

BOOK REVIEWS

PHOTOATLAS OF INCLUSIONS IN GEMSTONES, volume 2, by Eduard J. Gübelin and John I. Koivula. (2005) Opinio Verlag Publishers, Basel, Switzerland. 829 p., over 2200 color plates, \$260.00. ISBN: 3-03999-029-2.

The *Photoatlas* is fundamentally a compendium of photomicrographs of inclusions in gemstones organized and described in a fashion to enhance the gemologist's skills at identifying and interpreting such inclusions. It proceeds from an earlier volume published in 1986, and it is followed by volume 3 that is focused on the so-called precious stones: diamond, ruby, emerald, and sapphire. Eduard Gübelin, a dean of the gemological community (deceased in 2005), and John Koivula, a renowned gemologist and inclusion expert at the Gemological Institute of America (GIA), are indeed the experts in this field, so the book is a testament and proof of their experience and expertise with respect to inclusions in gemstones and gemology, more generally. Moreover, as the authors appreciate the beauty as much as the information revealed by inclusions, the *Photoatlas* can be viewed as a paean to gem inclusions as art. The images are superb and printed in high quality on heavy paper with attention to color correction (typically a problem for colored stones and inclusions). The authors also justifiably point out that inclusions and their identification can be critical, perhaps the only non-destructive and ready means to determine the origin (natural, natural-but-treated, or synthetic) and source of a gem (i.e., deposit, such as Mogok vs. Mongshu for Burmese ruby). Thus, while flawlessness of a stone may be praised, it is not as valuable (helpful?) in correctly assessing a gem and, thus, evaluating it. Presumably this message is vital to the gemologists who examine this book.

The *Photoatlas* is arranged with an introductory section that lays out concepts, terms, history, and acknowledgements; followed by sections on instrumentation and techniques; characteristics of inclusions including color, shape, fluids, and geological correlations; before getting to the detailed section in which individual gem species are reviewed with respect to their inclusions. Finally there is a short summation section, a shorter glossary, and a good index.

The intended market for the *Photoatlas* is gemologists, most obviously, those involved with routine examination of gems with microscopes but perhaps without some expensive instrumentation, such as confocal Raman microspectrometry. Certainly, it is also a reference book in the training of gemologists. Whether the average gemologist in the gem trade or mineralogists, who are interested in gems, will consider this book something for their libraries depends on the balance among cost, utility, and desire for such a beautiful compilation of images.

The fundamental strengths of the *Photoatlas* are its depth and

comprehensive coverage of inclusions in gemstones combined with the quality and care of the authors in providing superbly captured images, clear text, and good organization of the materials. Each section describes its content and layout with an overview of the issues involved with section. To each photo they have added abbreviations indicating the microscopic and illumination techniques, such as DF for dark field and PL for polarized light, plus a magnification scale referring to the 35 mm frame of the photographic film used (the photography is not digital in this book). There is also a very detailed system with abbreviations for the kinds of inclusions, such as F₂ for a 2-phase fluid inclusion or ST₂ for syngenetic for solid-type inclusions; however, these monikers are not used in the captions for the photographs.

One of the strongest sections, supported in those on individual gem species, is on characteristic or diagnostic inclusions. These are inclusions that can be used as Occam's razor to decide among origins of a gemstone. Some examples are uranpyrochlore in sapphire from Cambodia, högbomite in spinel from Morogoro, Tanzania, and platinum platelets in synthetic sapphire. This discussion is developed to show how inclusion assemblages along with geological conditions of formation create a consistent interpretation of origin. The only problem is the reader not provided with the information on how uranpyrochlore is (was) identified and differentiated from some other reddish brown inclusion phase.

Because the audience is gemological, most of the citations and language is largely limited to gemology. As a mineralogist, I understand the focus, but find it a bit self-limiting and overlooks other resources and perspectives available in geosciences and material sciences. It is not clear whether this was a choice, an oversight, or a reflection of the unfortunate divisions between the disciplines. The section in which this is most clear is the discussion of instrumental techniques used to identify inclusions, such as micro-X-ray diffraction (which is out of date), Raman spectroscopy, micro-X-ray fluorescence spectroscopy, and microbeam analysis. Examples of "what the data look like" are given, but the discussions and citations are limited and, in cases, outdated. Certainly, the focus in this volume is to demonstrate the utility and power of the microscope, an instrument generally easier, quicker, and cheaper to use than those mentioned above, but verification with multiple techniques provides the certainty for applying the visual interpretation. Consequently, one of my largest qualms with this compendium is that along with the abbreviations for microscopic technique with each image, there is no abbreviation for the verification technique or footnote, where appropriate, to a citation or other corroborating information. Likewise, as a geoscientist, while I applaud the section on "geological correlation," with its beautiful illustra-

tions, I find it conceptually weak, in particular, understating the role of hydrothermal fluids in the categorization of growth environments for gemstones. This is perhaps nit picking, as the subject is appropriate for separate treatment on geology of gem forming deposits, an interest that actually exists and is growing in academic geosciences.

Finally, I wonder whether the market for this photo atlas might be better served by a DVD with a built-in database system that permits organizing images along many paths of interest. In addition to the organization provided in the serial layout of the book, examining images by gem, inclusion characteristic, localities, or whatever could be of great value on a computer

adjacent to a microscope.

In conclusion, *Photoatlas of Inclusions in Gemstones, volume 2*, is a beautiful and valuable contribution to gemology, particular for those who need such information when examining gems to interpret their origin or treatment.

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CLASSIC AREAS OF BRITISH GEOLOGY: GLENCOE CALDERA VOLCANO, SCOTLAND by B.P. Kokelaar and I.D. Moore, 127 pp. British Geological Survey. Price £15.00 (paperback); book and map pack £22.00. ISBN: 978-0852 725252.

This book is another in a long tradition of contributions in the Geological Memoir style for key areas of British Geology. By their very nature, these books are written through the drive and determination of geologists who have spent significant time, and worn through many pairs of walking boots, combing the countryside for the key geological features that form the focus of the book/map. The Glencoe Caldera Volcano volume is one of the better examples of this type of contribution and is a must for walkers, ramblers, amateur geologists, and budding earth scientists who intend to explore the Glencoe area for a weekend or more in the near future.

The maps format is presented in its naked geological complexity, with the aid of a more general 1:100 000 inset, which provides a little context for the detail of the map. Indeed, it is an impressive array of cross-cutting units that make up the geology in this region, and the area's legacy as the roots of a volcanic system is further impressed on the reader by the beautiful cross sections through this complex structure.

The book has a nice feel to it. It is of a reasonable format to fit into a rucksack or mapping case, though not really of pocket size, and it is furnished with a number of color figures and plates.

Do not be fooled into thinking this will be a glossy read, since there is enough significant detail in this contribution to act as a standalone academic reference. However, the presentation is such that allows an interested reader without formal training to access key points of reference and follow the flow of the book. Through the use of some key summary figures and a key localities section, even the most modest of amateurs would be able to use the book to access the geology.

It is good to see the British Geological Survey (BGS) providing a full color format for books like these. Both 3D reconstruction figures and many plates are essential to this contribution's subject matter, so the presentation requires a good selection of color images. To this end some of the 3D reconstruction figures probably could have been improved by a more creative use of color, possibly color coded to the units on the map (e.g., Fig. 20, among others), but this is probably being a bit picky as they are impressive figures by themselves.

Through hard work, weather resistance, and persistence, the authors and the BGS have allied to produce a great example of a regional geological report that will become a geology classic! I hope to see many more examples of this type of contribution as its what the true field geologist and the BGS does best.

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