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## Barite in Alaska

By T.K. Bundtzen and M.W. Henning,  
DGGS mining geologists

The United States, the world's largest producer and consumer of barite ( $\text{BaSO}_4$ ), accounted for one-third of the free world's output from 1950-1970; this has dropped to one-fourth since 1970. Although barite and barium products have over 2,000 industrial uses, over 85 percent of U.S. consumption is used in well-drilling muds as a weighting agent and for other physical properties.<sup>1</sup>

In Alaska significant deposits of barite, the principal ore of barium,<sup>2</sup> are known throughout the Brooks Range, on the Seward Peninsula, in east-central Alaska, along the north flank of the Alaska Range, and in several regions of southeastern Alaska (fig. 1).

### Geology of Alaskan Barite Deposits

Barite deposits in Alaska occur as massive and nodular replacement bodies and as massive or gangue minerals in both hydrothermal veins and bedded deposits, all of varying age.

Alaska's total raw barite production of just under 1 million tons<sup>3</sup> has emanated from two sources, both in Southeastern: the Lime Point deposit on Prince of Wales Island and the Chromalloy Corp. mine on Castle Island, near Petersburg. At Lime Point, massive barite-dolomite lenses and nodules up to 3 m wide are hosted in metamorphosed Wales Group marble of Precambrian(?) age.<sup>4</sup> Barite found on the axes of small-scale

fold structures are deformed, indicating a premetamorphic mineral occurrence. Reserves above high tide were estimated at 5,000 tons of 91 percent barite.<sup>5</sup> Production was minimal, amounting to several large test shipments in 1915 by Charles Sulzer, operator of the nearby Jumbo copper mine.

The only significant producer of barite in Alaska has been the unique offshore mining operation on Castle Island.<sup>6</sup> The deposit consists of isolated elliptical masses of barite up to 25 m thick that are underlain by and are conformable with siliceous metasedimentary rocks and pillow lavas. Significant amounts of copper, lead, and zinc are present. The occurrence, first recognized in 1913, was well enough exposed to estimate (in 1920) a reserve of 60,750 tons of 90 percent barite between the high- and low-tide levels.<sup>7</sup> Serious mining development above low tide began in 1963 by Chromalloy's predecessor, Alaska Barite. Since 1967, mining has been offshore; the ore body is drilled and blasted underwater and is retrieved by a 'clam shell' mounted on a barge. Production has been as high as 100,000 tons of raw barite ore per year, but beginning in 1974, a smaller tonnage of ore was processed on the mine site into a refined drilling-mud product, thus extending the life of the operation. In 1977, about 18,000 tons of a bagged drilling-mud product was produced.<sup>8</sup>

A recently delineated Admiralty Island mineral belt (fig. 1) contains barite horizons associated with lead-zinc precious-metal enriched volcanogenic(?) mineraliza-



Fig. 1. Significant barite deposits in Alaska. 1 - Lime Point; 2 - Castle Island; 3 - Admiralty Island; 4 - Glacier Creek; 5 - Chitsia Mountain; 6 - Quarry Prospect; 7 - Red Dog; 8 - Wulik; 9 - Drenchwater Creek; 10 - Atigun Canyon; 11 - Sheenjak River; 12 - Tonzona River.

tion. The deposits are hosted in mid-Paleozoic volcanic-sedimentary packages; one prospect contains masses of barite over 20 m thick.<sup>9</sup>

Stratiform barite-sulfide deposits on Glacier Creek, near Haines, consist of lenses and barite-rich beds up to 10 m thick and 600 m long that are hosted in a Paleozoic sequence of pillowed mafic extrusions and minor siltstone and limestone.<sup>10,11</sup> Sphalerite, galena, and chalcopyrite are near the barite-rich zones. The ALYU Mining Company has been exploring the deposit since the early 1970s; they have announced plans to produce drilling mud and metals from the largest deposit.

Possible stratiform barite-sulfide mineralization occurs near Chitsia Mountain in the west-central Alaska Range. Barite-galena-pyrite lenses up to 3 m thick and 100 m long are conformable with sericite-rich metarhyolite tuff and porphyry of the Mississippian Totatlanika Schist.<sup>12</sup> Secondary(?) barite veins in tuffaceous phyllite are abundant nearby.

Poorly known stratiform barite mineralization up to several meters thick with an undetermined strike length is hosted in Devonian(?) phyllite near the Tonzona River in the southern Alaska Range.<sup>8</sup>

Barite-fluorite-sulfide deposits with associated gold and silver values at the Quarry Prospect<sup>13</sup> are found along thrust sheets of marble and schist in the Precambrian Nome Group in the Sinuk River area. Although Brobst and others<sup>14</sup> believe that the mineralization is associated with Late Cretaceous emplacement of tin-bearing granites, detailed descriptions by Herreid<sup>15</sup> indicate that this could be a tectonically modified stratiform deposit.

Lenses, beds, and nodules of massive barite up to 6 m thick and 30 m long are interbedded with chert, shale, and mafic intrusive sills northwest of the Sheenjak River in northeastern Alaska.<sup>16</sup>

At least three significant stratiform barite-base metal

deposits are found in Paleozoic and Mesozoic rock units in the western Brooks Range. The Red Dog Prospect is a large zinc-barite-lead-silver deposit hosted in bedded cherts and volcanoclastic shales of Mississippian age. Spectacular exposures of massive sphalerite and bedded barite, first reported by Tailleux,<sup>17</sup> crop out in a 3,000- by 1,000-meter area, and one massive barite layer could be up to 50 m thick.<sup>18</sup> Secondary(?) barite veins are also common. Grybeck and DeYoung<sup>19</sup> believe that these Mississippi Valley type deposits may have a volcanogenic origin.

At the Wulik prospect, lenses and pods of barite up to 10 m thick and 1,600 m long are hosted in Mississippian(?) dolomite. Industry has announced reserves of 35 million tons of 10 percent combined lead and zinc and 2 ounces/ton silver at this large barite-sulfide deposit.

The Drenchwater Creek deposit contains small beds, lenses, and nodules of barite within black chert and shale of the Permian Siksikpuk Formation.<sup>20</sup> The barite is associated with lead and zinc mineralization believed to be derived from metarhyolite volcanism.

At Atigun Canyon, in the central Brooks Range within the pipeline corridor, barite zones composed of nodules and layers pinch and swell within black sideritic shale horizons of the Permian Siksikpuk Formation. According to Paris,<sup>21</sup> "The barite, in both nodules and the layers, are in the form of beautiful prismatic and tabular crystals as long as 3 inches. In the middle of the barite nodules and beds, the texture becomes sucrosic with a mosaic-like appearance. Black shale fragments are found dispersed throughout the barite." Here, however, base metals are completely absent and similarities of the Atigun Canyon deposits with bedded deposits of the Shoshone Range in Nevada and Marzan Basin in Arkansas have been noted.<sup>21</sup> Metz<sup>18</sup> believes the potential tonnage and grade of barite at Atigun may be economically significant. (Processed barite is worth up to \$300/ton at remote drilling sites on the North Slope.)

#### Prospecting Techniques

Sophisticated prospecting techniques have not been fully developed for barite because of the relative ease of finding additional barite reserves in producing districts. The best prospecting tools available for use in barite exploration are 1) thorough working knowledge of geologic associations and terranes and the role of barite in the sedimentary environment, 2) standard geochemical sampling and analyses in which barite and base metals are used as pathfinders, and 3) the use of gravity surveys for both reconnaissance and detailed exploration programs.

Stratiform volcanogenic barite-sulfide deposits and bedded barite devoid of base metals constitute the largest known reserves. Bedded barite deposits can be associated with many rock types, including conglomerate, sandstone, shale, and limestone, but terranes containing iron-rich siliceous shales and limestone of upper Paleozoic age offer the best chance of discovery. Here

barite occurs in 'rhythmic' laminations and beds are rarely over 3 m thick. Explorationists often look for island-arc settings with large volumes of bimodal submarine volcanism; barite horizons often cap volcanogenic sulfide mineralization. Residual barite deposits are often formed in unconsolidated material by weathering of preexisting carbonate-rich terrane. Many of these deposits lie within the clay-rich residue derived from the underlying bedrock. Residual deposits have been important producers in the southeastern U.S. Vein deposits have accounted for significant production in Nevada; commercially viable veins in Alaska have not yet been discovered.

Barium may be a useful pathfinder in prospecting not only for barite but for base metals because of its common association with lead and zinc. Many of these barite-sulfide deposits are volcanogenic. The black sulfide-rich ore horizons within Kuroko-type volcanogenic deposits generally contain large amounts of barite mineralization. Barium has a high mobility and generally will show up in both soils and plants and is known to be the major indicator for barite-rich bedrock deposits.

In the southeastern U.S., regional gravity surveys have been used to find smaller target areas within a study area. A close-net gravity survey is then run to determine drill sites.

#### Marketing Aspects

Barite is a low-unit-value commodity worth \$19 to \$28 a ton unprocessed or \$40 to \$60 a ton as a ground drilling-mud product.<sup>2</sup> A given deposit's economic viability depends heavily on proximity to transportation, nearby markets, and ease of beneficiation.

