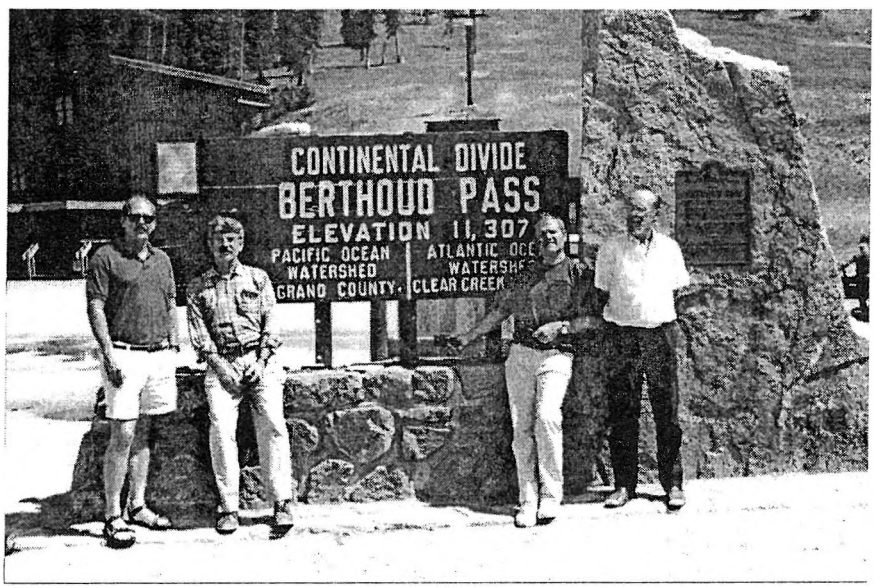
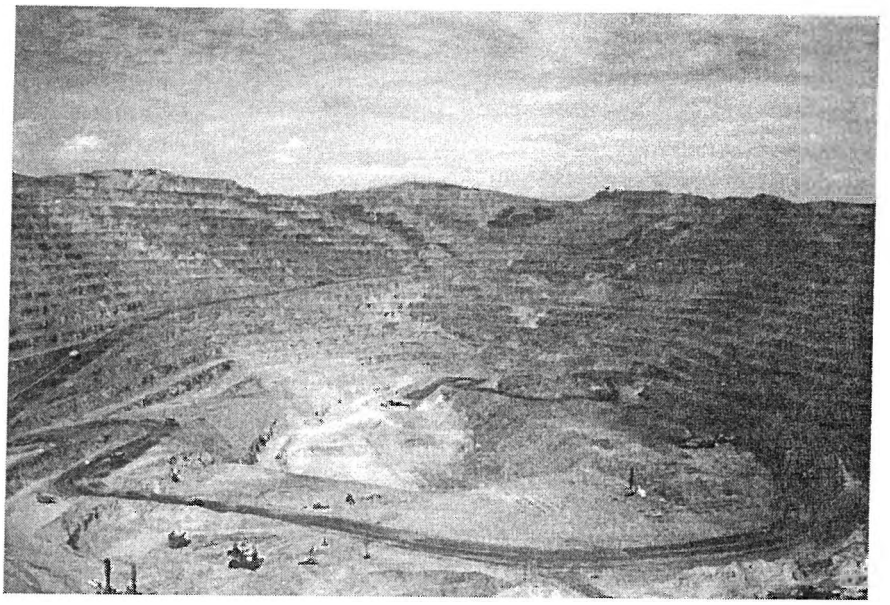
László Korpás and Albert H. Hofstra editors:

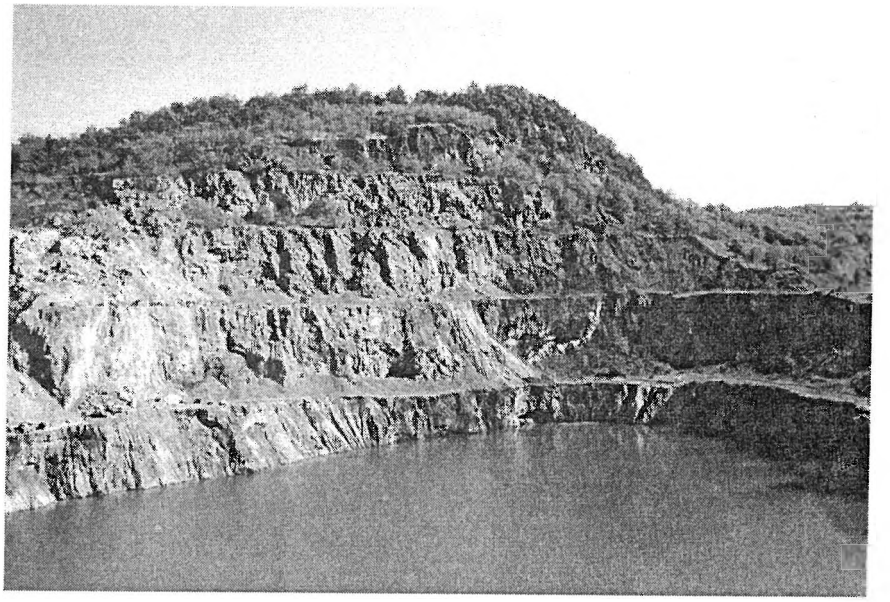
CARLIN GOLD IN HUNGARY



Participants of the project
(from left to right: Albert H. Hofstra, Joel S. Leventhal, János Haas and István Horváth)
(L. Korpás, 1995)



Betze Post gold deposit in Nevada, central part of the open pit
(L. KORPÁS, 1995)



Rudabánya iron ore deposit in Hungary, Vilmos open pit
(L. KORPÁS, 1995)

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Carlin gold in Hungary

POTENTIAL FOR CARLIN-TYPE GOLD DEPOSIT IN HUNGARY

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ABSTRACT

The project No. 435 of the US-Hungarian Science and Technology Joint Fund, entitled "Potential for Carlin-type gold deposit in Hungary" was carried out between 1995 and 1998 by the researchers of the Geological Institute of Hungary and the US Geological Survey. It aimed at the estimation of the Carlin gold potential of Hungary. The results of the project were published in this special issue and are described in the papers cited below.

