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Microcosmos: Discovering the World Through Microscopic Images from 20 X to Over 22 Million X Magnification

By Brandon Broll



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A journey into everyday life through spectacular microscopic images.

This substantial volume brings together extraordinary images produced through the latest technologies in microphotography. Most of the 205 stunning, full-color photographs have been taken using scanning electron microscopy (SEM), allowing us to see our world as never before.

Each image is a close-up that reveals remarkable forms, shapes and colors. The book is divided into six chapters that cover:

- Micro-organisms
- Botany
- The human body
- Zoology
- Minerals
- Technology.

Every spread includes complete, informative captions that identify the photograph and describe both the image and the way in which it was captured.

With its stunning full-color photographs and text written in clear and accessible language, **Microcosmos** provides a fascinating journey of discovery.

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Editorial Review

Review

An amazing array of shapes and textures that would be the envy of Joan Miró. (Alexander Theroux *The Wall Street Journal*)

A journey into everydy life through spectacular microscopic images... 205 extraordinary full-color photos. (*The New Hampshire Union Leader* 2007-12-12)

Visually stunning ... Anyone who is interested in seeing how things appear when magnified will find Microcosmos fascinating.... Recommended. (Barbara McMillan, Faculty of Education, University *Canadian Materials, Vol 114(7), University of Mani* 2007-11-23)

[A] visually arresting collection ... Broil's informative text highlights the noteworthy features of each image. (*Pacific Shipper (Long Beach, CA)* 2007-11-05)

Visually arresting collection... provides examples of SEM images from a wide variety of sources.. informative text highlights the noteworthy feature of each image. (*Science News* 2007-11-03)

This volume is an extremely well-produced collection of colorized micrographs that are technically good and quite interesting.... The captions are informative as written and do much to enhance the value of the book. I recommend Brandon Broll's Microcosmos highly. (Richard M. Jamison, emeritus, [micrographer] Louis *Science Books and Films* 2008-02-01)

Hundreds of extremely magnified images such as botanicals, minerals and insects, transport the reader into another world.... Who knew morning glory could look so interesting! (*Chicago Sun-Times* 2008-12-14)

About the Author

Brandon Broil is a journalist specializing in science and medicine. He has published stories on subjects as diverse as brain-mapping and crash-test dummies. His work has appeared in numerous international publications, including *Reader's Digest* and *The Guardian*, and he has acted as science consultant or editor on many books.

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Foreword

Revealed on these pages is the triumphant power of the scanning electron microscope (SEM) to explore nature and man-made objects at the microscopic level. Combined with the latest techniques microscopists are using to capture the mood and tone of their subjects, and of image artists who use color in order to bring to life the wonder of the microcosmos that surrounds us and is inside us. Most pictures chosen for this book, unless otherwise described, are taken with SEM's. There is reason for this choice. Other microscopes need the specimen to be sliced thinly, or trapped under glass, before it can be examined, creating a two dimensional picture which appears flat or just a part of the whole. A few examples of these methods are

illustrated here such as cell cultures and bird flu virus. But the scanning electron microscope, however, reveals another world entirely, a world familiar to the way we naturally see things, a world with outer surfaces and in three-dimensions. How do SEM's achieve this? Electron microscopes rely on a beam of electrons, rather than light, to illuminate a subject. And because an electron beam is produced in a vacuum the specimen must be dead and specially prepared. In SEM'S, a fine electron beam is scanned across the surface of the specimen, highlighting with precision and detail the complexity of the micro-world: microscopic hairs or pores on leaves, the silicate skeletons that make up tiny plankton, even the intricacies of something as mundane as the weave of waterproof clothing or the coil of a lightbulb filament. This power of the scanning electron microscope to resolve microscopic structures can be used to explore the beauty of what is too small to see with the naked eye, but it enjoys other applications in biology and medicine, technology and other sciences. For biologists, certain microorganisms may only be properly identified by their filigree shells as seen under SEM, pollen grains by their sculpted surfaces. In medicine, a nerve cell, for example, can be better understood by researchers able to trace the fine paths of nerve fibers in three-dimensions. In engineering, imperfections on a compact disc can be analysed. Perhaps not realized by the viewer but implicit in these images is that each one has been artificially colored. From a black and white picture produced by SEM, the skilled artist must combine scientific precision with color to make these images come alive. Science has a way of crossing over into art. Not long ago these artists were hand coloring directly onto black and white SEM prints, or using color gels, or chemical stains. Today, however, in our digital age, technology has introduced powerful computing tools that can not only clean and sharpen an image but with masks and layering give it the subtlety of tones in color and depth of shadow found on these pages. Neither are all images here attempts at real-life color. The colors may help to highlight important structures, making a complicated picture simpler to understand. Other images may try to mimic real-life, but only as we imagine it -- such as in our own bodies. Color is a very subjective concept and may just as well be used to enhance a picture's commercial value. For ease of access depending on how much information the reader requires, every picture has a short title, a longer descriptive one, and an in-depth caption. How many times each image has been magnified under the microscope is represented by an X.

What follows is a journey into the microcosmos as found around us and inside us in its amazing diversity.

Brandon Broll June 2006

Users Review

From reader reviews:

Bobbie Wallace:

Why don't make it to become your habit? Right now, try to ready your time to do the important work, like looking for your favorite publication and reading a guide. Beside you can solve your problem; you can add your knowledge by the book entitled Microcosmos: Discovering the World Through Microscopic Images from 20 X to Over 22 Million X Magnification. Try to stumble through book Microcosmos: Discovering the World Through Microscopic Images from 20 X to Over 22 Million X Magnification. Try to Stumble through book Microcosmos: Discovering the World Through Microscopic Images from 20 X to Over 22 Million X Magnification as your friend. It means that it can being your friend when you sense alone and beside that of course make you smarter than ever before. Yeah, it is very fortuned in your case. The book makes you considerably more confidence because you can know everything by the book. So , we need to make new experience along with knowledge with this book.

Daniel Hanson:

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