Book Reviews

Mathematics Today, the Dartmouth Conference

New Directions in Mathematics. A conference, arranged by John G. Kemeny and Robin Robinson, and held at Dartmouth College in November 1961. Robert W. Ritchie, Ed. Prentice-Hall, Englewood Cliffs, N.J., 1963. iv + 124 pp. Illus. $6.60.

A conference entitled New Directions in Mathematics was held at Dartmouth College in November 1961, in connection with the dedication of Dartmouth's new mathematics building. A significant number of leading mathematicians took part in the program, and this small book is a detailed report of the prepared addresses and the informal discussions that followed.

I know of no book or article available anywhere at the present time which more clearly pictures the nature of mathematics today, the outside influences on the subject, the direction in which mathematics may be going, or the concern of those working in the field for its development. Moreover, the reader receives, as an added bonus, clear insight into the type of men who represent the mathematical world today. I doubt whether the overall view of the field, offered by this book, will be sure to "influence the future of mathematics," as the publishers claim, but I do feel that *New Directions in Mathematics* is a worthwhile contribution to the literature.

The conference, and thus the book, was divided into four parts: New Directions in Secondary School Mathematics, College Mathematics, Applied Mathematics, and Pure Mathematics.

The three participants in the discussion of secondary school mathematics, Leon Henkin (University of California), E. E. Moise (Harvard University), and W. E. Slesnick (formerly of St. Paul's School, and now Dartmouth College), considered such topics as the degree of specialization of mathematics, the use of teaching (or learning?) machines, traditionalism, the advancing frontier of research, the new applications of mathematics to other fields, the curriculum, and the pedagogy and methodology of teaching. In addition, there is a rather detailed and excellent outline of the "basic curriculum" for the first 11 years of school, as well as several possible specific suggestions for the senior year.

In discussing college mathematics R. C. Buck (University of Wisconsin), H. O. Pollak (Bell Laboratories), and J. L. Snell (Dartmouth College) predicted more interaction of separate fields of mathematics, such as algebra and topology, in the field of analysis; significant use of computers in all education, technical as well as cultural, and the inevitability of more special honor-type courses. They also considered the amount of specialization in contrast with basic and broad liberal-arts training.

Mark Kac (Rockefeller Institute), Pollak, and A. W. Tucker (Princeton University) discussed applied mathematics. By specific examples, applied mathematics is "defined." Not only are the natural sciences considered but also the social sciences. Problems in these fields have led to entirely new branches of mathematics, such as game theory, linear programming, information theory, Boolean algebra, and Markov processes. In applied mathematics specialization is necessary, but interest in more than one branch of mathematics is frequently very important. Irving Kaplansky (University of Chicago) and Peter Lax (New York University) discussed pure mathematics. They briefly mentioned recent exciting results in the field of algebra and abstract analysis, some unsolved problems with solutions predicted, and new methods of approach in mathematical research.

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Cytocidal Viruses

Mechanisms of Virus Infection. Wilson Smith, Ed. Academic Press, New York, 1963. x + 368 pp. Illus. $12.

The study of viruses and their interactions with cells is one of the very active and exciting fields of modern biology. Recent conceptual and technological advances in molecular biology have opened up many new approaches to a better understanding of the structure, biosynthesis, and genetics of viruses. New information is accumulating rapidly in these areas. However, analysis of the more complex problem of virus pathogenicity has not yet progressed much beyond the descriptive phase. Viruses kill the cells that they infect, or they may cause transformation of susceptible cells to tumor cells. The precise mechanisms whereby they bring about these effects are not known.

This new book, *Mechanisms of Virus Infection*, aims to present a picture of the various aspects of virus-cell interaction, including transmission within, as well as among, host organisms. Although the book carries a general title and uses a broad approach, it deals almost exclusively with those viruses that cause degeneration and death of the host cell—that is the cytocidal viruses. The reason for this restriction is not clear, for the study of tumor viruses is yielding much exciting new information on virus infection.

The book opens with a chapter entitled "General considerations." Wilson Smith properly emphasizes the wide variety of viral agents known to exist and cautions against premature generalizations based on the study of only one group of viruses. It should be pointed out that Smith's remarks apply most directly to the effects of viruses on cells rather than to the biochemical mechanism of virus synthesis. In the area of animal virus biosynthesis, much has already been gained from attempts at extrapolation from bacteriophage research. Many of the fundamental concepts concerned with virus infection are aptly summarized in this introductory chapter, but in view of the rapid progress in the field of nucleic acid research, some incorrect statements are unavoidable. For example, it is stated that RNA molecules always consist of a single strand, yet evidence is now available that the RNA in certain viruses is double-stranded. And it is now known that viruses direct the synthesis of a number of new enzymes in