

Clinical Examinations in

NEUROLOGY

THIRD EDITION

Clinical Examinations in NEUROLOGY

BY

MEMBERS OF THE DEPARTMENT OF NEUROLOGY AND
THE DEPARTMENT OF PHYSIOLOGY AND BIOPHYSICS,
MAYO CLINIC AND MAYO FOUNDATION FOR MEDICAL
EDUCATION AND RESEARCH, GRADUATE SCHOOL,
UNIVERSITY OF MINNESOTA, ROCHESTER, MINNESOTA

ARNOLD E. ARONSON, Ph.D.
JAMES A. BASTRON, M.D.
JOE R. BROWN, M.D.
ROBERT C. BURTON, M.D.
KENDALL B. CORBIN, M.D.
FREDERIC L. DARLEY, Ph.D.
ANDREW G. ENGEL, M.D.
NORMAN P. GOLDSTEIN, M.D.
MANUEL R. GOMEZ, M.D.
ROBERT V. GROOVER, M.D.
FRANK M. HOWARD, JR., M.D.

DONALD W. KLASS, M.D.
EDWARD H. LAMBERT, M.D.
CLARK H. MILLIKAN, M.D.
DONALD W. MULDER, M.D.
E. DOUGLAS ROOKE, M.D.
JOSEPH G. RUSHTON, M.D.
BURTON A. SANDOK, M.D.
ROBERT G. SIEKERT, M.D.
JUERGEN E. THOMAS, M.D.
ARTHUR G. WALTZ, M.D.
~~JACK P. WHITENANT, M.D.~~

1971

W. B. SAUNDERS COMPANY • PHILADELPHIA • LONDON • TORONTO

W. B. Saunders Company: West Washington Square
Philadelphia, Pa. 19105

12 Dyott Street
London, WC1A 1DB

1835 Yonge Street
Toronto 7, Ontario

Clinical Examination in Neurology

© 1971 by W. B. Saunders Company. Original English Language Edition published by W. B. SAUNDERS COMPANY, a Division of Columbia Broadcasting System, Inc., Philadelphia, Pa. 19105. Copyright 1956 and 1963 by W. B. Saunders Company. Copyright under the International Copyright Union. All rights reserved. This book is protected by copyright. No part of it may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without written permission from the publisher. Made in the United States of America. Press of W. B. Saunders Company. Library of Congress catalog card number 77-135332.

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 THIRD EDITION

Graduate training in neurology at the Mayo Clinic started half a century ago. During this period the elements of the neurologic examination have remained relatively unchanged. An exception is in the field of pediatric neurology, which has expanded greatly in the past 20 years. In recognition of this, the chapter on the examination of infants and children has been rewritten and amplified. Similarly, the chapter on language and motor speech has been expanded to reflect the increased interest in and practical applications of knowledge in these fields. In keeping with advances in development of ancillary tests we have incorporated brief discussions of echoencephalography, the use of radioisotopes in localization of brain lesions and the uses of muscle biopsy. In each case it is our intent to indicate the general nature of the procedure and its sphere of usefulness and not to present a guide to performance and interpretation of the results of the tests. As in the past, we are grateful to our colleagues in the Section of Publications who, with patience and care, have again brought this manuscript into finished form.

JOSEPH G. RUSHTON, M.D.

CONTENTS

1

The Neurologic History	1
General Aspects.....	1
The Chief Complaints and History of the Present Illness.....	3
Past Medical History.....	4
Inventory and Functional Inquiry.....	4
Family History.....	5
Social History.....	5
Specific Inquiry in Regard to Certain Common Neurologic Problems.....	5
1. Pain.....	6
Peripheral Nerve Pain, 6. Root Pain, 7. Trigeminal and Other Neuralgic Pains, 9. Thalamic and Tract Pains, 10.	
2. Headache.....	11
The General Problem, 11. The Specific Headache, 11. Diagnostic Tests and Observations, 13.	
3. Convulsive Disorders.....	14
Focal Motor Seizures, 17. Focal Sensory Seizures, 17. Autonomic Symptoms, 18. Psychic Symptoms, 18. Automatism (Psychomotor Seizures), 20. Petit Mal, 20. Grand Mal, 20.	