Officials from several major barite distributors in Alaska estimate that total barite used in Alaska during 1977—all for oil- and gas-well drilling—did not exceed 20,000 tons (or 400,000 100-lb sacks of 'bar'). The demand dropped in 1978 because of the dry holes encountered in the Gulf of Alaska. The 1978 figure will be about 18,000 tons.<sup>22</sup>

The use of barite in Alaska fluctuates with petroleum development, which depends on lease sales and exploration. In addition, the amount of barite needed for a particular drilling project depends in turn on whether the subsurface pressures encountered in the structure are high or low. Some industry geologists believe there will be high subsurface pressures in the Beaufort Sea lease areas; if so, use of Alaskan barite could increase significantly.

Unfortunately, the Chromalloy mine has not supplied all of Alaska's needs. Most of the barite used in Alaska comes from Nevada, Arkansas, Peru, and Mexico. Ironically, the U.S., with 35 percent of the world barite reserves, imports up to 40 percent of the barite it consumes.<sup>2</sup>

#### Summary

Because most Alaskan barite-sulfide deposits have been discovered recently, barite resources are largely unknown. Industry geologists<sup>23</sup> working on barite-

sulfide deposits in the western Brooks Range stress that barite resources there are largely unevaluated, but are on the order of "many millions of tons." Prime areas of future discovery include Admiralty and Kupreanof Islands in southeastern Alaska, the north flank of the Alaska Range, and most of the Brooks Range.

Although Alaska's potential barite resources are very large, stateside and foreign sources may continue to dominate use in Alaska petroleum fields because of the cost of mining a low-unit-value ore in Alaska.

Deposits near tidewater or along established transportation systems have obvious economic advantages, whereas some remote deposits could have serious handicaps to development.

Refining the raw barite into a drilling-mud product at the mine site can enhance the value of the resource. Perhaps the most economically feasible means of producing barite is to export it to circum-Pacific markets as a by-product of base-metal mining.

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### The Mineral Industry in Alaska, 1978

(Excerpts from a speech given by Gilbert R. Eakins, DGGS Chief Mining Geologist, at annual Northwest Mining Association meeting, Spokane, WA, Dec. 1978)

Even though Alaska is historically a mining area actual metal production today is embarrassingly low. Construction materials—sand, gravel, and crushed stone—were the largest producer in 1978, amounting to about \$120 million. The state's one producing coal mine, near Healy, produced about 700,000 tons and supplied the Fairbanks area and military bases in the interior of the state.

In decreasing order of value, the metals produced are gold, silver, antimony, tin, and tungsten.

Gold production is practically all from placer operations, and the total produced during 1978 is estimated conservatively at 60,000 ounces, an increase of 10,000 ounces over last year. Alaska Gold (a subsidiary of UV Industries) is the largest producer; their two dredges operating near the coast at Nome yielded about the same as last year (11,500 ounces). Another large placer mine is on Livengood Creek, about 80 miles north of Fairbanks, where Asamara has recovered around 3,000 ounces each season for the last 2 years. The rest of the gold was recovered by more than 200 small placer mines scattered throughout the state, particularly in the Ophir, Iditarod, Circle, Cache Creek, Seward Peninsula, and Fortymile districts. (Circle alone produced about 9,000 ounces in 1978.)

Silver, recovered as a by-product of gold, is estimated at 7,000 ounces.

Fifty-six tons of high-grade antimony ore were produced from a mine in the Kantishna district.

About 6 to 8 tons of tin concentrates were recovered as a by-product of the Miller-Neubauer gold placer operation at Tofty; the Lee Brothers on the Seward Peninsula are still mining placer tin.

Some tungsten was mined from a lode in the Fairbanks area.

Alaska is credited with around \$60,000 in gemstone production each year, principally from jade and soapstone.

Barite, used in drilling muds, has been produced from an underwater deposit along the coast of Castle Island in Southeastern since 1963. The present operator,

Chromalloy, did not market barite this year because of a reduction in Alaskan oil-well drilling.

Mines inactive in 1978 include the mercury mines in the Kuskokwim region, the platinum operation at Goodnews Bay, and the Lost River tin-fluorite-beryllium mine.

### Exploration

Preliminary reports on exploration indicate another record year. Accurate figures are not available but estimates by both industry and consultants range between \$50 and \$75 million. One indicator is the \$14 million spent on exploration by the consulting firm WGM. Another indicator is the number of new mining claims—from 13,009 in 1977 to 18,439 in 11 months of 1978.

The exploration explosion is an indication of the high success ratio and size of discoveries. Other factors that have influenced industry to move into Alaska include the increased risks in investing in foreign countries, the gradual realization that Alaska is more than just ice and snow, and improvements in both exploration methods and equipment suitable for working in an arctic environment.

But many problems exist: the massive federal land withdrawals, uncertainty of government policies toward minerals (at all levels) complex permitting procedures, uncertainty over taxes, very high operating costs, unstable metals markets, logistical problems, and lousy weather with short working seasons.

According to a recent study by the UA Mineral Industry Research Institute, 73 percent of the state remains closed to mineral entry. John Norman, mineral law attorney, stated at the Rocky Mountain Mineral Law Foundation meeting last September that understanding the land situation in Alaska is like trying to fix a car while it is traveling at 60 miles per hour.

The most recent federal act was the Secretary of Interior's withdrawal or 'superfreeze' of 110 million acres by the implementation of the Antiquities Act in lieu of passage of the d-2 bill. The state has filed suit in protest of the action and also is contesting the supplementary environmental impact statement written by the Department of Interior.

### Areas of Exploration Activity

Upper Paleozoic and younger (Mississippian to Triassic) carbonate and clastic rocks containing stratabound and vein deposits of massive and disseminated Pb, Zn, Ag, and barite occur in the western Brooks Range. This type of deposit is being heavily drilled in the Wulik River area, 80 miles northwest of Kotzebue; this is just west of the earlier discovered Red Dog deposit, which lies on land withdrawn to mineral entry (p. 9). WGM has indicated that the partnership of General Crude Oil, Houston Oil and Minerals, and WGM has claims containing 30 to 35 million tons of ore averaging 10 percent combined lead and zinc valued at \$3 billion. This was the second year their multimillion-dollar drilling programs and six rigs were operating. But the operators are handicapped by BLM's refusal under the

Organic Act to allow construction of a gravel landing strip.

A trend of similar rocks extends eastward across the National Petroleum Reserve and contains a similar type of deposit at Drenchwater Creek, 120 miles east of Wulik River.

Activity in the central Brooks Range consisted of continued exploration and evaluation of several major discoveries in the so-called schist belt that extends for about 100 miles along the south flank. The prospects are massive-sulfide deposits of copper, zinc, lead, and silver contained within a thick metamorphosed volcano-genic sequence. This belt includes Bear Creek's large deposit at Arctic Camp and reportedly several billion dollars worth of known ore. Ambler Mining has announced several discoveries in the Ambler district and has a large drilling program going. It has released assays of high-grade silver-zinc-lead drilled on a prospect between the Ambler and Redstone Rivers. Farther east, Little Squaw Mining leased its placer claims and equipment on Big, Tobin and St. Marys' Creeks in the Chandalar district to Whelan Mining and Exploration Inc. of Oregon. Whelan began stripping last summer.

The Seward Peninsula continued to attract explorationists looking for base and precious metals and uranium, but no major developments were reported. Alaska Gold continued to operate its dredges at Nome and reported that they have 25 to 30 years of reserves. Unfortunately, the Lost River Mining Company filed for bankruptcy in 1978, and near-term development of its once-promising tin-tungsten-fluorite-beryllium deposit on the western tip of the peninsula is questionable.

Significant tungsten and copper-lead-zinc discoveries were made in the Interior north of Fairbanks. Asbestos deposits in the Eagle Quadrangle were drilled by a three-company consortium on Doyon Native lands; the group had a 30-man crew on the project. The discovery of massive-sulfide deposits on the north flank of the Alaska Range from Tok to Stony River has attracted a number of companies the last several years. General Crude, Houston Oil, Cominco, Gulf Minerals, and Noranda have been testing the area. Urangesellschaft continued their uranium drilling program in the Tertiary coal beds near Healy.

In the Copper River region, General Crude, Inco, and Conoco explored on Ahtna Native regional corporation land; Exxon was in the 'Denali' copper area; and Texas Gulf and Noranda were evaluating copper and zinc deposits in Prince William Sound.

A few placer miners were working on the Kenai Peninsula, but no exploration programs were reported.

Southwestern Alaska received some exploration for uranium, tungsten, and hard-rock gold.

Southeastern Alaska was a beehive of activity. U.S. Borax has been drilling their 1974 large molybdenum discovery at Quartz Hill, 45 miles east of Ketchikan. This is the mine most likely to achieve large-scale production in Alaska; however, the area is in the proposed Misty

Fjords wilderness area. Noranda and its partners were driving a 9- by 13-foot tunnel at their Greens Creek stratabound gold-silver-lead-zinc-copper prospect on the northern end of Admiralty Island, 18 miles west of Juneau. Last August they were 230 feet in from the portal. Published drilling results indicate several million tons of high-grade lead-zinc ores with particularly high silver and gold values. Much of Admiralty Island is being considered for wilderness status. Prince of Wales Island was again a very busy place, especially around the old Ross-Adams uranium mine at Bokan Mountain. Standard Metals has done considerable drilling underground at the mine and reportedly has located a significant tonnage of new uranium ore.

