

GINZBURG (I. I.). *Principles of Geochemical Prospecting*. Translated from the original Russian by V. P. Sokoloff. Pergamon Press, 1960. (70s.)

Geochemical prospecting, as defined by Hawkes (1957, p. 226) '... includes any method of mineral exploration based on systematic measurement of one or more chemical properties of a naturally occurring material. The chemical property measured is most commonly the trace content of some element or group of elements: the naturally occurring material may be rock, soil, gossan, glacial debris, vegetation, stream sediment or water. The purpose of the measurements is the discovery of a geochemical "anomaly" or area where the chemical pattern indicates the presence of ore in the vicinity.'

Ginzburg's monograph is a critical summary of applied geochemical investigations that have been carried out during the past 25 years by Soviet scientists in areas differing widely in geologic and climatic character, and is based on the data in the papers presented at the All-Union Conference on Geochemical Methods of Prospecting for Ore Deposits, which was held in Moscow in 1956.

The book is to be recommended to all who are concerned with the search for ore or with geochemistry in the widest sense of the word. Apart from Hawkes's small, but excellent, 'Principles of Geochemical Prospecting' (1957), it is, as yet, the only text-book on the subject, and these two works are, in many respects, complementary to each other. In addition, it contains a vast amount of material not hitherto readily available to those who do not read Russian. Clearly, the work carried out in this subject in the U.S.S.R. cannot be ignored when it is remembered that for several years 6 to 7 million soil samples have been analysed annually there to facilitate the search for ore, and that since 1957 every area that is geologically surveyed must also be subjected to geochemical investigation.

The present English translation was made by V. P. Sokoloff, a Russian-born scientist, who has had considerable experience in applied geochemistry in the United States and elsewhere. He has lavished care on this work, and his critical approach to the task is indicated by his illuminating footnotes and by the glossary of Russian soil terms that he has compiled.

Although investigations carried out by non-Russian workers have not been ignored, and 43 of the 313 references in the text relate to such work, yet incomplete knowledge of the contribution made by these has led to

statements that are *not* correct. Thus, on p. xvii it is stated that 'sizeable deposits of tin and tungsten were discovered in England during the last fifteen years, by geochemical surveys, in Cornwall, Devonshire, and Wales . . .'. Apart from the obvious geographical error, neither the Swedish Company nor others who have employed geochemical prospecting in these areas have found a mineral deposit of economic importance. On p. 8 Ginzburg remarks that chemical methods of analysis for small quantities of arsenic and antimony that would be suitable for applied geochemical investigations 'are either inadequate or entirely undeveloped'. In point of fact perfectly adequate methods have been known in Britain for several years. It is, however, clear that the Russians have generally employed spectrographic methods of analysis rather than colorimetric ones. Ginzburg advocates the greater use of the latter and he includes details of a few of these methods in an appendix.

The 72 diagrams considerably enhance the value of the work and they have gained much by being redrawn from the original, but the fundamental construction of some is such that they cannot be readily understood, and, unfortunately, many of the maps lack scales and cardinal points.

Despite the above criticisms the monograph is a major contribution to applied geochemical literature and the extent to which the subject is covered may be judged by the following chapter, &c., headings: Introduction (essentially a historical survey). Methods of analytical investigations. Geochemical tracers (indicators). Accumulation of metals in igneous and metamorphic rocks. Accumulation of metals in sedimentary rock. Prospecting in bedrocks. Prospecting for deposits without surface outcrops. Accumulation of metals in unconsolidated overburden (dispersion halos). Prospecting at the surface of the overlying mantle. Migration of metals in waters. Hydro-geochemical prospecting for metals and characteristics of different water types associated with ore deposits. The bio-geochemical method of prospecting. General conclusions in reference to geochemical survey. Appendix. Rapid methods of determining Pb, Cu, W, Mo, and Ag in the field. Glossary. Translator's notes on soil terms used in this book.

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KASPER (J. S.) & LONSDALE (K.), Editors. *International Tables for X-ray Crystallography, Vol. 2: Mathematical Tables*. Birmingham, England (Kynoch Press for the International Union of Crystallography), 1959, xviii + 444 pp., 39 figs. Price 115s.; there is a conditional reduced price for individuals on application to the Printers.