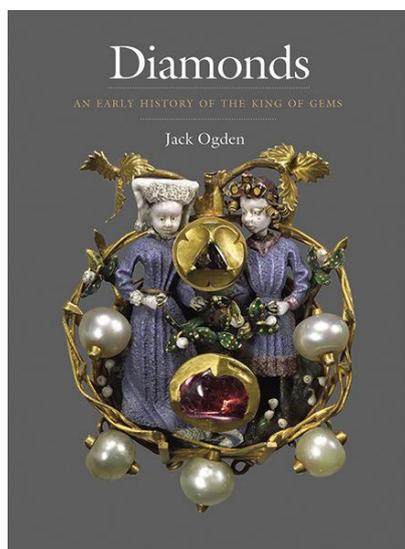


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Diamonds—An Early History of the King of Gems

By Jack Ogden, 2018. Yale University Press, New Haven and London, <http://tinyurl.com/Yale-Ogden-Diamonds>, 408 pages, illus., ISBN 978-0300215663. £30.00 hardcover.

The aim of this book is to consider the history of the trade in diamonds from India to Europe and the Near East, from its roots some two and a half thousand years ago until the early 1700s, when the diamond deposits in Brazil displaced India as the world's primary supplier' (Preface, p. x). This is what author Jack Ogden declares to be his intention, but in reality, this volume offers a lot more. Among other things, Ogden also delivers a history of the development of diamond cutting and its influence on jewellery styles, and he explains how the myths and legends from ancient times have gradually given way to real facts and figures. In 15 chapters, Ogden guides the reader through these topics.

In Chapter 1, 'The Diamond', Ogden presents what we know from the scarce old sources about what people in the ancient world believed to be the characteristics of diamonds—covering the well-known myths, from their indestructibility to their solubility in buck's blood, as well as the famous 'Valley of Gems'—and their social function in ancient cultures. Diamonds had always been rare and represented not only great wealth, but also high status and power. Interestingly, their oldest use seems to have been for grinding and as polishing powder for the

cutting of other gems. In jewellery, only well-formed, uncut octahedra were used. Of the few surviving jewels, the oldest is a Hellenistic ring from Afghanistan of ca. 300 BC, after the Alexandrian Conquest.

Chapter 2 describes the role of diamonds in 'The Ancient World', where—not surprisingly—the most important source of information is Pliny's *Natural History*. Chapter 3 gives an outline of what old Eastern sources reveal about diamonds in 'Early Persia and the East'. All diamonds at the time came from India, but only smaller stones reached the Mediterranean World and these were initially used for cutting, drilling and grinding. Only after the increased contact with India following the expansion of the Macedonian kingdom by Alexander the Great were diamonds also used more and more in jewellery. In Chapter 4, Ogden describes the situation in 'Medieval Europe'. After the arrival of the Sasanian Persians and the westward expansion of Islam in the Near East, the old trade routes were almost cut off, and only small amounts of diamonds trickled into Europe. Diamonds were nearly forgotten during the so-called Dark Ages. This also explains why it is only after ca. 1200 AD that one finds the first clear documentary evidence for diamonds in medieval European jewellery. The first surviving jewels date from the later 1300s.

The following six chapters are dedicated to diamond polishing and cutting, 'the most fundamental development in the history of diamond' (p. 79). Chapter 5 considers 'The Dawn of Diamond Cutting in Europe'. According to the sparse evidence, the cutting process had probably been understood by 1300 AD. It all started with the discovery that the faces of diamond crystals could be polished with diamonds. Inevitably, this discovery led to diamond polishing in India, but it was in Europe where 'The Fifteenth-Century Technical Revolution' (Chapter 6) took place: the invention of a horizontal rotating iron wheel (scaife) and other tools, which are still in use to this day. The following chapters describe the different stages of diamond cuts from 'Renaissance Table and Point Cuts' (Chapter 7) to 'Renaissance Multifaceted Cuts' (Chapter 8) to 'The Early Brilliant Cut' (Chapter 9). Generally speaking, the simple cuts of tables and roses were eventually replaced by sparkling brilliants, made possible by the advancements of 'cutting-edge' cutting technology, and the innovative spirit of the cutters. Chapter 10 discusses 'Diamond Cutting in London', following England's rise as a colonial power. With the establishment of the East India Company in 1600, large quantities of diamonds began to reach England. Within a relatively short time, London became a major cutting and trading hub, and it was the main diamond cutting

centre until Amsterdam and Antwerp took over about a century later.