2

General Observations and Order of Procedure	22
Order of Procedure.....	23
Examination of the Scalp and Skull.....	24
Bruits.....	25
Facies.....	27
Peripheral Nerves.....	28

3

Examination of Infants and Children	29
History	29
Examination of Infant.....	33
Motor Responses.....	35
Examination of Children More Than Two Years of Age.....	42

4

The Cranial Nerves (Except II, III, IV and VI)	52
Cranial Nerve I—Olfactory Nerve.....	53
Cranial Nerve V—Trigeminal Nerve.....	54
Cranial Nerve VII—Facial Nerve	56
Cranial Nerve VIII—Acoustic Nerve	59
Cranial Nerve IX—Glossopharyngeal Nerve.....	64
Cranial Nerve X—Vagus Nerve.....	65
Cranial Nerve XI—Accessory Nerve.....	66
Cranial Nerve XII—Hypoglossal Nerve.....	66

5

Neuro-ophthalmology (Including Cranial Nerves II, III, IV and VI)	68
Cranial Nerve II—Optic Nerve.....	68
Anatomy, 68. Visual Acuity, 69. Field of Vision, 72. Gross Test of Visual Fields, 72. Perimetry, 73. Recording Observations, 74. Interpretation of Visual Field Defects, 75. Scotomas, 76. Psychogenic Defects, 77. Retinal Lesions, 77. Choked Disks or Papilledema, 78. Prechiasmal Lesions, 78. Chiasmal Lesions, 78. Postchiasmal Lesions, 78. Ophthalmoscopy, 80. The Optic Disk, 81. Optic Atrophy, 83.	
Cranial Nerves III, IV and VI—Oculomotor, Trochlear and Abducens Nerves	83
Anatomy, 84. General Observations, 86. Ptosis and the Palpebral Fissure, 86. The Pupil, 87. Ocular Movements, 90. Examination and Recording of Ocular Movements, 91. Nystagmus, 94. Classification of Nystagmus, 95. Differential Diagnosis of Nystagmus, 99.	

6

Motor Function—Part I: Central Integration of Motor Function	100
Pyramidal and Extrapyrarnidal Systems, 101.	
Muscle Tone.....	102
Symptoms and Signs of Disturbances of Muscle Tone, 102.	
Examination of Muscle Tone, 103.	

Coordination.....	105
Testing Coordination, 106.	
Alternate Motion Rate.....	107
Tongue Wiggle, 108. Finger Wiggle, 108. Foot Pat 108.	
Involuntary Movements.....	108
Tremor, 109. Chorea, 110. Athetosis, 111. Ballism, 111. Dystonia, 111. Spasm, 111. Oculogyric Crises, 113. Hiccup, 113. Cramps, 113. Myoclonus, 114. Tics, 114. Mannerisms, 114.	
Gait and Station.....	115
Motor Function—Part II: Specific Study of Muscle.....	120
Muscle Size.....	120
Atrophy, 120. Hypertrophy, 121.	
Intrinsic Muscle Movements.....	121
Fibrillation, 121. Fasciculations, 121. Myokymia, 123. Facial Myokymia, 123.	
Response to Percussion.....	123
Normal, 123. Myotonic Reaction, 123. Percussion Myotonia, 124. Myo-edema, 124.	
Palpation of Muscle.....	125
Tenderness, 125. Consistency, 125. Contracture, 125.	
Muscle Strength.....	126
Symptomatology (The Language of the Patient Who Has Weakness), 127. Grading and Recording of Muscle Strength, 128. Normal Strength, 129. General Survey of Motor Function, 130. Technic of Testing Muscle Strength, 131. Hysterica Motor Dysfunction ("Weakness"), 133. Scheme Employed in Examining Muscles, 134. Outline of Anatomic Information Required for Tests of Strength of Specific Muscles, 134.	
Reflexes.....	166
Muscle-stretch Reflexes.....	166
Technic of Elicitation, 167. Interpretation and Grading of Reflexes, 169. Specific Reflexes, 170.	
Superficial Reflexes.....	172
Specific Superficial Reflexes, 173.	
Pathologic Reflexes.....	175
Specific Pathologic Reflexes, 176.	

