

BOOK REVIEWS

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Gemmology, 3rd Ed.

By Peter G. Read, 324 pp., illus., publ. by Elsevier Butterworth-Heinemann, Burlington, MA, 2005. US\$39.95

Peter Read's third edition of *Gemmology* is a comprehensive work covering the fundamentals of gemology and mineralogy. This book was developed to assist students of the British gemmological association (Gem-A), but the scope goes well beyond that of a simple textbook. This revised edition has been updated to include new treatments such as HPHT processing of diamonds and beryllium diffusion of sapphires, new synthetics such as CVD diamonds, and new instrumentation such as the Raman spectrometer.

The book consists of 20 chapters, beginning with a comprehensive review of the development of gemology over the past 170 years, including new synthetics and new gem finds. Naturally, some of the rarer new gemstones such as musgravite are not mentioned because of the time limit one has to impose when writing such a summary. The second chapter is a short overview of the geology of gem deposits, occurrences, major gem localities, and mining techniques. Chapter 3 covers the chemical composition of gems, and Chapter 4 describes their crystallographic systems. The next three chapters describe the mineral properties relevant to gems, such as cleavage, parting, and fracture; hardness; and specific gravity and relative density (including the measurement of SG and the use of heavy liquids).

Discussed next are the optical properties of gemstones and related identification methods. Chapter 8 explains the electromagnetic spectrum and discusses color and selective absorption, coloring elements, and color centers, in addition to describing luster, sheen, and transparency. Chapter 9 covers reflection and refraction, and the refractometer and its use. It also discusses optic axes, signs, and characters, and how these are used to identify gems. Chapter 10 describes polarization and pleochroism, and explains the use of the polariscope and the dichroscope. Spectroscopy and various spectroscopic techniques, from the handheld spectroscope to various high-tech spectrometers, are covered in the next chapter.

Chapter 12 examines luminescent, electrical, and thermal properties, while the loupe, microscope, and Chelsea filter are described in the ensuing chapter. The next section explores gemstone enhancement, from ancient to the most recent practices; synthetics, from a history of early gem synthesis up to CVD synthetic diamond; key features to distinguish between synthetic and natural gems; simulants of non-organic gems; and organic gem materials and their simulants.

The design and cutting of gemstones are well summarized in Chapter 19. Great emphasis is given to the "critical angle," which is important for a stone's internal reflection; also covered are polishing methods and different diamond grading systems. The text closes with a practical guide to identifying gemstones along with a very useful flow chart,

guiding the gemologist from simple to more advanced tests.

The 10 appendices provide summaries of properties and other information for most organic, inorganic, and synthetic gem materials. These are very useful, though the bibliography could have been slightly larger. Also included are suggestions for Gem-A students, a review of gemstone weighing, and an index.

There are some minor drawbacks to this excellent textbook, such as the photos (which are mostly black and white), the omission of Madagascar as a major source of corundum, and the section on refractometers (some of which are no longer available). However, these are small details and do not detract from the large amount of important and relevant information provided, not only for the gemologist but for anyone involved with gemstones.

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The Art of Enameling

By Linda Darty, 176 pp., illus., publ. by Lark Books [www.larkbooks.com], Asheville, NC, 2006. US\$17.95

It has been my personal experience with jewelry manufacturing instructional books that while there might be a tremendous amount of knowledge between the covers, there are inevitably blank spots, often with some critical piece of information about a project missing. This always made the concepts more difficult to

understand and apply when I tried the project myself. With this book, however, Linda Darty has created a truly complete text that encompasses all the major enameling techniques. Each of these is thoroughly explained, with photographic and technical support.

The book starts with an overview of enameling fundamentals. What is vitreous enamel? How is it manufactured? What are the material choices the artist has with this medium? The equipment list is extensive and detailed. Multiple choices are explained for each tool category, including their pros and cons. This level of detail allows beginning enamelists to more accurately and economically choose which tools to purchase, based on the type of enameling they want to pursue.

Throughout the book are "historical highlights," in sidebars, that review when specific techniques began and who pioneered them. The book is also loaded with "hot tips," little gems of information that are usually acquired only after years of experience and experimentation. Each one is clear and concise, with direct application to both basic enameling and more advanced techniques.

Following the fundamentals are full and clear descriptions of the enameling process, beginning with the various metal substrates and proceeding through the cleaning and preparation of materials. Explanations are given for the different methods of applying enamel to the metal, dry sifting as well as wet inlaying and liquid enamel. The firing process is broken down into its phases, illustrating the "sugar coat" texture that occurs at lower temperatures and moving through the "orange peel" and fully fused surfaces.

Colors, both transparent and opaque, are described in detail. The traits of each category are given, covering firing temperatures and soft vs. hard enamels, as well as how the colors interact with one another and different metals. These are some of the most complex and subtle aspects of

enameling, and they typically can only be learned with experience. Darty gives the reader a significant head start with her explanations and tips.

The next section deals with all the traditional enameling styles. It includes a description of each, as well as many practical examples using high-quality photographs. To demonstrate each technique, Darty walks the reader step by step through the making of an actual piece. All the steps are photographed well, and the technique is explained in detail. A thorough understanding of the difficulties and pitfalls—as well as advantages—of each technique can be learned from reading carefully through each step.

The last section of the book presents 12 different projects for readers to attempt themselves. These are explained in exacting detail, with each project broken down into easily digested steps. All the major enameling techniques are represented in this section.

Overall, I believe this is one of the best and most inspirational technical manuals for enameling ever published. Its clear and easily understood details make it an excellent reference for any metalsmith and aspiring enamelist, and even the more experienced enamelist.

