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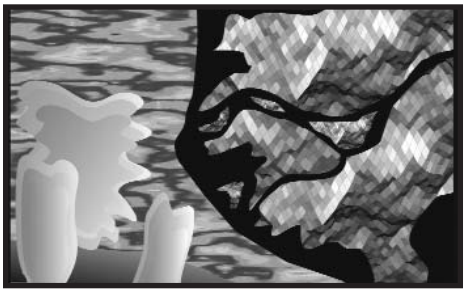

Environmental Marine Geoscience 4: Georgia Basin: Seabed Features and Marine Geohazards

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SUMMARY
A multibeam bathymetric swath-mapping program of the Strait of Georgia has provided a 5-m resolution map of the seabed. Numerous geological features of the basin, some of which are considered geohazards, are clearly defined. During the Olympia interglacial period most of the basin was filled with sediment and then subsequently excavated during the Fraser Glaciation, except for a group of isolated banks; the southern basin was partially filled by the prograding Fraser River Delta during the Holocene. Marine geohazards that exist in this seismically active region include, slope stability features, active faults, gas pockmarks, and large migrating sedimentary bedforms. Other features, such as sponge reefs, have developed because of the glacial history and dynamic oceanography of the basin and provide unique and critical habitats to marine species.

SUMMAIRE
Un programme de levé par balayage bathymétrique a faisceaux multiples dans le détroit de Georgie a permis la production d'une carte du fond marin d'une résolution de 5 m. De nombreux éléments géologiques du bassin y sont clairement définis, dont certains constituent des géorisques clairement définis. Durant la période interglaciaire d'Olympia, la plus grande partie du bassin a été rempli de sédiments, lesquels ont par la suite été excavés durant la glaciation de Fraser, sauf un groupe de bancs isolés; la partie sud du bassin a été partiellement remplie par progradation du delta de la rivière Fraser à l'Holocène. Les géorisques marins de cette région d'activité sismique comprennent certains éléments de stabilité des talus, des failles actives, des cratères d'échappement de gaz, et de grands éléments topographiques sédimentaires migrants. D'autres éléments, comme des récifs de spongiaires se sont développés à cause de l'histoire glaciaire et de la dynamique océanographique du bassin, constituent un habitat essentiel pour des espèces marines.

REVIEWS

Geoscience Reporting Guidelines

by Brian Grant
Victoria, 2003
ISBN 0-9687693-1-4
C $67.00, spiral bound, 356 p.

Reviewed by A.D. McCracken
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Brian Grant has long been involved in editing, and in this new book he has made major additions to his *Art and Science of Writing Geoscience Reports*, which was first published in 1999 and reprinted in 2001. Both books are available from GAC (at the time of this writing, the new volume is on sale at the GAC bookstore for $67.00 to Canadian residents (to US residents US$54.00); the earlier edition was $55 and was reviewed in Volume 26, Number 4).

Almost half this volume is devoted to the techniques of writing reports, with another third being advice on writing. As with any set of guidelines, not every point made may apply to a particular situation, but Grant seems to cover everything. He begins with the initial concepts for a report - title page, Cataloguing in Publication data (the CIP is one of those things, such as ISSN and ISBN, that is not always needed in a report, but necessary for books), authorship and consistency in author's name. The basic report elements include introductory data such as objectives or terms of reference, location, legalities, property history and previous work, climate and vegetation. Description of the geology begins at the regional scale, followed by the detailed or property geology (e.g., lithology, stratigraphy, paleontology, economic geology, etc.). Other elements include drilling programs, resource reserves estimates, and environmental statement. The basic report ends with topics such as recommendations, budget estimates, references, appendices, and index. This type of report is like an all-encompassing GSC Memoir, or a consultant's report.

Many of our writings of course may not fit this recipe, so Grant has a large section on specialist reports. These examples include university theses, geological field notes, drill core logs, diamond exploration reports, mineral property valuations, feasibility studies, due diligence reports, field trip guidebooks, and oral and poster presentations. The book is recent enough to contain warnings against overdoing the special effects in digital presentations. His advice on posters includes a good point of having take-home copies of your poster for your audience.