#### Summary

The increasing national need for new mineral supplies is not going to go away and the restrictions on development are frustrating to the mineral industry. I visited a number of small mining operations last summer and the comments I heard were the same everywhere: the placer miner is concerned that he might be regulated out of business. Some of the 'majors' are taking a wait-and-see stand until the land status and tax situation are settled before making any large investment. However, other majors are confident that they will be allowed to eventually develop large mineral deposits in Alaska and are continuing to explore wherever they can.

By way of counterharrassment, some of the small miners are reorganizing the old local mining districts and setting up their own regulations. One regulation is that any government official wishing to visit any mine or operation is to get permission from officers of the local district (p. 8).

If any good is coming out of all the problems being faced by the mining industry perhaps it will be increased cooperation and sharing of information. There have been some indications that this is happening.

#### DGGS Releases Southeastern Alaska Study

Two new geologic reports highlight this quarter's publications efforts. One of them is the most detailed study ever documented by DGGS. Geologic report 48, written by Gordon Herreid and others, has been in writing and production for the better part of this decade. The report, which details the geology and geochemistry of southeastern Alaska's Craig A-2 Quadrangle, is based on a 3-year study in which more than 1,200 stream-sediment, rock, and soil samples were taken and analyzed. The other, No. 59, features a new middle Tertiary volcanic formation in Mount McKinley National Park. It has a two-color centerfold map, scale 1:63,360. DGGS also released two updated information circulars this period.

Geologic report 48, "Geology and geochemistry of the Craig A-2 Quadrangle and vicinity, Prince of Wales Island, southeastern Alaska," by Gordon Herreid, T.K. Bundtzen, and D.L. Turner, has 49 pages, 2 plates (one

multicolored), and 4 geochemical tables and costs \$7.50. The report is briefly summarized below.

The Craig A-2 Quadrangle contains copper deposits and anomalously old layered rocks, which include the Wales Group, the oldest known unit in southeastern Alaska. The Wales Group contains varying amounts of marble, tuffaceous schist and phyllite, metakeratophyre tuff(?), metaspillite, quartz sericite schist, migmatitic gneiss, and slightly recrystallized limestone and phyllite. A trondhjemite dated at 730 m.y. intrudes the Wales Group, providing evidence that the group is Precambrian. The date of cessation of the most recent regional thermal event affecting Wales Group rocks was determined to be about 475 m.y. B.P.

The principal productive mineral deposits in the area are skarns containing copper, zinc, molybdenum, and gold around the Copper Mountain pluton (Cretaceous). Museum-quality epidote and quartz crystals have been won from the skarns around the pluton. Several small copper-zinc-gold deposits in the Hetta Inlet area occur as sulfide zones parallel to foliation and associated with bimodal sodic volcanism in the Wales Group. The deposits, which are all in about the same stratigraphic position, probably represent stratiform volcanogenic mineralization. Along the South Arm of Cholmondeley Sound lead, zinc, and silver vein deposits, lenses, and disseminations occur near large siliceous zones in the Wales Group.

Throughout the area 1,270 stream-sediment, soil, and rock samples were collected and analyzed by atomic absorption spectrophotometry (Cu-Pb-Zn) and by emission spectrography (30-element scan). Stream-sediment fractions (-80 mesh) show copper anomalies in the Hetta Inlet area and strong lead, zinc, beryllium, zirconium, and silver anomalies along Cholmondeley Sound.

Geologic report 59, "The Mount Galen Volcanics - A new middle Tertiary volcanic formation in the central

Alaska Range," by J.E. Decker and W.G. Gilbert, has 11 pages and one centerfold map. It costs \$2. The abstract follows.

The Mount Galen Volcanics are named for a series of andesitic and basaltic lava flows, breccia, and tuff of late Eocene-early Oligocene age in the west-central Alaska Range. These rocks, once considered part of the Cantwell Formation, cover at least 25 square kilometers and locally reach a thickness of 1,000 meters.

The formation can be divided petrologically into hornblende andesite, two-pyroxene andesite, and basalt. Hornblende andesite with calc-alkaline characteristics is the most common rock type and occurs as tuff, lava flows, flow breccia, and clasts and tuffaceous matrix in volcanic breccia. Two-pyroxene andesite most commonly occurs as lava flows and flow breccia. Basalt occurs as lava flows and typically contains phenocrysts of titanite and plagioclase (+ olivine) and has olivine tholeiite characteristics.

Ten K-Ar mineral ages from seven rock samples range from  $32.3 \pm 1.0$  m.y. to  $43.2 \pm 2.6$  m.y. with a mean and mode of 37-38 m.y.

Taken together, the Mount Galen Volcanics and lower Oligocene plutonic rocks of the Alaska-Aleutian Range batholith constitute a middle Tertiary magmatic arc that roughly parallels the southern Alaska continental margin.

Two information circulars, IC-9, "Rockhound information," and IC-17, "Companies interested in Alaskan mining possibilities," are also available. Both are free.

Seduction Point, Alaska, according to the *USGS Dictionary of Alaska Place Names*, was named by Capt. George Vancouver in 1798 "because of the designing nature of the Indians encountered there." The landmark is 26 miles south of Skagway.



—from *Wilderness Report*, Nov. 1978—



## Document on Alaskan Access Published

The Congressional Office of Technology Assessment (OTA) has released "Analysis of laws governing access across federal lands: Options for access in Alaska." This volume is an analysis of federal laws, policies, and practices that affect access through federal to non-federal mineral-bearing lands in Alaska.

The volume consists of four sections: an introduction by OTA staff; "Assessment of transportation access requirements for minerals exploration and mine development and operations in Alaska," by John W. Whitney and Dennis Bran; "Assessment of environmental penalties introduced by transportation access to Alaska nonfederal mineral resources," by Benjamin Shaine; and "The economic importance of the small miner and small mining businesses in Alaska," by C.C. Hawley and John W. Whitney.

Particulars on the document may be obtained from OTA, Senate Annex, 119 D Street N.E., Washington, DC 20510.

## Fairbanks Mining Author to Set Up Scholarship Fund

A Fairbanks miner-businessman-teacher has written a book and is donating a portion of the proceeds to set up a scholarship for local students who are interested in pursuing their academic studies in earth sciences.

Jim Madonna, who owns Alaskan Prospectors and Supply stores in both Fairbanks and Anchorage, wrote a book entitled "Guide for the Alaskan Prospector," which is an extremely useful and informative prospecting guide that can be understood by professionals and beginners alike. The booklet guides the prospective minerals sleuth to the proper offices for information needed before embarking on any type of prospecting or claim-staking activity. According to DGGs mining-information specialists Mildred Brown and Carole Stevenson, "The section on buying and selecting mining claims has been particularly helpful to many people who are unaware of exactly what 'rights' they are acquiring."

The booklet costs \$4.95, and Madonna will use the proceeds to establish a \$500 scholarship for a Monroe High School student interested in entering the Earth Sciences program (geology, geophysics, mineral engineering) at the University of Alaska. He says that "If the book goes over, I'll expand the program to include other schools as well."

Madonna has another book for sale, an out-of-print U.S. Geological Survey Bulletin that he obtained permission to reprint. The 213-page book, USGS Bulletin 1374, "Placer deposits of Alaska," by E.H. Cobb (1973), is popular but extremely scarce, so he paid to have it reprinted out of his own pocket. He is charging \$6.95 for it. "It is not a money maker—more like a labor of love," he says.

Both books are available from Alaskan Prospectors

Supply stores at 504 College Road, Fairbanks, 99701 and 4409 Spenard Road, Anchorage, 99503. (For mail orders, add \$0.50 for postage.) Copies may also be obtained (over the counter only) from the DGGs in the mining-information office in College.

## Satellite Image Map of Alaska Available

(from Dept. of Interior news release, Nov. 7, 1978)

A color space view of Alaska made from satellite images taken from 570 miles above the Earth has been prepared by the U.S. Geological Survey.

The space view of the nation's largest state is a "false color" mosaic made from parts of 130 individual images recorded by multi-spectral line scanners on NASA's Landsat Earth resources survey satellites.

The colors of the mosaic are not those that would be seen by the human eye when viewing the Earth because they are combined from both visible light and infrared rays. Green vegetation appears red on Landsat false-color images, urban areas are bluish-gray, bare ground and sandy beaches are in light colors, water ranges from black to blue depending on its depth and sediment load, and snow and ice appear white.

The new satellite-image map of Alaska is the first high-resolution mosaic of the state to be shown in color. Earlier efforts to acquire enough cloud-free images to mosaic the entire mainland portion of the state in color were unsuccessful. The new map does not show the western part of the Aleutian Islands or the southeastern panhandle.

Among the many features clearly visible on the image map are the Denali fault system, Malaspina Glacier, the Yukon River Delta, the North Slope (including Prudhoe Bay) and the cities of Anchorage and Fairbanks.

Copies of the map are available for sale to the public in five separate sheets, reproduced photographically at a scale of 1:1,000,000 (1 inch represents 16 miles), at a cost of \$50 per sheet. The entire satellite image map also has been photographically reduced to a single sheet at a scale of 1:2,500,000 (1 inch represents 40 miles), at a price of \$50 per copy.

Copies or further information may be obtained from User Services, EROS Data Center, U.S. Geological Survey, Sioux Falls, S.D. 57198.