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The Smale Collection: Beauty in Natural Crystals

By Steve Smale, with photos by Jeff Scovil and Steve Smale, 204 pp., publ. by Lithographie LLC [www.lithographie.org], East Hampton, CT, 2006. US\$50.00

The author describes this book, a gallery of some of the best mineral specimens in the Steve and Clara Smale Collection, as "neither a scientific book nor art book but a coffee

table book." If so, one should serve "premium blend" to go with this beautifully bound and illustrated volume! Although tailored for mineral collectors, gemologists should appreciate the natural forms of the gem minerals pictured throughout.

Steve Smale is a world-renowned mathematician who, with his wife, Clara, has lived in and traveled to many of the areas that have played major roles in the development of their collection. The introduction describes the collection's history and the places and people that influenced it. Cited are works by Desautels, Halpern, Wilson, and Bartsch and their thoughts on what defines a mineral masterpiece. The author agrees with much of what these experts say but also explains his own criteria: ideal form with variations and exceptions; ideal matrix; the crucial role of the specimen's horizon (the point where the upper ridge of the overall specimen meets the "sky"); the impact of damage; the importance of completeness; economy (which demands that every part of the specimen play a role in its presentation); judicious trimming (done by professionals); the integrity of the specimen (as it is presented), with disclosure of any defects that are not readily apparent; and related documentation.

The specimens are arranged in order of acquisition from the collection's beginnings in 1969. The earliest of the 99 photographs were taken by the Smales, the rest by Jeff Scovil. Nearly all of the pieces are represented by full-page color photos with a caption on the opposite page that gives the name of the mineral or principal minerals, together with the locality, dimensions, and a brief background of the piece and its acquisition. Smale prefers using popular or family names rather than scientific ones and follows this convention in his specimen titles. He also discusses his personal approach to photography, based on his observations of still life and the works of master photographers. The gallery is

followed by a short bibliography and index.

This book offers a glorious look at a world-class mineral collection and the couple who put it together. All the specimens depicted truly belong in this visually stimulating work. There is very little to fault other than a few inconsistencies in the specimen titles and the lack of explanation for why each specimen is exceptional. "Old masters" of the mineral world, such as the pyrargyrite from St. Andreasberg, Germany, are joined by modern-day classics, like the jeremejevite from Cape Cross, Namibia. I especially enjoyed the tourmalines and topazes but might give top honors to the rhodochrosite from Colorado's Sweet Home mine. While I wish I had a collection of such importance, at least I can enjoy this book for many years to come.

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Horn: Its History and Its Uses

By Adele Schaverien, 281 pp., illus., publ. by the author [www.hornhistory-uses.com.au], Wahroonga, NSW, Australia, 2006. US\$60.00

Well written and very interesting, this self-published and passionate effort offers a comprehensive review of the history of horn and its craft that did not exist until now. The author, who took up hornwork in 1976 and is one of a small number of people working with horn today, spent 16 years researching her craft and its history, in addition to photographing a wide variety of horn items of both utilitarian and decorative character.

The book is divided into three sections. The first covers the regulation of horn craft and trade from medieval times to the present day. The next section focuses on materials, tools,

and techniques. The last section contains numerous illustrations and photos along with a history of horn objects detailed by type, from combs to window panes.

Before the development of plastic, horn served as a common material for lightweight objects such as fans, combs, jewelry, snuff boxes, and more. Its processing was extremely malodorous (think of burning hair), and skilled craftsmanship was required to create beautiful and useful objects. Hornworking techniques ranged from simply using the natural form of horn to make items such as drinking vessels and baby bottles, to more complicated processes that required pressing it into plates or leaves that could later be molded. Schaverien's fascinating historical account of how this was done—the book focuses primarily on British horning history—takes us back to a time of innovation, when man needed to make creative use of available organic materials.

To the gemologist, horn is a semi-transparent-to-opaque, yellow to brown to almost black material with an RI of 1.560. It has resinous-to-vitreous polish luster, uneven-to-splintery fracture, and resinous-to-dull fracture luster. When examined with magnification, it reveals an undulating, fibrous structure. In more general terms, horn can be material from the projection of an animal's head made of a sheath of hardened protein over bone, or it can be a solid outgrowth of keratin and hair (as on a rhinoceros or the bill of a bird). The most common items covered in this book are made from the horn of bovine and ovine species, including buffalo, bison, and certain types of antelope.

Horn is a material that often does not survive the test of time because it tends to decompose. Only small numbers of antique horn pieces remain in museums and private collections. This book is not only one of importance to both horners and historians,

but it will also serve as an essential reference tool for museum curators, librarians, and antique collectors.

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OTHER BOOKS RECEIVED

Laboratory Created Diamonds. *By Sharrie Woodring and Branko Deljanin, 39 pp., illus., publ. by European Gemological Laboratory-USA [www.eglusa.com], New York City, 2005 [no price information available].* Intended as an aid for retail jewelers and appraisers, this short booklet provides a basic review of the manufacture and identification of synthetic diamonds. Part I reviews the history and technology behind HPHT and CVD synthetics, including post-growth treatments. Part II covers the various means of identification, from basic gemological examinations to more advanced techniques such as cathodoluminescence and Raman spectroscopy.

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Gem Raw Materials and Their Occurrence in Serbia, 2nd ed. *By Ilić Miloje, 152 pp., illus., publ. by the Yugoslavian Gemological Association, Belgrade, 2006 [in Serbo-Croatian, with English summary, no price information available].* This book reviews the gems that have been found in Serbia, including their occurrences and geologic settings. Though little if any organized mining is currently taking place, the author believes economic deposits of chalcedony, quartz, and opal, among others, may yet be developed. Several pages of color plates illustrate notable specimens of Serbian gem materials.

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