Some detail on the look or layout of the report is given in a section entitled "Elements of Graphic Design and Layout". This covers page layout conventions, some detail on different types of typefaces and styles, advice on formatting such as justification, line and symbol spacing, titles and headings, lists and bullets. Lists and bullets have become common now that we have these formatting functions in our "word processor" programs, and these bring new problems - how does one punctuate lists and bulleted points? Buy the book to find out!

A report is usually illustrated, and there are guidelines on how to create effective illustrations. For the self-published report, Grant gives a number of suggestions on where to place the illustrations on a page, and within a report. He comments "professional presentation improves credibility" and gives much detail on drawings, maps, legends, photographs, captions, and tables.

In this updated edition, the advice given on digital data is still current. This chapter covers metadata, data entry conventions, digital archives, file compression, graphic resolutions, computer editing (and the periodic unreliability of it), scanning of maps and photos, digitizing maps, and cartographic techniques.

As I noted above, about one-third of this book is about writing. Many of these points have been said and written before, but sometimes we are guilty of forgetting these rules and guidelines. This section begins with a chapter called "Peer Review, Editing and Proofreading", and the stages of "editing task hierarchy". Grant reminds the reader that self-editing is part of the normal process of creating a report, and he gives us a number of tips. His guidelines for review include a useful checklist for authors, reviewers, and editors. The other parts of this section on writing includes words that are overworked, wasted, contrived, euphemistic, jargons, metaphors and buzz, cluttered, redundant, and misused. All good stylebooks have to cover grammar. Grant gives us a few simple points on clauses, subjects, nouns, pronouns, verb tense, adjectives and adverbs, prepositions, and gender. There are pages of recommended spelling of geoscience words, what words to capitalize, and guidelines on hyphenation, punctuation, abbreviations, Latin words and phrases, symbols, numbers, and measures.

Included is an important chapter on coordinate systems for geographic locations - GPS, NAD 27 vs. NAD 83, and formatting geographic position information from grids such as spherical, UTM, DLS, and NTS. In addition to

having a useful table of contents, the book closes with nine pages of indexed terms.

To comment on the book itself, I like its small size (9 x 6 inches). The fact that it is wire bound is good because it can be folded for reading. What I do not like is the use of two colours for text - when it is to be reprinted the author should look into another means of highlighting. The regular text is completely readable. However, the text used as a highlight to stress important points is red and thus hard to read, especially when it is in italics. This then creates the opposite effect of what the highlighting is meant to do - I know it is important, but I cannot read it easily. Even *Geolog* blue might have been a better choice than red.

The user of this book should remember that although Grant's advice is good, some parts are in his own style, and if you are submitting a manuscript to a journal their guidelines must be followed. Grant ends his book with valuable Internet resources and several pages of "Sources of Rules & Inspiration". Some of these sources are especially useful - for example, the GSC's *Guide to Authors* - GSC Open File 3600 (1998, 194 pp., $15.00). It was written, like its previous versions, to act a guide to writers of GSC publications. But it too contains a wealth of information on the editorial side of writing. It can be seen in web form in English at: (http://www.nrcan.gc.ca/ess/pubs/guide/index_e.html), and in French at: (http://www.rncan.gc.ca/ess/pubs/guide/index_f.html).

Another useful, and inexpensive book is *The Canadian Style: A Guide to Writing and Editing*, which was originally produced in 1985 by the Department of the Secretary of State of Canada. The 1997 version (ISBN 1-55002-276-8) is a revised and expanded edition. This has a counterpart - *Guide du rédacteur de l'administration fédérale*. The English version can be found on Amazon.com for as little as $10.87 US, and can be ordered from the government's publications website (http://publications.gc.ca/) for $29.37 including taxes and shipping.

Geoscience Reporting Guidelines is the best of these three (despite its red highlights), but for relatively little cost, students and professionals, and editors could have all three.

Geological Society Memoir No. 20 - United Kingdom Oil & Gas Fields, Commemorative Millennium Volume

Edited by J. G. Gluyas and H. M. Hichens
Geological Society of London, London, 2004
ISBN: 1-86239-089-4
£175.00, hardback, 1016 p.