901

The Sensory Examination 178**Types of Sensation** 178

Superficial Sensation, 179. Deep Sensation, 179. Cortical Function in Sensation, 179. Thalamic Function in Sensation, 179.

General Methods of Examination 180**Specific Methods of Examination** 181

Superficial Sensation: Light Touch, 181, Superficial Pain, 184; Temperature, 185. Deep Sensation: Joint Sense, 186; Deep Pain, 186; Vibration, 188. Combined Sensation, 189: Two-point Distinction, 189; Traced-figure Identification, 190; Stereognosis, 190; Double Simultaneous Stimulation, 190.

Sensory Supply (Segmental and Neural) 191

10

Mental Function 198**Test Categories** 198**Mechanisms** 199**General Observations** 200**Level of Consciousness** 201

General Observations, 202. Deep Coma, 202. Semicoma, 202. Stupor, 203. Somnolence, 203. Confusion, 203. Motor Status, 203. Reflexes, 204. Vegetative Activity, 204. Pseudowakeful States, 204.

Emotional Reactions 204

General Observations, 205.

Intellectual Performances 206

General Observations, 207. Specific Testing, 207. Memory, 207 Recall, 208. Retention, 208. General Information, 208. Calculation, 208. Similarities, 209. Judgment 209.

Thought Processes 210

General Observations, 210. Specific Testing, 210. Mood, 210. Preoccupations and Somatic Concerns, 211. Insight, 211. Fixed Ideas, Delusions, Hallucinations and Illusions, 211.

Psychomotor Patterns 211

Ideational Apraxia, 211. Ideokinetic Apraxia, 212. Kinetic Apraxia, 212. General Observations, 212. Specific Testing, 212. Constructional and Dressing Apraxia, 213.

Psychosensory Patterns 213

Agnosia, 213. Specific Testing, 214.

11

Language and Motor Speech 216**Motor Speech** 216

Testing, 217. Observations, 218. Dysarthrias, 222.

Language.....	223
Modalities, 223. Defects, 225. Auditory Verbal Agnosia, 229.	
Visual Object Agnosia, 229. Calculation, 229. Apraxia of Speech, 229.	
12	
Autonomic Function.....	233
13	
Clinical Examinations in Selected Problems of Pain	237
Tests Used in Diagnosis of Pain in the Lower Portion of the Back and Lower Extremities.....	238
Straight Leg Raising Test, 239. Fabere Sign, 239. Kernig's Sign, 239. Chin-chest Maneuver, 239. Test for Spasm of the Psoas Muscle, 239. Test for Disease of the Lumbar or Lumbosacral Articulations, 239.	
Tests for Diagnosis of Pain Problems in the Cervical Region and Upper Extremities.....	240
Examination of Cervica Segment of the Spinal Column, 240. Foraminal Compression Test of Spurling, 240. Neck Traction Test, 240. Clinical Tests for Diagnosis of Various Thoracic Outlet Syndromes, 240.	
14	
Neuroradiologic Procedures	242
The Spinal Column	243
Plain Roentgenogram, 243. Myelography, 244. Myelography of the Posterior Cranial Fossa. 246.	
The Skull	247
Plain Roentgenogram, 247. Tomography and Zonography, 251. Cerebral Angiography, 251. Special Contrast Studies, 255. Pneumoencephalography, 255. Ventriculography, 257. Positive Contrast Ventriculography, 258.	
15	
Electroencephalography	259
Recording, 259. Normal Electroencephalogram, 260. Disturbances of Normal Rhythms, 261. Abnormal Rhythms, 261. Clinical Interpretation, 264. Lesion Diagrams, 266. Special Activation Techniques, 266. Investigations for Patients in Whom Surgical Treatment of a Convulsive Disorder Is Contemplated, 267. Portable EEG, 267. Common Conditions in Which the EEG Is Helpful in Diagnosis or Management, 267. Final Comment, 270.	

