the amount of titanium found in the Corridor to be of economic interest.

All the samples were scanned for radioactivity. The only significant amount of uranium is, as is typical throughout the region, in phosphate rock in the Phosphoria Formation (Sheldon, 1963). Although this formation is not exposed in the Corridor, it underlies the entire area. The highest uranium value is from a phosphate bed (about 1 foot (0.3 m) thick) cropping out 4,000 feet (1,220 m) north of the north boundary of the Corridor. This sample (B-92) contains 10 ppm eU (10 parts per million equivalent uranium) and 1.6 percent P_2O_5. The highest phosphate value of any sample in or near the Corridor is 4.9 percent P_2O_5 (sample B-101) from the same locality as B-92. Uranium, phosphate, and trace-element content in samples from the Phosphoria Formation where sampled just north of the Corridor is much lower than amounts reported from the formation elsewhere in the region (Sheldon, 1963). Because the Phosphoria lies at depths ranging from 1,000 (300 m) to at least 9,000 feet (2,700 m) in the Corridor (table 1), and because the values are so low, none of these elements or combination of them constitutes an economic resource in the Corridor.

Allanite, apatite, sphene, and zircon, all of which usually contain small amounts of uranium, were found in most of the pan concentrates but not in sufficient quantity to constitute a possible uranium resource.

Zircon is a very resistant mineral with high specific gravity and therefore is invariably present in concentrates of stream sediments. The resource potential of zirconium in the Corridor, however, is extremely small because richer zircon sources are readily available elsewhere in the world.

The mineral examinations show virtually no monazite in the pan concentrates. Moreover, spectrographic analyses show no indications of anomalously high concentrations of rare-earth elements, and the resource potential of these elements in the Corridor is nil. Mineralogical analyses are in table 4.

TABLE 4.—*Mineralogical analyses of pan concentrates of stream-sediment samples, Teton Corridor, Teton County, Wyoming*

[N, none found; Tr, trace]

Minerals	Sample localities[1] (Weight percent actually of concentrate)												
	C-46	C-83	C-79	C-85	C-88	C-90	C-91	C-43	C-38	A-18C	A-19C	A-10C	C-72
Magnetite, ilmenite	87.7	69.9	74.8	77.7	84.9	73.5	67.1	74.8	70.5	82.4	54.0	78.4	81.5
Hematite	3.7	10.1	1.7	3.7	3.0	4.9	([2])	([2])	1.4	5.5	8.6	3.1	3.1
Pyroxene, amphibole	3.7	2.0	6.5	4.3	3.3	1.7	9.5	6.1	13.5	2.7	4.2	1.9	4.1
Garnet	[3]1.1	2.0	3.1	3.9	3.2	.8	1.2	6.3	[3]5.6	5.0	23.5	8.2	6.5
Zircon	2.0	Tr	4.8	3.5	.1	1.7	5.4	2.4	5.4	2.4	3.6	1.8	2.2
Sphene	.1	2.0	.5	.7	.5	.7	1.6	.4	.1	.4	2.2	1.2	.4
Rutile	.2	Tr	.5	.9	.1	.2	.9	1.3	.1	.4	.4	.6	.2
Clear apatite	.2	Tr	Tr	Tr	N	.1	N	Tr	1.1	1.0	1.1	1.9	1.6
Black apatite	.1	N	Tr	Tr	N	N	Tr	N	.3	.1	.2	.5	.2
Pyrite	1.0	8.0	.3	.1	.1	.1	.1	.7	.6	.1	Tr	2.4	.2
Epidote	Tr	Tr	7.8	4.8	4.8	16.3	14.2	4.3	N	Tr	1.1	Tr	N
Allanite	Tr	2.0	N	N	N	N	N	N	N	N	1.1	Tr	N
Calcite-siderite	.1	2.0	N	N	N	N	N	N	1.5	N	N	N	N
Hercynite	N	N	N	N	N	N	N	N	N	Tr	N	Tr	N
Illite, biotite, chlorite	N	Tr	N	N	N	N	N	N	N	N	N	N	N
Anatase	N	N	N	N	N	N	N	N	Tr	N	N	Tr	N
Corundum	N	N	N	N	N	Tr	N	Tr	Tr	N	N	Tr	N
Gahnite	Tr	Tr	N	N	N	N	N	N	N	Tr	N	Tr	N
Tourmaline	.1	N	N	.4	N	N	N	3.7	N	N	N	Tr	N
Leucoxene	N	N	N	N	N	N	N	Tr	Tr	N	N	N	N
Barite	N	2.0	N	N	N	N	N	N	N	N	N	N	N
Gold:													
Number of flakes per pan	1	0	7	8	11	11	1	131	1	200	70	72	1,000
Value[4]	.2	0	2	2	3	3	.2	26	.2	48	17	17	240

[1]C-46, Bailey Creek; C-83, unnamed tributary to Snake River, northeast of Flagg Ranch; C-79, C-85, C-88, C-90, C-91, C-43, Snake River; C-38, Red Creek; A-18C, conglomerate rock tributary of Pilgrim Creek; A-10C, Pilgrim Creek; C-72, East Fork Pilgrim Creek.

[2]Included in magnetite-ilmenite.