*DGGs published a satellite map similar to this one last year. Although ours is not in color, it has the same scale and was shot from the same altitude. Moreover, the DGGs map is dirt cheap (\$7 will get you all five sheets). We still have some left.—Ed. note.*

## Minerals up, but due to Oil

(from Alaska Journal of Commerce & Pacific Rim Reporter, Oct. 23, 1978)

Mineral production in the state last year saw a drastic increase, but the picture isn't nearly the same when petroleum production is discounted.

Mineral production was valued at about \$1.3 billion in 1977, an increase of 52 percent over 1976, according to the federal Bureau of Mines.

Sand and gravel production actually decreased about 20 percent and stone production remained about the same.

In 1977, petroleum production showed a dramatic increase of more than 60 percent due to start-up of the Alaska pipeline. Natural gas production dropped and coal production remained at nearly the same level as 1976, the bureau reported.

Usibelli Coal Mining Co. produced about 685,000 short tons of coal in 1977. No coal was exported outside of the state.

The Alaska Gold Co. dredge operation in the Nome area was the largest gold producer in the state. Dredging started in June of 1977 and final cleanup that year came in November. More gold was produced by the many small independent miners.

Despite substantial increases in exploration activity in 1976, the state's mineral output for that year dropped two percent from 1975 levels. And once again, petroleum was the largest contributor.

Figures released by the bureau placed the value of 1976 mineral production at \$470 million—\$54.1 million less than the \$524.1 million recorded in 1975.

#### Letters....

Honorable Jay S. Hammond  
Governor of Alaska  
Juneau, Alaska 99811

Dear Governor Hammond:

This is to inform you that the Department of the Interior has designated the University of Alaska as a Mining and Mineral Resources Research Institute under Title III of the Surface Mining Control and Reclamation Act of 1977.

The Department's newly appointed Advisory Committee on Mining and Mineral Resources Research met recently in Washington, D.C., and considered the qualifications of all applicant universities. Out of 37 eligible institutions, the University of Alaska was one of such 20 schools chosen by the Department for funding under this program.

The Act authorizes annual allotments and research grants through fiscal year 1984. The Institutes will conduct research in mining and minerals extraction, as well as provide scholarships and fellowships for training associated with such research programs. The 20 designated Institutes will share \$5.4 million in Federal aid for fiscal year 1978 and each will receive basic grants of \$110,000 and an additional \$160,000 for scholarships and fellowships.

We regard these Institutes as a vital part of the Department's surface mining program and are confident

that the University of Alaska is a worthy institution. We are grateful to have shared the benefit of your views and recommendation in this very important endeavor.

Sincerely,  
Walter N. Heine, P.E.  
Director, Office of  
Surface Mining  
Dept. of Interior  
Washington, D.C. 20240

August 28, 1978

Division of Geological and Geophysical Surveys  
P.O. Box 80007  
College, Alaska 99708

Dear Sir:

The Circle Mining District is organized as provided in Federal Mining Law, U.S.C. Title 30, Chapter 2.

On August 28, 1977, the assembled miners of the Circle Mining District passed the following resolution: Any public servants or representatives of government agencies desiring to visit a mining operation or a mining claim within the boundaries of the district must submit written notice at least ten days prior to the visit, and be accompanied by an officer of the district or his designee.

The boundaries of the district are the same as those of the old Circle Mining District, and a description can be examined in the Clerk of Court's office in Fairbanks or at the office of the Recorder of the Circle Mining District at Mile 99, Steese Highway.

The purpose of this adopted resolution is to optimize the time and efforts of all concerned and to promote safety.

*Please note that members of the Alaska Division of Geological and Geophysical Surveys, in recognition of their long history of dedicated service to the Mining industry, are always welcome. [Italics ours—Ed. note.]*

Sincerely,  
Edwin C. Gelvin, President  
Circle Mining District  
P.O. Box 1872  
Central, Alaska 99730

#### Andrus's Annual Report Calls for Repeal of 1872 Mining Law (from *The Mining Record*, Oct. 25, 1978)

The 1978 annual report of the Secretary of the Interior under the Mining and Minerals Policy Act of 1970 has been published.

The report deals with many issues including a chapter on the need to repeal the Mining Law of 1872 and replace it with a leasing system.



With regard to the Mining Law of 1872, Secretary of the Interior Cecil D. Andrus says that it does not meet the needs of today's mining industry or today's environmental standards.

"The minerals on public lands belong to all the people of the United States—not just the fortunate few who discover them or acquire from the discoverers the right to exploit the deposits." He goes on to state that control of mining is vital to a healthy environment. "I know there are many who disagree with me. They cling to an outmoded law that allows an individual to claim as personal property valuable mineral deposits that previously belonged to all the public."

The report states that the BLM Organic Act embodies principles in the call for new mining legislation, including:

- Retention of public lands in federal ownership
- Establishment of rules and regulations for administering public lands statutes
- Receipt of fair market value for use of public lands.

To back up the Administration's proposals for repeal of the Mining Law and establishment of a leasing system, Chapter 4 cites the findings of the 1949 Hoover Commission and the 1977 report of the Council on Environmental Quality.

Discussing the "Problem of Withdrawals" the report states that the patent system fragments public land ownership and has contributed to the withdrawals of large areas of public lands. Withdrawals have been necessary, the report states, because there is a need to protect certain resources from undue impacts and that this is the best instrument of land management available.

### Caldera Studied

(from *Geotimes*, Nov. 1978)

Aniakchak caldera, one of more than 20 in the Aleutian volcanic arc, is a natural laboratory for volcanological studies, say scientists of the U.S. Geological Survey. Because it is ice-free, environmental concerns such as the effects of eruptions on sub-arctic flora can be studied. It also provides a good place to study the potential of calderas as shallow heat reservoirs for the production of geothermal energy.

Survey geologists T.P. Miller and R.L. Smith say Aniakchak formed about 3,500 years ago, after the collapse of a cone-shaped volcano that may have reached 2,400 m or more in altitude. Pumice, ash, and gas flowed down the sides of the volcano, across lowlands and through mountain ranges as far as 48 km before reaching the Bering Sea and the Pacific Ocean. The rim now ranges from 600 to 1,200 m high. Surprise Lake, a 3.2-km-long lake in the northeast corner of the caldera, is drained by the Aniakchak River, which has breached the caldera rim.

Of more than 20 eruptions that have occurred since the caldera's formation, only one is recorded, according

to Miller and Smith. In May 1931, violent eruptions lasting for 10 days deposited 0.6 cm of ash 200 km away at Katmai National Monument on Kodiak Island.

In a related note, DGGs published an article by R.J. Motyka of the UA Geophysical Institute about the glacier growth, lake rise, and geothermal activity of Katmai caldera, which is about 150 miles northeast of Aniakchak caldera. The article is contained in *Geologic Report 55*, "Short notes on Alaskan geology - 1977," which is available for \$2.—Ed. note.

### 'Promising' Mineralization in Alaska's Brooks Range Described in Mines Bureau Report (from Dept. of Interior news release, Sept. 8, 1978)

An area of the western Alaska Arctic excluded from the proposed Noatak National Ecological Preserve because of its apparently high mineral value is cited as 'highly promising' for several metals in a newly released Bureau of Mines report.

The area, known as the 'Red Dog' deposit, is located 80 miles north of Kotzebue at the western end of the Brooks Range. The region was included within Alaska conservation proposals developed in 1973, but was excised from current Administration proposals in response to more recent information about its mineral value.

According to the report, the deposit may contain lead, zinc, silver and barite and is called "one of the most attractive exploration targets in Alaska." However, the report cautions that the commercial value of the deposit was announced in 1975 following its location by a field party working under the direction of the Bureau of Mines.

The report is titled "Mineral Studies of the Western Brooks Range Performed Under Contract J0155089." The area covered in the study is a 19.2 million acre tract proposed for inclusion within a conservation area by the previous Administration under terms of Section 17 (D)(2) of the Alaska Native Claims Settlement Act of 1971. However, since current proposals excluded some of the most highly mineralized areas, the study area is no longer exactly congruent with the proposed Noatak National Ecological Preserve.

In Alaska the reports can be consulted at Bureau of Mines offices in Juneau, Anchorage (Suite 110, 2221 East Northern Lights Boulevard), and Fairbanks (212 Resources Building, University of Alaska).

There was a miner who lived practically on the border between Alaska and the Yukon Territory, and was puzzled for years about which country he lived in. Finally he got a surveyor to swing around his way and make a careful survey. "You live," said the surveyor, "in Alaska." "Thank heaven!" yelled the miner. "No more of those terrible Yukon winters!"—*ALASKA LIFE* magazine, March 1945.

### More on 'Wrangellia'... (excerpted from *Geotimes*, August 1978)

Packer and Stone (*Nature*, 1972) of the Geophysical Institute, University of Alaska, were the first to propose (in print) that tectonic segments of Alaska might have been displaced northward from more southern latitudes:

'If the Alaskan Jurassic data are interpreted in terms of the common assumption that the geomagnetic field is basically dipolar when averaged over several million years, then a paleogeographic reconstruction based on the Alaskan pole would place Alaska about 18° south of its present position, and rotated counterclockwise by 52°. Accordingly, the continental margin of the Alaska Peninsula would have been approximately parallel to the Oregon-Washington continental margin. The paleo-longitude of southern Alaska cannot, however, be determined from a single magnetic pole.'

Additional work (Packer and Stone, Canadian journal of earth sciences, 1974) reaffirmed the conclusion that southern Alaska had been considerably further south.

