

HISTORY OF FRENCH MATHEMATICS

Histoire de la Nation Française. Tome XIV, Histoire des Sciences en France; première partie, Histoire des Mathématiques, de la Mécanique et de l'Astronomie. Henri Andoyer and Pierre Humbert. Paris, 1924. xx+620 pp., of which 163 are devoted to the part under review.

This treatise is one of fifteen volumes on the history of the French nation from prehistoric times to the year 1920. The entire work is under the editorship of the distinguished scholar M. Gabriel Hanotaux of the Académie Française. This particular volume is edited by M. Émile Picard, a mathematician and general savant of very high rank, secrétaire perpétuel of the Académie des Sciences. The authors of the part devoted to the history of mathematics, mechanics, and astronomy are M. Andoyer, a member of the Académie des Sciences, and M. Pierre Humbert, professor in the university at Montpellier. Such personal mention is desirable as showing without argument the scholarly standing of those engaged in the work.

The dignity of the subject and the standing of those engaged in the undertaking are adequately paralleled by the dignity of the publication itself. Appearing in folio form, printed from type representing the modern trend toward a colorful page and release from eye strain, and upon paper of a dull finish, the book is reminiscent of the older format and the days of the best French presses.

As to the style in which the work is written there will naturally be various opinions, depending upon the bent of mind of the reader. The French are artists rather than mere mechanics, architects rather than mere structural engineers, poets rather than mere compilers of statistics. The work under review is frankly a work of literature as well as a scientific résumé; it has the charm that only the French language or the French training seems able to impart to a scientific study. Whether this is to be preferred to a lexiconic and laconic style is a matter that each reader must decide for himself. As for this reviewer, he envies it, and with an honest envy.

As to the scope and completeness of the work, it must not be expected that there can be adequately covered in 163 pages all the contributions made in more than a thousand years to the development of mathematics, mechanics, and astronomy in France. The entire volume would not suffice for this purpose if the aim were anything like completeness. What is set forth in essay form in the four chapters devoted to the subject may be summarized as follows:

Chapter I, from earliest time to Descartes,—only twenty-one pages, devoted chiefly to the middle ages and the renaissance.

Chapter II, pure mathematics from Descartes to Cauchy, with special attention to (1) the scientific academies and journals; (2) Descartes and

his period; (3) lesser scientists of the 17th century; (4) the rise of the calculus; (5) the middle of the 18th century; (6) the close of the century;—in all, fifty-eight pages.

Chapter III, mechanics and astronomy in the 17th and 18th centuries, forty-four pages, devoted chiefly to (1) statistics, dynamics, analytic mechanics; (2) the Copernican system in France, the problem of parallaxes, the figure and measure of the earth, celestial mechanics, and the metric system.

Chapter IV, from Cauchy to the present time, thirty-nine pages, devoted particularly to (1) the scientific schools and journals, (2) the theory of functions, (3) equations and groups, (4) differential equations, (5) geometry, (6) physics and mechanics, (7) astronomy and celestial mechanics, and (8) contemporary tendencies.

With such an extent of ground to be covered, any approach to completeness is impossible. The question that may therefore arise is as to whether the résumé is as complete as should be expected. In reply it will be observed that the authors not only give an interesting outline of French mathematical history, but freely go outside of their own country in the awarding of credit to such men as Isidorus, Cassiodorus, Boethius, and Jordanus Nemorarius, and also to such distinguished adopted sons as Alcuin, Adelard, Robertus Anglicus, Sacrobosco, and Roger Bacon. This is also done in the later period to men like the Bernoullis, Euler, Leibniz, Newton, Cayley, Sylvester, Gauss, Riemann, Georg Cantor, and Weierstrass.

The best résumés of achievements are perhaps found under the names of Viète, Descartes, Pascal, Desargues, Roberval, Laplace, Lagrange, Monge, Legendre, and Cauchy. The brief survey of present tendencies is also well written. The most valuable part of the work, from the mathematical standpoint, is naturally found in Chapter IV, which treats of the century from 1820 to 1920.

As to minor points, of adverse criticism, most of them unworthy of serious consideration: there is the mistake of a century in the case of Sylvester II (p. 8), and in the common repetition of the inaccurate statement that "La naissance du calcul des probabilités" occurred in the gambling problem proposed to Pascal and Fermat, when it had long before been discussed by Pacioli, Cardan, and Tartaglia. It seems, also, hardly worth while to ask whether the title of a book should be given precisely as in the edition named, as a bibliographer would desire, or given in the modern form. The question arises with numerous titles, such as Bachet's *Problèmes plaisans et delectables*, (instead of *Problèmes plaisants et delectables*, as here given), and *La Geometrie* of Descartes (instead of the modern *La Géométrie*). By way of criticism, it is also proper to refer briefly to the illustrations of a historical work of this nature, particularly in a case like this in which there is a decided departure from the conventional style. The artist, M. Mestchersky, has attempted three things: (1) to give a goodly number of portraits; (2) to reproduce illustrations from classical treatises; and (3) to give in polychrome certain scenes from the past, mostly imaginative. His art is modern; he seeks to employ the strong type of wood engraving

which is seen in some of the early work of the fifteenth century; and his aim has been to bring out characteristics rather than finished details. Frankly, however, as to furnishing good likenesses of the men portrayed, the results are very unsatisfactory.

As a general summary, the work is a fair presentation of the claims of France, it is delightfully written, and it is worthy of careful reading by everyone of mathematical tastes. The study of the nineteenth century will be particularly helpful to the student; it is hardly intended as mathematics, but it is very well-written history.

DAVID EUGENE SMITH

SECRIST ON STATISTICAL METHODS

An Introduction to Statistical Methods, Revised Edition. By Horace Secrist. New York, The Macmillan Company, 1925. xxxiii+584 pp.

The most notable developments in mathematics have had their origins in attempts to solve difficult practical problems. The purpose of mathematics is not to make easy things hard but to make hard things easy. If it sometimes seems to the layman that the former is true, this is because, with the powerful tools at hand, the mathematician frequently undertakes difficult things. The association between mathematics and difficulty is so close that the illusion is created that there is a necessary connection, and that, to avoid difficulty, one must at all costs avoid mathematics. This illusion is rather common among the economic-business group of statisticians.

There is a large section of Secrist's book which contains no mathematics, and there is no objection to its exclusion from this portion, for here the ideas portrayed are so simple that they can be conveyed easily by pictures and numerical illustrations. This part, perhaps seventy-five per cent, is intended for the use of those who have not studied, or at least are not still accustomed to the use of high school algebra. So far as the reviewer is qualified to pass on this phase of the work, it appears to be a valuable contribution. It is fair to say that it does not possess distinct literary merit or marked individuality of approach. The author is rather over fond of quotation. Especially when some difficult point is to be explained, or a critical remark to be made, it is usually somebody else who is invoked to do it; so that at times it almost seems that we have a compendium of what various authorities have said, Fisher, Bowley, Mitchell, et al., and sometimes Pearson and Pearl, but nevertheless a very useful one, handy as a reference book—notably Chapter XVI on indexes—up to date, and easy to read.

The other and newer part of the book deals with more difficult ideas. Rightly again, in view of the type of student for which the book was written, only the simplest of these are presented; but now it would seem to have been better for the author to have demanded a minimum of mathematics, certainly some algebra, and probably some analytics. In