times, but it is not necessarily immoral for it to be accompanied by fanfare.

Yung-Chen Lu's book is an introduction to mathematical aspects of catastrophe theory and he states that he aims it so that "... even strong undergraduate students should be able to understand most of the contents." Frankly, I don't think he has succeeded. Pedagogically the book is neither better nor worse than most others on the subject. His chapter on catastrophe theory is a bit more clear and down to earth than what Thom is wont to write, but then again it lacks Thom's flights of poetry. For the interested physicist who is willing to devote a few hours to gaining a slight acquaintance with the subject I would recommend M. Golubitsky's "An Introduction to Catastrophe Theory and its Applications" (to appear shortly in *SIAM Review*).

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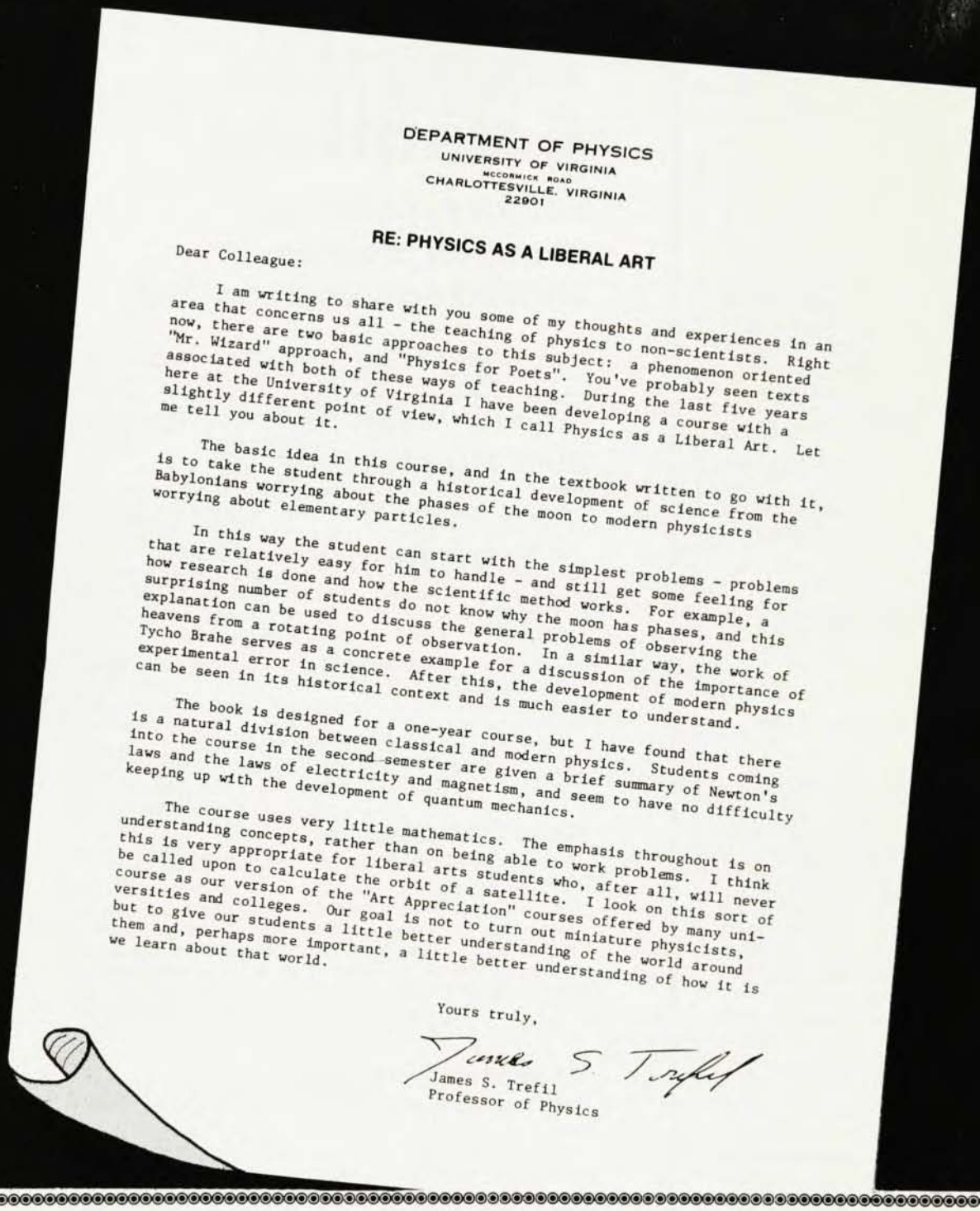
Fundamental Principles of Heat Transfer

S. Whitaker
556 pp. Pergamon, Elmsford, N.Y., 1977, $50.00

The growing concern about the global energy problem has recently aroused a great number of physicists to take a new, close look at the various elements of energy technology such as energy transformation, energy storage, energy transport and energy conservation. Studies related to any of these elements, however, often require a good knowledge of the subject of heat transfer, which has become a well-developed engineering discipline over the last twenty years. In fact, the recent focus on energy has resulted in a noticeable increase in the interest in heat transfer, accompanied naturally by an outburst of books, specialized monographs or general elementary texts on the subject. In the latter category, indeed, several have come out during the past year, and S. Whitaker's book is one of them.