Chapter 11 covers ‘The Value and Assessment of Diamonds’, where the author states that ‘in the past, as today, diamonds were a sign of wealth, if not wealth itself, and their value was of concern to dealers and owners alike’ (p. 203). Ogden follows diamond prices through the ages and the criteria for the assessment of the diamond qualities, as well as the motivations behind both. He stresses the great importance of honesty and experience, quoting Thakkura Pheru (India, 14th century): ‘Those who fix a high price for an inferior gem or a low price for a superior gem, due to arrogance or avarice, will become lepers’ (p. 231).

The last four chapters are dedicated mainly to India. They describe ‘The Indian Diamond Mines’ (Chapter 12), ‘The Diamond Trade in India’ (Chapter 13), ‘Diamond Cutting in India and the East’ (Chapter 14) and, finally, ‘The Eclipse of Indian Diamonds’ (Chapter 15). In all four chapters it becomes evident that the ‘knowledge’ described in ancient sources was mostly a compilation of myths and legends (e.g. the Valley of Gems). With growing contacts, first by people such as Marco Polo, and later by traders such as Jean-Baptiste Tavernier and the activities of the major trade organisations such as the East India Company, more and more first-hand information reached the Western World and created a detailed and realistic picture of the situation in the Orient.

After a short epilogue, the volume is rounded off with an appendix reproducing Nathaniel Chalmley’s *A Description of the Diamond-Mines* of 1677, followed by an impressive bibliography of 462 titles and an index, which contains primarily names and places, with less than a tenth of the entries devoted to general keywords.

With this book, Ogden does not claim to reinvent the wheel:

This is not the first study of the history of diamonds and their cutting—there is Godehard Lenzen’s 1970 study—but new research means that we can supplement or suggest some reconsideration of the findings of his and older works (Preface, p. x).

Nor does he claim to have exhaustively covered the topic:

There will always be further archives, inventories and collections that could shed light on this subject, there is much of relevance out there in myriad languages (...) that will have to await consideration by those with the relevant skills (Preface, p. xi).

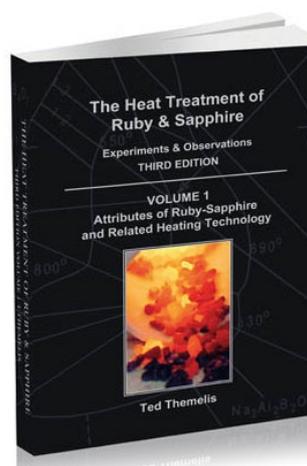
On the other hand, he states that ‘this book has been interesting and enjoyable to research and write’ (Preface, p. xi). I would like to add that reading it was equally

enjoyable and interesting. It is written in an easily readable, yet eloquent, style and Ogden manages to present the history of diamonds as an exciting adventure, while at the same time he has written a well-researched scholarly work. Ogden’s meticulous and painstaking approach leads to an almost flawless result (in fact, I stumbled over just one error: the author talks about ‘the Florentine Diamond, now in Vienna’ [p. 215], which is surprising, as this stone was stolen in 1918 and has never turned up again). To complement the text, this book is richly illustrated with pictures of old diamond jewels and images from old sources, some of which are rare and difficult to find.

All in all, Ogden’s early history of diamonds is not only an impressive scholarly masterpiece, but is also a great pleasure to read which I would recommend to everyone.