16

Electromyography and Electric Stimulation of Peripheral Nerves and Muscle	271
Electromyography	272
Survey of Clinical Uses of Electromyography	272
Detection of Disease in the Motor Unit, 272. Diagnosis of Primary Muscle Disease, 273. Detection of Defects in Transmission at the Neuromuscular Junction, 273. Diagnosis of Disease of the Lower Motor Neuron, 273.	
The Electromyograph	274
Origin of Electric Activity of Muscle	275
Procedure of the Examination	276
Criteria of Abnormality in the Electromyogram	278
1. Abnormal Response of the Muscle to Mechanical Stimulation by Insertion or Movement of the Needle Electrode, 278. 2. Spontaneous Electric Activity, 280. 3. Abnormalities of the Motor Unit Action Potential, 284.	
Sequence of Abnormalities of the Electromyogram After Nerve Injury	289
The Location of Lesions Affecting the Lower Motor Neuron ..	290
Differentiation Between Primary Muscle Disease and That Secondary to Denervation	291
Electric Stimulation	291
Electric Stimulation of Nerve Trunks	291
Procedure, 292. Excitability of the Peripheral Neuromuscular System, 292. Conduction Velocity of Motor Nerves, 293. Conduction in Afferent Nerve Fibers, 294. Fatigability of the Peripheral Neuromuscular System, 296.	
Strength-duration Curves	298

17

Examinations of Cerebrospinal Fluid by Lumbar and Cisternal Puncture	300
Lumbar Puncture	300
Contraindications, 300. Technic, 301. Bloody Tap, 304. Amount of Cerebrospinal Fluid Required for Tests, 304. Postpuncture Sequelae, 304.	
Cisternal Puncture	305
Technic, 305.	

Other Aids in Neurologic Diagnosis	307
Altered States of Consciousness and Mentation and Convulsive Disorders	307
Acute Alcohol Intoxication, 308. Acute Barbiturate Intoxication, 308. Bromide Intoxication, 308. Carbon Monoxide Poisoning, 309. Acute Morphine Intoxication, 309. Acute Salicylate Intoxication, 309. Arsenic Intoxication, 309. Acute Lead Intoxication, 309. Acute Porphyria, 310. Hypoglycemia, 310. Electrolyte Depletion, 311. Hypocalcemia, 311. Cretinism and Juvenile Myxedema, 311. Phenylpyruvic Oligophrenia, 311. Histidinemia, 312. Homocystinuria, 312. Maple Syrup Urine Disease, 312. Hartnup Disease, 312. Lowe's Syndrome, 312. Galactosemia, 312. Hurler's Syndrome, 313. Diseases of Organs Other Than the Central Nervous System, 313.	
Headache	313
Histamine Test, 313. Sublingual Nitroglycerin, 314. Vasoconstrictors, 314.	
Muscular Weakness	315
Myasthenia Gravis, 315. Muscular Dystrophy, 317. Periodic Paralysis, 318. Hyperthyroidism, 318. Hyperparathyroidism, 319. McArdle's Syndrome, 319. Addison's Disease, 319. Primary Aldosteronism, 319.	
Polyneuropathy	319
Lead Polyneuropathy, 320. Diabetic Polyneuropathy, 320. Porphyria, 320. Amyloidosis, 320. Refsum's Disease, 320. Bassen-Kornzweig Syndrome, 320.	
Wilson's Disease (Hepatolenticular Degeneration).....	321
Diabetes Insipidus	322
Echoencephalography	323
Principles, 323. Technic, 323. Normal Values, 324. Clinical Applications, 325.	
Cerebral Blood Flow and Circulation	328
Brain Scans	328
Muscle Biopsy	329
Index	333

1

The Neurologic History

GENERAL ASPECTS

History-taking is an art in the subtle directing of a conversation with a patient. As the interview develops, insight into the problem comes to the physician and enables him to direct the interview along the most useful lines. The physician should learn the art or, if you will, the science of eliciting history from a poor observer, an uneducated person, a person who may delight in twisting the meaning of things, and sometimes from a person who has mental deterioration. The task is a long one; if time has to be limited, subsequent interviews are imperative. In difficult problems a second interview is of inestimable value, since the patient's recollection may have been stimulated during the interval and important events may then be told with ease and accuracy. Physicians frequently complain that the patient misled them, that the history was changed and that, therefore, the patient is an unreliable witness. Sometimes this is true but not always. Frequently the physician has misunderstood the patient and written down his own interpretation of the patient's statements. There are times when the patient has had trouble recalling all details during the stress of his initial interview. The amount of time required to take a history will vary both with the personality of the physician and with the patient's particular problem. The amount the physician may guide and interrupt the patient as he gives the story varies with many factors, including the experience and ability of the physician. Too frequently a physician believes he can save time by direct questioning and begins such interrogation early in the interview. The technic may work reasonably well for the experienced physician, and for the inexperienced in evaluating simple problems. In difficult diagnostic problems such a method will not be efficient or satisfactory for anyone. The method must be modified according to the education and cultural background of the patient.