[3]Includes yellow grossularite.

[4]Value of gold, cents per cubic yard at $35.00 per ounce.

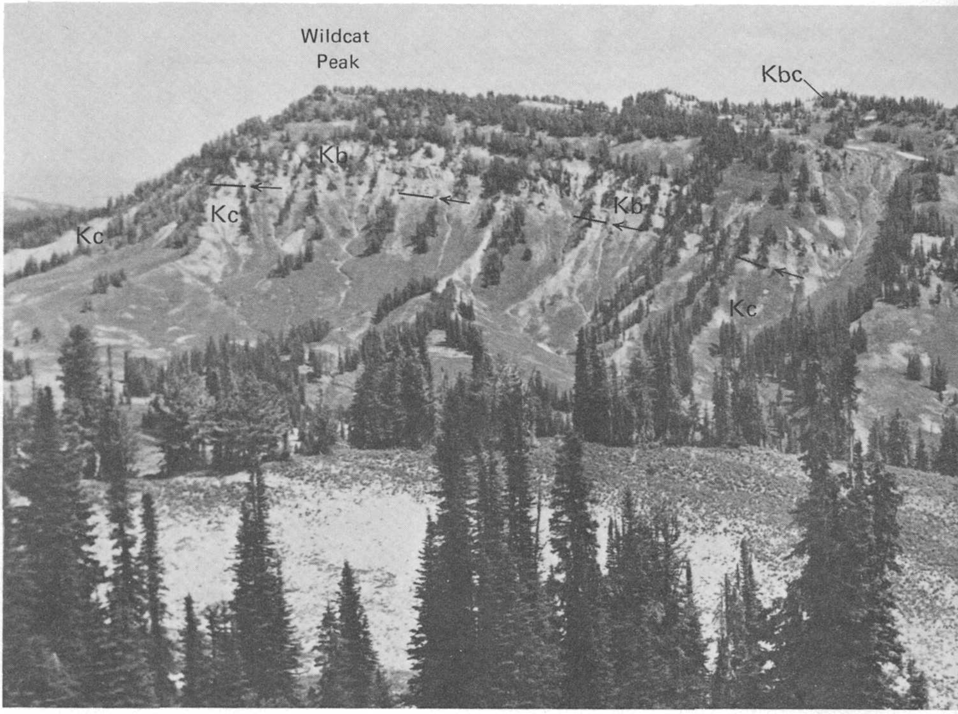
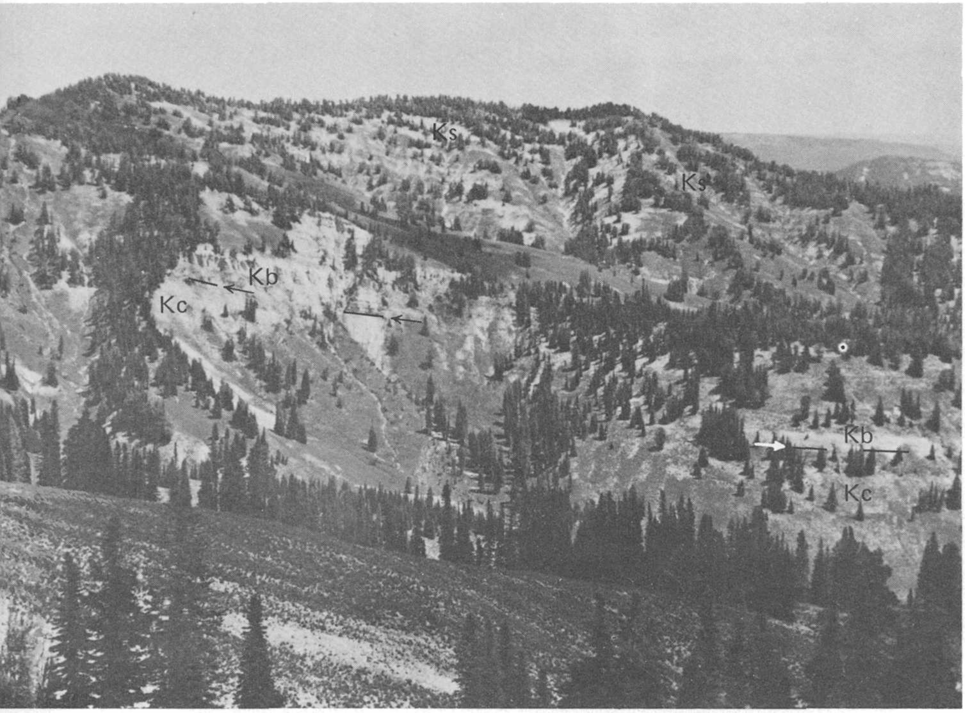


FIGURE 7.—View east at Wildcat Peak from Kitten ridge. Deep valley extending length of photograph is cut in soft Cody Shale along crest of Wildcat anticline. Arrows point to contact between Cody Shale (Kc) and thick cliff-forming basal sandstones in Bacon Ridge Sandstone (Kb). Kbc, coal bed 5.5 feet (1.7 m) thick in Bacon Ridge Sandstone; Ks, unnamed lenticular sandstone and shale sequence. Thickness of visible part of section above base of Bacon Ridge Sandstone is nearly 3,000 feet (915 m). Photograph by J. D. Love, July 18, 1972.