Dr Rolf Tatje

Duisburg, Germany



The Heat Treatment of Ruby & Sapphire: Experiments & Observations, 3rd edn., Vol. 1: Attributes of Ruby-Sapphire and Related Heating Technology

By Ted Themelis, 2018. Self-published, <http://themelis.com/Books-Heat-TRS3.html>, 294 pages, illus., ISBN 094-0965577. US\$150.00 hardcover.

When I was invited to review this book I was very excited, since I have long been curious about the processes that happen when a gemstone is heated, but never had the chance to get actively involved. When I then held the book in my hand, I almost rejected the task because it was full of so much information that it seemed impossible to get through. However, the more

I read, the more I was captivated by it.

In his preface, Themelis points out that this book is not intended to be scientific, and the results presented are often based on trial and error without any explanations behind them. He also gives a short rundown on the instruments, furnaces and samples that he has used for his experiments.

The book then starts with a very informative chapter about the history of heating corundum, giving some early accounts, and then delving into more precise descriptions when heat treatment became more common in the 1970s. Themelis then goes into the history of heating corundum from certain origins.

Following the historical part, there is a wild mix of introductory subjects, including corundum definitions, disclosure issues, stability of heat treatments, values of the treated gems compared to their untreated counterparts, as well as information about the gem trade and various markets, economic impact, the value of gemstone reports, gemmologists in the trade, technologies for heat treatment, and the physical and chemical properties of corundum. For a laboratory gemmologist like myself, some of these subjects (e.g. various markets and worldwide heat-treatment facilities) were extremely interesting because I am not often exposed to them. However, I missed seeing a paragraph about trade shows, and also sample reports from the various laboratories (at least the better-known ones).

The next two chapters are dedicated to the properties of corundum and the effect of heat treatment on them. A detailed account of all possible colour impurities and irregularities is given, often with further explanations on their reaction to heat treatment, accompanied by numerous images of corundum from various localities, as well as charts for a better understanding. Themelis also describes different types of colour zoning and other defects such as twinning, parting, fissures, etc., and their effects on the outcome of heat treatment. A large part of the book is concerned with the description of internal features in corundum, again noting how they are affected by heat treatment. This includes not only mineral inclusions, but also fluid inclusions, 'silk' and staining in fissures. Material on the surface of a stone is also covered. A special section mentions inclusions separately in alphabetical order with their origins and melting points. The descriptions in these chapters are complemented by numerous images.

Starting with Chapter 5, the volume covers the practical side of heat treatment. It lists various heating parameters for different cases with detailed explanations of why it is important to choose certain steps,

and explains the types of heating environments and the gases that are used. This is followed by a chapter that alphabetically lists additives in the heating process, with their chemical formulas, melting points and where and how they are used. Themelis then goes on to review other additives such as fertilisers, natural substances, etc., followed by helpful notes.

In Chapter 8, Themelis describes the entire methodology involved in heating corundum, starting with identifying rough material in the field and sorting it from other gem materials. He also gives an overview of classical gemmology, as well as advanced gemmological instruments for identification found in major gemmological laboratories, before continuing with a sub-chapter on the chemical cleaning of corundum. He lists all the acids that are used in various cleaning processes, generally with a description of the substance it is supposed to remove, the necessary equipment and a detailed description of how to clean the corundum. He then describes pre-burning processes and why they are performed, why shaping the rough stones may be necessary, how to assess certain features and attributes of the corundum, and how to classify it into different groups. Afterwards, he explains step by step how to determine the appropriate heating process, with many tips on what to watch out for when loading the crucible, choosing the right atmosphere, running the heating process, retrieving the stones and assessing the results.

In Chapter 9, Themelis gives a rundown of heating equipment from blow pipes to primitive furnaces to the most complicated electric furnaces. This chapter again gives many examples of which corundum is heated with which oven, together with some historical data from the 1980s. It is followed in Chapter 10 by an account of problems and damage that can occur during the heating process, be it failure of the instrument, overheating or contamination, as well as the effects fluxes may have on equipment.

