avoiding a tendency to over-abstraction which is apt to show itself in this type of work. The way the material is arranged also tends to emphasize the geometry—as each new principle is developed its use is illustrated by one or more applications to geometric problems, and in most cases some additional exercises are provided for the reader.

In his preface the author states that the book was written to provide the reader with the background necessary for the study of the deeper parts of algebraic geometry, especially the theory of surfaces. This requirement is perhaps a little vague, as the word "deep" may mean different things to different people, but by almost any criterion it may be said to have been well carried out. As noted above, the book contains a minimum of algebraic complications, and it certainly gives a good account of the basic notions of the subject. There are a few additional topics which the reviewer would have liked to see discussed, particularly the algebraic function field associated with an irreducible variety and its invariance under birational transformations. This is closely related to the notion of a general point and could easily have been introduced in Chapter 4. However, this is merely a detail; on the whole, we believe that the author has made a very good selection of the material at hand.

Technically the book lives up to the high standard we have been led to expect of its author and publisher. A few misprints and incorrect statements were noticed, but these are all of a trivial nature and can easily be detected and corrected by any conscientious reader. Probably the most serious defect is the lack of an index; this is particularly to be deplored in a book which is to serve as an introduction to a relatively unfamiliar branch of mathematics.

We recommend this book to the attention of every mathematician who is interested in either algebra or geometry, and particularly to those who believe that algebraic geometry is still a backward and unrigorous branch of mathematics. They will find here a clear, systematic exposition of an important new mathematical development, one which will undoubtedly have great influence in enlarging the interest in this fascinating field.

R. J. WALKER

The Decline of Mechanism in Modern Physics. By A. d'Abro. New York, Van Nostrand, 1939. 10+982 pp.

The author of this book is already known as a successful popular writer on science (cf. this Bulletin, vol. 34 (1928), p. 789, for review by T. C. Benton of *The Evolution of Scientific Thought from Newton to Einstein*, Boni and Liveright, 1927).

In brief, the book is good. The aim is "to give a semipopular presentation of the progressive growth of the new ideas, starting from the most elementary notions and giving due consideration to the mathematical development without which the new theories could never have been constructed." This aim is admirably fulfilled in three steps: Part I, "General Considerations" (114 pp.); Part II, "Physical Theories of the Classical Period" (312 pp.); Part III, "The Quantum Theory" (535 pp.). The three steps are progressively more technical.

The criticisms offered below are criticisms of detail. On the execution of his scheme, planned on such generous lines, the author is to be congratulated. It is to be hoped that potential readers will not be deterred by the formidable bulk of the book. Condensation is not desirable in a semipopular book, and there is advantage, rather than disadvantage, in a certain amount of repetition for emphasis.

The general scope of the book is indicated by the following samples of chapter headings (there are 41 chapters altogether): Assumptions in Science, The Significance of Theoretical Physics, Mechanistic Theories, Field Theories, Phenomenological Theories, Analytical Mechanics, Minimal Principles and Principles of Action, Thermodynamics, Planck's Original Quantum Theory, Bohr's Atom, De Broglie's Wave Mechanics, Heisenberg's Uncertainty Principle, Dirac's Theory of the Electron, The New Statistics.

The emphasis throughout is on theoretical physics rather than experimental. A novel feature is a popular presentation of pure mathematics, including functions of real variables, complex variables, elliptic functions, automorphic functions, groups of substitutions, differential equations, with a chapter on "The Controversies on the Nature of Mathematics."

A book of such length and of this character would be intolerable if dull or badly written. It is neither. It has a few dull patches but they are balanced by portions in which the interest is skilfully worked up. The style flows easily—perhaps a little too dignified—but science seldom smiles (in print).

Now for some criticisms. Before warming to his subject proper, the author had to (i) proclaim a new scientific era, (ii) kick the ancient Greeks. It is right and proper that the reader should know that this is an age of scientific revolution and that the Greeks were not the last word. But these things are so obvious that the information should be conveyed adroitly and, in the case of the Greeks, chivalrously, seeing that they are not in a position to answer back. The title of the book is not adroitly chosen. How many potential readers of a semipopular book know in what sense "mechanism" is to be understood?