COAL

The coal-bearing rocks are shown in the columnar sections (fig. 2). Minable thicknesses of coal occur only in the Bacon Ridge Sandstone of Late Cretaceous age. The lower part of the Frontier Formation on the southeast end of the Bailey anticline has one impure coal bed 2 feet (0.6 m) thick. Other thin coals, most less than 1 foot thick, occur in the lenticular sandstone and shale sequence above the Bacon Ridge Sandstone. Analysis of one of these, L72-40A, from about 1 mile (1.6 km) east of the Corridor, is shown in table 5.

On Wildcat Peak, the coal-bearing Bacon Ridge Sandstone is well exposed, and a detailed section was measured (fig. 2). An impure coal bed 2.7 feet (0.8 m) thick occurs about 225 feet (69 m) above the base; a second, 2.5 feet (0.76 m) thick, is 260 feet (79 m) above the base; and a third, 3 feet (1 m) thick, is 580 feet (177 m) above the base. A short interval higher in the section, southeast of Wildcat Peak, and 2,000 feet (610 m) outside the



Corridor (in the Teton Wilderness), is a coal bed 5.5 feet (1.7 m) thick that was sampled and analyzed (B-338A, table 5; fig. 7). The highest quality coal in this seam, sample B-33, has a thickness of 1 foot (0.3 m).

In the Kitten measured section of the Bacon Ridge Sandstone (fig. 2), a mile west and on the opposite (west) flank of the Wildcat anticline, a coal 2.5 feet (0.8 m) thick is 207 feet (63 m) above the base of the formation; a second, 3 feet (0.9 m) thick, is 241 feet (73.5 m) above the base; and a third, 2.1 (0.6 m) feet thick, is 583 feet (178 m) above the base of the formation. These probably correlate with the lower three coals in the Wildcat Peak section.

In the section on Arizona Creek (fig. 2) 2.8 miles (4.5 km) west-northwest of the Kitten section, the following coals occur in the Bacon Ridge Sandstone:

Stratigraphic thickness above base of formation	*Thickness of coal*	
(ft)	*(ft)*	*(m)*
947	3.7	1.1
914	2.1	.64
801	2.0	.61
720	2.1	.64
416	1.9	.58
398	4.8	1.5

It is not known how these coals correlate with the ones on Wildcat Peak and at Kitten.

TABLE 5.—*Analyses of coal samples from or near the Teton Corridor*

[<, less than; ND, not determined]

Field No.	Formation	Coal thickness (feet)	Ash (percent)	Total S (percent)	Total C (percent)	Carbonate C (percent)	Hg (ppm)	Analysis of ash (percent)			
								SiO_2	Al_2O_3	Fe_2O_3	P_2O_5
L72-67-1	Bacon Ridge	<1	11.50	1.21	59.6	0.02	0.595	24.0	7.0	12.5	0.10
L72-67-2	do	<1	12.40	.60	58.9	<.01	.05	22.0	6.0	27.6	.10
L72-67-3	do	2	3.45	.72	66.0	<.01	.04	35.0	13.0	12.9	.20
L72-40A	do	<1	27.80	1.02	51.3	<.01	.31	67.4	17.0	4.5	.06
B-33	do	1	6.64	.67	57.4	<.01	.14	20.0	7.4	6.2	.07
B-33A	do	5.5	33.40	.77	37.2	.01	.17	63.4	12.4	2.2	.11
L72-42	do	<1	7.88	.87	68.5	.08	.09	45.3	13.5	8.8	1.69
B-45	do	1	17.10	.65	49.6	<.01	.05	57.6	9.1	2.9	.15
B-5[1]	Mesaverde	ND	8.64	.34	53.9	<.01	.06	42.4	11.4	6.2	.62
B-6[1]	do	ND	72.70	.15	16.4	<.01	.04	85.9	6.8	.8	.05

[1]Coal seam from caved mine that was worked by U.S. Bureau of Reclamation outside Corridor on Pilgrim Creek.

Three thin coal beds in the Bacon Ridge Sandstone were sampled along Bailey Creek Canyon in the southern part of the Corridor (at dip symbol 35° on plate 1). The lower two are each less than 1 foot thick, but the uppermost is 2 feet (0.6 m) of black shiny coal. Analyses are given in table 5 (first three entries).

The coal beds in the Corridor are much thinner and have more shale partings than do those in the Bacon Ridge Sandstone and younger formations farther southeast in more accessible parts of Jackson Hole (Love, Duncan, and others, 1948). Therefore, under present economic conditions, all coals in the Corridor are considered to be only of slight commercial interest.

BENTONITE

Thin beds of impure bentonite are present in the Mowry Shale, Frontier Formation, Cody Shale, and Bacon Ridge Sandstone. Those in the Mowry were sampled in the northern and northwestern parts of the Corridor. (See analyses of samples in table 2.) Most are less than 2 feet thick.