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This long awaited book has finally arrived. As soon as the Geological Society of London announced the forthcoming publication of this book, I immediately ordered it for our library. More than a year later I was not disappointed. This volume is the most comprehensive, complete and second heaviest (at 3.9 kg) reference book on the UK's oil and gas fields, which has been published to-date. For the record, the heaviest reference book is the "Millennium Atlas: Petroleum Geology of the Central and Northern North Sea", which was published by the GSL in 2002 and weighs in at 10.3 kg.

The Memoir 20 editors, J.G. Gluyas and H.M. Hitchens, have put together an excellent publication of extremely high-quality and with lavish illustrations. This new volume updates my very used and patched up "United Kingdom Oil and Gas Fields, 25 Years Commemorative Volume", GSL Memoir 14 edited by I.L. Abbotts (1991). This book was a best-seller but was out of date within five years of first printing because it only contains details on half the fields that were in production at that time. The Gulyas and Hitchens volume is subject to the same problem, since a number of major new fields are prominent by their absence. This problem is to be expected given the time and effort required to bring hundreds of authors and reviewers together to publish a volume such as this.

It should be mentioned that the book "Geology of the Norwegian Oil and Gas Fields" edited by A.M. Spencer et al. (1987) was used as the template for both the Abbotts' and Gluyas and Hitchens' volumes. The Norwegians should update their oil and gas field data in a similar fashion so that the first 35 years of knowledge and innovations in this incredible North Sea geological province are fully documented.

There have been a number of changes in the UK oil and gas scene since Abbotts' 1991 publication, including significant technological advances. Many of the significant geological and geophysical advances were presented at the Petroleum Geology of Northwest Europe Conference in 1992 and 1997; they are nicely documented in the resulting publications. Advances were made in the integration of 3D seismic with sequence stratigraphic analysis and in modelling from a reservoir and basin perspective. Improvements in both, extended reach and horizontal drilling, use of minimum facility platforms, introduction of sub-sea completions using FPSO technology, and stimulation of low permeability reservoirs have made production much more efficient. These technological advances reduced geological uncertainty, improved economics and allowed the development of smaller fields. The Abbotts' volume describes 64 fields, from the UK's first 25 years, which have an average reserve size of greater then 300 mmboe (million barrels of oil equivalent). The Gluyas and Hitchens' volume, from the following 12-year period, describes about 130 oil and gas fields, which have an average reserve size of 100 mmboe. This smaller reserve size reflects the mature stage of exploration in the North Sea, which is reflected by a plateau in production and a decline in the number of wells drilled and exploration expenditures.

The introduction contains two useful summaries of the UK North Sea story, the 35 year history of exploration and development, and the geological history. R.F.P. Hardman (Amerada Hess International Ltd, UK) covers the former and describes the exploration lessons that can be applied elsewhere in the world, partly from an anecdotal point of view. He goes on to describe the first hydrocarbon discovery at the West Sole gas field in 1964 in the Permian Rotleingendes in the southern North Sea. In 1969, the industry drilled to the north in the Central Graben, looking for

a Rotleingendes gas target and discovered oil serendipitously at Arbroath, in the Paleocene. This was such a surprise that the galley was raided for pickle jars to store samples of their new found oil. This oil, of course, originated from the Late Jurassic Kimmeridge Clay Formation. Hardman then goes on to tell the story on how the Viking Graben was finally drilled in 1971 and 1972 with the discovery of Brent and Beryl, respectively, creating the North Sea black gold rush. He also recounts some interesting exploration stories about fields not being discovered by their first well, such as Scott. In 1975, this field was originally drilled on its crest, where the Upper Jurassic Sands are missing. However, it was 1984 before a 440 mmboe recoverable field was discovered surrounding this 1975 dry well.

The second part of the introduction, by John R. Underhill (University of Edinburgh), describes the tectonic and stratigraphic framework of the UK oil and gas fields. This chapter sets the stage nicely for the field summaries that follow in the book. He first describes the plate tectonic framework from the Late Cambrian to the Early Cenozoic, which set this area up for deposition of the source rocks, the Late Jurassic Kimmeridge Clay Formation. Underhill then goes on to describe, using clear diagrams and maps, the tectonic and stratigraphic controls on the development of the oil and gas plays though geological time, with reference to relevant fields described in the volume.

