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analogues, followed by a discussion of parasequences, sequences and systems tracts. This forms the basis for their final section on the sequence stratigraphic evolution of the Book Cliff succession.

In the final section Bosence and Wilson discuss the complexities of sequence stratigraphy in carbonate settings and introduce the use of numeric stratigraphic modeling for facies prediction. Bosence then illustrates the application of these sequence models using the Late Miocene of Mallorca as an example of a rimmed platform, and the Upper Jurassic of Spain as an example of a carbonate ramp.

Although this book is intended for undergraduate and graduate courses, as well as professional geoscientists, I would not recommend it as an upper year undergraduate or graduate text. Despite the exemplary use of simplified case studies, and excellent coloured photographs and diagrams, it lacks the scope of the GAC's Short Course Notes 16, which in my opinion provides a far more comprehensive coverage of the topic.

Mine Water Hydrogeology and Geochemistry

Edited by P.L. Younger and N.S. Robins

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This book comprises 26 papers derived from a meeting of the Hydrogeological Group of the Geological Society of London in February 2001 and some additional contributions. Neither the theme of the meeting nor the exact number of additional papers is revealed. The topics range from in-depth reviews and detailed case studies on the hydrogeological and/or geochemical aspects of both operating and closed metal and non-metal mines to cursory accounts of modeling exercises and environmental impact assessments. As such, the papers vary in quality and the collection as a whole, in the absence of a preface providing synoptic comments on the individual papers, appears to be unorganized. With a few exceptions, the more than 200 illustrations are generally easy to understand and the papers relatively free of typographic errors. However, North American readers may have to contend with a few unfamiliar mineral names (some of which are obsolete) without a given chemical composition and the rather odd usage of some familiar terms (e.g., petrological instead of petrographic analysis; mineralogy in place of minerals, tailings dam meaning tailings impoundment, etc.).

Upon closer perusal, it appears that the editors have tried to strike a balance among papers with a focus on coal mines (9 papers), metal mines (9 papers) and miscellaneous topics of general interest (8 papers, including two dealing with both coal and metal mines). Particularly outstanding in the first group of coal papers are an overview on the effects of longwall mining on aquifers (Booth), and a case study on the assessment, prediction and management of long-term, post-closure water quality at a South African coal mine (Hattingh et al.). In lucid terms, Booth first elaborates the mechanisms and impacts of the hydrogeological response to longwall mining. With reference to long-term investigations at two sites in Illinois, USA, he then illustrates the application of the derived general conceptual model and demonstrates that different responses could result from minor variations in geological setting within the same coalfield. From another continent, Hattingh et al. documents an exemplary multidisciplinary effort that integrates situation analysis, hydrology, hydrogeology, mineralogy, predictive geochemical modeling and systems environmental management, to address residual impacts after mine closure at the Hlobane Colliery. The remaining seven papers are derived from case studies at UK coalfields, with three focused on hydrogeological aspects (such as mine water recovery rate and impacts), two on hydrochemical issues (mine water fingerprinting and iron release modeling) and two attempting to integrate both aspects. In general, an empirical approach is emphasized in these case studies with the consequence that the conclusions drawn may not necessarily apply to coalfields elsewhere with different geological settings.

The second group of papers on metal mines are based on case studies of mostly abandoned or closing mines in Europe (4 in UK and 1 in France), Africa (2) and South America (2). Among these, three hydrogeological modeling papers address the issues of water rebound in an underground tin mine, depressurization of a pit wall in an open-pit copper mine and structural control of contaminant migration in a tailings impoundment of a lead-zinc mine. Integrating hydrogeological and hydrochemical observations at large-scale gold mines and a silver-tin mine, two other papers emphasize the importance of collecting relevant data for environmental-impact and risk assessments. The remaining four papers focus mainly on water-quality issues, with topics ranging from geological materials as a source or sink of metal contaminants to arsenic removal by oxidizing bacteria. With the exception of the modeling papers, most articles are well referenced with conclusions clearly supported by the data furnished.