Nine bentonite beds, the thickest a pale-lemon-yellow bed 3 feet (0.9 m) thick, were measured in a section (fig. 2, basal part of Arizona Creek section) near the southeast end of the exposed part of the Bailey anticline. They are associated with plastic shales and comprise an unstable zone that is marked by landslides at all outcrops. The Bailey section has been extensively trampled and licked by elk and deer. In places licked holes extend as much as 2 feet (0.6 m) into the hillside. These beds contain a yellow bitter salt (O. A. Beath, Univ. of Wyoming, written commun., 1950). Sample B-178 from the Frontier Formation is a bentonite in this part of the section but from a locality east of the Corridor.

A 2.2-foot (0.7-m) light-gray impure micaceous bentonite is near the base of the Cody Shale in the Arizona Creek section (fig. 2) and a few thinner beds of bentonite occur higher in the formation. A 3.3-foot (1-m) pearl-gray biotitic bentonite occurs about 600 feet (180 m) above the base of the Bacon Ridge Sandstone in the Arizona Creek section (fig. 2) and is probably part of the pearl-gray marker zone that is widespread in the Bacon Ridge Sandstone of Jackson Hole (Love, Hose, and others, 1951).

None of the bentonite beds in the Corridor is sufficiently thick, pure, or accessible to be of economic interest.

GYPSUM

The only bedded gypsum in the area is in the Gypsum Spring Formation. All the gypsum has been leached from the outcrops in the northern part of the Corridor. One outcrop of gypsum 1 mile (1.6 km) north of the northeast corner of the Corridor is about 15 feet (4.6 m) thick. It is snowy white and finely crystalline, and has many solution cavities. Samples B-212–B-215 were taken from this outcrop, but the analyses showed nothing unusual.

Elsewhere in Jackson Hole, where drill holes have penetrated the Gypsum Spring Formation, the basal gypsum bed is invariably present indicating that solution is a near-surface phenomenon. It is assumed, therefore, that this gypsum bed underlies all the Corridor except the area north of the outcrop (pl. 1). The gypsum has no economic significance here, for there are much thicker and more easily accessible deposits along outcrops of the Gypsum Spring Formation in central and northern Wyoming.

PUMICITE

Pumicites occur in the Colter Formation and at the bases of members A and B of the Huckleberry Ridge Tuff. The thickest and perhaps the purest deposit is a 50-foot (15-m) snowy-white soft water-laid bed in the upper middle part of the 7,000-foot- (2,150-m)-thick Colter Formation in the southeast corner of the Corridor (at the 50° dip symbol on plate 1). The rock is composed almost entirely of transparent angular glass shards and small fragments of fibrous pumice. Sample B-272 is from near the top of bed, B-273 is from the middle, and B-274 is from the basal 1 foot (0.3 m) (table 2).

A somewhat slumped and faulted outcrop of pumicite about 15 feet (5 m) thick is at the base of member A of the Huckleberry Ridge Tuff on Pilgrim Mountain. The strata are very soft, bedded, and almost unlithified, and consist of angular gray, clear, and black shards and fragments of gray and white fibrous pumice. The sequence is gray at the base, grading up to cream colored in the middle, and then to black at the top. This, in turn, grades up to hard black crystal-rich welded tuff of the rest of member A.

A slightly younger pumicite about 15 feet (5 m) thick is present at the base of member B on the Huckleberry Ridge Tuff southwest of the Lookout Station on Huckleberry Mountain (fig. 5). The following suite of six samples (table 2) was collected (in descending stratigraphic order):

Welded tuff of member B, forming cliff (sample L72-62-7).

Black and colorless coarse shards in bed 4 feet (1.2 m) thick (sample L72-62-6 is from 1 foot (0.3 m) below top).

Shard bed, black, greasy-looking, evenly layered, 1.5 feet (0.5 m) thick (sample L72-62-5).

White pumice chunk bed 2 feet (0.6 m) thick (sample L72-62-4).

White pumicite, chiefly large colorless shards and crystals containing some black grains, 5 feet (1.5 m) thick (sample L72-62-3 is from 1 foot (0.3 m) above base).

Cream-colored clay, soft, 1 inch (2.5 cm) thick, just above unconformable contact with Frontier Formation (sample L72-62-2 of clay).

Only the pumicite in the Colter Formation is sufficiently thick and pure to warrant economic consideration. It is only 2,000 feet (610 m) from the access road along Pilgrim Creek at the southeast corner of the Corridor. The properties of the pumicite appear to be the same as those of the thicker and more conveniently located pumicites elsewhere in

Jackson Hole. Even if a market for pumicite should develop, the Corridor deposit is not considered to be of economic importance.

GLAUCONITE

Conspicuous amounts of glauconite, which is sometimes marketed as a fertilizer because of its potash content, occur in sandstones in the "Upper Sundance" and in the topmost sandstones of the Frontier Formation. The most abundant glauconite is in the Frontier at a locality 3,500 feet (1,070 m) west of the Corridor, along the west flank of the Lizard Creek anticline. This sandstone (L72-205, table 2) is about 25 feet (7.6 m) thick and in some parts glauconite granules comprise nearly one-third of the rock. Available potash in sample L72-205 is 1.61 percent (R. L. Rahill, written commun., 1973). This glauconite, therefore, is not of economic importance at present.