Is it the insides of a watch? Or what? The author says what it is with a noble attempt to be clear and consistent, but flounders in the face of the impossible. One cannot tie words down like this. Half way through the book he seems to realize that all is not well: " . . . the meaning of the word mechanism needs revision, for today, since mechanics has been revised, there is no reason to associate mechanism with a form of mechanics which is recognized as a mere approximation." To save himself from intolerable confusion, the reviewer intends to continue to regard the insides of his watch as mechanism, and to think of the book under review as "Modern Physical Thought and the Quantum Theory."

As for the Greeks, we bare our teeth and rush to their defense on reading the following: "These qualities of courage, sincerity and modesty, which the Greeks seem to have lacked, prevented them from creating a science." We pass the lack of modesty (they were not alone), and even the courage and sincerity (though we have heard to the contrary), but on the point that they did not create a science, a stand must be made. Not only did the Greeks create *a* science, they created Science, in the sense in which it is understood in this book—namely deductive science. Any primitive people can collect data and record it: but that is not science. The dangerous and fascinating idea that nature is amenable to reason—that, for example, from a small number of axioms a geometry can be created which will not crack under application to astronomical observations or the surveying of fields—that courageous (if immodest) idea we owe to the Greeks. If not, to whom? Our forefathers in mediaeval Europe did not get it without the Greek contact.

Poor Aristotle comes in for special punishment, to quote: "We are told that a body dropped from the mast of a moving ship falls behind the mast. Obviously the experiment was not performed." Where does Mr. d'Abro think it would fall? It seems to the reviewer that a climb to the masthead would be an unnecessary exertion in order to verify such an obvious truth. Indeed Aristotle seems to have stuck to facts more than Galileo. He appreciated that terrestrial motions are conditioned by fluid resistance so that a terminal velocity (motus naturalis) cannot be exceeded, and the fact that Galileo succeeded where Aristotle failed might be ascribed in part to the fact that Galileo had the nerve to neglect experimental evidence and talk about motion in vacuo as if it existed physically. (See Nature, vol. 92 (1914), pp. 584, 606.)

In conclusion let it be repeated that the above are criticisms of detail. When he gets down to business the author proves himself a

master of lucid exposition, and the book is to be warmly recommended to physicists and mathematicians and to those members of the public who are interested in getting a general view of modern theoretical physics. The book is well turned out, shows only a few trivial misprints (the omission of "h" from "psychological" in the table of contents is the most shocking), and has a much fuller index than those found in other books of this sort (if there are other books of this sort).

J. L. SYNGE

Colloque Consacré à la Théorie des Probabilités. Edited by M. Fréchet and E. Borel. (Actualités Scientifiques et Industrielles, nos. 734–740.) Paris, Hermann.

The proceedings of this colloquium are published in eight small volumes. They comprise an excellent collection of articles which would be an extremely valuable addition to the library of anyone interested in the theory of probability. Although very little of the material is of a purely expository nature, these volumes furnish a rather complete picture of the modern developments of this theory. The following is an outline of the contents of the various conferences.

Volume I. *Conférences d'Introduction et d'Initiation.* 1938

This volume contains two introductory addresses, 1. *Introduction*, by R. Wavre, 51 pages, and 2. *Allocution*, by M. Fréchet. These addresses are followed by:

3. *Les principaux courants dans l'évolution récente des recherches sur le calcul des probabilités*, by M. Fréchet. The author outlines the contributions, trends, and methods of the modern theory of probability. This paper constitutes only the first part of Fréchet's discussion. The remainder appears in Volume II.

4. *Promenade au hasard dans un réseau de rues*, by G. Pólya. The author considers certain probability problems leading to linear partial difference equations of the second order. Limiting cases of these problems admit of physical interpretations. In the limit the difference equations become differential equations. Moreover the solutions of these differential equations with suitable boundary conditions give asymptotic values for the solutions of the difference equations. The author discusses a promenade along a street of infinite length in which the direction of promenade is settled by the tossing of a coin at the end of each block. The corresponding physical problem is the diffusion of a salt solution in a tube. Furthermore the motion of rocks