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ZENTRALBLATT FÜR MATHEMATIK

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Allgemeines. Didaktik. Bibliographisches.

● **Kline, M.: Mathematics in western culture.** New-York: Oxford University Press 1953. XII, 484 p. $ 7,50.

Although the material in this book is arranged in a historical order, it is not a history of mathematics; the history (of which there is necessarily a great deal) is only incidental to the main motive, which is to discuss the cultural significance of mathematics in the development of Western civilization. The author expresses his thesis in the Preface: „... mathematics has determined the direction and content of much philosophic thought, has destroyed and rebuilt religious doctrines, has supplied substance to economic and political theories, has fashioned major painting, musical, architectural, and literary styles, has fathered our logic, and has furnished the best answers we have to fundamental questions about the nature of man and his universe. As the embodiment and most powerful advocate of the rational spirit, mathematics has invaded domains ruled by authority, custom, and habit, and supplanted them as the arbiter of thought and action. Finally, as an incomparably fine human achievement mathematics offers satisfactions and aesthetic values at least equal to those offered by any other branch of our culture". Since the book is intended for non-mathematical as well as mathematical readers, the first chapter is devoted to the general nature and chief characteristics of mathematics, espacially as regards method, artistic quality, symbolic aspects, position as a body of knowledge and as a living and growing entity. The general characteristics of the mathematics of the ancient Orient and Greece are then analyzed, as well as the shaping of mathematical thought by these ancient cultures and its reciprocal influence on the latter. In a chapter entitled „The birth of the mathematical spirit", the author declares, „The Greek preference for deduction was, surprisingly, a facet of the Hellenic love for beauty ... Beauty was an intellectual as well as an emotional experience. Indeed, the Greek sought the rational element in every emotional experience." Also, „The slave basis of classical Greek society fostered a divorce of theory from practic and the development of the speculative and abstract side of science and mathematics with a consequent neglect of experimentation and practical applications." He judges that „the contribution of the Greeks that did most to determine the character of present-day civilization was their mathematics." The development of Euclid's geometry, founding of the Museum and the fusing of practice with mathematics at Alexandria, and the work of Eratosthenes, Archimedes, Hipparchus and Ptolemy are all discussed as part of their cultural milieu. — The period from 500 to 1400 A. D. is given the title „Interlude", and touches on the influences operating between theology and mathematics during the period; notice is taken of the progress in mathematics made by the Hindus and Arabs, of course. With the re-introduction of Greek works into Europe by the Arabs, rise of the merchant and trading class, exploration, ect., the idea grew that man might master nature (F. Bacon, Descartes) through the medium of mathematically expressed laws. „Many people credit the rise of modern science to the introduction of experimentation on a large scale and believe that mathematics served only occasionally as a handy tool. The true situation ... was actually quite the reverse". „For Galileo, Descartes, Huygens, and Newton, the deductive, mathematical part of the scientific enterprise always loomed larger than experimentation". Copernicus and Kepler sought and became enchanted by the mathematical harmony of their astronomical laws. „The scientific Declaration of Independence is a collection of mathematical theorems". Two chapters are devoted to the developement of rules of perspective in painting and its influence on the creation of projective geometry. There follows a series of chapters on the growth of the „scientific method" (Descartes, Fermat, Galileo, Newton) and the effects on philosophical thought, religion, literature, aesthetics, etc.; and two chapters describing in a very effective and elementary manner the mathematical analysis of wave motion and the resulting discoveries of Maxwell. An entertaining account is given of the 17th and 18th century attempts to emulate the success of the mathematical method in the physical world by setting up a „Science of human nature", a series of endeavors possibly little known to the average mathematician, followed by a description of the rise of the more successful methods of statistics and probability. Concluding chapters are devoted to Cantor's theory of the infinite, non-euclidean geometry, and relativity, and their impact on modern thought; and, finally, a chapter on the flourishing state of modern mathematics. The typography ist excellent and in addition to the many (88) figures in the text a series of twenty-seven plates is assembled in readily accessible form after the table of content. In the reviewer's opinion, the author has well sustained his thesis, quoted above, and has produced

a work that no mathematician, and no scientist, can afford to ignore; and a similar remark holds for the layman who wishes to be well-informed on the development of Western culture.
R. L. Wilder (Math. Rev. **15**, 769).

