dents taking high school mathematics. The author of each book has indicated the background needed by the reader to be able to benefit from reading the book.

In general each volume starts in with elementary material that can be understood by many students in grades 7 through 12 and proceeds to develop the topic so that several sections at the end of each book require more mathematical maturity. These books are meant to be read with pencil in hand and time taken out to do some pencil work filling in steps left out in proofs and in solving many of the problems that are an integral part of the books. Teachers will find the volumes very valuable for supplementing their knowledge of the topics discussed.

In the "Note to the reader" at the beginning of each book the reader is told that he will need little technical knowledge to understand most of these books, but he will have to make an intellectual effort. I quote a section from a note to the reader that needs to be emphasized: "If the reader has so far encountered mathematics only in classroom work, he should keep in mind that a book on mathematics cannot be read quickly. Nor must he expect to understand all parts of the book on first reading. He should feel free to skip complicated parts and return to them later; often an argument will be clarified by a subsequent remark. On the other hand, sections containing thoroughly familiar material may be read very quickly. The best way to learn mathematics is to *do* mathematics, and each book includes problems, some of which may require considerable thought. The reader is urged to acquire the habit of reading with paper and pencil in hand; in this way mathematics will become increasingly meaningful to him."

Few of the topics discussed in these volumes are included in the so-called traditional courses in secondary mathematics. On the other hand, the newer mathematics programs used in many of the better schools contain at least the elementary aspects of the topics discussed.

Students who have studied the SMSG texts, the University of Illinois Committee on School Mathematics texts, materials developed at Ball State Teachers College, or comparable "modern" texts will find these books easier to understand than will most traditionally trained students.

Numbers: Rational and Irrational is a very well paced book, in that 7th graders can read and understand much of chapter 1 on natural numbers and integers and chapter 2 on rational numbers. Geometry and algebra are needed for chapters 3 and 4 on real and irrational numbers. Chapters 5, 6, and 7 require the background of a junior or senior. There is plenty here to challenge the gifted, and many sections of chapters 5, 6, and 7 are within the reach of average juniors and seniors.

What Is Calculus About? is sure to delight many students at the end of grade 9 and during the 10th grade. They should be able to do the first six chapters which end with simple maximum and minimum problems. Calculus is approached through the study of speed, velocity, and acceleration. Second-year algebra students have plenty of background for all of the material in this book.

An Introduction to Inequalities is a book that all seniors capable of college work should know quite a lot about. This is material not found in most "traditional" programs, but found in all of the newer mathematics programs.

Chapter 1, "Fundamentals," chapter 2, "Tools," and chapter 3, "Absolute value," which gives the axiomatic aspect of inequalities, should be read from grade 9 through 12. Chapter 4, "The classical inequalities," requires junior and senior sophistication in mathematics. Chapter 5, "Maximization and minimization problems," and chapter 6, "Properties of distance," are interesting and will require the algebraic facility of the better students. This book should challenge the student during all of his high school years.

Geometric Inequalities, a book that I recommend studying after or concurrently with *An Introduction to Inequalities,* is definitely for high school juniors and seniors and probably requires greater sophistication in mathematical knowledge and ability than any of the other five. This is a fascinating book, but not one that should be read in a hurry.

The Contest Problem Book contains the problems from the annual high school contests of the Mathematical Association of America as well as the keys and solutions to all problems. Problems for the last 10 years have been included, and a classified index helps to locate particular types of problems. Arithmetic as well as geometric and algebraic problems are in the book, and some are within the scope of a 9th grader, while others will challenge the best senior. Math clubs may find that many of these problems will start very stimulating discussions in their meetings.

The Lore of Large Numbers is a book that will fascinate all from grade 7 through 12. Elementary algebra is needed very quickly, so only the gifted 7th grader will go very far, and he will skip much of the book. The first sentence at the top of page 29 is confusing because the word "between" is not defined. Sections 15 and 16, are a bit confusing; very careful reading and interpretation of the symbolism and the way it is used there is necessary.

These books should be available in all school libraries. Teachers should read and study them, and they should encourage their students to buy the ones they find most appealing, to work on them during the years of high school, and to see how nearly they can master the books by the end of their senior year.

Trade editions are being published for the regular book trade by Random House and are available at book stores and at many paperback outlets. SMSG is making the books available to secondary school students and teachers at a reduced price of 95¢ each by agreement with Random House.

Teachers may order these books from School Mathematics Study Group, Box 2029, Yale Station, New Haven, Conn.

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Cosmochemistry

The Abundance of the Elements. Lawrence H. Aller. Interscience, New York, 1961. xi + 283 pp. Illus. $10.

