of the fungi belong to the Ascomycetes and the Fungi imperfecti. In at least two instances, a distinct specificity of fungi for certain species of trees was exhibited. Results indicate that some species of fungi are quiescent during the period of bud dormancy. In addition, although many of the species could be isolated throughout the year, they were most abundant at the time of the opening of the buds. Some species were obtained at this time which were not observed at any other period.

Since the frequency of fungi and bacteria increased with the opening of the buds, the question is raised of the possible physiological rôle these organisms may have in bud and shoot development. It has been reported in the literature that auxins capable of accelerating the development (". . . die Entwicklung . . . fördern können") of winter buds of lilac (*Syringa vulgaris*) were isolated from culture media in which *Saccharomyces cerevisiae* and *Penicillium luteum* were grown.[1]

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SCIENTIFIC BOOKS

JOHN MERLE COULTER

John Merle Coulter. By ANDREW DENNY RODGERS, III. viii + 321. Princeton, N. J.: Princeton University Press. 1944. $3.75.

THE life of a botanist, like that of an industrialist, may be a "success story," advancing from the humblest beginnings, not indeed to wealth and power, but to dignity and glory. The life of John Merle Coulter, moreover, like that of many another recent American botanist, coincided with the great advance of botany in this country from its own humble beginnings to its present peak of prestige. Coulter, the son of a missionary to China, landed in this country in 1854, aged three years. At that time Torrey was working on collections made in surveying routes for a railroad to the Pacific. Young Gray had but recently published his "Manual," and Chapman had not yet written his "Flora." The Smithsonian Institution was about six years old, the National Academy of Sciences not yet in existence. The alternation of generations was unknown and the origin of the embryo of flowering plants a mystery. The cell theory was a novelty, physiology was little more than a name and evolution not even that. Botany was the determination and naming of plants "according to the natural system." In contrast with this pastoral scene, the last years of Coulter's life were spent at an institute for plant research where taxonomy is eschewed and botany merges into biochemistry—replete with auxins, hormones, vitamins and all the wonders of the age. Botany had become plant physiology, pathology, mycology, anatomy, ecology, genetics and other things. It is the story of these years that Andrew Denny Rodgers unfolds for us in the latest of his works.

It is perhaps not always now remembered that Coulter earned recognition first as a taxonomist, beginning with the collection of the flora of Indiana and working up to the great revision of the Umbelliferae with J. N. Rose. But Coulter had genius not only for rising to eminence in a particular field but for adapting himself to the changing spirit of the times and assimilating what was new into the old frame of ideas. He early became interested in morphology, and successfully used new morphological criteria in his taxonomic work. He founded the *Botanical Gazette,* chiefly for taxonomic articles, and lived to see it become one of the chief vehicles in the world for the publication of botany in all its branches. Taxonomy remained until the end one of his chief interests; but he was quick to embrace the evolutionary doctrine, and to turn his morphological learning into phylogenetic research and speculation. Perhaps more than any other botanist he is identified with the great advance of the last century in botanical thought.

The author submits "that employment of a biographical method does not necessarily interfere with either accuracy or fullness of historical narrative." To which contention the present reviewer would reply that this is not really a biography at all; it is a panorama with a central figure. Every contemporary figure in American botany is treated in some detail, and the narrative frequently wanders far from its announced theme for dozens of pages at a time. For instance, one third of the chapter entitled "The Years at Wabash College" is devoted entirely to other botanists. Chapter 10, entitled "Pure and Practical Science," contains 15 consecutive pages in which Coulter is scarcely mentioned. This is not said in disparagement of the work. On the contrary, such an array of highly accurate historical information is impressive and can not fail to be useful. But it is scarcely biography.