The book provides a fundamental treatment of various heat transfer processes, namely heat conduction, convection, radiation, and boiling and condensation. It is intended as a textbook for a beginning course in heat transfer in an undergraduate engineering curriculum. The coverage of material, however, is sufficiently extensive that this book can be also used as a general, introductory reference book for non-engineering students. The students are expected to have an elementary background in thermodynamics and fluid mechanics, as well as

Why Professor Trefil's Course Grew from 40 to 600



DEPARTMENT OF PHYSICS
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RE: PHYSICS AS A LIBERAL ART

Dear Colleague:

I am writing to share with you some of my thoughts and experiences in an area that concerns us all - the teaching of physics to non-scientists. Right now, there are two basic approaches to this subject: a phenomenon oriented "Mr. Wizard" approach, and "Physics for Poets". You've probably seen texts associated with both of these ways of teaching. During the last five years here at the University of Virginia I have been developing a course with a slightly different point of view, which I call Physics as a Liberal Art. Let me tell you about it.

The basic idea in this course, and in the textbook written to go with it, is to take the student through a historical development of science from the Babylonians worrying about the phases of the moon to modern physicists worrying about elementary particles.

In this way the student can start with the simplest problems - problems that are relatively easy for him to handle - and still get some feeling for how research is done and how the scientific method works. For example, a surprising number of students do not know why the moon has phases, and this explanation can be used to discuss the general problems of observing the heavens from a rotating point of observation. In a similar way, the work of Tycho Brahe serves as a concrete example for a discussion of the importance of experimental error in science. After this, the development of modern physics can be seen in its historical context and is much easier to understand.

The book is designed for a one-year course, but I have found that there is a natural division between classical and modern physics. Students coming into the course in the second semester are given a brief summary of Newton's laws and the laws of electricity and magnetism, and seem to have no difficulty keeping up with the development of quantum mechanics.

The course uses very little mathematics. The emphasis throughout is on understanding concepts, rather than on being able to work problems. I think this is very appropriate for liberal arts students who, after all, will never be called upon to calculate the orbit of a satellite. I look on this sort of course as our version of the "Art Appreciation" courses offered by many universities and colleges. Our goal is not to turn out miniature physicists, but to give our students a little better understanding of the world around them and, perhaps more important, a little better understanding of how it is we learn about that world.

Yours truly,

James S. Trefil
Professor of Physics

PHYSICS AS A LIBERAL ART By James S. Trefil, University of Virginia

CONTENTS: How We Know Things. Philosophy and Technology in Two Ancient Civilizations. The Birth of Human Reason. The Flowering and Death of Greek Science. The Copernican Revolution. The Scientific Method. The Newtonian World. Electricity and Magnetism—The Scientific Method in Action. The Theory of Relativity. Scientific Ideas in the Nineteenth Century. Splitting the Atom. Quantum Mechanics. The Nucleus. Nuclear Reactors and Radiation Safety. Elementary Particles. Bibliography. Appendices. Index.

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some familiarity with ordinary differential equations and vector analysis.

Compared with other standard heat-transfer texts, this book is very much the same in terms of both the sequential development and the topical coverage. The main difference from the others lies in its detailed presentation, which provides much more mathematical development and derivations as well as graphical representations. Moreover, it contains in each chapter a worked-out design problem, several practical examples, and a number of homework problems. As a result, the book is considerably bulkier and lengthier (556 pages in the standard large size of 21.5 × 28 cm) than all other introductory texts. This is probably a natural outgrowth of the author's earlier book on elementary heat transfer analysis.

Despite its impressive size and comprehensiveness, however, some important topics are not covered. Notably missing are gaseous radiation and combined heat and mass transfer, which are assuming increasingly significant roles in modern technological problems. The value of the book as a general reference would also have been enhanced if a few topics of current interest, such as the heat pipe, thermal contact resistance and heat transfer in high-speed flows, had been briefly introduced and discussed.

Finally, all the property values, examples and problems are still based on the British unit system, while all other recent texts have adopted either the SI system or the mixed SI and British unit system. This decision may present a problem to people outside the engineering community.

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book notes

Mars and its Satellites: A Detailed Commentary on the Nomenclature. J. Blunck. 200 pp. Exposition, Hicksville, N.Y., 1977. $10.00.

Since details of the Martian surface were first mapped in the mid-17th century by Christiaan Huygens, the task of naming these features has been a continuous and increasing problem. Individual astronomers have used different systems, leading to much confusion. Only with Giovanni Schiaparelli's nomenclature, deriving from the old geography and its connected mythology and first seen on his chart of 1877, has some order developed. In his introduction Jürgen Blunck describes the various systems of nomenclature that have been proposed during the past 100 years and summarizes the naming procedures adopted in a series of In-