duces some theory but goes very little beyond Arrhenius. As a result, the generalizations and simplications that come from a thoroughgoing application of statistical mechanics to reaction mechanism are lost.

The first 11 chapters treat most of the available experimental methods for measuring fast reactions. In the first chapter, which is the introduction, the theoretical treatment of diffusion controlled reactions is quoted. Typical of the methods of measuring reaction rates, which are treated in considerable detail, are quenching methods, flow methods, relaxations from temperature, pressure and voltage jumps, ultrasonic-adsorption, flash photolysis, electron spin, and nuclear magnetic resonance. The book is an interesting and useful presentation of the rapidly growing field of fast reactions.

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Agricultural Research

The Principles and Practice of Agricultural Research. S. C. Salmon and A. A. Hanson. Leonard Hill, London, 1964. xii + 384 pp. Illus. 75s.

The authors are senior, capable, United States agronomists. As a basis for their book they have used largely agronomic material liberally spiced with horticulture, animal husbandry, range management, animal feeding, animal breeding, farm management, and marketing.

The book consists of five parts plus a bibliography and an index. The parts are Historical (3 chapters, 73 pp.); The Philosophy of Research (5 chapters, 67 pp.); Statistical Methods (6 chapters, 104 pp.); Techniques of Agricultural Research (6 chapters, 103 pp.); Appendix, Statistical Formulae, and Tables (7).

The book is intended for undergraduate students who are preparing for careers in research, especially for students in or from developing countries. Those who study it will be well repaid; so will their teachers, who perforce may read or even study it. Nonstudents and nonteachers seriously concerned with agriculture, whether in the rather limited scope of this book or in broader terms, will also profit from reading this concisely written volume. The first chapter, "Agriculture and the development of civilization," covers the topic in 16 pages; covers it with enough specific illustrations to provoke interest and to verify the essential limitation placed on civilization by the available supply of food and the determining role played by technology resulting from discovery, experience, and systematic research on the abundance of that supply.

The second chapter describes the origin and development of agricultural research. Major beginnings were formulated by Leibig, who (about 1840) developed the mineral theory of plant nutrition and by Boussingault, who demonstrated by field experiment and chemical analysis that legumes are able to obtain nitrogen from sources not available to other plants. Boussingault's work was carried out at Alsace, the first agricultural research station, in 1834.

The third chapter, "The twentieth century revolution in agriculture" sketches the research-based events that have enabled agriculture in the developed countries to increase food production more rapidly than required to meet domestic requirements. In the United States, the farm population dropped from about 60 percent of the total population in 1860 to less than 10 percent in 1960, but the amount of food and fiber produced on the farm showed a fivefold increase. Mechanization, the control of insects, weeds, and diseases, commercial fertilizers, improved animal health and nutrition, hybrid corn, rust-resistant wheat, and adapted soybeans are among the items described.

Part 2, on the philosophy of research, is excellent, and sometimes provocative, material for new and old researchers. The authors consider the nature of basic and applied research, and identify the essential interdependence of the two, although this is done by describing basic research as an inseparable part and concomitant of all effective research. There are sections on science and mathematics; science and art; science and politics; science and certainty. The senior author is a devotee of statistics but at the same time properly skeptical about placing too great reliance on such data.

Chapter 5, "Methods of research" describes, defends, and criticizes many methods—the scientific, the empirical, the experimental, the case, the survey, the historical, and the synthetic method. I doubt that there are so many distinct roads to Rome, but it is interesting to read about them. Of particular validity and importance are the author's criticisms of the scientific method. Subsequent chapters deal with how discoveries are made, perhaps better with how they were made. Illustrations are attributed to accident and observation (including serendipity) as well as to planned research. There are chapters on the reasons for error and the nature of proof. The argument is not always persuasive, but it is always provocative.

Part 3, Statistical Methods, is adequate through the description of Fisher's methods. Since research is learned by doing it, the treatment is necessary as a part of research training. It may be questioned whether in the future agricultural, even agronomic, research will use the methods that are described here or newer ones, which are not described. The same question may be raised with respect to part 4, on the techniques of agricultural research. In any case, these techniques must be understood in order to understand much of the research literature on agronomy.

In summary, I recommend this book, although it describes agricultural research in a narrow sense that was. The implication that, as it was, so it is and should be, I question.

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Colorimetry

The Measurement of Colour. W. D. Wright. Van Nostrand, Princeton, N.J., ed. 3, 1964. x + 291 pp. Illus. $11.

The second edition of this highly praised work on colorimetry was rewritten in a logical and lucid manner [reviewed in *Science* **128**, 588 (1958)]. Wright's treatment of the algebra of color-mixture equations, the greatest contribution that book made, and all other parts of the second edition—radiation, photometry, color-vision theory, the Commission International de l'Eclairage (CIE) tristimulus system and the applications of that system—were so directly and succinctly written that specialists and nonspecialists alike found the science of color understandable.