

need for further investigation. It seems likely that the methods he has introduced here will also suggest interesting developments in other approaches to the problem of estimation; thus the integral occurring in (1) plays an important part in Prof. R. A. Fisher's theory of 'statistical information', while (following suggestions by Diananda and Perks) some comments are made in the present work on the relation of maximum likelihood to invariance theory.

The book concludes with a number of new tables and with an appendix on the consistency of the product rule. The first edition contained a very useful appendix on the properties of the factorial (that is, gamma) function; this has been omitted, but an equivalent account has been published separately (in "Methods of Mathematical Physics").

Only to those few who are not familiar with the 1939 edition need it be said that this is a profoundly interesting book of the greatest originality. No one who is seriously interested in the subject can afford not to read it.

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A TEXT-BOOK ON FUNGI

The Fungi

By Frederick A. Wolf and Frederick T. Wolf. Vol. 1. Pp. x + 438. 36s. net. Vol. 2. Pp. xii + 538. 39s. net. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, 1947.)

There is a great demand among university students in botany for modern text-books dealing with the fungi. Broadly speaking, two works are needed: a relatively small book dealing briefly but clearly with the morphology and reproduction and also discussing the physiology, ecology and cytogenetics of fungi, and a larger work, probably running into several volumes, dealing with the structure, reproduction and taxonomy of fungi along the lines of Fritsch's classic on algæ.

The publishers' announcement heralding the appearance of F. A. Wolf and F. T. Wolf's two volumes led many teachers of botany to hope that this new work would satisfy a very real want; unfortunately, the books have proved a disappointment. Volume 1 is so different from volume 2 that a reviewer must treat them separately. The former aims at giving the student a picture of the developmental morphology and classification of fungi. Clearly, in 438 pages it is not possible to be exhaustive, and the authors have deliberately omitted certain families; but the omission of all reference to Drechsler's beautiful work on Zoopagaceæ and to Winge's classic researches on haplophase and diplophase in yeast are difficult to excuse.

It is the modern fashion to condemn the 'type' method in teaching, and certainly Wolf and Wolf are modern in this respect. From their book it would certainly be very difficult for the student to gain any really clear picture of the structure and life-history of any single fungus. This difficulty is increased by the fact that the numerous black-and-white illustrations are merely scattered about the text as decorations, the authors having deliberately refrained from making reference to them in the text. Perhaps the best part of volume 1 is the treatment of the Ascomycetes; but in the Basidiomycetes the Hymenomycetales are dismissed in twenty pages and, instead of a careful comparative account of structure and development, the student is presented with a

very inadequate discussion of the characters used in the delimitation of genera. Again, the section on Phycomycetes leaves much to be desired, and there are errors both in the figures and in the text. We are told that the chytrids are characterized by anteriorly uniflagellate zoospores; bi-flagellate zooids are seen escaping from the zoosporangium in Fig. 22 which represents *Blastocladia*, and the structure of the sporangium of *Rhizopus* (Fig. 35) is distinctly odd.

The mycologist having perused volume 1 turns with relief and hope to volume 2, since the list of chapter headings gives real promise. This volume consists essentially of a series of essays on mycological subjects, such as: nutrition of fungi, biochemistry of fungi, spore dissemination, germination of spores, host penetration, physiological specialization, mycorrhiza, genetics of fungi, poisonous and edible fungi, medical mycology, soil fungi, fungus-insect relationships, marine fungi and fossil fungi. Each essay has a good list of literature at the end, and these lists probably represent the most useful part of the whole work. But the essays themselves are disappointing, and errors are easy to find. It would have been better had the authors discussed fewer topics in a more careful and discriminating manner.

The volumes are well printed, strongly bound and the text-figures are clear; but, even if the work could be recommended to students, the price is much too high.

C. T. INGOLD

SELECTED PAPERS OF C. O. JENSEN

Selected Papers

By C. O. Jensen. (Published at the expense of the Rask-Ørsted Foundation.) Vol. 1: 1886-1908. Edited by M. Christiansen and H. O. Schmit-Jensen. Pp. xvi + 681 + 14 plates. (Copenhagen: Einar Munksgaard, 1948.)

This collection of papers represents the scientific activities of C. O. Jensen during 1886-1908, and is to be followed by a second volume covering the period 1909-33. Thirteen of the papers which were originally published in Danish have been translated into excellent English. The remainder are reprints in German and one in French.

Most of the work was done in the Bacteriological Department of the Laboratory for Agricultural Research, Copenhagen. A short biography, in English, by M. Christiansen, adds point to the collection. A period of three years illness forced Jensen to give up his veterinary practice and take a sedentary job in bacteriology, and this greatly influenced his scientific career. He was fortunate in having for his teachers Salomonsen, who also trained Fibiger, with whom Jensen was associated in several investigations, and for a time in Berlin, Robert Koch.

Jensen succeeded Bang, and for forty-five years lectured on bacteriology and serology. Living at a time when bacteriology was making rapid strides, it is not surprising that Jensen was able to produce a great many valuable papers on milk control and various animal diseases. To the medical reader, the greatest interest probably will centre on his advocacy of pasteurization and hygiene in the dairy industry. Jensen identified the causes of the turnip flavour in milk and butter, which he showed to be due not, as then believed, to the cows' diet but to contamination