The number of errors discovered in a rather careful reading are less than what one would expect in a first printing; only two errors are serious enough that they should be mentioned here: (a) on p. 25 in the last displayed equation of the page, an x has been replaced inadvertantly by an a (i.e., the equation should read $\log_{10}y = mx+b$); (b) Eq. (4–25) on p. 46 should read $v_x = dx/dt = \omega r \sin\omega t$. Since many students will learn for the first time about semilog plots from this book and will often refer to Chap. 4 on "Applied Math Functions," these typographical errors might serve to confuse them unduly. Although the list of fundamental constants is up to date, one of the not-so-fundamental conversion terms is not: the listed value for the nautical mile is that which had been defined in 1832, not the presently accepted value of 1 nautical mile = 6080.2 ft (a fact that would have been missed except for some work being done for the Navy in non-mks units). Finally, to end the inevitable paragraph of critical remarks, the paper copy of this book is recommended rather than the hardbound volume, based on the observation that our cloth library copy had a broken binding simply from the handling on the new book shelf. The reviewer's personal paper edition is beginning to lie flat wherever it is opened and shows no sign of wear in its glued binding. For a book that will certainly get much use for the entire undergraduate career of any science student fortunate enough to have a copy, service over the four-year span is an important consideration.

The collection of formulas, the conversion tables, the integral table, indeed the entire text that Prof. Swartz has produced will be a constant source of information and inspiration to the beginning science student. Not only is this text recommended for the first and second year physics student, but for all science students; it would be of great interdisciplinary usefulness if it were to be placed in the hands of chemistry and biology instructors. For myself, the used math of this book is so helpful it has earned a spot on my bookshelf beside the CRC, and Abramowitz and Stegun's NBS math tables.

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Thematic Origins of Scientific Thought: Kepler to Einstein. GERALD HOLTON. Pp. 495. Harvard U.P., Cambridge, MA, 1973. Price: $10.00. (Reviewed by James L. Park.)

In recent centuries orthodox scientific discourse has often feigned disinterest in propositions which are decidable by neither measurement nor logic. Yet thoughtful students of epistemology have long recognized that even modern physics is ultimately grounded in principles of precisely this scientifically undecidable type, *metaphysical* principles without which the theoretical algorithms and data gathering procedures of the "scientific method" would be uninspiring catalogic exercises.

The existence of such an aspect of science distinct from mathematical reasoning and laboratory experimentation is important not only to the epistemologist seeking to understand the nature of scientific knowledge but also to the historian striving to transcend simple chronology in order to probe the origins of scientific inspiration and creativity. Thus Gerald Holton has formulated, as essential background for his approach to the history of science, the concept of *themata*, defined as "fundamental preconceptions not derivable from observation or rational analysis." The thema list for all of scientific history is remarkably limited to a relative paucity of recurring ideas, most having originated in antiquity.

Illustrative of themata are a number of theme–antitheme pairs like continuity–discontinuity, reductionism–holism, complexity–simplicity, mechanism–teleology, vacuum–plenum. It is meaningful, moreover, to speak of the thematic component of a concept or proposition as opposed to its rational and empirical components. The principle of energy conservation, for instance, has a mathematical definition and an experimental interpretation. In addition, it reflects the ancient thema of constancy; and when stated in terms of perpetual motion, it is seen to embody also the thema of impotency.

Holton's new book, *Thematic Origins of Scientific Thought,* is a collection of 15 essays first published on various occasions during the period 1953–1971. It is not, however, just another heterogeneous "collected works" volume; there is a connective thread, this concept of *thema,* which links most of the essays and serves admirably well to unify the work. In addition to these 15 chapters, a long (33 pp.) introduction and an excellent index are provided. Besides a philosophical explanation of the thema notion, the introduction offers a discussion of modern historical methodology which is very informative to the non-historian. The entire book is written with great eloquence and style; and its scholarly content is substantial, cogent, and provocative.

To this reviewer, the singularly outstanding portion of the book is a set of six essays constituting a thematic historical analysis of the theory of relativity. Much of this work is based upon an obviously painstaking investigation of Einstein's correspondence and of the scientific literature to which the young Einstein was exposed around the turn of the century.

Other less extensive but equally fascinating applications of thematic analysis include studies of Kepler and Bohr. For the latter, Holton seems to have adopted the orthodox view that complementarity is an important new thema which accommodates the conception of an electron as *either* a particle *or* a wave. Nevertheless, Holton's treatment of those influences on Bohr's intellectual development that may have inspired complementarity is a stimulating historical analysis even for those of us who regard complementarity as a fading aberration which sought to institutionalize a dilemma rather than acknowledge simply that an electron is *neither* a particle *nor* a wave.

Finally, it should be noted that the collection also includes Holton's views on the growth of contemporary science and on education, views which may be valuable and interesting to many readers. However, most of the essays are devoted to the historical studies discussed above, and the book is worth buying just for its profound treatment of relativity alone.

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Basic Electromagnetics with Applications. N. Narayana Rao. Pp. 563. Prentice–Hall, Englewood Cliffs, NJ, 1972. Price: $16.95. (Reviewed by John J. Wright.)

This book has been written for the undergraduate electrical engineering student and presumably for a one-year course at the junior–senior level. Although written as an engineering text, it could serve as a physics text.

There are six chapters: "1. Vector Analysis," "2. The Static Electric Field," "3. The Static Magnetic Fields," "4. The Electromagnetic Field," "5. Materials and Fields," and "6. Applied Electromagnetics." The first chapter on vector analysis is extremely good. It presumes the student is unfamiliar with this material and presents a very thorough treatment. The author has used detailed examples to show the student exactly how to perform line integrals, surface integrals, take the curl of a vector, etc. Rectangular, cylindrical, and spherical coordinate systems are treated. Chapters two through five are quite standard in the material covered and in presentation, although the order of presentation is somewhat unusual. Most standard physics texts treat electrostatics in its entirety, i.e., the static field and potential, including boundary value problems, followed by a treatment of dielectrics and electrostatic energy. This sequence is then repeated for magnetostatics. Dr. Rao, however, has chosen to treat electric and magnetic fields simultaneously in chapters four through six. For example, Sec. 4.6 is entitled "Energy Storage in an Electric