

International Platinum Symposium

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International Platinum Symposium

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The International Platinum Symposium of the Society of Economic Geologists was held in Denver, Colorado from the 16th to 18th of October, 1975. The meeting was hosted by the U.S. Geological Survey with Drs. G. A. Desborough and B. F. Leonard acting as convenor and symposium editor respectively. Twenty-two papers were presented by participants representing seven different countries. Some will appear in a special issue of *Economic Geology* scheduled for publication in 1976. Topics considered in some detail include the following: platinum-group metals (PGM) and minerals in nickel and copper-nickel deposits, the Bushveld Complex and its platinum deposits, placer platinum deposits, PGM geochemistry in igneous complexes, and hydrothermal platinum deposits.

The PGMs comprise a significant component of Canada's mineral industry output, Canadian production ranking third behind that of the U.S.S.R. and the Republic of South Africa. While all Canadian production of consequence is a by-product of nickel-copper sulphide mining from Sudbury, Ontario and the Thompson-Wabowden region of Manitoba, the recent drilling by Texasgulf Canada Ltd. at Lac des Iles in northwestern Ontario (*Northern Miner*, Aug., v. 61, no. 21, p. 2, 1975) holds some prospect of future primary platinum metal recovery in Canada. Our understanding of the processes leading to economic concentration of PGMs and their efficient milling and metallurgical

recovery has been restricted by limited knowledge of the mineralogy of these metals. Certainly no technique has played a more important role in rectifying this deficiency than the electron microprobe and a leader in this research effort has been the Canada Centre for Mineral and Energy Technology, EMR.

Several papers presented at the Symposium emphasized the diversity of platinum group minerals in many Ni-Cu sulphide ores as revealed by electron microprobe studies. For example, a detailed mineralogical investigation of ores of the Sudbury Irruptive, reported by Dr. L. J. Cabri of CANMET, EMR, noted the occurrence of 13 platinum-group minerals in these ores as well as several important differences in North and South range platinum-group mineralogy. A glossary of platinum group minerals prepared for the Symposium by Dr. Cabri lists 72 mineral species and represents an increase of more than two-fold since his last survey in 1972.

A total of eight papers dealt with the Bushveld Complex including a number discussing the platinum deposits of the Merensky Reef horizon. Introduced by an authoritative review of the regional geological setting by Professor D. R. Hunter, University of Natal, discussion of the Bushveld Igneous Complex and its renown platinum deposits proved among the most stimulating of the entire Symposium. A comprehensive overview of PGM mineralogy in the Merensky horizon was presented by Mr. C. F. Vermaak of Johannesburg Consolidated Investment Corporation together with a new and original analysis of the environment and genesis of the Reef leading to a model explaining the exceptional concentration of PGMs in the Merensky horizon. Other presentations demonstrated the predominant importance of discrete platinoid minerals and the lesser, but nevertheless significant, role of sulphides as PGM carriers in the Merensky ores.

Of the papers dealing with placer deposits a contribution by Dr. C. E. Feather of Anglo American Research Laboratories dealing with platinoid minerals in the Witwatersrand conglomerate reefs (South Africa) provided a number of new and significant insights into the platinoid mineralogy of this famous deposit. The study, which constituted an impressive demonstration of the power of the

electron microprobe and the scanning electron microscope in the study of placer platinum occurrences, showed that about 80 per cent of the PGM grains were Ir, Os, Ru alloys with sperrylite (PtAs) and isoferroplatinum (Pt₃Fe) making up most of the remainder. The Ir, Os, Ru alloys along with the Pt₃Fe appear to undergo little or no alteration during weathering, transport and burial whereas most of the sperrylite is secondary forming during later burial metamorphism probably from less stable tellurides and antimonides.

The papers dealing with geochemistry of PGMs in igneous complexes produced several interesting presentations, including a report on PGMs in the Stillwater Complex, Montana, presented by Dr. N. J. Page and colleagues of the U.S. Geological Survey. The paper noted the recognition of several horizons containing Pt, Pd and Rh contents nearly 1000 times higher than the estimated levels of these metals in the parent basaltic magma of the complex. A discussion of the recent discovery of commercial levels of platinoids in the Stillwater Complex by Johns-Manville Company Ltd. was presented by company geologists and received with considerable interest by the Symposium. In view of the extensive field mapping, petrological and geochemical research carried out on the Stillwater Complex over the last three decades this recent proving of an economic platinum metal horizon is indeed outstanding and a striking witness to the need to improve our understanding of the genetic processes governing PGM enrichment in basic-ultrabasic rocks.

The final session dealing with hydrothermal platinum drew attention to the importance of aqueous solutions and supergene processes in the formation of some platinum deposits.

In summary, the Symposium left little doubt that the mineralogical and geochemical characterization of platinum group metal ore deposits has been markedly upgraded thanks to new data from the electron microprobe, the scanning electron microscope and neutron activation. The synthesis of this information in metallogenic models of potentially powerful predictive value can be expected to significantly influence exploration for new PGM resources.

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