as a result of spreading diseases. Quite suggestive, also, is Ackerknecht's opinion that "history" is often the cause, rather than the consequence, of changes in morbidity—that malaria in Rome, for example, was the consequence rather than the cause of social dissolution. Likewise sound, I think, is the statement that medical history always shows "a combination of retreats and advances" rather than a growing "conquest" of diseases; though the recent increase in average life expectancy at birth may be viewed as a positive achievement. Certainly, as the author notes in closing, the contemplation of this vital theme "does not offer any cause for excessive optimism."

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Strategists' Guide

The natural appeal of rational conflict lends an aura of excitement to the theory of games. Since the appearance in 1944 of von Neumann and Morgenstern's monumental treatise *Theory of Games and Economic Behavior*, the glamorous opportunity to solve a wide variety of decision-making problems has attracted numerous adherents. The businessman, the social scientist, the military strategist, the diplomat have heeded the call of a lustrous future filled with optimum strategies. In order to provide a clearer perspective to the nonmathematician and the potential user (or misuser) of game theory, Anatol Rapoport has written **Two-Person Game Theory: The Essential Ideas** (University of Michigan Press, Ann Arbor, 1966. 229 pp., illus. Paper, $1.95; cloth, $5).

Rapoport discusses the nature of the theory—what it is and what it is not, what it could become and what it cannot become. In order to lessen the notational worry, he confines his attention to the treatment of two-person games. After an opening chapter on the essential features of game theory, he tackles the difficult questions of what utility is and what relationship holds between utilities of different players. Next are presented highlights of the zero-sum theory: game matrix, saddlepoint, minimax, mixed strategy. Turning to the nonzero-sum theory, Rapoport uses the Battle of the Sexes as an example to summarize and contrast varied methods of solution offered respectively by Shapley, by Nash, by Raiffa, and by Braithwaite. The treatment of nonnegotiable games analyzes such conflicts as the Prisoner's Dilemma and Chicken. A chapter on the inductive theory is followed by a detailed example discussing a diplomatic conflict concerning international inspection to control treaty evasions.

The final chapter, entitled "Opportunities and limitations," is vital reading for all players in game theory. Here the author identifies the usefulness of game theory—and it is not a sort of usefulness that readily appeals to strong advocates of practical application, but it is a type that must not be dismissed. In summary I quote the book's penultimate sentence: "The great philosophical value of game theory is in its power to reveal its own incompleteness."

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Gauss on Number Theory

Carl Friederich Gauss is one of the handful of mathematical giants who tower above the merely great mathematicians. Although he flourished over a century ago, his work has a very modern flavor. Moreover, he is a masterly expositor, with the virtues of simplicity, clarity, and care for historical detail. It is therefore scandalous that virtually none of his works have been available in English. Now at last we have his **Disquisitiones Arithmeticae** [Translated from the second German edition (Göttingen, 1860) by Arthur A. Clarke. Yale University Press, New Haven, Conn., 1966. 492 pp., illus. Paper, $2.95; cloth, $12.50]. Perhaps the greatest single treatise on number theory (the study of the properties of whole numbers), it presupposes no more than a knowledge of arithmetic and elementary algebra, and a willingness to construct and work out numerous arithmetical examples to illustrate the argument. The principal topics are elementary theory of congruences, the law of quadratic reciprocity, forms, and the division of the circle (a little trigonometry is required for this last topic). Both mathematical specialists and amateurs will find much of interest in this book. Admirers of Gauss will not be surprised to find, in sections 267 through 270, that he used matrices to represent linear transformations and the row-column product to represent their composition almost half a century before Caley's "invention" of matrices. Section VIII, referred to several times by Gauss and not included in this book, may be found in volume 2, pages 510-14, of the collected works. The only significant weakness in the translation is the absence of an alphabetical index. Congratulations to Clarke! Let us hope that he will make more classics available in English.

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New Books

Mathematics, Physical Sciences, and Engineering

Advances in Machine Tool Design and Research. Proceedings of the Sixth International Machine Tool Design and Research Conference (Manchester, England), September 1965. S. A. Tobias and F. Koenigsberger, Eds. Pergamon, New York, 1966. 807 pp. Illus. $36. There are 48 papers.

Advances in Structure Research by Diffraction Methods. vol. 2. R. Brill and R. Mason, Eds. Vieweg, Braunschweig; Interscience (Wiley), New York, 1966. 170 pp. Illus. $9.75. Four papers.

Bioluminescence in Progress. Proceedings of the Luminescence Conference sponsored by the Japan Society for the Promotion of Science and by the National Science Foundation, under the United States–Japan Cooperative Science Program (Kanagawa-ken, Japan), September 1965. Frank H. Johnson and Yata Haneda, Eds. Princeton Univ. Press, Princeton, N.J., 1966. 664 pp. Illus. $15. There are 35 papers.

Chebyshev Methods in Numerical Approximation. Martin Avery Snyder. Prentice-Hall, Englewood Cliffs, N.J., 1966. 126 pp. Illus. $7.50.

Contamination Analysis and Control. James L. Dwyer. Reinhold, New York, 1966. 349 pp. Illus. $15.

Effects of High-Energy Radiation on Inorganic Substances. A symposium (Seattle, Wash.), October–November 1965. American Soc. for Testing and Materials, Philadelphia, 1966. 176 pp. Illus. Paper, $5.25; members, $3.70. Eight papers.

Electrical Methods in Geophysical Prospecting. George V. Keller and Frank C. Frischknecht. Pergamon, New York, 1966. 527 pp. Illus. $18.50. International Series of Monographs in Electromagnetic Waves, vol. 10.

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