Book Reviews

General Education in Science. I. Bernard Cohen and Fletcher G. Watson, Eds. Cambridge, Mass.: Harvard Univ. Press, 1952. 217 pp. $4.00.

General education is a religion that is fast acquiring the status of an established church. This book is a contribution to its ecclesiastical literature, being 15 essays prepared by competent educators for the Harvard Workshop in "Science in General Education" (1950). Although understandably exhortatory in tone, each essay has merit as an indication of honest effort to say something significant about science teaching and its needs.

When one has lived for years, as I have, in *sin*—the sin of specialization—the reading of this book is likely to arouse mixed emotions. First, there comes the spirit of proud defiance, then of contrition, and finally of conversion as one evangelist after another preaches the gospel of integrated education. If there is backsliding, it is but an indication of the utter depravity of the old ways into which one has heedlessly fallen.

The 15 defenders of the faith are united in their opposition to "the traditional specialist's courses" in science. In their concerted aim to make science intelligible to more nonscientists and to make scientists better citizens, historians, and philosophers, their purpose is noble. On how to attain their desired goal, each man's suggestions are worth considering: surely, any program that includes among its aims the cultivation of *better thinking* by students deserves attention! General education hopes to liberate liberal education, to have students "know the scientific enterprise as a whole," to divest science of its priestly robes, to disengage it from its beautifully deceptive aura, to restore to it a history and a philosophy, to debunk it of its fictitious "scientific method," to release it from the "curse of coverage," and replace coverage by well-chosen case histories, in the study of which the student is led into scientific thinking, or a reasonable facsimile thereof. If the movement avoids playing the role of a Don Quixote, it may have in it the strength to accomplish what has always seemed to this reviewer as the avowed but unattained purpose of education generally. New ideas, new slogans, and new blood should be welcomed in any process as important as education, since each generation reviews the faults of the past and tries to modify its own course in directions that give promise of satisfactory advancement. One detects frequently the note of humility as these essayists recognize the vastness of the task undertaken.

In a short review, it is not possible to give many of the quotable statements the volume contains, nor to write adequate criticisms of each man's contribution. The place of science in our civilization and the reasons for believing that changes in science education are much overdue are viewed from various angles by Messrs. Dubos, French, Sears, LeCorbeiller, Goudsmit, and Fuller. The part played by philosophy in the teaching of science is treated by Kemble and Frank; by history, in three essays by Cohen, Nash, and Kilgour. Two sane and realistic contributions by the biologists Castle and Erikson appealed to your reviewer as particularly acceptable. The book concludes with two chapters by Dyer and Watson on the difficult problem of evaluating the results of the new approach to science teaching. Throughout the "commercials," there are valuable suggestions and stimulating ideas.

If, two decades from now, science teaching has taken on a new complexion, if it serves the populace better, makes more civilized scientists and more science-minded citizens among the laity, it may come to pass because of the efforts of these men, and others, who honestly and earnestly seek for better ways to do this perennial job of educating that has never been done well enough. Much as they tend to blame the present sorry plight of the world, so far as education is responsible for it, upon the growth of narrow specialization, most of them frankly admit that general education is not a proved panacea for all our ills, but that it still stands in the position of a promising experiment. Education is still likely to remain a process that depends primarily upon the teacher's breadth of interest, devotion, and ability to share with students his best insights.

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Physics and Mathematics

Astrophysics: A Topical Symposium. Commemorating the fiftieth anniversary of the Yerkes Observatory and a half-century of progress in astrophysics. J. A. Hynek, Ed. New York: McGraw-Hill, 1951. 703 pp. $12.00.

This volume, most appropriately bearing the subtitle *A Topical Symposium,* was composed to commemorate the fiftieth anniversary of Yerkes Observatory and half a century of progress in astrophysics. The contributors, who all at one time or another were connected with Yerkes, were each asked "to survey his field, to describe its growth during the past fifty years, to examine its particularly challenging problems; and to address a hypothetical first-year graduate student, well versed in fundamentals but by no means a specialist." It is amazing, even when one takes into account the galaxy of contributing astrophysicists, to what degree practically all of them have succeeded in doing exactly this. The result is a most stimulating survey of practically the whole field of astrophysics, and this volume can certainly be used as a textbook for graduate courses in the subject. The fact that the various contributors have clearly indicated the many problems with which astrophysics is still confronted should assist research workers in the field, and for a long time to come this book should provide a powerful stimulus to astrophysicists.