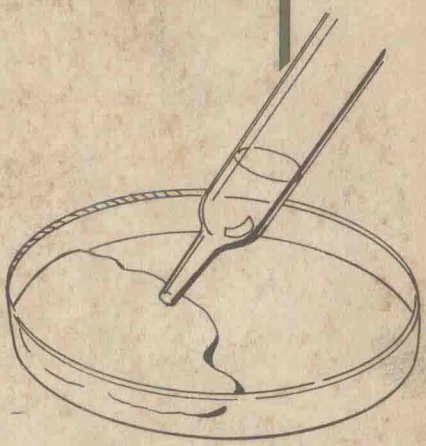
SERODIAGNOSIS OF MYCOTIC DISEASES



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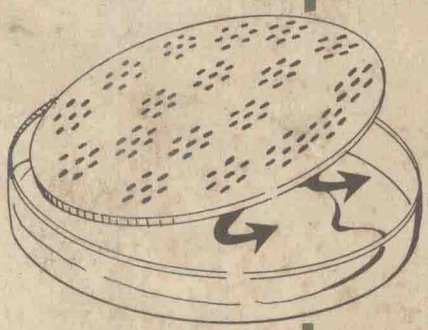

Comprised of a comprehensive set of detailed mycoserodiagnostic procedures which are of proven value, this book will be useful to clinicians, diagnosticians, laboratory personnel and all others interested in the deep mycoses. The authors — all recognized experts in the serodiagnostic field — present the latest and most authoritative information available on performing, controlling and interpreting the procedures. In addition to lucid instructions for performing the serologic tests, the text includes sections which describe the preparation of antigens, antisera and all other required reagents.

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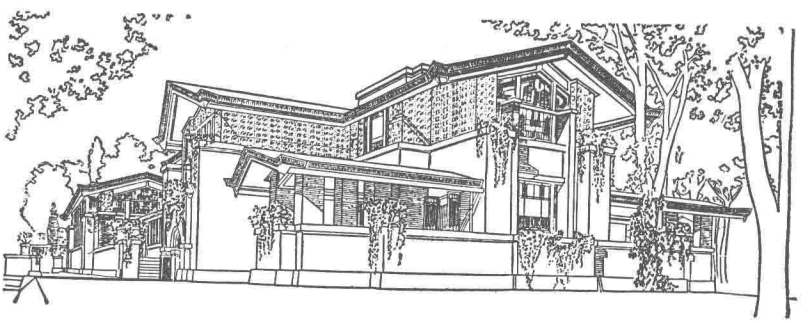

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AMERICAN LECTURE SERIES®

A Monograph in

The BANNERSTONE DIVISION of
AMERICAN LECTURES IN CLINICAL MICROBIOLOGY

Edited by

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SERIES FOREWORD

THE GENESIS OF THIS SERIES, *The American Lecture Series in Clinical Microbiology,* stems from the concerted efforts of the editor and the publisher to provide a forum from which well-qualified and distinguished authors may present, either as a book or monograph, their views on any aspect of clinical microbiology. Our definition of clinical microbiology is conceived to encompass the broadest aspects of medical microbiology, not only as it is applied to the clinical laboratory but equally to the research laboratory and to theoretical considerations. In the clinical microbiology laboratory we are concerned with differences in morphology, biochemical behavior, and antigenic patterns as a means of microbial identification. In the research laboratory or when we employ microorganisms as a model in theoretical biology, our interest is often focused not so much on the above differences but rather on the similarities between microorganisms. However, it must be appreciated that even though there are many similarities between cells, there are important differences between major types of cells which set very definite limits on the cellular behavior. Unless this is understood it is impossible to discern common denominators.

We are also concerned with the relationships between microorganisms and disease—any microorganism and any disease. Implicit in these relations is the role of the host which forms the third arm of the triangle: microorganism, disease, and host. In this series we plan to explore each of these, singly where possible for factual information and in combination for an understanding of the myriad of interrelationships that exist. This necessitates the application of basic principles of biology and may, at times, require the emergence of new theoretical concepts which will create new principles or modify existing ones. Above all, our aim is to present well-documented books which will be informative, instructive, and useful, creating a sense of satisfaction to both the reader and the author.

Closely intertwined with the above *raison d'etre* is our desire to produce a series which will be read not only for the pleasure of knowledge but which will also enhance the reader's professional skill and extend his technical ability. *The American Lecture Series in Clinical Microbiology* is dedicated to biologists—physicians, scientists, or teachers—in the hope that this series will foster better appreciation of mutual problems and help close the gap between theoretical and applied microbiology.

The addition of this book to *The American Lecture Series in Microbiology* is of considerable importance because it represents the first time that a book devoted exclusively to the serodiagnoses of the systemic mycoses has been published. Furthermore, this publication is viewed as recognition that the systemic mycoses do indeed constitute an important segment of infectious diseases that clinicians and clinical microbiologists deal with on a daily basis. Morbidity and mortality statistics indicate that systemic mycoses are by no means limited to the tropical or subtropical climates; to the contrary, these diseases are worldwide in distribution, with some evidence of increased prevalence of one disease over another in certain geographical areas. Some of the systemic mycoses are increasing in incidence because of a variety of preexisting conditions which compromise the host. Our increased knowledge of the environment and its cause and effect relationship regarding other mycotic infections has also contributed to a better understanding of the increasing number of fungi that can and do cause systemic disease.