BUILDING STONE

The crystal-poor part of member B of the Huckleberry Ridge Tuff has, for many years, been used by local residents for building stone. It is colorful in some places (red, orange, pink, purple, and gray), is light weight, easily cut and shaped, and moderately durable. No quarries have been opened in the Corridor; all are farther south in Jackson Hole. The largest quarry was opened by the U.S. Bureau of Reclamation at the northwest end of Signal Mountain and was used for riprap on the Jackson Dam, 4 miles (6.5 km) south of the Corridor. Although the building stone quality of this rock in the Corridor is probably equal to that elsewhere, there is no large market for it, and occurrences in other parts of Jackson Hole are more accessible. Other rocks in the Corridor that might be used for building stone are not unique and can be obtained more easily elsewhere.

SAND AND GRAVEL

Sand and gravel are plentiful in Jackson Hole, especially along and near the Snake River and its major tributaries. In comparison, the sand and gravel deposits in the Corridor are minimal and the best ones are confined to the northwest margin nearest to the Snake River. The sand and gravel in the Corridor has no unique quality and, with abundant deposits nearby, is of no economic significance.

GEOTHERMAL RESOURCES

No wells have been drilled in the Corridor and there are no hot springs, travertine deposits, or large intrusive igneous bodies. Therefore, temperature gradients and potential geothermal resources must be inferred from data outside the Corridor boundaries. Three thermal areas are present near the north and west boundaries:

1. Snake River Hot Springs, 12,500 feet (3,800 m) north of the northeast corner of the Corridor.

2. South Entrance Hot Springs, extending from the north boundary of the Corridor northward for about half a mile. (0.8 km)
3. Huckleberry Hot Springs, 5,000 feet (1,500 m) west of the northwest boundary of the Corridor and 6,500 (2000 m) feet south of Yellowstone National Park (fig. 1).

From the standpoint of geothermal potential, these thermal areas have not been adequately studied. For example, the areas have not been mapped in detail and the rates of flow and temperatures of individual orifices have not been determined. Two chemical analyses of water are available from one area, one from another, and none from the largest springs. The following discussion summarizes pertinent available data on each thermal area. Some additional information is contained in the cited references.

SNAKE RIVER HOT SPRINGS

The Snake River Hot Springs, named by Hague (1899, p. 177–178), were renamed Chalk Springs by Allen and Day (1935, p. 388) but are shown on the Huckleberry Mountain quadrangle topographic map, 1956, as Snake Hot Springs. They should not be confused with the "Snake River Springs" of Allen and Day, which are here called the South Entrance Hot Springs.

Two groups of springs about 2,500 feet (760 m) apart compose the Snake River Hot Springs. Both groups were described briefly by Hague (1899, p. 177–178 and pl. XXIV). Allen and Day described and rephotographed the eastern group (which they called Chalk Springs) but did not mention the western group, which is of more interest in the Corridor study. Additional observations, notes, and photographs have been taken by U.S. Geological Survey personnel in later years (Love in 1945, 1949, 1972; Irving Friedman in 1965 and 1969). These show some changes in rates of flow and in temperatures, and, in the eastern group, progressive erosion of old travertine cones and development of new orifices.

Springs in both parts of the area emerge from or are adjacent to gently dipping Madison Limestone (Mississippian), but only the eastern group has deposited travertine. No chemical analyses are available for any of the springs. Some orifices in both groups emit boiling water. The combined flow from the eastern group was estimated by Allen and Day (1935, p. 391) as about 0.1 second feet (approximately 65,000 gallons (246,000 litres) per day). The western group, however, has a tremendous discharge of hot sulfurous water from two vents, both of which emerge from an alluvial flat adjacent to the Madison Limestone.

The southern of these large springs flows an estimated 6 million gallons (22.7 million litres) per day and the northern one, 100 feet (30 m) to the north, flows about 2 million gallons (7.6 million litres) per day, for a combined total of about 8 million gallons (30.3 million litres). The water in both springs is boiling. In the southern spring, thousands of tiny gas bubbles explode with a sharp crackling noise, like popcorn, as they reach the water surface. Gas in the northern springs emerges in large bubbles that break with the conventional "blurps."

About 100 feet (30 m) south of the southern spring is a cold-water spring that flows an estimated 75,000 gallons (284,000 litres) of water per day. This forms a stream that merges with those from the hot springs and creates a hot creek. Observations during a period of several years indicate that the temperature of the creek fluctuates considerably, probably as a result of increased or decreased flow of the cold spring.

The large hot springs are younger than the alluvial surface from which they emerge. Mammal bones project out from silt and clay forming the vertical sides of the largest orifice at a depth of 4 feet below the present land surface. Adjacent geomorphic data suggest that this alluvium is only a few thousand years old. There is no evidence that the big springs, at least, are declining in vigor.

