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maximum information on the localization, grade and quality of the deposits.

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ALTERATION AND MINERALIZATION IN THE IRWIN DISTRICT, GUNNISON COUNTY, COLO.

By Arthur A. Socolow

In this area a thick sequence of clastic sediments was invaded by a group of dikes, sills, and laccoliths, all acid in nature and genetically related. Following the intrusions, there was mineralized a system of fissures which had originated during a broad warping. Base metal and precious metal mining operations have developed here. The large intrusions show so little in the way of distinctive contact effects that an insulating action by the early chill margins is suggested. The wall rock alteration by the solutions which mineralized the fissures, consists of silicification and sericitization; this alteration is restricted to well defined zones parallel to the fissure walls. Pervading the rocks of the entire area is yet another type of secondary mineralization consisting in the development of epidote, chlorite, and pyrite. This would seem to fit the concept of propyllitization, even though the rock assemblage of the area is acid in nature. Structural and textural data indicate that much of epidote-chlorite-pyrite was brought in as such by hydrothermal solutions, rather than developed in situ at the expense of pre-existing minerals. It is suggested that this propyllitic type of mineralization has developed in a thick, widespread zone over the roof of a deep-seated batholith, the very same mass which was responsible for the broad warping and fracturing.

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TRACING GEOLOGICAL STRUCTURES BY GEOCHEMICAL MEANS

By Forbes Robertson

Geological structures including contacts of intrusive rocks; "favorable" beds for replacement orebodies; and fissure veins can be traced by geochemical means in mining districts. A recent investigation to be published by Montana Bureau of

inherent components of force in forming flood zones of mineralization in the axial-crestal plane zones of anticlines. The flood zones in turn have the maximum chance of containing major ore deposits.

The advantages, limitations, and pitfalls inherent with anticlinally controlled exploration are briefly presented.

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GEOLOGICAL, MINERALOGICAL, AND CRYSTALLOGRAPHIC FACTORS IN THE EXPLOITATION OF LEPIDOLITE DEPOSITS

By E. Wm. Heinrich and A. A. Levinson

The chief districts in the United States from which lepidolite has been produced are Maine, the Black Hills, Gunnison County, Colorado, Taos County, New Mexico, and the Pala district, California. Major areas of production or potential production in foreign countries include southeastern Manitoba, Canada, Varutrask, Sweden, Haut Vienne, France, Karibib, South-west Africa, Southern Australia. Lepidolite and lithian muscovite are restricted to complex pegmatites, i.e., those with both primary zones and secondary units. These uncommon complex pegmatites normally occur in the marginal zone of a district, close to the margins of the parent batholith, usually in bordering metamorphic rocks. Within individual pegmatites lepidolite typically is confined to secondary units, such as fracture fillings and replacement bodies, which have been localized by various primary structural features of the pegmatite. Cleavelandite or sugary albite, quartz and a wide variety of rare constituents are characteristic associates. Two or more generations of lepidolite may occur in a single deposit, and each may be characterized by distinctive associates, macrostructural properties and composition including the Li_2O content. Color in lepidolite is independent of the Li_2O content. Lepidolite occurs in four polymorphic structural types, which can be correlated with their Li_2O contents. Different polymorphs occur in different parts of the same deposit and even in different parts of the same book. X-ray studies can predict the approximate Li_2O content. Because of these small-scale variations in the nature and occurrence of lepidolite, detailed geological, mineralogical and crystallographic studies must be combined in order to obtain the