Accurate diagnosis of these fungal diseases require laboratory input such as the use of special and/or selective media, often with long incubation times, followed by careful microscopic examination of the resulting growth for the etiologic agent's identifying features. While this classical approach may still be necessary for confirmation of the diagnosis, modern-day immunology and the application of appropriate serologic tests have resulted in the development of a battery of serodiagnostic tests for virtually all of the systemic mycoses. Some of these tests were developed by Doctors Kaufman and Kaplan, and all of them have been thoroughly evaluated by them. The sensitivity and specificity of the various tests have been clearly established. With these useful serodiagnostic procedures, the laboratory can now materially assist the clinician by making a strong presumptive diagnosis early in the course of the disease. This, in turn, will, more often than not, aid the clinician in the proper choice of therapy and also will prevent him from confusing the patient's symptomatology with diseases that are mimicked by the systemic mycoses.

The authors are all highly qualified and respected scientists. Doctors Kaufman and Kaplan are distinguished mycologists whose research efforts have produced or improved many of the procedures covered in this publication. Doctors Palmer and Cavallaro are noted teachers whose present interests are in the training of young scientists, microbiologists, and technologists in the intricacies of diagnostic serology. The four authors have teamed up to produce a volume that not only is a first of its kind, but one that will undoubtedly serve as the standard in the field. The scope, depth, and clarity of this textbook assures its usefulness to the microbiologist and clinician alike.

Albert Balows, Ph.D.
Editor

FOREWORD

The proliferation of diagnostic laboratories for the mycoses throughout the United States[1] and other nations of the world reflects the growing realization that the pathogenic fungi are important causes of morbidity and death among the peoples of the world. The mycoses are no longer considered to be rare and exotic diseases. They abound in all parts of the world, be they temperate or tropical. The United States encompasses within its borders endemic areas for blastomycosis, coccidioidomycosis, and histoplasmosis where the incidence and prevalence of infection are among the highest in the world. Skin test surveys have revealed that literally millions of infections have occurred with an accompanying high morbidity in the resident population. Information on mortality, incomplete and fragmentary as it may be, indicates that over the past ten years (1965-1974) an average of 350 persons have died yearly in the United States from blastomycosis, candidiasis, coccidioidomycosis, cryptococcosis, and histoplasmosis.[2]

Any hope of reducing the public health burden of this high morbidity and mortality rests on raising the diagnostic competency of laboratory personnel. Without rapid and specific diagnosis, the clinician cannot prescribe and institute specific antifungal therapy. Medical mycologists have made significant advances in the development of selective isolation media, biochemical and physiological tests and histological stains for the pathogenic fungi. All of the procedures concerned serve either to detect the etiologic agents in clinical material or result in their isolation and specific identification.

Indispensable as these methods are, there has always been a compelling need for rapid and specific indirect diagnostic tests for the systemic mycoses. Such necessity arises from the inherent slowness or failure of conventional isolation and identification procedures for pathogenic yeasts and moulds and the pressing need to objectively monitor the effect of therapy. These needs are particularly compelling now that lifesaving therapeutic agents against the mycoses have been developed and have shown their effectiveness.

Serological tests were the obvious diagnostic weapons lacking in the armamentarium of the diagnostic laboratory. Immunologists accepted the challenge of developing antigens and tests for the serodiagnosis of mycotic diseases. As a result of their diligent efforts in many research laboratories around the world, we now have an imposing battery of useful and lifesaving serological tests for the most deadly of the mycoses—aspergillosis, blastomycosis, candidiasis, coccidioidomycosis, cryptococcosis, histoplasmosis, and paracoccidioidomycosis. When used competently and interpreted judiciously,

mycoserological tests have greatly aided the clinician in diagnosing the mycotic ills of his patients and in saving their lives. The virtual end of fatalities due to *Blastomyces dermatitidis,* that has dramatically occurred in the past few years, can be attributed in part to the breakthrough in the serodiagnosis of that important disease. During the decade beginning in 1958, an average of thirty-eight persons a year died of blastomycosis. The latest available statistical data gratifyingly reveal that deaths dropped to zero in 1968 and to an average of 1.5 yearly through 1974.[23] Wider use of serological tests, coupled with appropriate therapy, would undoubtedly serve to significantly reduce the mortality from all other systemic mycoses. Immunological techniques (fluorescent antibody and immunodiffusion) have also been developed in recent years for the specific detection and identification of pathogenic fungi in tissue and for the rapid identification of cultural isolates.

Publication of this manual comes at an opportune time and marks a milestone in the history of medical mycology. It is the first to be devoted exclusively to mycoserological tests. It contains the latest and most authoritative information on those procedures that have proven through experience to be singularly effective in the serodiagnosis of the major mycotic diseases that afflict mankind. This manual, together with the courses that it was designed to aid, will serve to increase the use of serology and raise performance standards in diagnostic centers throughout the world. The authors deserve high praise for their initiative and for having set such high standards in the writing of this manual.

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[2]*Morbidity and Mortality Weekly Report.* Center for Disease Control, 1976, 24 (54):5.

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Use of trade names is for identification only and does not constitute endorsement by the Public Health Service or by the U.S. Department of Health, Education, and Welfare.

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