The theory and practice of deriving elemental abundances from terrestrial materials, meteorites, cosmic rays, interstellar material, normal stars, and nonnormal stars is outlined for each topic in separate chapters. The treatment of the first three topics is more or less descriptive. The treatment of the last three occupies half the book, is more analytical, and is useful to the active investigator in the fields of cosmology and geochemistry, who may be

unfamiliar with the basic principles of the relation between atomic emission and absorption spectra on the one hand and abundances, pressure, temperature, and excitation mechanisms on the other. In a following chapter, Aller gives several recent universal abundance compilations (which he has modified) and compares them with a universal compilation based primarily on stellar data. Discrepancies are discussed in terms of measurement difficulties and source material differences. In a final chapter the basic nucleogenic theories of B^2FH and Cameron are outlined without the most recent bifurcations.

Because of rapid change, it is difficult to write a useful book in this field. Aller has used the opportunity offered by the room in a book to present the entire subject with superior organization and clarity. As a result, his work may outlast the rapid obsolescence of the abundance data which he presents and may be welcome and useful for several years (as it is now) as a supplementary text in the borderline subjects of cosmology and geochemistry.

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Scientific Go-between

The Human Use of the Earth. Philip Wagner. Free Press, Glencoe, Ill., 1960. ix + 270 pp. Illus. $6.

Science may be a unitary effort of men to gain mastery over their world and themselves, but the various sciences are more often like camps fortified against each other and suspicious of communications across the no-man's-land that lies between them. We may therefore thank our common totemic ancestors for an intellectual broker like Philip Wagner who, as a human geographer, is committed to wandering between camps. Conceptual integration is not an easy task, and the resultant combinations sometimes exhibit signs of strain; but it is this effort at synthesis, above all, that makes this book in "both geographical and ecological" aspects, such attractive reading. To bring order out of chaos, the author has employed the scientifically economical (if hazardous) tool of typology, and the book may best be characterized as a set of typologies, related so as to produce a cognitive map of adjacent scientific territories.

Man's symbiotic ties with other organisms (plants, animals, and other men) may be categorized as either obligate or facultative (chapter 1). These two categories are then combined with a typology of economies derived from Polanyi, to obtain a fivefold scheme of economies, seen as symbiotic types: (i) obligate subsistence with sporadic relations with outsiders; (ii) obligate subsistence with facultative arrangements for reciprocity; (iii) obligate subsistence with facultative redistribution; (iv) obligate subsistence with facultative market relations; (v*a*) obligate redistribution with facultative marketing (the Soviet Union); and (v*b*) obligate marketing with facultative redistribution (the United States). Chapter 6 presents a taxonomy of artifical objects made by man, in which there is implicit a progression from simple elements to automatic devices and a concomitant increase in man's power over nature. This taxonomy is linked, via a chapter on factors in the spatial structuring of such man-made objects, to a typology of livelihood types and food-getting forms (chapter 8). Wagner has, wisely perhaps, refrained from integrating this typology with his economic types, but the last two livelihood types (peasantry, commerce) appear to articulate with types iv to v*b*, above, and with the categories "consumers' economy" and "producers' economy" discussed in chapter 9. Chapters 3 and 4 are not essential to this chain of considerations, but they serve to acquaint the "earth-scientist" with the conceptual trappings of his hostile friends in the social science camp. From reading this book, I came away with the feeling that there *is* a science called human geography; this after some initial doubt.

Terminological quibbles should not be allowed to detract from the high quality of this work, but I arched my eyebrows at the use of "consumers' economy" and "producers' economy" and—especially—at the use of "capital" for all artificial things made by man. On the other hand, why does a geographer put the Totonac in Oaxaca and the Arapesh in southeastern New Guinea (page 44)? Relocation seems urgent.

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Arbiter of Mankind's Goals

Toward a Science of Mankind. Laura Thompson. McGraw-Hill, New York, 1961. xxvii + 276 pp. $4.95.

Any progress in applying what is known of man and his behavior to the solution of social tensions and conflicts deserves attention. During the past three decades a handful of anthropologists, most of them in England, Mexico, and the United States, have attempted to formulate practical programs for action in a variety of situations such as colonial administration, American Indian health, conservation of economic resources, and industrial personnel problems. In general, the proposals have met with skepticism from administrators, but a few successes have encouraged the "applied anthropologists" to continue their efforts.

Laura Thompson reviews the changes in anthropology's orientation that have permitted the inclusion of these aims, which represent a marked departure from former goals (and for many in the discipline, from their current goals). Instead of seeking further understanding of man and his behavior, Thompson argues that we know enough now to tackle the problems of "how to improve the welfare of whole communities and of . . . tribes, nations, and international groupings," and "the formulation of adequate norms or standards for the advancement of community welfare and for the development of community-oriented government administration." Her approach is eclectic, drawing on the insights and techniques of numerous disciplines, such as physiology, psychology, animal ecology, and conservation, as well as the social sciences. She is liberal with quotations and includes several case histories from her own previously published work; except for too frequent lapses into jargon, the book is stimulatingly written and will interest a broad spectrum of readers.

The major part of the book is devoted to proposing and explaining the "social-action research approach" that the author believes will permit anthropologists to direct human activities toward "scientifically based ideal goals." This is an extraordinarily optimistic attitude, proposing to solve all the basic problems of mankind. Optimism should not be discounted, and it is needed in any approach to the world's crises in human relationships. But there are risks