A Source Book in Classical Analysis by Garrett Birkhoff; Uta Merzbach
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tion. The aim of publication was pedagogical, but students of crystallography will make better use of these volumes than students of history. All the same, they are a treasure trove, an inspiration to scientist and historian, and a genuine pleasure to peruse.

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Garrett Birkhoff (Editor) with the assistance of **Uta Merzbach.** *A Source Book in Classical Analysis.* (Source Books in the History of the Sciences.) xii + 470 pp., index, bibl. Cambridge, Mass.: Harvard University Press, 1973. $25.

Source books are collections of excerpts from significant documents of the past, usually translated, if necessary, into English and presented in a historical context. Those which contain the writings of scientists can be helpful to the professional historian of science as a starting point; but their primary purpose is didactic. If the selections are well chosen and the translations accurate, they are useful not only in history of science courses but also as a tool to convey to working scientists a sense of the historical development of their subject. Therefore the Harvard series of Source Books in the History of the Sciences is a very welcome enterprise. The latest volume to appear is the *Source Book in Classical Analysis.*

The book covers analysis in the nineteenth century, though a few selections fall outside that period at either end. There are eighty-one articles by forty-seven mathematicians, divided by subject into thirteen chapters. The choices seem to be good, though there is somewhat of an overemphasis on Cauchy, who is represented by twelve selections while Riemann and Abel have six, Jacobi four, and Weierstrass three. Of those I found outstanding I will single out two: Riemann's introduction to the surfaces which bear his name is among the clearest I have seen, and Poincaré's on asymptotic series is a model of exposition from an author not always noted for his clarity.

The quality of the translations is general-ly high, though there is one problem I will mention later. The introductory sections are uneven, and though most of them are helpful, some are unorganized and fragmentary. There is, wisely, no attempt to present an overall history of the subject, but one aspect of such a history which does come out very clearly is the large part played in the development of classical analysis by applied problems. Furthermore, the way in which the problems changed throughout the period—from a search for answers to questions about nature to the study of mathematical objects for their own sake—is well illustrated, particularly in the selections on Fourier analysis and Dirichlet's principle.

I have, however, one serious reservation about the approach taken in the preparation of this volume. It concerns the modernization of terminology and notation, a policy followed by Garrett Birkhoff, the editor. Certainly the problem of terminology can be a difficult one when it comes to translation, but I would like to state a case for sticking as closely to the original as possible. It seems to me that changing the notation and terminology falsifies history, by not showing when new concepts were introduced nor how fast they became accepted.

More important, the purpose of the changes is, I presume, to make the material easier to understand. But for the mathematician, to make it too easy loses some of the point, which should be the way great men had to struggle to formulate ideas that have now become commonplace. Also, ideally this book should be used in teaching, not only in the history of mathematics, but as an adjunct in general history of science courses, which often tend, wrongly, to omit mathematics. In this respect I found, to my surprise, that at times the original would have been easier for the nonmathematician than the modernized version. Mathematics has gained much in power and conciseness from its evolving language, but the effect has been to make it foreign to outsiders, a pattern that had not gone quite so far in the period covered in this book as it has now. For example, "lim sup" is short and sweet and conveys all it should to someone who has had a course in real analysis, but the original, "limit toward

which the greatest values tend," can be comprehended by a wider class of readers. In all fairness I should say that the translator does often give both versions, at least the first time the concept is introduced.

The changes made include such things as altering a writer's symbols, say an i or u to an n or V, in order to conform with present standard usage. This may seem trivial, but one of the results one hopes to get from a source book is that it will inspire its readers to seek out the originals, read them in their entirety, and delve more deeply into the subject. Now, even though there is usually a "dictionary" given in a footnote, the task of reconciling the translations with the originals is often quite formidable and may well discourage a student. Furthermore the changes have not been made consistently, so that often in the middle of an argument the n or V is apt to disappear and be replaced by the original i or u.

And that brings me to my final point. In these days of inflation one has become inured to a cost of $25 for a fairly thick volume, which this is. But I think one should still have the right to expect a certain minimal amount of care in the production of the book. This does not seem to be the case here. There are many editorial problems which detract from the readability of the work. The list of errata, assuredly incomplete, which I compiled has over 290 entries, most of the errors in mathematical formulas. In addition to those introduced by the changes in notation, there are misplaced and missing subscripts, superscripts, and integral signs, misprinted symbols, and so on. Even the references are at times incomplete or incorrect. "Poincaré, *Oeuvres*" is not too helpful a citation, and one work by Weierstrass is not to be found in either of the two locations given for it (which happen to contain another work with the same title). I sincerely hope that the errors will be corrected in the next printing so that the book will be better able to achieve the editor's laudable aim of stimulating deeper and wider interest in the history of mathematics.

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Terry Nichols Clark. *Prophets and Patrons: The French University and the Emergence of the Social Sciences.* x + 282 pp., 7 graphs, 9 tbls., 3 apps., index. Cambridge, Mass.: Harvard University Press, 1973. $12.

Prophets and Patrons is an important study of French intellectual life from about 1880 to 1914 and makes solid contributions to our knowledge of a crucial era for all of the sciences.

Terry Clark is concerned with the social sciences as they gained credence and support as new fields of knowledge in France. The central question he addresses is "How are ideas affected by the social arrangements within which they develop?" (p. 1). He will, he says, respond by examining "variations in social scientific knowledge and relat[ing] them to the structural arrangements within which social scientists worked" (p. 2). Since the significant "structural arrangements" for intellectual life in France toward the end of the last century were those of the French system of higher education, the study boils down to an investigation of the entry of the social sciences into the university, that is, the "institutionalization" of the social sciences.

The first section of the book deals with the structure of French higher education. Although this analysis is sharply focused on the prospects for innovation within the system, it has general usefulness and is sensitive to a number of internal and external factors. Clark lays particular stress on the informal structure of the system—the "clusters" of academicians around a series of "patrons." The patronal organization was a stable structure of authority which inhibited the entry of new academic concerns and ideas unless the bearers of such innovations adopted the appropriate mannerisms, followed well-established career lines, related their ideas to existing concerns, and were able to negotiate tentative footholds at the peripheries of the system. Typically, according to Clark, the social scientists intially formed groupings outside the university centered around "prophetic precursors" like August Comte, Frederic Le Play, and Paul Broca. To the extent that the struggles to bring the ideas of these men into the university were successful, Clark argues, "the prophetic style of the