Territory of Alaska
Department of Mines

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## MINING ACTIVITIES

FIRST DIVISION - The diamond drilling program on the Admiralty-Alaska nickel-copper lode at Funter Bay has disclosed some additional high grade. The present government-supported program is expected to be complete by the middle of November. Application is being made for patents on 20 claims covering this property. Another group is being surveyed.

A small amount of drilling was accomplished at the uranium property near William Henry Bay held by the Southeast Mining & Exploration Co. Some promising core was recovered.

Drilling is still in progress at the Climax Moly uranium property (originally Ross-Adams) near Kendrick Bay on Prince of Wales Island.

THIRD DIVISION - The Kenai Chrome Co. should by now have finished loading out their second shipment of chromite for this season. The shipment of 2500 tons was to have been completed on October 29. Company officials state that with this shipment they will have repaid in full their Government loan, and that this is the first mining loan made in Alaska under the present lending setup to be repaid in full with interest. The mine is at Red Mountain on the Kenai Peninsula.

Another company which is progressing nicely is DeCoursey-Brewis at the Red Devil mercury property on the Kuskokwim River. Though not yet in production since the fire of a year ago, they have rebuilt the camp and plant in a safe and well-engineered manner. Modern metal and concrete buildings have been built, and the old buildings that remain will be torn down. The labor force numbers about 90, a large part of which are Natives and the rest are said to be all Alaskans. Late mine development work is showing additional good ore. A storage capacity of 9000 barrels of fuel oil have been installed. Dwellings have been built for married employees in addition to the dormitories. The new reduction plant is a 40-ton Hershoff type roasting unit. Timber is purchased from local Natives, which gives a still greater boost to the economy of the area. Production is scheduled to start in January 1956.

No samples have been submitted to the TDM from the reported uranium discoveries of C. C. Cechowski in the Copper River region which were given wide publicity lately in Anchorage newspapers.

Bob Lyman and George Willis are stripping on the old Parks mercury property in Kuskokwim area. Some interesting exposures have been made.

FOURTH DIVISION - Charles Herbert and George Ramstad report having had a successful season at their Yukon Placers' Livengood operation where they took over the former Livengood Placers ground from Callahan Zinc Lead. The operation was by open cut rather than by dredging as was done formerly on Livengood Creek.

The U.S.S.R. & M. Co. crew at Hog River in the Koyukuk have completed most of the 25 miles of road from the river to the dredging ground over which the dredge must be moved next spring. The dredge was transported this past summer from Livengood to Fairbanks by road, then to its present position by water down the Tanana and Yukon Rivers, and up the Koyukuk.

## LEAD AND ZINC

Because of the usual simultaneous occurrence of these two metals in nature, and their usual similar trends in market fluctuations, it was thought proper to treat them together. (Also, the fact that we are short on other bulletin material this month may have had something to do with it.)

Lead has been used since the beginning of history. The finding of lead water pipes in Pompeii shows that the Romans used it for a present-day purpose. It was used for money and debasing coins as early as 2000 B.C. by the Chinese. Ancient silver-lead deposits were mined in China, India, Persia, Arabia, and the Mediterranean countries and somewhat later in Greece, Spain, the Pyrenees, the Harz, and Silesia. Zinc was discovered as a metal in 1520, but zinc ornaments were found in ancient burnt ruins. The Greeks and Romans used it in alloying copper with smithsonite to make brass, but did not realize what it was. It was first mined in India and China, then later in Europe, starting about 1740. The first mining in the U.S. was in Missouri in 1720, but the first actual zinc production was at the Washington arsenal from New Jersey ores.

Lead and zinc rank next to copper as essential nonferrous metals in modern industry. The chief uses of lead have been in red lead, white lead, batteries, cable coverings, litharge, tetraethyl lead, solder, pipe, sheet lead, ammunition and bearings. Many new uses are developing in new industries, and lead's use in pigments is being displaced by other substances such a lithopone, zinc, titanium, and barium oxide pigments. The chief uses of zinc have been in galvanizing, die castings, brass making, and rolled zinc. Zinc galvanizing is done by dipping sheets or other metal objects into molten zinc. This is to prevent rust. Zinc constitutes 30 to 40 percent of brass and is also used in bronzes and other alloys. Zinc die castings are used for carburetors, pumps, hub caps, drills, and many other uses. Lately, the zinc industry, hard pressed because of slowing demand and low prices, has been doing much research to develop new uses for zinc. The new use of zinc phosphate for fertilizer is one good result of this research.

The mineralogy of lead and zinc ores is relatively simple. Three lead and six zinc minerals are commercial sources of the metals, the one sulfide in each case being the most important. They are as follows:

| Mineral | Composition | Percent Pb or Zn |
|---|---|---|
| Galena | Lead Sulfide | 86.6 |
| Cerussite | Lead Carbonate | 77.5 |
| Anglesite | Lead Sulfate | 68.3 |
| Sphalerite | Zinc Sulfide | 67.0 |
| Smithsonite | Zinc Carbonate | 52.0 |
| Calamine | Zinc Silicate | 54.2 |
| Zincite | Zinc Oxide | 80.3 |
| Willemite | Zinc Silicate | 58.5 |
| Franklinite | Zinc Oxide (variable) | 15 to 20 |

Galena and sphalerite may occur separately, but are generally associated, and sphalerite nearly always has at least some galena with it. In oxidized ores (carbonates and sulfates) the two become separated. Galena is seldom free from contained silver, and both minerals may carry gold. Cadmium is a common associate of zinc, and bismuth and antimony of lead. Pyrite and chalcopyrite are common associates of both, and silver minerals are likely to be present.