Further refinements of these ideas, including the concept of 'Baha Alaska' were contained in a later paper entitled 'Tectonic implication of Alaska Peninsula paleomagnetic data' (Stone and Packer, 1977) in v. 37 of *Tectonophysics*.

### Big Pipeline—Big Impact (from *Utah Survey Notes*, August 1978)

The Alyeska (Trans-Alaska) Pipeline celebrated its first year of operation on June 20, and the impact of the \$7.7 billion project is being felt around the world.

While the pipeline has caused a glut of crude oil on the U.S. West Coast, tangled political and environmental barriers have so far prevented the oil from reaching the Rocky Mountain region, Middle West and East Coast where it is much needed. At present a transfer from large tankers to small tankers through the Panama Canal bottleneck is the only way Alaskan crude oil can reach Southern and Eastern U.S. ports.

At present levels of Alaskan North Slope production, the U.S. balance of payments deficit resulting from foreign oil imports will be reduced by \$6 billion annually. Alaskan North Slope crude to the lower 48 states plus North Sea oil to Europe has also softened the attitude of OPEC nations and influenced their decision not to raise oil prices this year. The overall effect is to hold down inflation of energy costs and inflation in general, an influence unfortunately not felt in many other commodities.

Production of the Prudhoe Bay field which feeds the huge new pipeline is now 1.17 million barrels per day. Cumulative production is more than 256 million barrels. For comparison total production of all fields in Utah averaged 100,000 barrels per day in 1977, and the State's cumulative production (since the 1950's) is about 625 million barrels.

### Zinc, Lead Deposits Staked in Wulik River Area North of Kotzebue (from *The Alaska Economic Report*, July 17, 1978)

Houston Oil and Chemicals, WGM, Inc. and General Crude have staked extensive numbers of claims on a heavily mineralized zinc-lead deposit located in the Wulik River area about 80 miles north of Kotzebue. Cominco American has also done extensive staking in this area, and both company groups are conducting studies on the feasibility of commercial development of the ore bodies. Both the state and Nana Regional Corporation are interested in making land selections in the area. WGM indicates that claims staked by its partnership contain some 30-35 million tons of ore, running about 10 percent combined zinc and lead to the ton. Minerals geologists indicate that the same mineralization belt extends eastwards through the Brooks Range, and that potential for further discoveries is very good. But it might take as long as 10 years to start production from deposits if studies indicate that development is feasible.

### Mineral Deposits Promise (from *Alaska Journal of Commerce & Pacific Rim Reporter*, Oct. 23, 1978)

Four known mineral deposits could become the backbone of industry in Southeast Alaska.

Mining employment has been relatively insignificant in Southeast in recent years but has the potential to once again become an important source of primary employment.

Cited as top contenders for employment are the Quartz Hill molybdenum deposit near Ketchikan, the Takanis nickel, cobalt, silver and copper ore body on Yakobi Island and the Bid Sore zinc, silver, lead, copper and gold deposits on Green Creek near Hawk Inlet on Admiralty Island.

The Ross-Adams uranium deposit near Kendricks Bay on Prince of Wales Island also is a top contender.

Given full development of Quartz Hill, Takanis and Bid Sore, long-range direct employment in Southeast could jump by about 1,300; total jobs would increase by 3,000 and the population could go up by 7,000.

### Filing is Heavy in Southeast (from *Alaska Journal of Commerce & Pacific Rim Reporter*, Oct. 23, 1978)

"Get in while the gettin's good," was the apparent byword recently when mining firms filed about 1,000 claims on Kupreanof Island, about 15 miles west of Petersburg.

Mining geologists say development of hundreds of copper prospects near the Southeast city may be thwarted by being designated as wilderness areas.

Some of the claims lay within a 168,000 acre area along the Duncan Canal which the Carter Administra-

tion has proposed for wilderness status.

The geologists feel the mineralized area is part of a geologic trend of massive sulfides occurring from Noranda Exploration's discovery on northern Admiralty Island to south of Ketchikan.

Amoco Minerals and other exploration firms staked the 1,000 claims. Other companies staking mining claims near Kupreanof include Resource Associates of Alaska, Mapco, Inc.; and B.P. Alaska Exploration.

Most of the companies are actively seeking high grade deposits of copper that also contain zinc, silver, and gold. Although deposits several feet thick are legion in the area, most companies indicate they are looking for deposits 50-60 feet thick.

About 10 major firms have been active in the exploration with Amoco Minerals the first to file claims near Petersburg. A total of 596 claims were filed in August alone.

Wilderness laws do not prohibit mining and previous rights and existing mining rights have to be respected. And mining firms, by law, can stake claims until 1984.

Most companies don't favor wilderness designations because of the stricter regulations. But even though there is no legal reason to preclude mining in wilderness, many companies prefer not to set a precedent by mining wilderness.

The stricter regulations also mean higher development costs by the companies involved.

### New Claims Double

The number of new mining claims more than doubled over last quarter, according to the College mining information office. A total of 9,668 new claims were filed during the last three months, up substantially from the 4,075 filed during the last reporting period.

This increase is a direct reflection of the main mining season, since the law allows a 90-day grace period between claim staking and recording; the recording months involved are September, October, and November.

Recording districts with the most significant increases over the last quarter are Nome (up from 492), Barrow (from 639), and Fairbanks (from 848). Totals by recording district are:

Fairbanks	2,612	Haines	4
Barrow	1,496	Ketchikan	168
Manley Hot Springs	59	Sitka	290
Mt. McKinley	107	Nome	2,215
Nenana	57	Glennallen	14
Kotzebue	585	Valdez	13
Ft. Gibbon	40	Chitna	130
Talkeetna	186	Wrangell	251
Palmer	92	Anchorage	56
Seward	22	Iliamna	50
Juneau	521	Bethel	32
Petersburg	668		

### Interior has Discretionary Power over Mining not in Progress Oct. 21, 1976

(from Northwest Mining Ass'n Bulletin, Nov. 1978)

An Interior Department counsel has determined that the Secretary of Interior has the discretionary power to prevent mining activities not in progress on enactment of the BLM Organic Act (Federal Land Planning and Management Act), thus giving Secretary of Interior Cecil Andrus the control he has sought over the mining industry.

In his lengthy decision on application of FLPMA's Sec. 603 (the wilderness review section), Interior Solicitor Leo Krulitz determined that the Interior Secretary legally assumed such power on Oct. 21, 1976, the date of enactment of the act.

Even before procedures were established by the BLM for conducting wilderness inventories, FLPMA set Sept. 30, 1980, for completion of the wilderness inventory of the California desert conservation areas. And in spite of the 15 years allowed for wilderness review by the act, BLM has already completed the wilderness review of 1-1/2 million acres of potential hydrocarbon lands in Nevada.

The BLM definition of road for their wilderness review will allow almost any roaded area to be considered roadless unless it is currently paved, maintained, and in use by normal two-wheel drive passenger vehicles.

It seems certain that public lands will be largely removed from public use, either by being classified as "wilderness" or by being held in limbo for further study. It seems equally certain that the courts will be flooded with contests before practicality returns to the administration.

### Good Scientists Don't Find Orebodies

(from The Northern Miner, Nov. 9, 1978)

"Exploration uses science, but it is not science, since its aims are fundamentally different. Science strives for understanding, whereas exploration strives solely for discovery—with or without understanding—by whatever means."

Those were the words of Siegfried Muessig of Getty Oil Co., president of the Society of Economic Geologists, delivered at the recent gathering of almost 5,000 geologists in Toronto. He was discussing the "art of exploration."

"Some years ago I read the following sentence in an exploration report: 'I recommend additional drilling to confirm that areas of structural preparation, which are permissive of mineralization, are present.' You may say, 'What's wrong with that?' I say the emphasis is wrong," Mr. Muessig said.

"The writer was thinking like a scientist, not like an explorationist. He's a loser; he'll never find an ore-

body, unless he begins to understand the proper role of science. Moreover he needs to understand that one can't send 'structural preparation' to the mill."

A corollary, Mr. Muessig pointed out, is that so long as the geologist acts strictly as a scientist he constantly seeks more understanding, more data, and consequently tends to delay that expensive drill hole.

"The good explorationist looks for reasons to drill a hole rather than geologize a prospect to death. It is after all, the drill hole, not the geologist, that finds the ore-body."

### **Miners: Learn From Other Side** (from *Anchorage Times*, Oct. 27, 1978)

The new president of the Alaska Miners Association says miners must take "a page from the environmentalists' handbook" in order to re-establish a strong mining industry in the state.

Jon Paul "J.P." Tangen, a Juneau mining lawyer, was elected by the organization's board Thursday during a four-day convention at the Captain Cook Hotel.

Issues confronting the miners' group, Tangen said, include D-2 land, water pollution controls, access across Native and public land.

Tangen said miners should learn from environmentalists to "negotiate when we can and litigate when negotiations fail.

"A renewed effort will be made to establish lines of communication within the Alaska community and we will seek out our opponents to attempt to find a common ground for understanding. But large tracts of Alaska land will not arbitrarily be closed to mineral entry by the state or federal government.

"Ours is an association of small businessmen. The day of the individual prospector is not gone," Tangen said.

"One of our chief goals for the next two years will be to help those individual entrepreneurs who have been beaten and mauled by the environmental activists of the '70s into a renewed opportunity for private enterprise in the industrial '80s," he said.