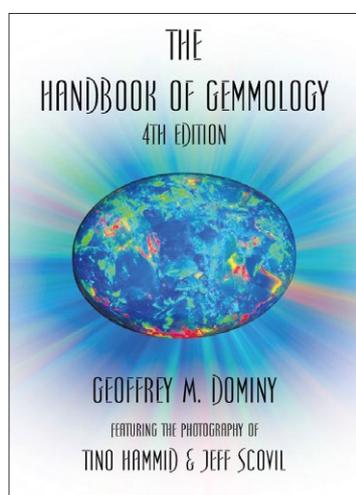
The final chapter (Chapter 11) gives a classification of the heating processes for ruby and sapphire, accompanied by flow charts and before-and-after images of treated corundum. Here, I was a bit puzzled about the group classifications in the flow charts because I did not see an explanation why Themelis provided these group names without using them elsewhere to describe the processes (perhaps this will be done in Vol. 2).

In conclusion, this is a very thorough book, mainly addressed toward someone wanting to learn about heat treatment, but I also highly recommend it to the interested gemmologist as there is information that is not found elsewhere (e.g. types of fluxes and cleaning

substances, the effect of heating on certain inclusions and the temperatures used for certain treatments). However, the book contains such a wealth of information based on experience that it is sometimes hard to combine the information found in the various chapters. The individual pages appear slightly overloaded with images and text, but this helps to keep the book at a reasonable size that is easy to use as a reference guide. Overall, I think it is a valuable book wherever heat treatment is concerned, and I am curious how Themelis will follow it in the second volume.

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The Handbook of Gemmology, 4th edn.

By Geoffrey M. Dominy, 2017. Amazonas Gem Publications, Mallorca, Spain, <http://handbookofgemmology.com>, 1,342 pages, illus., ISBN 978-0991888238. US\$49.95 eBook.

Now in its 4th edition, Geoffrey Dominy's digital *Handbook of Gemmology* continues its expansion into the gemmological field, creating an indispensable electronic reference that should be in every gemmologist's library. Running an impressive 1,342 pages, this edition aims to be a one-stop reference source, more easily carried and accessed than any traditional paper book of this size.

If downloaded as the 'flip-book' option, the *Handbook* comes complete with a handy overlay function that details the interactive features of the book and helps the user get the maximum potential from this format. Thumbnail previews allow the equivalent of quickly flicking through a traditional paper book, enabling

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Using a columnar format, and high-quality images throughout, Dominy illustrates each chapter, often with full-page views of gemstones or features, bringing his customary style to all areas of the book.

Certain areas enjoy greater detail and more in-depth discussion than previous editions. For example, when considering atoms and bonding, Dominy includes s, p, d and f orbitals in a way that the lay person can follow. This is beyond the information provided by most other gemmological courses, but with advances in treatments and synthesis, it is increasingly important to have a greater understanding of such properties in gem materials.

Each crystal system also gets its own explanation, often covering several pages, and is related back to familiar household items, such as the tetragonal system that is explained by way of a milk carton. Crystallographic concepts are often difficult for students to grasp, which makes this a useful teaching tool. Within the same chapter the author also lists an extensive range of magnetic/paramagnetic reactions from various gem materials, an area that I have always found interesting but lacking in most mainstream texts. Dominy provides a reasonably extensive list of these magnetic reactions, covering the main gem materials that are found in today's jewellery market.

Spectroscopy and light absorption are covered in another chapter, and a variety of spectra are provided, with colour illustrations accompanied by lists of important absorption lines. With an ever-expanding use of laboratory equipment, these spectral lines play an increasing role in gemmological testing. This is demonstrated at the end of the chapter, where the visible spectrum is overlaid onto spectral traces obtained from a spectrophotometer, which allows direct comparisons to be made and eases the transition from traditional to modern laboratory gemmology.

The section on refraction covers detailed use of the refractometer and underlying theory, and gives an excellent visual representation of the distant-vision or spot method for obtaining a reading from a non-planar surface.

This is an area that many students struggle with, and this may prove useful in teaching centres globally. Beyond this, Dominy considers alternative ways of determining the RI value(s) of a stone, including Alan Hodgkinson's 'Visual Optics' and the use of immersion cells for estimating RI (and assisting with observing internal features).