SOUTH ENTRANCE HOT SPRINGS

The South Entrance Hot Springs are here named in order to avoid confusion with the Snake River Hot Springs described above. This confusion is caused by Allen and Day (1935, p. 333–336) in naming the springs near the South Entrance the "Snake River Springs." They were not mentioned by Hague (1899) and are not named on the Huckleberry Mountain quadrangle topographic map, 1956. They extend from the north boundary of the Corridor northward for about a half mile (0.8 km) in a roughly elliptical area. Many small orifices emerge from alluvium and others from the Amsden Formation and Tensleep Sandstone. The vents have not been mapped in detail, and only a few temperatures and flows of water have been measured. Most springs are warm but a few small vents emit boiling water. Allen and Day gave two water analyses, rates of flow, temperatures, and geographic data on several clusters of springs. They considered the water to be alkaline, with an estimated combined flow from all vents of 0.461 second feet (about 300,000 gallons (1,100,000 litres) per day) of water at temperatures ranging from 124° to 163°F (51° to 72.8°C). Some travertine is present, as well as siliceous sinter cones and sinter-capped terraces. It is not known if the thermal activity is static, is increasing, or is declining.

HUCKLEBERRY HOT SPRINGS

The Huckleberry Hot Springs are 5,000 feet (1,520 m) west of the northwest boundary of the Corridor and 6,500 feet (1,980 m) south of Yellowstone National Park, in the Teton National Forest. They were named Huckleberry Hot Springs in the 1960's at the time a resort area was developed under lease from the U.S. Forest Service. They had long been known as the Flagg Ranch Hot Springs, but Allen and Day (1935, p.

336-337) called them "Polecat Springs." Hague and others (1899) did not mention them and they are not named on the Huckleberry Mountain quadrangle topographic map, 1956.

These springs are underlain by Quaternary rhyolite welded tuff. An interesting feature is their radioactivity. A manganese-rich precipitate along the margin of the hottest springs (destroyed in the 1960's by development of the resort) has 0.019 percent equivalent uranium, but only 0.003 percent uranium. The radioactivity is apparently caused by radium. One sample contained 0.2×10^{-10} curies of radium per gram (analysis by J. T. Bracken and W. R. Champion, U.S. Geol. Survey, Oct. 25, 1951). Spectrographic analysis of this manganese precipitate (analysis by J. C. Hamilton, U.S. Geol. Survey, Oct. 15, 1962) shows, in percent: tungsten 0.5, barium 7.0; beryllium 0.003; molybdenum 0.05; niobium 0.015; lead 0.05; strontium 0.2; yttrium 0.05; and ytterbium 0.003.

The springs contain little sulfur and are alkaline, similar to the South Entrance Hot Springs. They have deposited much siliceous sinter but little travertine. Allen and Day reported temperatures ranging from 129° to 142°F (54° to 61°C), but several springs observed by Love are near boiling. Allen and Day estimated a combined flow of 0.39 second feet (about 350,000 gallons (1,325,000 litres) per day). The one published water analysis showed 118 parts per million SiO_2 (an unpublished analysis by R. C. Scott had 124 ppm). These values suggest a temperature at depth of about 300°F (150°C) (D. E. White, oral commun., 1973).

In conclusion, the data from these three thermal areas suggest that the geothermal potential near the north and northwest margins of the Corridor merits additional investigation, even though the potential of the Corridor itself remains unknown.

ECONOMIC APPRAISAL OF CLAIMS AND ADJACENT AREAS

By F. E. Williams, U.S. Bureau of Mines

The U.S. Bureau of Mines was concerned primarily with the potential for economic minerals. Search of U.S. Bureau of Land Management records in Cheyenne, Wyo., and U.S. Forest Service records in Jackson, Wyo., disclosed no patented mineral claims or outstanding leases. Records of unpatented claims were obtained from the Teton County courthouse records at Jackson, Wyo.

Fieldwork consisted of examining the unpatented placer claims. Twenty-eight samples were obtained from the major streambeds, as shown in figure 8. Two 12-inch (30.5 cm) pans—factor 400 to a cubic yard—were filled at each locale. Each of the 28 samples was panned to concentrate the heavy minerals present.

Concentrates were wet-screened at 28 mesh and then amalgamated, and the amalgams were assayed for recovered gold. The amalgam tailings