The next 900 pages are divided into eight sections describing specific geographical and geological areas, both offshore and onshore: East Irish Sea Fields, Atlantic Margin Fields, Viking Graben Fields, Moray Firth Fields, Central Graben Fields, southern North Sea Gas Fields, East Midlands Basin Fields, Weald and Wessex Basin Fields. A reference map is included at the beginning of each section. Each section is then further divided into chapters that describe a field or cluster of fields. Each chapter ranges from 7 to 30 pages with most of them being 10 to 15 pages in length. Each is set up, for the most part, with the following template which is very logical, consistent and concise: LOCATION HISTORY – pre-discovery to post discovery, STRUCTURE – tectonic history, regional and local, STRATIGRAPHY - in general, TRAP-type, seals and faults, RESERVOIR - depositional setting, pore types and diagenesis, porosity and permeability, reservoir engineering, petrophysics and pressure relationships , SOURCE – source beds, maturation, migration and charge, RESERVES AND PRODUCTION - petroleum in place and reserves, cumulative production, recovery factors through time and production rate. Each of these field chapters is clearly illustrated using a location map, structure maps, seismic lines, cross sections and reservoir summary logs, many in colour. There is also a table of reservoir data at the end of each field description. It is extremely easy to find quick facts on a field. Only 22 of the fields covered by the Abbotts' volume are described in

this volume so the two are largely complementary. In fact, the former one is still available at £30.

Appendix 1 summarizes the geology, the reservoir properties and fluid properties of the 130 fields described in the volume. The data include trap style, depth to crest, lowest closing contour, OWC or GWC, hydrocarbon column height, pay formation, age, thicknesses, porosity, permeablity, petroleum saturation, oil and gas densities, viscosities and bubble points, gas/oil ratio, formation volume factor, water salinity and resistivity, reservoir pressure and temperature, field area, rock volume, oil/gas in place, recovery factor, start up date, production rates and number of wells. This is an incredible database that will satisfy most geological and engineering statisticians.

Appendix 2 lists the 300+ oil and gas fields in the UK with key references for each one. For example, the "missing" Schiehallion Field is referenced. The editors mention in the overview that the intention was to have all the fields in this reference. This was not possible for a number of reasons including, unfortunately, a few companies refusing to participate. The fields that are not covered in the book are at least shown on the location map at the beginning of each section.

The "United Kingdom Oil and Gas Fields" volume is a must have for anyone, engineers included, working the rift margins and frontiers of the world. The field examples can provide information and analogies for exploration as well as for development and reservoir engineering. This book, however, may have limited use for the average geologist working in Western Canada. Some may complain that the price is a bit steep but a discounted price of £105 is available to AAPG/SEPM/GSA/RSA members and of £100 for GSL/IGI members. These books should come out automatically with an included CD-ROM version.

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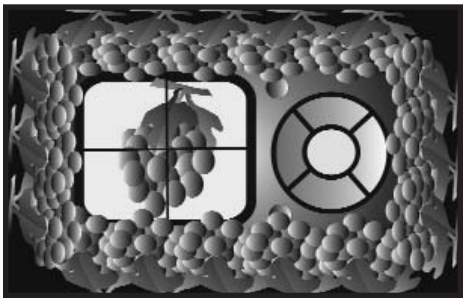

Geology and Wine 10: Use of Geographic Information System Technology to Assess Viticulture Performance in the Okanagan and Similkameen Valleys, British Columbia