In the chapter that discusses polarised light, Dominy covers the enantiomorphism of quartz, and shows how left- and right-handedness can be determined in a way often overlooked in all but the highest levels of gemmological education. Filters are also dealt with in great detail, not only in terms of results, but also regarding their construction and usage, whether something as simple as crossed polarisers or a full filter set.

The chapter on specific gravity has been updated to show a more visual representation of the various methods and principles, making it easier for the non-specialist to understand and increasing its potential use for students.

An interesting addition to this edition is a section on building a smartphone microscope camera, which is useful given the high quality of images now obtainable from most phones. In place of simply holding a smartphone over a microscope eyepiece, Dominy details how a simple apparatus can be constructed that supports the phone at a suitable distance and position for images to be captured. The pages immediately after this provide an extensive range of inclusion images, showcasing what can be done with the right equipment.

Subsequent chapters cover composite gems and synthetics. Each is covered in detail, with images and diagrams to highlight key features and what to look for when faced with specimens that are potentially laboratory grown. Synthetic diamond, as might be expected, is covered in its own in-depth section, which goes beyond prior editions of this book. Modern production techniques (both HPHT and CVD) are covered in

detail, and accompanied by numerous images showing rough and cut examples. Where this edition significantly exceeds all previous ones is a description of the advanced technology currently in use to detect synthetic diamonds, even down to melee sizes. Although most readers will not have a chance to see or use these tools, Dominy gives a good explanation of their capabilities, as well as when—and in which sequence—they should be used.

The important area of treatments is given greater consideration, spanning more than 60 pages of high-quality information and illustrations, bringing the reader up to date with the latest developments. This provides an essential reference source for all levels of reader.

Both diamond and coloured stone grading are dealt with in detail. The former is to be expected in any gemmological text nowadays, but the extensive detail provided on the latter—including systems, nomenclature and processes—exceeds most other texts.

Next are a series of chapters dedicated to gem identification and ordered by colour, which are very useful for any student. Following these is an extensive 'Gemfacts' section that provides in-depth coverage of 17 gem materials. Last are a series of appendices that make useful references.

In conclusion, this updated version of *The Handbook of Gemmology* builds upon previous successes, expanding and enhancing the prior editions with new and in-depth information. Given the digital portability of this work, and the range of formats in which it is available, this continues to be a ground-breaking publication, and an essential tool for any level of gemmologist.

Editor's note: A two-volume 5th anniversary printed edition of *The Handbook of Gemmology* was released in May 2018 for €309.00 in Europe and €329.00 elsewhere.

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By Joe Dan Lowry, 2018. Gibbs Smith, Layton, Utah, USA, 256 pages, ISBN 978-1423650898. US\$75.00 hardcover.

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Evolution of Magmatic and Diamond-forming Systems of the Earth's Lower Mantle

By Anna V. Spivak and Yuriy A. Litvin, 2018. Springer, Cham, Switzerland, 108 pages, ISBN 978-3319785172. €109.99 hardcover or €91.62 eBook.

GENERAL REFERENCE

The Jeweller's Directory of Gemstones

By Judith Crowe, 2018. Herbert Press, Bloomsbury, London, 176 pages, ISBN 978-1912217182. £20.00 softcover.

INSTRUMENTATION

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Ed. by Jan Toporski, Thomas Dieing and Olaf Hollricher, 2018. Springer, Cham, Switzerland, 596 pages, ISBN 978-3319753782. €140.17 softcover or €118.99 eBook.

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By Joseph I. Goldstein, Dale E. Newbury, Joseph R. Michael, Nicholas W. M. Ritchie, John Henry J. Scott and David C. Joy, 2018. Springer-Verlag, New York, New York, USA, 550 pages, ISBN 978-1493966745. US\$129.00 hardcover or \$99.00 eBook.