Tangen is with the firm of Robertson, Monagle, Eastaugh and Bradley in Juneau.

### **Geology: It's Opening up for Women** (from *U.S. News & World Report*, Nov. 13, 1978)

Cindy Crawley went to work the other day with her toothbrush, seasickness pills, hard hat and work boots packed in the trunk of her car.

As it turned out, because of a breakdown in offshore-drilling equipment, she spent the day poring over maps in her 29th-floor office here in Houston.

But desk work is nothing unusual for Crawley, 24, a geologist with Continental Oil Company. She normally spends more time in the office than in the field. "We can work Alaska from our desks in Houston," she explains.

Crawley has a career that most picture as a man's

world, where backpackers with rock hammers in hand clamber over mountains in search of minerals. But the closest she gets to chiseling a chunk of rock from the earth is where she peers over a roughneck's shoulder as a drill pulls up a sample taken from thousands of feet beneath the sea.

A geologist's job involves studying the structure, composition and history of the earth to determine the stability of the crust and the distribution of its resources.

In Crawley's case, the work entails trips to offshore oil rigs about twice monthly to secure top-quality well logs that look like an electrocardiogram chart. Her real job starts when she correlates the logs, seismic data, well samples and maps to determine whether to continue drilling for oil and gas.

"You can get gray hairs knowing you're holding up a \$50,000-a-day operation," she says.

Crawley explains that geology builds on basic principles of physics, chemistry, engineering and biology. "But you have to look for new ways to put together old data," she says. "Most of the easy oil has been found. Now we are refining our techniques."

The geologist graduated from college in 1975, in the wake of anti-oil-industry sentiments that resulted from the Arab oil embargo. But, she recalls, "The field was opening up for women and everyone."

More than 34,000 people work as geologists. In the oil industry, salaries range from \$17,000 for a new graduate with a bachelor's degree to \$28,000 for a geologist with five years' experience.

Demand for geologists is somewhat cyclical, but is expected to be strong through the mid-1980s. As Crawley observes: "It is getting harder and harder to find oil and gas, and it takes more people to find alternatives."

While Crawley's education trained her in geological concepts, she learned that it did not prepare her for what she found on the job. "Industry technology moves so fast," she says. "It's difficult for a university to stay on top."

The oil industry prefers to hire master's level graduates, but those with bachelor's degrees are sometimes considered on a case-by-case basis. Crawley admits to some early frustrations because she lacked the higher degree, but her work experience soon made up for that.

There are times, Crawley admits, when she feels like a used-car salesman in defending the potential of well sites she has chosen.

In addition to advising management on well locations, Crawley is involved in proposing potential drilling sites to be leased from the government. The red tape involved in that and other tasks can be discouraging.

"Regulation puts a cap on free enterprise," she argues. "We have got to compromise."

Crawley also has little patience with militant environmentalists who oppose oil exploration. "I'd like to keep the environment pleasing and usable," she says, "but it's just as much an abuse if our resources are

not utilized. What good is it to have beautiful, untouched mountains if you can't get the gas to drive to Colorado?"

### USBM Releases Handbook, Open-File Reports

The U.S. Bureau of Mines has released one handbook and four open-file reports. "Capital and Operating Cost Estimating System Handbook - Mining and Beneficiation of Metallic and Nonmetallic Minerals Except Fossil Fuels in the United States and Canada" was prepared under contract by STRAAM Engineers, Inc. of Arcadia, CA.

This publication, which revises and updates the USBM open-file report 10-78, is sold for \$2.35, and can be procured from the Juneau office (P.O. Box 550, Juneau, AK 99802).

The four open-file reports are free while the supply lasts. They may be examined at and obtained from the Juneau office (above) and the offices in Fairbanks (205 Resources Bldg., UA campus) and Anchorage (2221 E. Northern Lights Blvd). The reports, which all have fold-out maps, are:

OFR 109-78, "Mineral appraisal of the proposed Gates of the Arctic Wilderness National Park" (28 p.).

OFR 110-78, "Mineral appraisal of the proposed Kobuk Valley National Park" (31 p.).

OFR 114-78, "Mineral appraisal of certain Alaska national interest lands, proposed Lake Clark National Park," (17 p.).

OFR 117-78, "Mineral potential of Alaska's Mt. McKinley region" (18 p.).

### ...FORUM...

*The Bulletin occasionally prints viewpoints found in editorials and letters to the editor of various publications. Readers with differing opinions are urged to send their rebuttals to us.—Ed. note.*

### Long Live the Alaska Lands Bill

(from *Wilderness Report*, Nov. 1978)

"H.R. 39 is dead, long live the Alaska lands bill!" became the new rallying cry for the Alaska Coalition after eleventh-hour efforts to salvage the legislation collapsed in the waning hours of the 95th Congress. With the Administration now studying options for executive action, the State of Alaska and special interest groups poised to file suit, and the cosponsors of H.R. 39 vowing to reintroduce the legislation, the battle over Alaska's wildlands promises to reach new peaks of intensity in the coming year.

Alaskans have only Senators Ted Stevens and Mike Gravel to blame. Although it was Gravel who finally pulled the trigger on the bill, Senator Stevens loaded the gun through obstructive maneuvers in committee, delaying the possibility of floor consideration until the

very last days of the session when the likelihood of reaching agreement quickly was virtually nil.

Far from regarding the death of the bill as a disaster, the Alaska Coalition views the outcome as second best to passage of a strong bill, and far preferable to enactment of the severely weakened measure reported by the Senate Energy and Natural Resources Committee. The Coalition is conducting no post-mortems, but is focusing now on action by the Administration and on legislation for 1979.

Ironically, development interests may be more worried about the failure to enact legislation this year. Tony Motley, lobbyist for Citizens for the Management of Alaska Lands (CMAL), and others were in close communication with Stevens and Gravel during the October 12-14 negotiations, pushing for compromises favorable to their side. In a recent *Anchorage Times* article, Motley expressed some disappointment that "we weren't able to wrap it all up."

In also blocking the bill to extend protection for the national interest lands beyond December 18, Senator Gravel went counter to the advice of CMAL and other Alaskan groups. With an extension there would be no need for the Administration to invoke the Antiquities Act. Presidential action to establish permanent national monuments in Alaska can only strengthen the hand of conservationists in the next legislative round.

Perhaps we were all a little too optimistic in believing we could win a good bill the first time out. Conservationists worked eight long years before Congress finally passed the 1964 Wilderness Act. We will win the Alaska issue too. The Alaska Coalition has drawn together a remarkably dedicated group of people. Their effort isn't funded by huge bank-rolls or founded upon vast experience in the political arena. It runs on commitment, youthful energy and an extraordinary camaraderie. The excitement generated by the Alaska campaign exerted immeasurable impact on all conservation issues in 1978. Backed by the strong and continuing support of citizens across the nation, the Coalition is eagerly awaiting the rebirth of the Alaska lands bill in the 96th Congress.

### Feds Cancel Road Permit

(from *Fairbanks Daily News-Miner*, Dec. 2, 1978)

The Agriculture Department has canceled a special permit to build an 11.5-mile access road to mining claims near Ketchikan.

Assistant Secretary M. Rupert Cutler said the permit was issued a year ago by the Forest Service—an agency he supervises—to the U.S. Borax and Chemical Co. to build the road to its claims in the Misty Fjords area.

Cutler said his decision restricts the company to the use of helicopters to take bulk samples from its 876 mining claims in the roadless area.

Alaska's glaciers cover an area larger than Switzerland.

## Antiquities Act Invoked

(from Fairbanks Daily News-Miner, Dec. 1, 1978)

In the largest land freeze in American history, the Carter administration today invoked the 1906 Antiquities Act to designate 56 million acres of land in Alaska as national monuments, closing them off from state selection and development.

The administration also directed an immediate study of an additional 39 million acres for possible inclusion in the national wildlife refuge system.

Interior Secretary Cecil Andrus said he would expedite transfers of all state and Native land selections outside the new monuments. He added, however, that he would not let the state have the 9 million acres of land within the new monuments that the Hammond administration had told him it wanted to select.

The unprecedented massive use of the 72-year-old act was taken by President Carter after Congress failed to pass a bill settling the 20-year-old controversy over federal lands in Alaska. Congress's inaction meant that federal lands would lose their protection under the Alaska Native Claims Settlement Act of 1971 Dec. 18.

Last month Andrus withdrew about 110 million acres for three years under the BLM Organic Act, encompassing composite boundaries in the House and Senate versions of the Alaska lands bill, as well as the administration's proposal.

At a press briefing today Andrus said the Antiquities Act would be an additional way of protecting federal land in Alaska.

"If we had adequate protection without the Antiquities Act, we would not have taken this action," Andrus told the reporters. "I would not have put the President through this exercise."

Earlier this week, Andrus recommended that Carter designate 17 national monuments in the state, all of which were classified by Carter today.

Included are 13 national monuments to be managed by the National Park Service, two to be managed by the Fish and Wildlife Service and two to be managed by the National Forest Service.

Andrus said the 17 new monuments will be regulated according to the rules governing their respective management as follows:

- There will be no mining or logging permitted in any of the monuments, but existing rights will be honored.

- Sport hunting will be precluded from the 13 monuments managed by the Park Service, but permitted by the Forest Service and the Fish and Wildlife Service.