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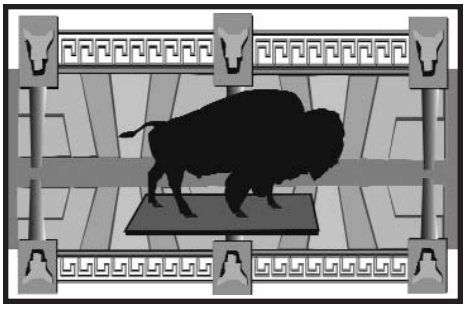
SUMMARY
The complex geological history of the Okanagan and Similkameen valleys in British Columbia has created a wine growing region by way of diverse bedrock, soils, terrain and climate. Although wine grapes have been grown in the area for many decades, a recent conversion of vineyards to predominately *Vitis vinifera* varieties, and the subsequent world recognition of wine quality, suggests that there is further potential to improve wine quality through fine-tuning of grape varietal choices and vineyard management techniques. A geographic information system (GIS) application has been developed to study the relationships among site conditions, management practices and vineyard performance including fruit and wine quality. The production area was divided into six regions based on landform and climate: 1. Kelowna, 2. Penticton, 3. Vaseaux - Oliver, 4. Golden Mile, 5. Black Sage - Osoyoos, and 6. Similkameen. The complement of grape varieties planted varies among the regions. Comparisons of regional patterns of varieties planted, and medals received, have revealed significant regional differences in varietal suitability. Although most of the vineyards are sited on coarse-textured soils, comparisons of the distributions of all and medal-winning vineyard blocks among soil textural classes have revealed that quality wine grapes are grown on a broad range of soil types within, and among, the six regions studied. Loamy soils appear to be especially suitable for producing quality wine grapes in the Okanagan and Similkameen valleys.

SUMMAIRE
L'histoire géologique complexe des vallées d'Okanagan et de Similkameen en Colombie-Britannique a créé une région vinicole en réunissant divers socles rocheux, sols, terrains et climats. Bien que le raisin de cuve ait été cultivé dans la région depuis plusieurs décennies, une conversion récente aux variétés de *Vitis vinifera*, et la reconnaissance mondiale de la qualité de ses vins qui s'en est suivie, permet de penser que la qualité des vins pourrait encore être améliorer par le choix de variétés de vignes et l'amélioration des techniques de production. Une application d'un système d'information géographique (SIG) a été mise au point pour étudier les relations entre les caractéristiques des sites, les pratiques de gestion, et les performances du vignoble, dont la qualité des fruits et du vin. La zone de production a été subdivisée en six régions selon la forme du relief et le climat, soit : 1. Kelowna, 2. Penticton, 3. Vaseaux-Oliver, 4. Golden Mile, 5. Black Sage, et 6. Similkameen. Le complément des variétés de raisin plantées varie selon les régions. Les comparaisons d'arrangement des variétés plantées et des médailles reçues ont mis au jour d'importantes différences régionales quant aux variétés les mieux adaptées. Bien que la plupart des vignobles croissent dans des sols légers, les comparaisons des distributions des parcelles en fonction des types de texture des sols et des médailles reçues ont montré que des vignes de qualité sont cultivées sur une grande variété de types de sol à travers les six régions étudiées. Les sols loameux semblent particulièrement convenir pour la production de raisin de cuve dans les vallées d'Okanagan et de Similkameen.

SERIES



Geology of the Parliament Buildings 5: Geology of the Manitoba Legislative Building

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SUMMARY
The Manitoba Legislative Building was designed by Frank Worthington Simon, assisted by Henry Boddington III, architects from Liverpool, England. The building style is neoclassical, incorporating Greek, Roman and Egyptian motifs and elements. Construction was completed early in 1920 and the building was dedicated July 15, 1920, on the fiftieth anniversary of the Province.

The building is located in central Winnipeg, close to the north bank of the Assiniboine River and rests on 14 m of glacial Lake Agassiz clays over till and limestone bedrock. The mass of the building is supported by 421 concrete caissons that extend through the clays to indurated till or bedrock. Steel frames rest on the caissons and support bearing walls constructed of bricks manufactured from Manitoba shale and clay.

Dimension stones decorate the bearing walls inside and outside, and the floors and stairways within. Each type of stone has its own decorative characteristics and each records geologic processes at different times in Earth history. The predominant dimension stone both outside and inside the building is Manitoba Tyndall Stone. Grey, pink and red Tennessee marbles are from the southern Appalachians. Botticino marble was quarried in the foothills of the Alps in northern Italy. Ordovician black marble and Verde Antique are from the Vermont-New York region in the northern Appalachians. Missisquoi marble is from quarries in southern Québec near Philipsburg, and also represents a northern Appalachian source.