1. MODEL OF CARLIN-TYPE GOLD DEPOSITS

Discovery, increasing exploration and exploitation of the large Carlin-type gold deposits during the last 30 years in many countries of the world resulted in even more detailed understanding and modeling of ore forming processes. The paper of Hofstra gives an excellent overview about sizes, mineralizations, ore grade, and reserves of these gold deposits. On examples of the type-localities Carlin Trend and Battle Mountain–Eureka Trend, Nevada were described by him the general features of large scale and long term geologic-tectonic processes, controlling the mineralization. Analysis of the mineral association and transfer-processes has led to the reconstruction and modeling of huge hydrothermal fluid systems operating in deep crustal levels. The paper includes a brief summary concerning rational geochemical and geophysical methods of exploration and is completed by an extense and upto date source of references.

2. THE DEVELOPMENT OF THE CARLIN GOLD PROJECT IN HUNGARY

Hungary's last project on ore exploration of the century was aimed at the estimation of the Carlin gold potential of the country. Since this type of gold mineralization was unknown earlier the paper of Korpás, Hofstra, Ódor, Horváth, Haas and Leventhal offers a good overlook about data and scientific base, from where started the geochemical exploration in 1995. A preliminary screening resulted in selection of 97 formations was followed by their systematic rock chip sampling representing almost 1400 samples from 604 sample sites. This sampling was completed by a complimentary stream sediment survey. Both type of samples were analyzed for Carlin suite elements (Au, Ag, As, Sb, Hg and Tl) at the Laboratory of the Geological Institute of Hungary.

The paper of Bertalan and Bartha presents the good analytical background for both geochemical methods in gold prospection. They describe the applied techniques (AAS, ICP-MS, ICP-OES) including instruments, processes and methods of digestion and analysis, precision and detection levels of the elements. Comparison on sensibility and precision of different analytical methods have given good results.

3. GEOLOGICAL AND TECTONIC MODELS

Success of an exploration could be strongly influenced by the concept and reality of the applied geological and tectonic models. From this point of view Hungary is a rather well studied country because of its high grade of

geological exploration. Large scale geologic and tectonic processes play an imortant role in the formation of Carlin gold deposits. Consequently the goal of the paper of HAAS, HÁMOR and KORPÁS is to reconstruct the main stages of evolution and paleotectonic settings which were permissive for the occurrence of massive disseminated gold deposits. Paleozoic and Mesozoic rifting, subduction and collision overprinted by a Paleogene subduction and collision are considered favorable situations.

4. THE CARLIN GOLD POTENTIAL OF HUNGARY

The final results of Carlin gold exploration are discussed in details by the paper of KORPÁS, HOFSTRA, ÓDOR, HORVÁTH, HAAS and ZELENKA. The systematic evaluation of the prospected areas and formations led to the estimation of a rather modest Carlin gold potential for Hungary. This potential is hosted mainly im Paleozoic, Early Mesozoic subordinately in Young Mesozoic and Paleogene formations. The anomalous and subanomalous groups of formation are located in favorable geologic and tectonic settings of rifting, subduction and collision and in related master faults and shear zones. From almost hundred formations 18 show subanomalous (10-100 ppb Au) and anomalous (> 100 ppb Au) gold values. Ten predicitve areas of 3 to 190 km^2 were recommended by them for further explorations. Two of them in the Velence Hills and in the Rudabánya Mountains is considered promising.

To this latter one has contributed the study of HOFSTRA, KORPÁS, CSALAGOVITS, JOHNSON and CHRISTIANSEN presenting new isotopic data and genetic model of the Rudabánya Iron Ore. The ore deposit formed during the Middle Triassic rifting in the mixing zone of ascending acidic, basinal brines rich in Fe, base metals and sulfate and of the descending idigenous ground waters rich in Ba and H_2S.

5. CONCLUSIONS

The main result of our work lies in that we have confirmed the previous expectations done in the project description: "a.....proposal will be prepared for further study of the selected 2-5 zones" (KORPÁS and HOFSTRA 1994). Although Hungary's Carlin gold-potential is rather modest, still we have recommended ten areas for further explorations and two of them seems to promise good perspectives.

The value of the research includes some more aspects: 1) The successful collaboration of researchers from the Geological Institute of Hungary and the United States Geological Survey has been resulted not only in exchange of knowledges and experiences but in common publication of these volume. 2) The issue, the first one in the 10 year long history of the US-Hungarian Science and Technology Joint Fund should be considered as a reference-work for all participating institutions and noted in the international field of geosciences too. 3) The common work has contributed to the better understanding of style of working and thinking of researchers from different continents and to the creation of new friendships.

6. ACKNOWLEDGEMENTS

We would like to express our gratitude to Dr. Dóra GROÓ, manager director of the US-Hungarian Science and Technology Joint Fund in Hungary for her help in realisation of the project and in edition of this special issue.

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