● **Allendoerfer, C. B. and C. O. Oakley: Principles of mathematics.** London: McGraw-Hill Publishing Company, Ltd. 1953. VIII, 544 p. 30 s.

„The authors believe, however, that some of the content and much of the spirit of modern mathematics can be incorporated in courses given to our beginning students. This book is designed to do just that". The book presents in 13 chapters the elements of logic, the number system, groups, fields, Boolean algebra, functions, algebraic functions, trigonometric functions, exponential and logarithmic functions, analytic geometry, limits, the calculus, statistics and probability. Numerous examples illustrate the text. A very successful effort has been made in order to make the subject matter easily understandable. *B. Kjellberg.*

● **Schellenberger, M.: Zahlwort und Schriftbild der Zahl.** Leipzig: VEB Bibliographisches Institut Leipzig 1953. 72 S.

Verf. gibt im 1. Teil seiner Ausführungen einen Überblick über Zahlwort und Zahlbild bei den großen Kulturvölkern. Das hier Vorgebrachte ist stark von K. Menninger, „Zahlwort und Ziffer. Aus der Kulturgeschichte der Zahlen" (dies. Zbl. 8, 98) beeinflußt; von dort sind auch zahlreiche Abbildungen entnommen. Im 2. Abschnitt tritt Verf. mit guten Gründen für inversionslose Wortbildungen bei zweiziffrigen Zahlen ein. *J. E. Hofmann.*

● **Feigl, Georg: Einführung in die höhere Mathematik. Vorlesungen an der Universität Berlin (1920—1934). Bearbeitet und herausgegeben von Hans Rohrbach.** Berlin-Göttingen-Heidelberg: Springer-Verlag 1953. VIII, 375 S. mit 19 Abb. DM 26,80.

G. Feigl († 1945) las an der Berliner Universität in den Jahren 1920 bis 1934 regelmäßig jedes Semester eine Vorlesung mit dem Titel „Einführung in die höhere Mathematik". Diese Vorlesung sollte einmal den Studierenden des ersten Semesters den Übergang von der Schule zur Hochschule erleichtern und erfüllte diesen Zweck dank Feigels pädagogischem Geschick in hervorragender Weise; zum andern sollte diese Vorlesung die Anfängervorlesungen über Analytische Geometrie und Infinitesimalrechnung in stofflicher Hinsicht entlasten. Das Beispiel des Verf. hat an anderen Universitäten nicht in dem Maße Schule gemacht, wie man es hätte wünschen sollen. Es war daher ein verdienstvolles Unternehmen H. Rohrbachs, die „Einführung in die höhere Mathematik" als Buch zu bearbeiten und so weiteren Jahrgängen junger Mathematiker zugänglich zu machen. Dem Herausgeber ist es zu danken, daß das Buch die Lebendigkeit und Klarheit der Feiglschen Vorlesung widerspiegelt und damit wirklich den Zweck erfüllt, den sein Titel angibt. Auch zum Selbstunterricht dürfte das Buch dank seiner Ausführlichkeit gut geeignet sein. Im einzelnen werden folgende Gegenstände behandelt: 1. Komplexe Zahlen. 2. Zahlenreihen und Vektoren. 3. Determinanten. 4. Polynome und rationale Funktionen. 5. Systeme von linearen Gleichungen. 6. Der Gruppenbegriff. 7. Matrizen und lineare Substitutionen. 8. Grundbegriffe der Mengenlehre. 9. Die ganzen rationalen Zahlen. 10. Die rationalen Zahlen. 11. Die reellen Zahlen. *R. Kochendörffer.*

● **Galilei, Galileo: Opere.** A cura di **F. Flora.** Milano: Riccardo Ricciardi 1953. XXIX, 1139 p.

● **Riemann, Bernhard: Gesammelte mathematische Werke und wissenschaftlicher Nachlaß. Herausgegeben unter Mitwirkung von Richard Dedekind von Heinrich Weber. 2. bearb. Aufl. Nachträge. Herausgegeben von M. Noether und W. Wirtinger.** New York: Dover Publications, Inc. 1953. 558, 116 S. 2,55 $.

Dieser Nachdruck vereinigt in einem Bande die erstmals 1892 in Leipzig erschienene 2. Auflage der Werke und die 1902 erschienenen Nachträge. Hinzugefügt ist eine Einführung in Riemanns Leben und Werk von Hans Lewy in englischer Sprache.