



# CLINICAL EXAMINATIONS IN NEUROLOGY

by

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# DEDICATED TO

HENRY W. WOLTMAN, M.D.

*and*

FREDERICK P. MOERSCH, M.D.

PIONEERS IN NEUROLOGY—MAYO CLINIC

INSPIRING TEACHERS—MAYO FOUNDATION

GENEROUS ASSOCIATES OF THE AUTHORS

THIS BOOK represents an attempt to convey to two men the gratitude of those who have been apprenticed to them. The connotation of "teacher and student" is not quite applicable to the relationship which has existed between us. Henry Woltman and Frederick Moersch have been more than schoolmasters in neurology, and we who have been reared by them have learned from them values and nuances of our art which cannot be defined by any formal statement. We imbibed these intangibles by some manner of person-to-person osmosis. Our "trade" was learned in the spirit of the "guild" and not by the didactic methods of the classroom. These men created for us a departmental environment free of jealousy, greed and false pride. In it we learned the technics and judgments necessary to our craft, stimulated constantly by unaffected trust and encouraged to perform instead of merely assimilating by rote.

Paradoxically, we now venture a work that was never a formal part of our training—a factual outline of the practical components of the neurologic examination. This effort of ours will succeed or fail, as we succeed or fail to impart to others something of the essence of our indoctrination. We intend this book as a series of working blueprints and not as a course of lectures delivered from a remote podium. And so, we who are now journeymen write about the prosaic aspects of our branch of medicine, about the tools to be used and the manner of their using. We hope that these two masters of the "guild" may read into this primer our common gratitude for the uncommon things that happened to us through our association with them.

ALEXANDER R. MACLEAN

# PREFACE TO THE SECOND EDITION

THE clinically useful technics of neurologic examination have not materially changed since this book was first written. There may be reason, then, to question why a revision is being made. In the first edition we omitted any discussion of roentgenographic technics. Subsequent experience has caused us to believe that these technics might be discussed briefly in an effort to indicate their spheres of usefulness and their limitations. Therefore, a new chapter has been added. The problems of performing neurologic examinations on infants were alluded to in the first edition. At this time it has seemed proper to give the subject somewhat more formal attention. Minor alterations have been made in other chapters in order to bring the information up-to-date or to clarify certain portions that were subject to misinterpretation. The list of contributors has been altered. Of special significance to us is the loss of Dr. L. M. Eaton and Dr. H. L. Parker, whose wisdom and advice would have undoubtedly made this revision a better book.

JOSEPH G. RUSHTON

# PREFACE TO THE FIRST EDITION

*"Here is an opportunity. What you make of it is  
your responsibility."* Guy Stanton Ford

WERE ONE to paraphrase the conventional medical history it might be said that "the onset of the Mayo Clinic was insidious." Some might push the beginning back to 1883-1888 when the brothers Mayo returned from medical school to join their father, William Worrall Mayo, in the practice of medicine and surgery. Others might select a more dramatic incident, the tornado of 1883, from which to date its history. Certainly this catastrophe demonstrated the advantages of a group of doctors working together for the care of the sick and injured and emphasized the need for a hospital. That need was supplied by the Sisters of St. Francis who conceived, planned and made a reality of St. Marys Hospital in 1889. During the next few years new members were added to the small but growing group of physicians. This group was not yet the Mayo Clinic, but by 1909 William Osler\* was able to say:

We are waking up to the fact that the man may make his own environment, and may make it just what and where he pleases; he may even perform a miracle—the mountain may come to Mahomet. Let me give you a notable illustration.

A few years ago when two young Irish-Americans called Mayo began to frequent the surgical clinics of Europe, no one knew where they came from; no one had ever heard of Rochester, Minnesota, and when informed that it was on the "Prairies," about 1,000 miles north-west of Chicago [it is less than 400], there was a shrug of the shoulders and "Oh!" Self education,

\* Osler, W.: Remarks on the Medical Library in Post Graduate Work. Brit. M. J. 2:925-928, (Oct. 2) 1909.

post-graduate study, books, journals, laboratory work, have enabled these remarkable men to build up one of the largest and in some respects the most important surgical clinic in the world, and a town of less than 20,000 inhabitants has become the Mecca of all surgeons.

No exact date for the founding of the Mayo Clinic can be assigned. The occupation of the new building in 1914 is as close an approximation as possible. By this time, not only were patients coming to Rochester from far away but physicians were congregating there. Many were young men who came to assist and study. The founders of the institution which attracted them were not wholly satisfied with the status of residents and house physicians at that period in other medical centers. The essence of the attitude the brothers Mayo wished to inculcate in the institution bearing their name was implied in their choice of the word "Fellow," meaning "companion," as a designation for temporary assistants. The Mayo Foundation for Medical Education and Research became a reality in 1915 when an endowment was made by its founders to the University of Minnesota and an affiliation was begun between the Mayo Foundation in Rochester and the Graduate School of the University of Minnesota in Minneapolis. This was made permanent in 1917. The much-discussed "Minnesota Experiment" was under way.