The recording of the history is important; if it can be remembered that one is documenting evidence, the record will likely be clear and complete. Within reasonable limits one should make use of the patient's own words, since these give a picture of the patient in his cultural background. Attempts to abbreviate remarks of the patient by using technical terms, or the physician's interpretation of the patient's remarks, usually will result in an inaccurate history. The physician may, of course, ask for clarification of the meaning of words used during the interview, and in fact he should do so. If the patient possesses reasonable mental competence, it is often worthwhile to record almost verbatim the patient's chief complaint and part or all of the symptoms in the present illness. The importance of an accurate and detailed record of events in the case of patients with compensation and insurance problems cannot be overemphasized. In such instances a verbatim report may be essential in making a correct diagnosis and giving evidence in court. The patient should be encouraged to give his story in chronologic order; during or at the end of the interview the physician will need to ask pertinent questions to obtain accurate dates and to clarify the meaning of certain words or phrases. A record of the interview should be made at the time or immediately afterward.

The order in which information is obtained about the family, past illnesses, and the social situation may vary from one physician to another, and may depend on the problem. The emphasis will not always be the same, but the important thing is to pursue the inquiry in a systematic manner; otherwise the history is likely to be incomplete. The history of the illness is a part of a life story and not something unrelated to home, work and community. The correct perspective and emphasis on these aspects are essential in making a correct diagnosis and in managing the patient and his family.

Evaluation of the clinical problem begins by an interview with the patient. This approach is advisable, and the exceptions to it are few even with patients who are mentally ill. However, relatives and friends should not be ignored. In fact, they should be given every opportunity to report information and ask questions, even though it may be inappropriate to answer all the questions they may ask. The reason for the question being asked may be as important as the question itself. Sometimes information about changes in behavior, memory, hearing, vision, speech, coordination and gait can be obtained only by interviewing the relatives. For example, in convulsive disorders the observations of the relatives may be of the utmost importance in establishing the origin of the discharging focus that initiates the spell. Furthermore, it is important to understand the attitudes of the patient and his relatives in the general management of the medical or surgical problem presented.

The method of taking and recording a history is the same for the

physician who uses a form as it is for the doctor who prefers to take a blank sheet of paper and write his notes. Our form is used as a guide for assistants and permits the recording of certain negative and positive findings in a graphic fashion and at the same time allows for the free description of observations which cannot be reduced satisfactorily to symbols.

THE CHIEF COMPLAINTS AND HISTORY OF THE PRESENT ILLNESS

The chief complaint or complaints should be documented carefully, with their duration. The latter information may not be admitted by the patient in the first part of the interview, and he should be allowed to tell his story for several minutes without interruption. Otherwise, important details may be pushed aside in his mind. Sometimes it is necessary to bring the patient back to the onset of the illness by asking such a question as "When were you last well?" or "How did these symptoms begin?" Circumstances surrounding the onset of symptoms in such data as time of day or night, location of the patient and the relation of symptoms to other events should be elicited. The actual analysis of different symptoms follows a rather similar plan; the suggested plan of inquiry about each symptom is as follows:

1. Date of onset.
2. Character and severity.
3. Location and extension.
4. Time relationships.
5. Associated complaints.
6. Aggravating and alleviating factors.
7. Previous treatment and effects.
8. Progress, noting remissions and exacerbations.