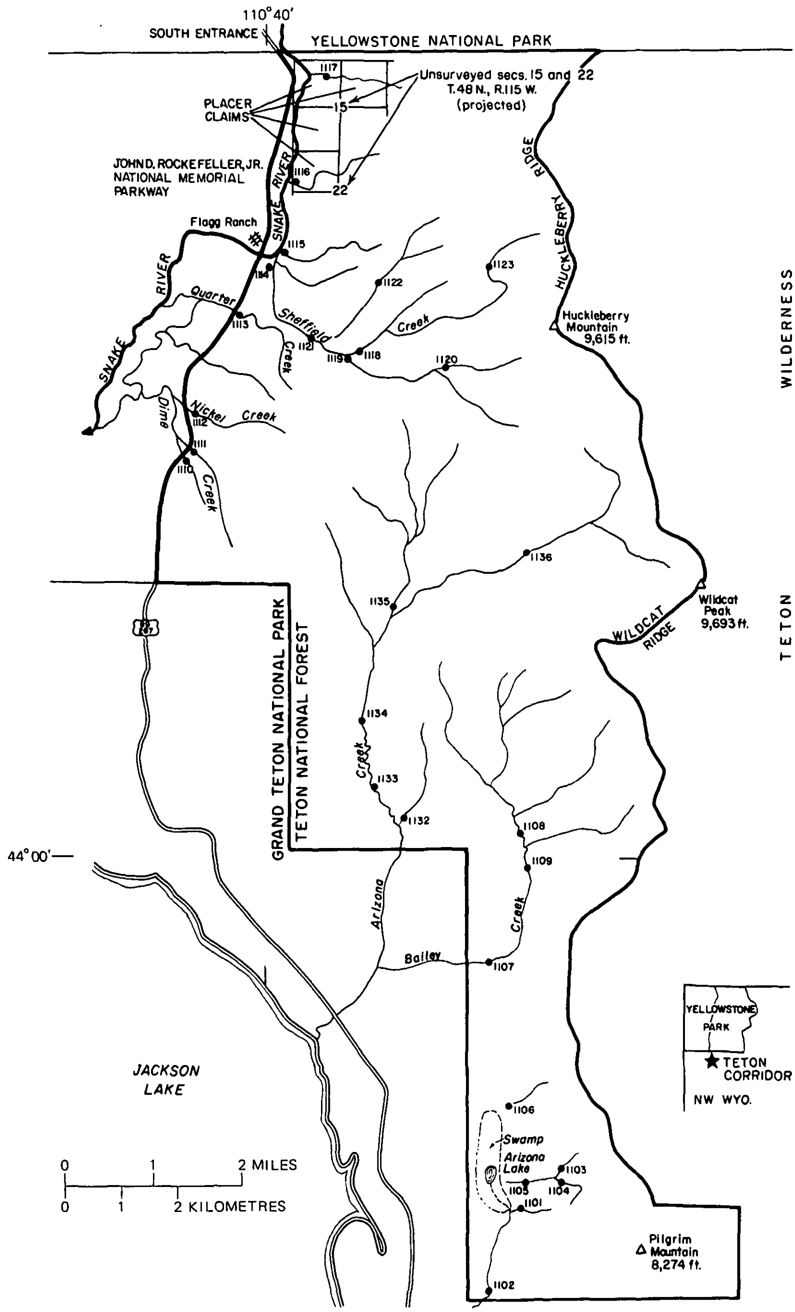


FIGURE 8.—Sample localities and gold placer claims.

TABLE 6.—*Chemical analyses for gold in panned sample concentrates from the Teton Corridor*

[Sample localities shown in figure 8. U.S. Bureau of Mines analyses. tr, trace; ..., not determined]

Sample No.	Sample weight (grams)	Au (mg)	Au in amalgam tails, (oz per ton of tails)
1101	78.29	tr	0.01
1102	36.34	...	tr
1103	51.58	tr	.01
1104	75.10	...	tr
1105	61.90	...	tr
1106	94.60	tr	tr
1107	67.82	0.03	tr
1108	61.10	tr	tr
1109	51.58	tr	tr
1110	71.40	...	tr
1111	40.75	...	tr
1112	61.79	tr	tr
1113	96.35	...	tr
1114	74.90	tr	tr
1115	69.80	...	tr
1116	49.40	...	tr
1117	83.69	tr	...
1118	72.12	tr	...
1119	77.60	...	...
1120	59.48	...	...
1121	51.00	tr	...
1122	28.90	...	...
1123	47.77	tr	...
1132	75.72	tr	...
1133	103.42	...	...
1134	51.78	.01	...
1135	96.48	tr	.03
1136	82.60	tr	tr

were pulverized and assayed for remaining gold, as well as analyzed spectrographically for 42 other elements. Tables 6 and 7 present the results of the gold and spectrographic analyses, respectively.

SNAKE RIVER

The Snake River has cut a canyon in a Tertiary volcanic sequence, which consists mainly of rhyolite and volcanic conglomerate. The river drops approximately 70 feet (21 m) in the 2.5-mile (4-km) length of the canyon.

Placer claims covering 640 acres (2.6 sq km) along and near the Snake River were filed in 1970. Although recorded as seven claims, there are actually four 160-acre (0.65 sq km) units, of which the three along the river are claimed twice. These are shown in figure 8 as lying in secs. 15 and 22, T. 48 N., R. 115 W.

TABLE 7.—*Spectrographic analyses of panned-sample concentrates from the Teton Corridor*

[U.S. Bureau of Mines analyses. The following elements were not detected in any of the samples: As, B, Be, Bi, Cd, C, Ga, Hf, In, Li, La, Sc, Y, Nb, P, Pt, Re, Sb, Sr, Ta, Te, Tl, W, and Zn. All Samples showed major Si, and all showea < 60 ppm V. M, major; >, more than]