Coulter was not only a progressive scientist; he was an inspiring teacher and an able administrator; as he developed the Department of Botany at the University of Chicago, he demonstrated his ability to attract others who became leaders in their fields. To these qualities his fame owes as much as to his intellectual

[1] Anneliese Niethammer, *Gartenbauwissenschaft,* 14: 651, 1940.

achievements. There is little, however, in this work to portray to us the human lineaments, the personality of its subject. One aspect of Coulter's mental life is indeed suggested from time to time; his devotion to an orthodox religion which survived unshaken his acceptance of evolution and of deterministic science in general. Most scientists, more or less unconsciously, shed their religion or keep it in a sealed compartment somewhere where it can not interfere with their thinking. It would be interesting to know, even to try to find out, how Coulter managed his own reconcilement. In this we get no help from Rodgers. Indeed, he falls into the attitude characteristic of so much of what passes now for biography—an uncritical reverence for his subject; the hero can do no wrong. This tends to slop over into his environment, so that from the little college where he first studied to the great institute where he passed his last years, we are invited to admire everything with which Coulter had dealings.

The book is attractively produced, and the publishers are to be congratulated on what seems to be good material for these years. It is a matter of surprise, however, that a work which bears the imprint of a university press should apparently never have been edited. At least it is full of the most obvious and elementary mistakes in grammar and punctuation. These, with the curiously naive style, the mixed metaphors and the hackneyed phrases, the sudden outbursts of hyperbole, can not but detract from its value as literature and from any pleasure in its perusal. It is as a reference work for North American botanists of the second half of the nineteenth century that it should have its greatest use; in that way it should be very useful indeed.

H. W. RICKETT

THE NEW YORK BOTANICAL GARDEN

SOIL FUNGI

A Manual of Soil Fungi. By JOSEPH C. GILMAN. xi + 392 pp. 135 figs. The Iowa State College Press. Ames, Iowa. 1945. $5.00.

THE author's interest in soil fungi dates back to the early 1920's when he and Abbott started a systematic study of the fungi isolated from soils of Iowa and Louisiana. Their 118-page paper, "A Summary of the Soil Fungi," published in 1927, described 242 species of fungi in 61 genera. Twenty species were described as new to science, and six old species were described from the soil for the first time. Over half of the total number of species described were isolated and studied by the authors; the descriptions of the remaining 115 were compiled from the reports of other writers from all over the world. This seems to have been the first systematic attempt to get together descriptions of the more common soil fungi.

The present volume is a revision and extension of this early paper, which has long been out of print. Descriptions of 795 species of soil fungi are given, over three times the number of species included in the 1927 paper. As the author states in the preface, the book contains little new data, but is a compilation, for the most part, of the works of others. It is intended as a tool to assist investigators in identifying soil fungi. The need for such a book is clearly indicated by the fact that though numerous monographs on soil-inhabitating groups have been published, no one since 1927 has brought together all the known soil fungi in one volume.

Included in the manual are those fungi which have been isolated from the soil and cultivated artificially. Excluded are the terrestrial mushrooms, soil-borne plant pathogens which have not been directly isolated from the soil and forms which have been reported on leaf-mold, decayed wood and other substrates not fully incorporated in the soil. The Actinomycetes, Myxomycetes and Zoopagaceae are also omitted. All four groups of the true fungi are represented in the manual, the Basidiomycetes by only one, *Pellicularia filamentosa*, and the other three by many species. The genus Penicillium is the most abundant with 189 species from the soil, with Fusarium, Mucor, Aspergillus and Achlya coming next in the number of species in the order named. Many of the species described here are already recognized as very important organisms in medicine, industry and in the spoilage of food and various cellulose, leather and other products. Most of the fungi involved in the deterioration of military material in the tropics are the common soil fungi described here.

The book is well furnished with keys for identification of the classes, orders, families, genera and species. The descriptions are well written and the figures (a total of 135) will be helpful in identifying the genera and species. Following the descriptive text is a list of "Pertinent Literature" with 169 titles and a glossary of several hundred terms.

The book seems to be remarkably free from errors. On page 64, Figure 19 is wrongly labelled *Blastocladiella* when both "a" and "b" should be *Blastocladia parva*. Figure "a" seems to be a combination of Whiffen's figures 21 and 22, and "b" is a misleading reproduction of Whiffen's figure 32. Figure 21, labelled *Blastocladia*, is unlike any figure of Whiffen's, but is very much like some of Indoh's figures. On page 56, Thaxter is credited with *Cunninghamella*, when the authority should be Matruchot.

The book makes no pretense of telling what functions the soil fungi perform or even in what kind of soil the various species are found. A review such as this can only call attention to what the author has