Bedford limestone, used for most of the statuary, is from south-central Indiana. Butler granite from Ignace, Ontario, was used for steps and floor surfaces of all four porticos. Red marble breccia, used to decorate most fireplaces, may have come from northern France.

SUMMAIRE
L'édifice du Palais législatif du Manitoba a été conçu par Frank Worthington Simon, assisté de Henry Boddington III, deux architectes de Liverpool en

Geology of the Parliament Buildings of Canada: Series Update.

The accompanying paper, "Geology of the Manitoba Legislative Building", by W.C. Brisbin, Graham Young and Jeff Young, is the 5th paper in this Geoscience Canada series.

The previous published papers in the series are:

"Building Stones of Canada's Federal Parliament Buildings", by D.E. Lawrence, Vol 28, No 1, March 2001

"Geology of the Alberta Legislative Buildings", by R.A. Burwash, D.M. Cruden and R. Mussieux, Vol 29, No 4, December 2002

"Building Stones of Ontario's Provincial Parliament" by E.B. Freeman, Vol 30, No 2, June 2003, and

"Geology of the Quebec Parliament Buildings" (in French) by R. Ledoux and H-L Jacob, Vol 30, No 4, December 2003

Five further papers are in various stages of completion: British Columbia, lead author Danny Hora; Newfoundland and Labrador, lead author Jeff Pollock; Nova Scotia, lead author Howard Donohoe; New Brunswick, lead author Gwen Martin; and the Northwest Territories, lead author DE Lawrence.

We are still looking for authors for the Parliament Buildings of Prince Edward Island, Saskatchewan, Yukon, and Nunavut. For those who may be interested, broad guidelines for the preparation of the papers are described by the Series Editor in an introduction to the first paper in the series, in Vol 29, No 1, March 2001.

If readers have any questions about the series, please contact the Series Editor, Doug VanDine, email vandine@islandnet.com, or telephone 250-598-1028.

Angleterre. Il s'agit d'un édifice de style néoclassique comprenant des éléments et des motifs grecs, romains et égyptiens. Sa construction s'est achevé au début des années 1920 et son inauguration a eu lieu à l'occasion du cinquantième anniversaire de la Province, soit le 15 juillet 1920.

L'édifice est situé au cœur de Winnipeg, non loin de la rive nord de la rivière Assiniboine, la géologie environnante consistant en une couche d'argile du lac Agassiz de 14 m d'épaisseur reposant sur du till et un socle calcaire. Le poids de l'édifice repose sur 421 caissons de béton qui s'enfoncent jusqu'au till consolidé ou jusqu'au socle. Des structures d'acier appuyées sur ces caissons supportent le poids des murs de briques fabriquées avec des schistes argileux et des argiles du Manitoba.

Des pierres de taille parent les murs porteurs à l'extérieur comme à l'intérieur ainsi que les planchers et les escaliers intérieurs. Chaque type de pierre de taille présente des caractéristiques particulières, et chacun témoigne de processus géologique d'une époque particulière de l'histoire de la Terre. La pierre de Tyndall est celle qui prédomine tant à l'extérieur qu'à l'intérieur. Les marbres gris, roses et rouges du Tennessee proviennent du Sud de la chaîne des Appalaches. Les marbres de Botticino ont été extraits du piémont des Alpes dans le Nord de l'Italie. Les marbres noirs et les porphyres verts antiques proviennent des États du Vermont et de New York, au Nord des Appalaches. Les marbres de Missisquoi ont été extraits de carrières du Sud du Québec près de Phillipsburg proviennent aussi du Nord des Appalaches. Les calcaires de Bedford qui ont été principalement utilisés comme matériau statuaire proviennent du centre-sud de l'État d'Indiana. Les granites de Butler provenant de Ignace en Ontario ont été utilisés pour les marches et les planchers des quatre portiques. La brèche de marbre rouge qui a été utilisée pour la décoration de la plupart des foyers pourrait provenir du Nord de la France.