

CLINICAL ASPECTS OF
POXVIRUS INFECTIONS



1781

Clinical Aspects *of the* Autonomic Nervous System

by
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WITH 42 ILLUSTRATIONS
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LONDON
J. & A. CHURCHILL LTD.

104 GLOUCESTER PLACE, W.1

1955

Foreword

Since man first realized that he was in some way different from the "lower" animals, the search for the location of the psyche has interested philosophers of all eras. Modern researches are making it increasingly apparent that there is no single structure which houses this human asset. Rather, it is created by the summation of reactive units involving the entire body—sensory, affective, and effective. Thus, sensations as appreciated by man differ from those of animals in the greater influence of memory, emotional tone, and mood states in determining the ultimate interpretation of any given stimulus. Similarly, the direction and intensity of resultant activity are, in man, more influenced by feeling, memory, beliefs, intelligence, purpose, and the will, whereas animals respond largely to groups of conditioned reflexes of greater or lesser complexity.

As practitioners of medicine find more and more that many physical dysfunctions result from a perversion of these mechanisms, the need for a book such as this one has been increasingly felt. To those of us who are engaged in the study of illness and the care of the sick this volume will serve to give landmarks along the way as we try to understand disease, the effect of disease on the patient, the effect of the patient on his disease, and, finally, the patient himself as a temporarily deranged human personality.

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Acknowledgments

During the preparation of any book, there are many people and many incidents which contribute to it. There are always a few, however, whose participation has made the work an accomplished fact. From the beginning Dr. Oscar V. Batson has encouraged the writer and has given his time for reading and for constructive criticism of the manuscript. His advice and suggestions regarding the illustrations have been invaluable. Dr. Elizabeth C. Crosby, teacher and friend for many years, was kind enough to read the sections on the neuroanatomy. To Dr. Julius H. Comroe, Jr., I am indebted for the three tables on drugs in Chapter 3 and also for checking the chapters on the circulatory and respiratory systems. Dr. Perry S. MacNeal has been interested in the subject of this book for a long time and has contributed welcome suggestions from the clinical point of view.

Several people have helped in the mechanical drudgery of preparing this manuscript, but my secretary, Miss Edna Rogers, has been an indispensable assistant to me. I wish also to thank Miss Frances R. Houston, Medical Librarian, for her help in tracing some of the obscure references in the bibliography.

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PRINTED IN THE UNITED STATES OF AMERICA

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CLINICAL ASPECTS
of the
AUTONOMIC NERVOUS SYSTEM

1

Introduction

Stress and strain on the human mechanism have been increased with the rapid changes in science and technology in war and general living. Bodily ills are now better taken care of by the New Medicine, but mental ills are a growing problem not only to the physician but also to society.

More serious is the large number of *potential mental patients*, those not able to adjust to life in the twentieth century, to cope with economic competition, or to conform to moral and ethical standards of a democratic society. The group is made up chiefly of children and young and middle-aged adults. Some of them will become sick enough to necessitate their removal from free society. Others will succeed in ruining their own lives and those of their immediate families and friends. The latter group, in the long run, are the more serious threat to the country and the world, since the havoc they create is so difficult to combat because of its insidiousness and intangibility.

In the days of many general practitioners and few specialists, the family doctor knew his patients thoroughly, both mentally and physically. For the most part he handled their mental and emotional upsets instinctively on the basis of long experience and sound judgment. In these days of specialties it is common for a physician to see 40 to 60 patients a day. He cannot adequately know the physical ills of the patient, much less the functional ills which directly provoke many of the physical complaints he is asked to treat. The fact that this relationship is not understood causes many patients to be considered "neurotic" and therefore outside the physician's sphere of interest and treatment.

Clinical Aspects of the Autonomic Nervous System

In a course in psychosomatic medicine medical students are being taught what the old family doctor practiced by instinct, good judgment, long experience, and knowledge of his patients. The student of today has one advantage over the older men, however, since research in anatomy and physiology has laid the foundations for placing the subject on a truly scientific basis. The autonomic nervous system unites the central nervous system, including the cerebral cortex, with the viscera into a functioning unit, i.e., an individual with personality and moods. There is a great need for a thorough understanding of the anatomy and physiology of the autonomic nervous system so that clinical application of the principles involved may be made to psychosomatic medicine as it relates to all branches of medical practice.