- All the new monuments will be opened to subsistence hunting and fishing except Kenai Fjords, where there is no record of ongoing subsistence use.

Andrus called the Antiquities designations "permanent" until further action by Congress. "I am confident that Congress will act soon, but make no mistake, this is a permanent action," he said.

Environmentalists praised the executive order as one

of the greatest land conservation moves in history. A spokesman for the Alaska Coalition, an environmental umbrella group, said, "We believe that this action will make Carter considered one of the greatest conservationist presidents in the history of the country."

Andrus said, "These proclamations were required to protect scientific, cultural, historic and living resources no longer available in any other part of our country."

At issue is about a third of the state that had been set aside for classification under section 17(d)(2) of the 1971 Alaska Native Claims Settlement Act.

Then-Secretary of Interior Rogers C.B. Morton withdrew about 80 million acres for consideration by Congress to designate the lands as national parks, refuges, forests and wild and scenic rivers. Congress set a Dec. 18, 1978, deadline to resolve the question.

However, after nearly two years of work on the controversial Alaska lands bill, negotiations collapsed on the last day of the 95th Congress last month when Alaska Democrat Sen. Mike Gravel refused to accept the compromise.

Alaska Sen. Ted Stevens, who had worked with environmentalists during the final days of deliberations to produce what he called a "balanced" bill, accused Gravel of killing any chance the state had for a "better bill."

The massive reclassification of federal lands in Alaska had produced one of the biggest lobbying efforts of the year. Environmentalists, industry lobbyists and members of the Alaska congressional delegation began lining up their support last January for what was expected to be a cake-walk for the conservationists.

And despite opposition from industry and state interests, the House overwhelmingly passed its version of the bill last May setting aside about 120 million acres, half of which would have been classified "instant wilderness," the most restrictive land use category.

But the measure faced its toughest battle in the Senate where Gravel and Stevens had vowed to kill it unless the House version was substantially weakened.

After four months of Senate hearings, Stevens eventually conceded that he could live with the bill produced by the Senate Energy Committee, with some minor changes. Gravel said he would defer to Stevens in hopes that he would come up with a good bill.

The final days of the 95th Congress produced marathon negotiations between the principals involved: Andrus, Gravel, Stevens, Rep. Don Young and House environmental leaders Rep. Morris Udall, D-Ariz, and Rep. John Seiberling, D-Ohio.

The result was a compromise that was said to have support both from environmentalists and industry. Stevens called it a "liveable" bill.

But Gravel found the compromise "totally unacceptable" and said he did not fear the Antiquities Act.

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"In all fairness, modern well planned and operated mines are not the despoilers many believe them to be."—U.S. Forest Service, 1975.



## Agencies Fly High on Coordination

(Excerpted from news release, Federal-State Land Use Planning Commission)

Ten federal agencies and the State of Alaska have joined together to fund and operate a joint high-altitude photography program in Alaska.

The agencies that are participating in the program are the: Bureau of Land Management, U.S. Forest Service, National Park Service, U.S. Soil Conservation Service, U.S. Fish and Wildlife Service, U.S. Geological Survey, Army Corps of Engineers, U.S. Department of Energy—Alaska Power Administration, Bureau of Mines, the Bureau of Indian Affairs, The State of Alaska—Department of Natural Resources, University of Alaska—Geophysical Institute, and the Joint Federal-State Land Use Planning Commission.

Meetings of the concerned agencies were conducted by the Federal-State Land Use Planning Commission in early 1978 to explore the possibility of coordinating an Alaskan high-altitude photography program. At the invitation of this committee, NASA has agreed to provide photo coverage of the state on a reimbursable basis within the limits of their existing manpower, aircraft and support equipment.

Two aircraft types will be used: the U-2 and the WB-57F, located at Ames Research Center in California and the Johnson Space Center in Texas. The aerial flight program is expected to be completed in 1980. The program has been scheduled to take advantage of snow free seasons when vegetation is full and there is little cloud or forest fire smoke cover.

Final products include simultaneous 1:120,000 scale black and white and 1:60,000 scale color infrared high-altitude aerial photographs. Also included are computer compatible tapes (flight summary records) that are placed into the Bureau of Land Management's automated photographic indexing system.

A complete set of duplicate aerial film is available at the Bureau of Land Management and at the state Department of Natural Resources, both in Anchorage. Anyone interested in purchasing them should contact the Aerial Photograph Field Office, USDA, 2222 West 2300 South, P.O. Box 30010, Salt Lake City, Utah 84125.

## Exploratory Drilling to Continue in Alaska Reserve

(from Dept. of Energy news release, Oct. 30, 1978)

Husky Oil NPR Operations, Inc. will receive a contract to administer a \$200-million exploratory drilling program during fiscal year 1979 in the National Petroleum Reserve in Alaska (NPR), the U.S. Geological Survey announced.

In 1974, the Office of Naval Petroleum and Oil Shale Reserves began an evaluation and assessment

program to determine the petroleum potential of the Reserve. The contract with Husky provides for the fourth year of that planned five-year program.

A major goal of the program is to explore and evaluate the petroleum resources of NPR by means of drilling and geological and geophysical investigations and build an information base to assist Congress in determining the best use of land within the Reserve.

At the time of transfer of the Reserve (1977), the Navy, in the third year of its program, had drilled seven exploratory wells in the northern coastal part of the Reserve and had completed 7,680 miles of a 10,000-mile seismic reconnaissance survey. All the wells were dry or had at best only slight indications of oil except for the W.T. Foran well, which had "good porosity and permeability and residual oil" in a formation equivalent to the main producing zone at Prudhoe Bay.

The exploration program in fiscal year 1979 includes completion of two deep wells begun in fiscal year 1978, Inigok and Tunalik test wells, and re-entry and completion of the South Meade test well. Four medium-depth test wells (wells which can be completed in one winter drilling season) will be drilled in the northern coastal region, and drilling will be started at two deep well sites in the southern part of NPR. At the conclusion of the fiscal year 1979 program, a total of 19 exploration wells will have been drilled on the Reserve.

NPR, totaling 37,000 square miles in area, is located in a vast sedimentary basin on Alaska's North Slope, west of the Prudhoe Bay Oil Field. The Reserve is located mostly in the Arctic Coastal Plain and Foothills; its terrain is marked by tundra cover, underlain by permafrost. The rough boundary of the Reserve extends from the Arctic Ocean on the north to the crest of the Brooks Range on the south, and from about Longitude 161°50'W to the Colville River on the east.

## They Said It....

"But I also write to ask for your support in what will undoubtedly be the toughest reelection fight of my career—a race that has seen my opponent take issue with my sponsorship of H.R. 39—calling it 'extreme' and 'anti-Alaskan.'—U.S. Rep. Morris K. Udall (Dem-AZ).

"Alaska national interest lands remained the primary public lands question in Congress this year, but the query went unanswered....Maybe next year wildlife will get proper consideration and not be trampled by the mad rush for wilderness and federal control over resident wildlife."—Wildlife Management Institute *Out-door News Bulletin*.

"In view of the intentional exclusion of prime mineral resources (in the National Monument withdrawals) and lack of current production which calls

into question the validity of existing mining claims, the impact of compliance with addition regulations is likely to be minimal or nonexistent."—Dept. of Interior Draft Environmental Supplement, Alternative Administrative Actions, Alaska national interest lands (p. 111-21).

"At the 1976 rate of consumption, the proven reserves (of Cook Inlet's natural gas) would last about 49 years and even with a 400% increase in use, less than half the available gas would be used by 200."—ALASKA Magazine, Feb. 1978.

"What is the present status and prospects then for U.S. regulation (of oil)? You have many predictions that Mr. Carter will not get his way, that there will come out of Congress an energy plan that will be very different from what he put in...Mr. Carter has already gotten his way in what really counted...He has already gotten the major element of the whole program, namely a Department of Energy which has 20,000 employees and a budget of \$10 billion—a budget roughly equivalent to the profits of all of the American oil companies combined...20,000 full-time employees who have a strong interest to propagandize for and to work for the government takeover of the oil industry.—Dr. Milton Friedman, 1976 Nobel Laureate for Economic Science, in *The Sohioan*, Aug. 1978.

"Mertie was telling me that the USGS was planning to drop the 'na' at the end of names for rivers, as the 'na' meant 'river' in Indian, as Nenana; they changed their minds when the Oshitna River was mentioned."—Letter from A.B. Shallit, Alaska Territorial Dept. of Mines assayer to R.L. Stewart, Chief Clerk, Dept. of Mines, July 3, 1940.

### A Scrutiny of the Abstract By Kenneth K. Landes

(Reprinted from *The Bulletin of the American Association of Petroleum Geologists*, July 1951)

#### ABSTRACT

The behavior of editors is discussed. What should be covered by an abstract is considered. The importance of the abstract is described. Dictionary definitions of "abstract" are quoted. At the conclusion a revised abstract is present.

Presumably new editors, like new senators and small children, should be seen and not heard. But unfortunately the Association has elected (the electorate had no choice) an editor who is a non-conformist. For many years I have fretted over the inadequate abstract, and now perhaps I can do something about it—but not by keeping quiet.

