Preface

This book has been written for those interested in, and concerned about, the future sources of metals for the industry, and through it for the rapidly growing population of the world. At present over 95% of the industrial metals come from mines situated on land and the exceptionally large (giant or world-class) deposits contribute the bulk, regardless of where they are located: one of the most practically relevant lessons of globalization. This role of the oversize deposits is projected to persist until at least the end of this century, but finding them is going to be increasingly more costly and will require all the sophistication and effort the exploration community could muster. This requires a solid broad knowledge to identify prospective areas for more detailed exploration, or to evaluate mineral occurrences available for acquisition, based on the time-tested technique of geological analogy. The chance of finding an orebody by accidentally stumbling upon it, or by unsophisticated prospecting, has by now been severely reduced. As mineral exploration is, and will continue to be, mainly precedent-oriented activity, there has been a need for a comprehensive text to provide essential facts about the global distribution of metals now and in the future, above the textbook level.

The exponential increase of information that includes printed as well as electronic literature has combined with sharply reduced opportunity to access and to follow it, resulting in “knowledge gaps caused by lack of access to deposits or literature” (Cuney and Kyser, 2009). This book has been designed to help, by gathering essential scattered information about the world’s metalliferous giants under a single cover.

The book consists of three parts followed by a database, although the parts are not explicitly marked as such. Part I (Chapters 1–3) is a short review of the changing sources and utilization of metals for the industry, and it explains the various approaches to magnitude classification of ore deposits as related to geochemical backgrounds. Part II (Chapters 4–14) is a factual review of the “ore giants” in a rather loose empirical framework of depositional environments and rock associations. The spectrum of the geological settings follows the plate tectonic arrangement, but the plate tectonic concepts, as related to the actual ore formation, are used sparingly because many are still in the hypothetical realm, they change rapidly, and there is the ubiquitous multiplicity of interpretations. The emphasis here is on the demonstrable, lasting “facts” one can actually see in the field. The closing Part III (Chapters 15–17) deals with the common geological attributes of “ore giants” and how they relate to industrial needs and how ore search or acquisition are influenced by politics and economic factors. It ends up with some revelations as to how and where the future “giants” might be found.

In writing this book I have made a good use of the over 40 years long experience in the ore deposits field, and personal familiarity with at least 4,000 ore sites in some 140 countries and large territories, along with a multilingual reading capability. I have compressed many “facts” into a series of “inventory diagrams” of rocks and ore occurrences in close to 80 lithotectonic settings, interspersed throughout this book. The diagrams came from my electronic book “Total Metallogeny” that also includes the ore types considered of limited significance in addition to the “giants”. This alleviates somewhat my feeling of guilt of catering to the “big and rich” only. The small deposits are, moreover, often indicative of the larger ore presence and have to be recognized and interpreted as such.
The years 2003 through mid-2008 brought us a mineral exploration boom unprecedented since the late 1960s. This followed decades of stagnation of commodity prices, mining industry downturn and decline of exploration. The short boom came to an abrupt end in late 2008 as a consequence of the Great Financial Crisis, but there are already signs of early rebound.

During the recent boom a number of new giant/world class deposits have been discovered and/or announced. As the previously antagonistic politico-economic world systems came closer and globalization advanced, much of the previously unavailable quantitative information on ore deposits in China, the former Soviet Union, Mongolia, Vietnam and Eastern Europe have been gradually published. This has made it possible to quantitatively define additional ore giants the number of which has increased well above the mid-500s quoted in Laznicka (1999). These additions and some interpretational changes created a need for updated text. It has been a pleasure to accept the Publisher’s invitation to prepare a second edition of this book which, in addition to new data, also benefits from the rapid progress of electronic publishing and information transfer. The first book edition has been warmly accepted, especially by the exploration industry that has also provided valuable new unpublished information, site access, feedback and critique.

Acknowledgments: More than 2,000 references in this book and additional ones in the database make it clear that this is a collective undertaking, an extract of knowledge generated by tens of thousands of colleagues in the industry, governments and academia. The shared purpose and enthusiasm of international professionals and students supported a wonderful, politically neutral fellowship, very helpful in alleviating the antagonism that divides this world along political, religious, racial, wealth and other lines. My thanks thus go to the thousands of persons and organizations who provided direct or indirect help to keep my project moving, and all I can do is to print a short list of names, the tip of an iceberg. The main supporters were: Amira International, Christian Amstutz, Anglo-American Corporation, Australian Mineral Foundation, Australian Selection Ltd., Chris Bates, Rob Bills, BP Minerals, Alfred Bogaers, Bill Brisbin, Leif Carlson, Chen Guoda, Roy Corrans, CVRD Ltd., Directorate of Mineral Resources Jeddah, Peter Freeman, Geoscience Australia, Magnus Garson, Alan Goode, David Groves, G. von Gruenewaldt, Greg Hall, Douglas Haynes, Paul Heithersay and PIRSA Adelaide, INCO Ltd., Douglas Kirwin, Mel Kneeshaw, KSA Geological Survey, Jan Kutina, Jim Lalor, Manitoba Geological Survey, Don Mustard, Národní Museum Praha, Jingwen Mao, Normandy Ltd., Kerry O’Sullivan, Zdeněk’s Pertold and Pouba, Rio Tinto Ltd., Dimitri Rundkvist, Phil Seccombe, Nikos Skarpelis, Art Soregaroli, Teck Ltd., Jim Teller, Universities of Manitoba, Charles (Prague), Colombia-Medellín, Heidelberg, Moscow State, New England, Oriente (Cuba), Western Australia and Zimbabwe; Cesar Vidal, Richard Viljoen, Western Mining Ltd, HDB Wilson, Karl Wolf, Roy Woodall, Zhai Yusheng, and many others.

The actual book writing has been a lonely affair, as one of the organizations that brought me to Australia (AMF) went out of business so I have had to do without access to my own materials locked in containers for the fifth consecutive year, as well as a lack of technical assistance from anywhere: a source of immense frustration in struggling with the computer while physically manufacturing the ready to print document. I am grateful to Springer-Verlag in Heidelberg, especially to Dr. Christian Witschel for invitation to prepare second edition of this book and thank Ms. Almas Schimmel for bringing it into production. My geological wife Šárka, a most reliable co-worker, deserves the greatest thanks.

Peter Laznicka, Adelaide, January 2010
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