The Material of Invention

Ezio Manzini (translated by Antony Shugaar)
(MIT Press, Cambridge, Massachusetts, 1989), approx. 255 pages.
ISBN: 0-262-13242-7

In *The Material of Invention,* Ezio Manzini attempts to communicate the complex interrelationship between design and materials. As Professor of Architectural Technology at the Politecnico di Milano, he lives professionally in the borderland between art and engineering. This book is the result of a research project aimed at creating critical communication links between the designers, engineers, and researchers who are today creating the products of our culture.

In the introduction, the author notes, "Every object made by man is situated at the intersection of lines of development of thought (models, cultural structures, forms of knowledge) with lines of technological development (availability of materials, transformation techniques, forecasting and control systems)." Manzini focuses on the properties of materials as both a fountainhead of possibilities and as a practical limitation on what can be produced. The process leading from inspiration through design to production is complex, and is becoming increasingly more so with each passing moment. This is illustrated, for example, by his observation that in 1900 it took 100 materials to make a car while today it takes more than 4,000. The myriad of materials choices confronting today's designers creates a new problem: communicating the important positive and negative qualities of materials to designers without numbing their creativity. It is equally important that the researchers and technicians who focus on the materials as materials appreciate the ultimate effects they have on the objects our culture produces.

The Materials of Invention makes connection with all players in this game in a manner that appeals strongly to the right side of the brain. In the first of five sections, a philosophical Manzini re-introduces the ancient Greek concept of *metis*—a quality or skill implying a collection of mental attitudes such as instinct, wisdom, multiple or polymorph talent—as a desirable quality for the times we work in. Metis was applied to mobile or slippery concepts devoid of exact measurements or strict meaning. More broadly, it has always been the basis of practical knowledge. It seems that our culture has created in designers and artists what is termed transverse knowledge, while simultaneously fostering the development of vertical knowledge in researchers and technicians. The partitioning of skills is shown to be not without value, but in the extreme will lead to stagnation and collapse in a time of plenty. The remaining four sections are historical, analytical, playful, and technical appendix, respectively.

The book itself is of high technical quality, illuminated with color and black-and-white photographs and sketches. Figures appear on every page, but are only rarely referred to in the text. Rather, they contribute to the metis the author is trying to develop in the reader by provoking thought and subtly exercising requisite skills. Originally written in Italian, the book suffers somewhat in translation, being somewhat heavy at times rather than joyful. I was distracted occasionally by odd constructions, particularly in the early sections where apparently literal translation did not seem to do justice to the philosophical context. The middle and latter sections I found to be increasingly entrancing. While it quickly becomes obvious that the author's preference runs toward modern polymers and composites, the treatment of metals, ceramics, and natural materials is fair.

On the whole, I found the book enjoyable and can recommend it to students, both new and near graduating, as well as practicing scientists, engineers, architects, designers, and artists who may appreciate a fresh view from a height.

Reviewer: Martin J. Carr is a member of the Material Characterization Department at Sandia National Laboratories.

Polymer Update: Science and Engineering (Australian Polymer Science Series Volume 2)

Edited by W.D. Cook and G.B. Guise
(Royal Australian Chemical Institute, 1989), approx. 285 pages.
ISBN: 0-909589-67-4

This text has seven chapters in which Australian polymer scientists, who are experts in different areas, review the fundamental aspects of polymer science and give their views on the future of these areas. The subjects treated in this book include chain and step growth polymerization, mechanical properties, structure and properties of elastomers, the glassy state, and the morphology of crystalline polymers. The objective, according to the editors, is "to provide the reader with a grounding from which to expand," and the authors have succeeded in providing some of the basic concepts of these different areas of polymer science clearly and concisely. As the editors state, this text is "not meant to be an end unto itself rather it aims to be a means to further elucidation in the field." Indeed, the authors do not attempt to treat the different areas in any detail but do provide the basic fundamentals.

This text should be quite useful to those beginning study in polymer science, to those needing a concise discussion of a particular aspect of polymers, or to those wanting a general overview. Since this book originated from a series of lectures, it would serve as an ideal text for an introductory course in polymer science. The book is similar in content to the classic text by Billmeyer, but updated with some of the more recent advances. I feel that the editors and contributing authors have achieved their goal in providing a general course text in polymer science. The inclusion of a brief history of polymer science is also quite useful so that the student can place things in perspective. The book is a worthy and successful addition to the Australian Polymer Science Series.

Reviewer: Thomas P. Russell is a research staff member in IBM Almaden Research Center's polymer physics section. His research interests include the use of x-ray and neutron scattering and reflectivity techniques to study the bulk and surface behavior of polymers in the solid state. □

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