The last group of papers of miscellaneous interest is apparently intended to expand the scope of the conference volume and includes several interesting, albeit somewhat controversial, articles. As an opening overview paper, Younger and Robins (the editors) discuss challenges in characterizing and predicting the hydrogeology and geochemistry of mined ground, apparently perceived as

the thread connecting many of the papers scattered in the book. The authors conclude with the concept of "defensive mine planning" and a suggested list of relevant measures, the majority of which have already been incorporated in the mandatory environmental impact assessment of any significant proposed mining operations in North America. There are two additional overview papers in the group. Augmented with a case study, Wolkersdorfer lucidly describes the applications and outlook of tracer tests in mines. Bowell presents a well-referenced and comprehensive review on the hydrogeochemical dynamics of mine pit lakes, despite some complicated diagrams that fail to clearly demonstrate the detailed processes involved or contain apparently unbalanced chemical equations. Two potentially contentious papers are also found. One is on the prediction of mineral weathering rates at field-scale based on simple scaling of physical parameters without considering detailed water-rock interactions. The other is on modeling sulfide oxidation in an unsaturated soil with the conclusion that pyrite oxidation by ferric ion is not faster than that by oxygen. The remaining three papers include a case study on the hydrogeological and geochemical interactions of adjoining mercury and coal spoil heaps in Spain, a brief description of alkaline mine drainage from metal sulfide and coal mines in Svalbard and Siberia, and an assessment of liabilities at a uranium mine the Slovak Republic. Incorporating few detailed hydrogeological and hydrochemical data, the last paper hardly fits the theme of the book.

In conclusion, compared to many conference volumes, this Geological Society Special Publication is a good-quality product. It contains many excellent overview papers and case studies. Readers interested in the hydrogeology of coal mines, in particular, may find many papers highly informative. Readers with a special interest in detailed mine water geochemistry, on the other hand, may find many of the papers lack the more vigorous data analyses commonly emphasized in more specialized publications. Moreover, the wide variety of topics covered in the absence of a synopsis chapter or preface makes navigating through the book somewhat difficult. At a price of US$142.00, the reviewer does not think that the book belongs to the must-have category.

Magmatic Platinum Group Element Environments in Canada: Present and Future Exploration Target Areas

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Special Publication, CD-format, $25.00

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A few years ago I had the opportunity to attend an oral version of this presentation. I remember an inspiring talk, full of relevant facts and data, delivered with inspiration and enthusiasm by a dedicated professional who was presenting a significant part of his life's work. Included in this CD is a vastly expanded version of the original lecture, including 202 images (slides) many of these with attached, helpful and informative speakers notes, an extended abstract and a list of references. The author promises that the user of this CD will not only become knowledgeable about Platinum Group Elements (PGE) and their significance to our civilization and way of life, but also become convinced that Canada is endowed with the geology that will make it "the world's next major source of PGE". A tall order, one may think, bearing in mind that Canada currently produces <10% of the world's PGEs. However, this is exactly the impression one is left with after reviewing the slide show.

The presentation is divided into sections based on the genetic origin of PGE deposits: a) layered intrusions; b) flood basalt; c) komatiitic magmatism; d) greenstone belt magmatism; e) alkalic magmatism; f) orogenic magmatism and g) impact-related magmatism. These major divisions are subdivided according to the physical configuration of the mineralization. For example, layered intrusions are subdivided into stratiform and contact deposits, with the stratiform deposits further subdivided into chromite and sulphide-associated deposits. Each example of these topics is illustrated with one or more images, running the gamut from basic geological sketches to maps and elaborate geological block diagrams replete with geological and geochemical information. An added feature, entitled "Future exploration targets" on the CD's frontispiece but named "New opportunities" within the presentation, is appended to each of the topics. These "New opportunities" are a veritable smorgasbord of well-thought-out grassroots PGE exploration leads and ideas that may lead to discovery of new resources.

The first part, dealing with sulphide-associated PGE occurrences in layered stratiform intrusions, begins with an overview of the geology of the Muskox intrusion and its PGE concentrations, followed by descriptions of the geology, geophysics and PGE discoveries of the Fox River sill and the Mechanic intrusion in New Brunswick. The next segment, addressing stratiform PGE associated with chromite, features the geology and mineralization of Crystal Lake, the Muskox intrusion, the Bird River sill, Big Trout Lake, the Menarik intrusion and the Puddy Lake intrusion. This is followed by a segment highlighting PGE mineralization concentrated as a result of the physicochemical interaction of intrusive rocks and host rock. Examples are provided for the Muskox Intrusion, Pyrrhotite Lake, the Fox River sill, the East Bull Lake, Agnew and River Valley intrusions of the Sudbury Basin and finally, the Lac des Isles Intrusion in