JEWELLERY AND OBJETS D'ART

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By Anita Coppet, 2018. Abrams, New York, New York, USA, 216 pages, ISBN 978-1419734908. US\$80.00 hardcover.

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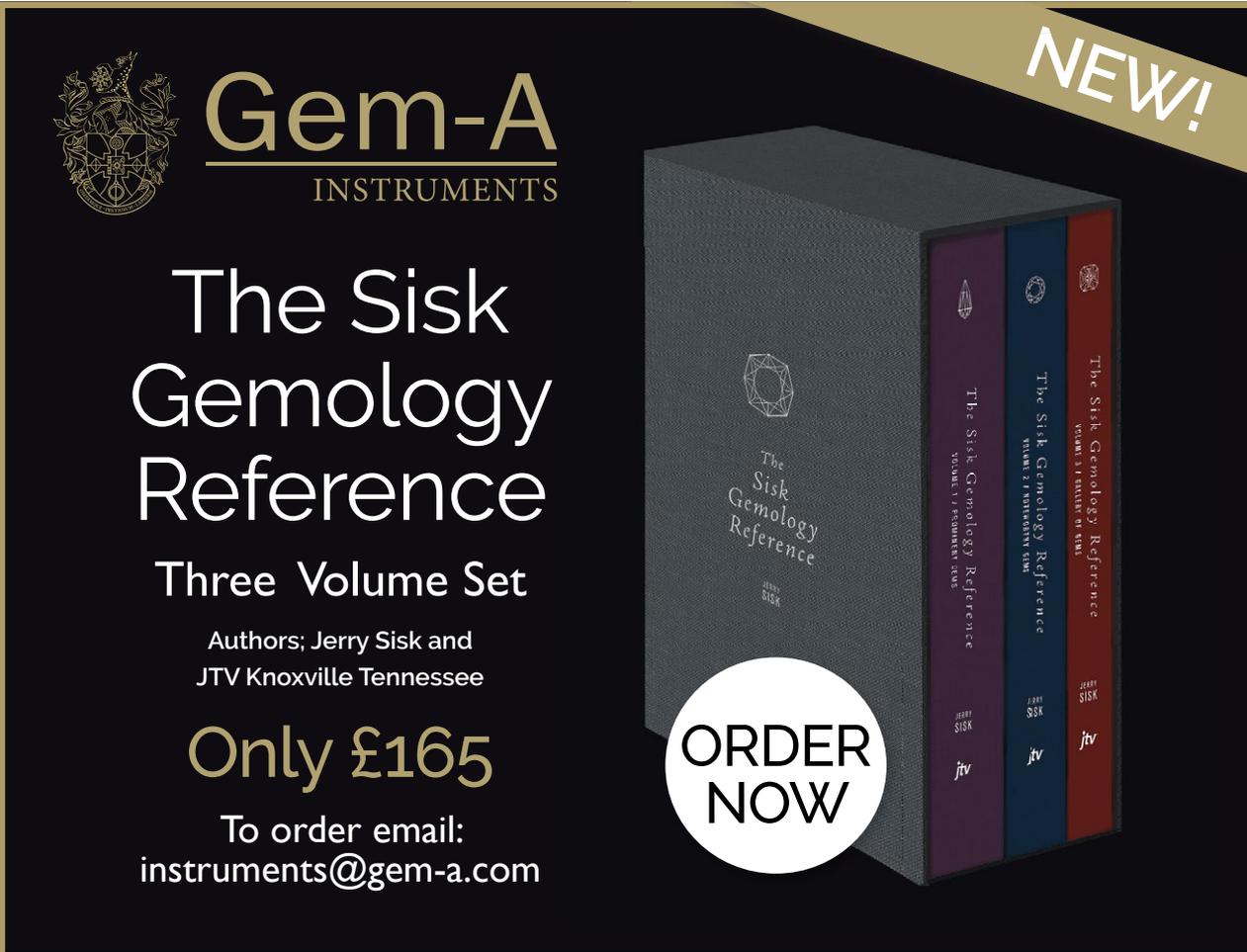
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