Sample	Semiquantitative spectrographic analyses (ppm)											
No.	Fe	Mg	Ca	Ti	Al	Cr	Cu	Mn	Na	Ni	Pb	Zr
1/1101	20,000	8,000	5,000	1,000	50,000	300	20	500	20,000	20	400	70
1102	40,000	8,000	5,000	8,000	>50,000	300	20	1,000	20,000	20	400	600
1103	40,000	8,000	5,000	4,000	50,000	300	20	2,000	20,000	20	400	300
1104	20,000	30,000	10,000	2,000	50,000	400	20	1,000	20,000	20	200	600
1105	40,000	8,000	10,000	3,000	>50,000	300	20	2,000	20,000	20	200	200
2/3/1106	70,000	4,000	3,000	20,000	50,000	200	20	2,000	20,000	20	200	400
2/3/1107	70,000	5,000	3,000	20,000	40,000	70	20	2,000	10,000	20	200	600
1108	20,000	4,000	1,000	1,000	40,000	70	20	300	5,000	20	2,000	70
1109	20,000	4,000	1,000	1,000	40,000	70	20	300	5,000	20	200	100
1110	20,000	4,000	4,000	1,000	50,000	70	20	300	20,000	20	400	100
4/1111	70,000	2,000	4,000	3,000	>50,000	70	20	1,000	40,000	20	400	100
1112	70,000	5,000	4,000	2,000	>50,000	70	20	1,000	20,000	20	200	100
1113	30,000	4,000	4,000	2,000	50,000	70	20	500	20,000	20	200	1,000
1114	50,000	4,000	4,000	2,000	50,000	70	20	1,000	20,000	20	200	70
1115	50,000	4,000	4,000	2,000	>50,000	70	20	2,000	20,000	20	200	40
1116	20,000	4,000	4,000	1,000	40,000	70	20	500	20,000	20	200	40
1117	30,000	4,000	4,000	1,000	40,000	70	40	1,000	20,000	20	200	20
3/1118	70,000	4,000	4,000	20,000	>50,000	70	20	1,000	20,000	20	200	600
1119	40,000	5,000	5,000	2,000	50,000	70	20	500	10,000	20	200	100
3/1120	70,000	8,000	3,000	4,000	>50,000	70	20	2,000	20,000	20	200	100
1121	40,000	2,000	1,000	2,000	30,000	70	20	500	10,000	20	200	100
3/4/1122	40,000	2,000	3,000	2,000	M	70	20	500	40,000	20	200	1,000
3/1123	20,000	4,000	2,000	3,000	>50,000	70	20	500	10,000	20	200	100
1132	40,000	4,000	2,000	3,000	>50,000	70	20	500	10,000	20	200	70
1133	40,000	8,000	10,000	2,000	50,000	30	20	500	20,000	-	100	600
1134	20,000	4,000	5,000	1,000	40,000	30	20	500	20,000	-	100	100
1135	20,000	4,000	5,000	1,000	50,000	30	20	500	20,000	-	100	100
1136	40,000	4,000	5,000	2,000	50,000	80	20	500	20,000	-	100	600

1/ 20 ppm silver.

2/ 20 ppm tin.

3/ 30 ppm molybdenum.

4/ 4,000 ppm barium.

Three minor unnamed creeks flow westward from Huckleberry Ridge to join the Snake River along the 2.5-mile (4-km) length of the canyon. The panned concentrates from the two creeks that cross the claims and from the third, which does not, were analyzed (Nos. 1115–1117); a trace of gold was found in each sample (table 6). Spectrographic analyses showed no unusual concentrations of other valuable elements (table 2).

No prospect workings were seen at the placer claim sites. Because there are few minor accumulations of alluvium and no sand bars, this area along the river was evaluated as void of heavy mineral concentrations.

SHEFFIELD CREEK

Sheffield Creek drains westward from the west flank of Huckleberry Mountain and drops 2,200 feet (670 m) to join the Snake River near Flagg Ranch. Seven panned samples (Nos. 1114, 1118–1123) were taken from this drainage and its minor tributaries. None of the samples contained more than a trace of gold or unusual concentrations of other valuable minerals. Most of the pebbles and boulders seen in the streams are volcanic in origin.

QUARTER, NICKEL, AND DIME CREEKS

Quarter, Nickel, and Dime Creeks are minor tributaries of the Snake River, joining the parent stream west of U.S. Highway 89-287 below Flagg Ranch. Each creek was sampled (Nos. 1110–1113) by panning. None of the samples contained more than a trace of gold or unusual concentrations of other valuable minerals.

ARIZONA CREEK

Arizona Creek drains the southwest flank of Huckleberry Mountain and the northwest flank of Wildcat Peak. The stream flows through Cretaceous rocks that are older than any known gold-bearing rocks in the immediate area. Five samples were panned from Arizona Creek (Nos. 1132–1136). The analyses gave no indication of valuable minerals within the drainage area. Sample 1134 contained 0.01 mg or 190 parts per billion of free gold in the panned concentrate, which corresponds to only about ¼ cent per cubic yard of in-place gravel, assuming a value of $35 per troy ounce for gold.

BAILEY CREEK

Bailey Creek drains the southwest flank of Wildcat Ridge. It is estimated that less than 5 percent of the pebbles and boulders in Bailey Creek consist of quartzite. Three samples (Nos. 1107–1109) were panned from this stream. Spectrographic analyses indicated no unusual quantities of valuable minerals. Assay results show virtually no gold, although color was observed in one panned concentrate (No. 1107), which contained 0.03 mg or 440 parts of free gold per billion, corresponding to about ¾ cent per cubic yard of in-place gravel, assuming a value of $35 per troy ounce for gold.

UNNAMED CREEK

An unnamed creek draining south along the west flank of Pilgrim Mountain was sampled (Nos. 1101–1106) at six places. The analyses gave no evidence of economically recoverable minerals in the drainage.

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☆GPO 1975 — 677-340