Galena is one of the most distinctive and easily identifiable minerals in existence. It has a cubic habit, breaks into cubes, or exhibits square corners where broken, has a high metallic luster, is lead grey in color, and is quite heavy. Any practical prospector "worth his salt" should recognize galena the instant he sees it, except perhaps in some cases where it is so fine grained that the cubic habit is not easily distinguishable. Lead minerals will usually yield pure lead globules before the blowpipe. Or heat the fused powdered mineral in nitric acid, cool, add a little sulfuric acid, and a white precipitate forming indicates the presence of lead.

Sphalerite can usually be recognized by its brownish to black color and resinous luster, coupled with its high specific gravity of 4.1. It is not prominent in outcrops as it weathers easily to one of the oxides. The oxides, while white or light colored when pure, may be stained almost any color, but are noticeably heavier than most light-colored minerals. In testing for zinc, heat a mixture of the powdered mineral, soda, and powdered charcoal on charcoal. A pale yellow sublimate should form which turns white when cool. Then add a drop of cobalt nitrate to the mineral and another to the sublimate, and heat both again. Green spots (sometimes blue) indicate that zinc is present.

Most lead and zinc occur as cavity fillings and replacements form by low-temperature hydrothermal solutions. Generally, they occur in limestones or dolomites. These deposits have been oxidized in varying extent and depth in many districts.

In Alaska, the production of lead for the period 1880 to 1943 was 24,756 tons. During the last part of this period, most of Alaska's lead came from lead concentrates produced as a by-product by flotation at the Alaska Juneau Gold Mining Co. mill, where about 900 tons per year was the normal output. No significant zinc has ever been produced in Alaska, and practically no lead since 1944.

Lead and/or zinc have attracted attention in four regions or areas of Alaska: (1) the Mount McKinley district of Central Alaska, (2) Southeastern Alaska, (3) certain islands of Southwestern Alaska, and (4) the eastern part of the Seward Peninsula. In the first three areas named, both the USGS and the USBM have made investigations and published important contributions to the knowledge of the geology and mineral deposits there. Most recently, the USBM drilled a new lead-silver property in the Darby Mountains on the Seward Peninsula a few miles from the old Omilak mine, long dead, but which was one of the first producers in Alaska in the early 1880's. A report on this investigation by the Bureau will be forthcoming. In addition to the USBM and USGS reports and bulletins, the TDM also has in its files reports on many of the lead-zinc properties by Territorial and private engineers which are available for study.

One of the most favorable appearing lead-zinc prospects in Alaska is the Mt. Eielson property, near Mount McKinley. The USBM did extensive surface sampling there, but did not draw conclusions as to average grade or tonnage. They also

performed metallurgical treatment tests on the ore. In Southeastern Alaska, there are known deposits in Ground Hog Basin (one containing an estimated reserve of 124,000 tons containing 8% zinc, 2% lead, 2 oz. silver per ton), on Tracy Arm, at Taylor Creek at Kupreanof Island, Dora Bay on Prince of Wales Island, Moth Bay near Ketchikan, Thorne Arm, Dolomi, several in the Hyder District, and others. In Southwestern Alaska, one of the largest known zinc-lead occurrences in Alaska is on Sedanka Island, about 25 miles from Dutch Harbor and near Biorka Harbor. Sphalerite and minor amounts of galena, chalcopyrite, gold, and silver are included in the mineralization. Other deposits of possible value are also known in that region.

The drawbacks to mining lead and zinc in Alaska are chiefly the low unit price of the two metals (usually 10 to 15¢ per lb. for the last 10 years except for occasional spurts during the war), high cost of transportation, and the lack of a zinc smelter on the Pacific Coast. A lead smelter is located at Selby, near San Francisco, but the closest U.S. buyer of zinc ores or concentrates is the smelter at Kellogg, Idaho, where lead ores are also processed. In many locations in Alaska away from salt water transportation, the price of a 100% lead or zinc ore without other metals would hardly pay the cost of mining and transportation to the smelter. The only hope in these cases at present is that there will be a sufficient "sweetener" in the form of silver, gold, or possibly copper to add enough value to cover the costs.

Looking ahead, the future for lead and zinc, particularly the latter, looks brighter. With the movement of the steel and other allied industries toward the West Coast, it seems reasonable to expect that the western demand for zinc for alloying, galvanizing, etc., in addition to other new uses, will increase to the point where western smelters will be built and a West Coast market established.

E. AND M. J. METAL MARKET PRICES

| | Oct. 27 1955 | Month Ago | Year Ago |
|---|---|---|---|
| Copper, per lb. | 42.8¢ | 43.7¢ | 29.7¢ |
| Lead, per lb. | 15-1/2¢ | 15¢ | 15¢ |
| Zinc, per lb. | 13¢ | 13¢ | 11-1/2¢ |
| Tin, per lb. | 96-1/4¢ | 96-1/4¢ | 92-7/8¢ |
| Quicksilver, per flask | $276-281 | $265-270 | $325-330 |
| Silver, foreign, New York | 91-5/8¢ | 90-3/4¢ | 85-1/4¢ |
| Silver, domestic, per oz. | 90-1/2¢ | 90-1/2¢ | 90-1/2¢ |
| Platinum, per oz. | $91-102 | $91-96 | $79-84 |
| Nickel, per lb. | 64-1/2¢ | 64-1/2¢ | 60¢ |
| Molybdenum, per lb. | $3 | $3 | $3 |
| Tungsten ore, per unit | $63 | $63 | $63 |
| Titanium ore (ilmenite), per ton | $20 | $20 | $18-20 |
| Chrome Ore, (48%, 3 to 1 ratio) per ton | $115 | $115 | $115 |