The history is then developed in a chronologic fashion, and it is easier to follow the record if the dates are clearly indicated in a space on the left side of the sheet. Knowledge about the sequence of events is used in localizing lesions and in determining the nature of the pathologic process producing symptoms. During this part of the interview appropriate questions are asked about other possible symptoms often associated with the main complaints. Later a systematic review or what may be called the "functional inquiry of the nervous system" is carried out. It is often advisable to ask the patient what he means by the particular words he uses. There is a surprising variation as to what people mean by such symptoms as "dizziness," "headaches" and "poor vision." To some patients headache means a drawing sensation; to

others an ache or pain, or even numbness or dizziness. At the end of this part of the interview, if the information has not already been forthcoming, direct inquiry should be made as to whether the patient has stopped working, and the date of this event should be noted in the space allotted in the heading of the neurologic record. This datum is of special importance in compensation and insurance problems, but actually in any illness some idea of the disabling qualities is important.

PAST MEDICAL HISTORY

There are many reasons for taking the history of the present illness before beginning questions about the past history which are unrelated to the present chief complaints. The patient should have an opportunity to talk about what he considers important before these questions are asked. Furthermore, one may better direct the inquiry into the past history, family history and functional data once one is acquainted with the present situation. Careful evaluation and recording of past events are important. A common error is to accept the patient's use of a diagnostic term as a statement of fact when he is reporting a past illness. It is wise to make some inquiry into the symptoms and situations which caused a certain diagnosis to be made. Each past illness should be carefully evaluated from this point of view. For example, patients often cite a diagnosis of poliomyelitis in childhood to explain some old trouble with an extremity. Such a statement may not fit with the present findings, and further inquiry about such an illness may be enlightening.

INVENTORY AND FUNCTIONAL INQUIRY

Special attention should be given to this as it relates to the nervous system. In part, it is carried out as the history is unfolded. For example, in the history of headaches, inquiry is made about nausea, vomiting and visual disturbances. However, a more complete and systematic interrogation is necessary during the interview and examination. There is a certain ease and naturalness about asking some of these questions as the physical examination is being done. For example, what is more natural than to ask the patient questions about his vision and then to test the function of the eyes? This procedure may make it very simple to clarify the meaning that he attaches to the term "blurred vision." This plan of questioning and examining does not overemphasize the question in the patient's mind. More important is the fact that the physician thinks functionally as well as anatomically as he pursues the evaluation of a clinical problem. Thinking and examining go on simultaneously as one looks on these systems.

FAMILY HISTORY

The family history may be of special importance to the neurologist. The health history of the parents and the siblings should be carefully obtained and recorded. The patient's condition may be such as to suggest that a hereditary factor is important. If so, then a more detailed family history needs to be taken. Charts and symbols have been used by the specialist in genetics, and they do portray nicely a family history. However, the eliciting of such information is best done in a simpler way. The name, age, sex, state of health and cause of death are recorded for each parent. Similar information is then obtained for the patient's siblings, the siblings of each parent and other relatives. At a later date this information may be reduced to a chart.

Questions about other relatives are frequently indicated, particularly in the case of headache, epilepsy, hyperkinesia, nystagmus, muscular atrophy and dystrophy, cerebellar disorders, ataxia and neuropathy. Many other examples might be given, but in a broad way one should think to ask such questions as "Have any of your relatives had any illness such as you have?" or, as in the case of convulsive disorder, one may need to frame the questions in a meaningful way for the patient and ask, "Have any of your relatives had fainting spells, spasms or blackouts?" The questions should be asked more than once when there is a reason to expect a positive answer. Sometimes, during a second interview, the patient may come with a family tree carefully prepared as the result of some research at home or of correspondence with relatives in other parts of the country.

SOCIAL HISTORY

It has been mentioned that data about social problems in the family are of importance to the physician. In like manner inquiry should be made about the patient's personality development and his reaction to stress and illness. At least brief inquiry should be made regarding attitudes toward parents and siblings. Some factual data regarding the patient's educational achievements and his adjustment at work should be obtained. A knowledge of marital harmony or disharmony and of the behavior of offspring often throws some light on the neurotic aspects of an illness.

SPECIFIC INQUIRY IN REGARD TO CERTAIN COMMON NEUROLOGIC PROBLEMS

It is only natural that the experienced neurologist is more adept than the novice in quickly eliciting pertinent data from the patient.