The story of graduate medical education in neurology is blended with the story we have been reviewing. In 1913, Dr. Walter D. Shelden came from the University of Minnesota to be the first member of the staff of the Mayo Clinic to limit his work largely to the field of neurology. In 1916, temporarily, and in 1917, permanently, Dr. Henry W. Woltman joined forces with Dr. Shelden. In 1920, Dr. Frederick P. Moersch completed the triumvirate, and the neurology section of the Mayo Clinic and graduate training in neurology in the Mayo Foundation assumed their present pattern. "Guidance without pampering; help without meddling" was, to these men, a way of living, not merely a text for preaching. In other words, here are patients, laboratories, libraries, and men of experience to guide and help: "Here is an opportunity; what you make of it is your responsibility." The original Section of Neurology has grown to become three sections comprising a total of 16 neurologists, and comparable growth has taken place in the related Sections of Neurosurgery, Psychiatry, Ophthalmology and Medi-

cine. Basic science Sections of Anatomy, Pathology, Physiology, Biochemistry and Biophysics now bolster the clinical sections in fostering the neurologic training of Fellows in Neurology, Neurosurgery, Psychiatry and Internal Medicine.

The training of this large group in the discipline of neurology dictated the need for and character of this book. The neurologist practices his specialty against the broad background of general medicine. His contributions to the welfare of the patient stem from his mastery of the clinical neurologic examination, and his special knowledge of anatomy and function of the nervous system and of the diseases which affect it. Mastery of the clinical neurologic examination is a necessary acquisition. It can be learned only by doing, but guidance can accelerate the process. Thus, we come to the purpose of this book. It is prepared, not only to honor our colleagues, to whom it is dedicated, but also to guide the Fellows of the Mayo Foundation and to facilitate their mastery of the clinical neurologic examination. Since our practice is a group practice, data regarding examination must be recorded in a form intelligible to others in the group. Neurologic record forms have been in use at the Mayo Clinic for approximately 30 years, and their evolution to the present pattern has been based on experience, trial and error.

Since this book has a practical purpose, it must be of a practical size. The routine description of tests alone could be placed on relatively few pages. Yet, to perform the tests intelligently some understanding of their significance as it relates to anatomy, physiology and disease is required. Consequently, we have not hesitated to insert such information where it is appropriate. The need to conserve space has required that such explanations be brief. In a further effort to attain brevity we have omitted some topics which are customarily included. For example, special roentgenologic techniques are omitted, since even a cursory consideration of them would make this book too large. These techniques are the proper subject of existing and readily available monographs and texts. Aiming at brevity, how can we justify the relatively expanded sections on neuro-ophthalmology, language and motor speech, electro-encephalography, electromyography and biochemical and pharmacologic testing? Certainly we cannot include sufficient of each subject to make for proficiency in any one of them. However, the clinical



neurologist must have a broad understanding of these newer and even more essential components of the neurologic examination. It is our aim to provide sufficient information concerning these techniques that the student may form a valid opinion of their usefulness.

This book is the effort of many. All sixteen listed as authors have made specific contributions. Some have written whole portions, all have contributed to several portions; and thus we find credit difficult to assign. The second of the two chapters on cranial nerves contains an expanded portion on neuro-ophthalmology, taken, at times, verbatim from the writings of our associates on ophthalmology, Dr. C. Wilbur Rucker and Dr. Henry P. Wagener. The work of three former colleagues calls for signal attention: Dr. Allan A. Bailey, head of a section at the time this book was conceived, wrote much of the text on history-taking and lumbar and cisternal puncture; Dr. Waldemar C. Rasmussen labored meticulously over the anatomy involved in tests of muscle function and, in addition, designed the "muscle chart"; Dr. Alexander R. MacLean, whose loss from active participation in our work, due to illness, we feel so keenly, has sensed the special quality of the relationship of Dr. Woltman and Dr. Moersch to their younger associates and has written it into the Dedication. Miss Josephine Simonson, speech pathologist, has been of great aid in the planning and writing of the chapter on language and motor speech. The illustrations woven into the specific tests for muscle strength result from the combined efforts of Dr. W. Henry Hollinshead, anatomist, and Mr. Russell L. Drake, artist at the Mayo Clinic and Mayo Foundation. Dr. John R. Miner, Editor, and Mrs. Margaret Thompson, Executive Assistant, Section of Publications, have, with tact, charity and graciousness performed their respective functions in seeing to it that the authors said what they meant to say and in getting the manuscript into finished form. Mrs. Martha Miner, secretary to the neurologic sections, has typed and cheerfully re-typed the pages of this book and somehow kept the various portions properly catalogued and filed during the years of its preparation. We recognize our debt to the great neurologists of the past and present who conceived and taught many of the tests we use in a routine manner today. Our ready acceptance and constant use of their teachings are, in themselves, a testimony to the fundamental nature of their contributions. We trust that inclusion without

designation by proper name or reference will be sufficient tribute. Finally, since blame rather than acclaim may be the harvest reaped, the editing committee of Dr. Kendall B. Corbin, Dr. Lee M. Eaton and Dr. Joseph G. Rushton are prepared to accept responsibility for rearranging, at times altering, and perhaps distorting the productions of the individual contributors to a pattern which may at times be difficult for them to recognize as their own.

LEE M. EATON

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