Many of the abstracts appearing in the publications, including the meeting programs, of the A.A.P.G. can

best be described by the use of a homely word that refers to an infestation by certain minute organisms. The abstract appearing at the beginning of this note is in that category. I regret to say that it is not an extreme case. My collection contains several that are worse. Dean Russell of Louisiana State refers to such abstracts as "expanded titles." They could also be looked upon as a table of contents, in paragraph form, with "is discussed" and "is described" added so as to furnish each subject with the verb necessary to complete the sentence. The reader is left completely in the dark not as to what the paper is about but as to what it tells! The information and the interpretation contained therein remain a mystery unless the reader takes the time to read or listen to the entire paper. Such abstracts can be likened to the "teasers" which your local movie manager shows you one week in the hope of bringing you back next week. But the busy geologist is more likely to be vexed than intrigued by the coy abstract.

To many geologists, especially to the tyros in exposition, the writing of the abstract is an unwanted chore required at the last minute by a rule-ridden editor or insisted upon even before the paper has been written by a deadline-bedeveled program chairman. However, in terms of market reached, the abstract is *the most important part of the paper*. For every individual who reads or listens to your entire paper, from ten to five hundred will read the abstract. It is much better to please than to antagonize this great audience. Papers written for oral presentation should be prepared with the deadline the abstract date instead of the delivery date. Later discoveries can be incorporated within the paper—and they would miss the program abstract anyway.

My dictionary describes an abstract as "a summary of a statement, document, speech, etc." and "that which concentrates in itself the essential qualities of anything more extensive or more general, or of several things; essence." The definition I like best has been set in italics. May all writers learn the art (it is not easy) of preparing an abstract containing the *essential qualities* of their compositions! With this goal in mind I append an abstract that I believe to be an improvement over the one appearing at the beginning of this discussion.

#### ABSTRACT

The abstract is of utmost importance, for it is read by 10 to 500 times more people than hear or read the entire article. It should not be a mere recital of the subjects covered, replete with such expressions as "is discussed" and "is described." It should be a condensation and concentration of the *essential qualities* of the paper.

### DGGS to Hire New Lab Chief

Daniel B. Hawkins, 45, will assume the duties of DGGS Minerals Laboratory Supervisor effective January 1. Currently a Professor of Geology at the University of Alaska, Hawkins has a Ph.D. in geochemistry from Penn State and Masters and Bachelors degrees in chemistry from Montana State. He replaces Henry S.

Potworowski, who resigned October 1.

'Hawk' is active in the Fairbanks Light Opera Theater and in competitive rifle shooting. In his spare time, he and his wife, JoAn, secretary to the UA Dean of Students, tend their brood (six children).

In other personnel changes, GERALYN A. Broker was hired as clerk-typist in the College office to replace Mona J. Rector, who quit to have a baby (Benjamin, born Nov. 5). Geri, 21, is from Tok.

In Juneau, Christopher C. Landis, 28, replaced the late Earlene L. Grose as mining-information specialist. Chris, who attended the University of Utah, and his wife Sandra have a daughter, Kristen, 3.

Richard W. Flanders, 28, is the new Anchorage-office geological assistant. Flanders has a Masters degree (Idaho) and a Bachelors degree (Michigan State) in geology. A bachelor, Rich lists music as his hobby.

### Our Gangue....

By Frank Larson, DGGS editor

Ho. Ho. Ho. 'Tis the season to be jolly, but you'd better smile before the Federal Government discovers their newest immutable regulation—Excessive Jocularly. It's on the books, you know. Section 435, Code 88, Para. 4.7.5.3(a), "Excessive hilarity, mirth, or any similar expression resembling joy or optimism or causing undue noise over 3 decibels will cause perpetrator to be subject to a facial impact statement or an investigation by the proper agency (usually Interior)...Like, 'Big Brother' didn't used to be involved in nearly everything in your life, did it?...Remember the so-called 'Good Old Days'?...Skating in the winter, building dams in the slush of spring, swimming in the summer, and tipping over out-houses in the fall. (Which never fails to remind me of one boyhood pal, Jack Hanson. A generation ago, Ol' Jack earned everlasting local fame one dark, moonless October night while furtively scurrying through the rock-ribbed fields of an upper Midwest hamlet. He was on his way to tip over the privy (a two-holer—the 'Country Gentleman' model) that belonged to one Byron Brown, farmer....Imagine, Dear Reader, Jack's astonishment as he found, to his utter dismay, that Farmer Brown had grown weary of these Hallowed Eve tomfooleries and had moved his outhouse about 3 feet downwind. The result? A Guinness Book of Records entry for the first one-and-a-half gainer performed in the middle of a field. Ugh....I believe Jack went on, with that 'head start,' as it were, to become an environmental-impact-statement writer....But as time went by, your ideas of fun had changed. You got into things like high-school sports, cars, avoiding responsibility (both scholastic and domestic), parties, and Attempted Premartial Sex. Nevertheless, even with the growing specter of Big Brother, Christmas traditions remained largely unchanged: Streets lined with festive lights, holiday wreaths, turkey with the trimmings, sweaty

department-store Santas, and the office parties with the various goodies—cakes, cookies, booze, and bourbon balls (which always left me wondering where I was when bourbon season had rolled around)....Above all, the one thing that remained constant was the Christmas music. The old standards prevailed, year after year: 'White Christmas,' 'Jingle Bells,' 'Rudolph the Red-Nose Reindeer'....Until recently, that is. We have a new pop hit: 'Give Me Land, Lots of Land, Under Starry Skies Above,' by the Andrus Sisters....Why, even Big Brother, the Gummint, is undergoing drastic change. Did you know that stodgy, snaillike Department of Interior, which has not only taken 20 years to convey less than 35 percent of Alaska's land due under its Statehood entitlement but 8 years to convey less than 13 percent of Alaska Native lands, completed its environmental impact statement on invoking the Antiquities Act of 1906 (p. 14) on 56 million acres of Alaskan land in just 60 days? Amazing turnabout, isn't it? (We knew the Secretary was quick, but faster than the speed of sleight?)....Then again, he must have had his reasons....After all, past Administrations have used the Antiquities Act to create national monuments—look at Gettysburg, Kitty Hawk, and the cliff dwellings at Mesa Verde. But no doubt Secretary Andrus realized that Alaska has its share of history, too....For instance, there's Emil Furd's relict sluice box near Fortymile up in the Yukon-Charley River (1.7-million-acre) National Monument. That's definitely an antiquity. There's Swede Olafson's 1920-vintage dragline up on the Kobuk River (1.7 million acres). And down in the Wrangells-St. Elias National Monument (10.9 million acres), along the banks of the Chitina River, there's Peg Leg Gertie's old house of ill repute (which *definitely* qualifies under the 'Good Old Days' category)....Moving to more 'mundane' (Webster's: *earthly*) subjects, Little Squaw Mining has leased its gold placer claims on the upper Tobin, Big, and St. Mary's Creeks in the Chandalar district to Whelan's Mining and Exploration Inc., of Oregon....A joint venture called Adcon (Arctic Dredging and Construction) has been formed to conduct large-scale construction projects for offshore oil development in the Beaufort Sea. Adcon, which comprises four international firms, will initially build artificial gravel islands for exploratory drilling....In a related vein, Exxon plans to construct an ice island about 6 miles north of the Prudhoe Bay East Docks to gather info on using ice islands as drill sites. (Union Oil completed a similar well on an ice island in nearby Harrison Bay 2 years ago before spring breakup softened the ice)....The proposed natural-gas pipeline from Prudhoe Bay to the Lower 48 will cost \$12 billion, a 20-percent increase, largely because of delays and the lack of U.S. Senate action on a natural-gas deregulation bill....In closing, a Christmas gift to you, Uncle Cecil: If you are befuddled as to where to put your next national monument, remember that most Alaskans will be glad to offer their advice.....Holiday Cheers..

## Metals Market

	<u>Nov. 17, 1978</u>	<u>Three Months Ago</u>	<u>Year Ago</u>
Antimony ore, stu equivalent			
European ore	\$ 17.00	\$ 16.20-18.20	\$ 16.2-18.2
Barite (drilling mud grade			
per ton)	\$ 19-28	\$ 19-28	\$ 19-28
Beryllium ore, stu	\$ 45-50	\$ 40-42	\$ 40-42
Chrome ore per long ton (Transvaal)	\$ 54.00	\$ 54.00	\$ 56-61
Copper per lb. (MW-prod.)	\$ 0.70	\$ 0.68	\$ 0.596
Gold per oz.	\$198.25	\$198.25	\$159.30
Lead per lb.	\$ 0.38	\$ 0.327	\$ 0.32
Mercury per 76-lb flask	\$154.00	\$153.00	\$130.00
Molybdenum conc. per lb.	\$ 4.95	\$ 4.41	\$ 4.10
Nickel per lb. (cathode)	\$ 2.00	\$ 2.06	\$ 2.13
Platinum per oz.	\$307.00	\$264.20	\$166.00
Silver, New York, per oz.	\$ 5.75	\$ 5.41	\$ 4.70
Tin per lb., MW composite	\$ 7.44	\$ 6.43	\$ 6.20
Titanium ore per ton (ilmenite)	\$ 50.00	\$ 55.00	\$ 55.00
Tungsten per unit (GSA domestic)	\$131.35	\$117.31	\$148.00
Uranium per lb., MW US			
spot oxide	\$ 42.50-44.00	\$ 42.50	\$ 41.50-42.50
Zinc per lb. (MW-US PW)	\$ 0.34	\$ 0.316	\$ 0.305

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