Some of the earliest reliable knowledge of the autonomic nervous system is recorded in the papers and books of the late nineteenth-century physiologists, especially Sherrington, Bayliss, and Gaskell. Langley, a British physiologist, gave the first organized account of the anatomic arrangement of the autonomic nervous system in 1893 and later published fuller descriptions (1903, 1921). Two groups of investigators in the United States, one working with Albert Kuntz in St. Louis and the other with Stephen W. Ranson in Chicago, provided a great deal of information on the comparative anatomy of the autonomic system. The momentum of research increased during the first half of the twentieth century so that a plethora of material is now being published both on its anatomy and on its physiology. During the 1930's the clinical aspects of this part of the nervous system came in for consideration. Mayo (1931) and Mallory (1935) drew attention to the fact that the autonomic nervous system not only is important in the healthy person but plays a role in disease. Therefore it is a subject which is valuable in medical and surgical practice. In a recent publication Wolff (1953) discussed the effect of stress in producing visceral dysfunction and disease. Although he does not so state, the autonomic nervous system is definitely implicated in the types of diseases which plague man today. The autonomic nervous system got its first firm footing in medicine when Max M. Peet (1935a,

Introduction

1935b) devised his operation for relief of hypertension. Since that time Smithwick, White, Dragstedt, and other surgeons have added useful knowledge to the clinical applications of autonomic function as well as surgical techniques carrying their names. One of the latest subjects connected with the autonomic nervous system to gain attention is the neurohumoral transmission of impulses. Dale's work on acetylcholine in 1913-1914 was the beginning of the pharmacologic approach to autonomic function, which today has resulted in an avalanche of pharmaceutical products designed to treat everything from asthma to constipation. Much information has been added in the interim by Loewi, Feldberg, Hebb, von Euler, Liljestrand, Paton, Daly, Koelle, and others.

Not only are papers by American and British authors to be found in almost all of the journals of the medical specialties, but there are numerous publications of various European countries on the anatomy, physiology, and clinical applications of the autonomic nervous system. Many of these papers, especially those of the Hungarian, Kiss, and of some of the German and Scandinavian investigators, are not readily available. One of the best books on the autonomic system is L. R. Müller's *Lebensnerven und Lebenstriebe* (1931). Unfortunately it is almost unknown in the United States even to those writing on the subject.

The present monograph is a summary of the isolated facts available from various and scattered sources. While no new material is recorded, the assembled facts have been correlated and arranged in such a way that the clinician will be able to use them in his practice. It is intended to furnish an anatomic and physiologic background for his clinical work. The clinical applications in the second portion should suggest further avenues for thought and application of the subject to diagnostic work.

Part I

ANATOMY OF THE
AUTONOMIC NERVOUS SYSTEM

2

The Cerebral Centers and the Autonomic Nervous System

Location and function of the cortical centers regulating autonomic functions

Manifestations of cortical activity in visceral function — Abnormal visceral function resulting from emotional and tension states — examples

Attempted correlation of "autonomic types" with physical habitus

Suggestions for preventing autonomic dysfunction, as a part of preventive medicine programs

Summary

All autonomic activity in the body is to a degree under the control of the cerebral cortex. It is largely inhibitory in nature and is of great importance in psychosomatic medicine as it relates to all branches of medical practice. The autonomic centers of the cerebral cortex do not dominate and govern visceral activity in the sense that the primary motor area is capable of initiating contraction of individual skeletal muscles. Rather, visceral function is always coordinated and integrated with other visceral or somatic activity, whether this is induced by electrical stimulation of the brain or by the normal functioning of the individual. The concurrence of autonomic activity with somatic activity and certain emotional states is so intimate that we see the *pattern of the activity* and do not realize