

Edwin R. Bickerstaff

# NEUROLOGY

**Third Edition**



# NEUROLOGY

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**HODDER AND STOUGHTON**

LONDON SYDNEY AUCKLAND TORONTO

**British Library Cataloguing in Publication Data**

Bickerstaff, Edwin Robert

Neurology—3rd ed.

—(Modern nursing series).

1. Nervous system—Diseases

2. Neurological nursing

I. Title II. Schurr, Peter Howel III.

Series 616.8'02'4613 RC346

ISBN 0-340-23166-1

ISBN 0-340-23167-X Pbk

ISBN 0 340 23166 1 Boards

ISBN 0 340 23167 x Unibook

First printed 1965

Reprinted 1968, 1969, 1970

Second edition 1971

Reprinted 1973, 1974, 1975, 1977

Third edition 1978

Swedish edition published by Natur och Kultur, Stockholm

Italian edition published by Il Pensiero Scientifico, Rome

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Printed in Great Britain for

Hodder and Stoughton Educational,

a division of Hodder and Stoughton Ltd.,

Mill Road, Dunton Green, Sevenoaks, Kent by

Richard Clay (The Chaucer Press), Ltd.,

Bungay, Suffolk.

*NEUROLOGY*

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## ***PREFACE TO FIRST EDITION***

Glancing along the crowded shelves labelled 'Books for Nurses' in libraries and bookshops, one is struck by the absence of text books devoted to diseases of the nervous system. Each book on general medicine, of course, has its section on neurology which is necessarily limited in its scope owing to lack of space. There are some excellent books on the bedside nursing of neurological and neurosurgical cases, but these say little about the nature of the diseases under treatment, their origin or their outlook. It is with these aspects of organic nervous disease that I have attempted to deal. It is important for the nurse to know about them, for these are cases specially needful of her care, and they are not just to be found segregated in special units, but abound in every general medical ward. I hope, therefore, that both the trainee and the postgraduate will find here the information that they need presented in a manner which they can understand and absorb, and which will interest them in this all-important branch of medicine.

A book is always the result of team work. I am particularly grateful to Professor A. J. Harding Rains, General Editor of this series, and Mr. John Maitland, of the English Universities Press, who first stimulated me into writing this book, and to Mr. Brian Steven and Mr. David Zwartz, who were so helpful during its production. Finally, my wife, herself an S.R.N. patiently typed and retyped the various versions of the manuscript, and her criticisms and advice have been invaluable in assessing what in particular a nurse wants to know, and how best to describe it to her.

## ***PREFACE TO SECOND EDITION***

It had always been my impression that nurses, physiotherapists, radiographers, electroencephalographers and laboratory technicians wanted a small book which explained in as straightforward a manner as possible the diseases of the nervous system they were called upon to treat or investigate, and the fact that within five years three reprints of the first edition have been required has rather confirmed this. However, there have been several changes in thought in the neurological field in this time, and this new edition gives me the opportunity to revise the whole book, rewrite several chapters, correct omissions, and clarify still further phrases or explanations which some readers found difficult or puzzling. The book's aim remains the same—to help the nurse and other hospital ancillary staff to know what the doctors mean when they are talking about their patients, the diseases they suffer from, and the investigations they are undertaking. It has grown a little, for neurology is constantly advancing, but I hope this adds to rather than detracts from its usefulness.

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## ***EDITORS' FOREWORD***

The scope of this series has increased since it was first established, and it now serves a wide range of medical, nursing and ancillary professions, in line with the present trend towards the belief that all who care for patients in a clinical context have an increasing amount in common.

The texts are carefully prepared and organized so that they may be readily kept up to date as the rapid developments of medical science demand. The series already includes many popular books on various aspects of medical and nursing care, and reflects the increased emphasis on community care.

The increasing specialization in the medical profession is fully appreciated and the books are often written by Physicians or Surgeons in conjunction with specialist nurses. For this reason, they will not only cover the syllabus of training of the General Nursing Council, but will be designed to meet the needs of those undertaking training controlled by the Joint Board of Clinical Studies set up in 1970.

## ***PREFACE TO THIRD EDITION***

It is not until one starts preparing a new edition of a book such as this that one realises how considerable have been the advances in the understanding, investigation, and treatment of certain diseases of the nervous system in the past few years. During several reprints of the second edition brief reference has been possible to some of these, but the time has now come to revise the whole book, particularly in respect of the sections on cerebrovascular disease, encephalitis, syringomyelia, the treatment of Parkinsonism and epilepsy, and methods of neuroradiological investigation.

The neurologist and the neurosurgeon have come to work even more closely together and it is with great pleasure that I have been able to include two chapters on the principles of operative neurosurgery by Mr. Peter Schurr.

This book has become widely used as an elementary textbook for undergraduate medical students in editions translated into Swedish and Italian, and indeed is recommended as such in some parts of this country. Conscious of this I have tried to include some facets of the subject which the most junior students may find rather perplexing in their usual textbooks. However, the book retains its main and original purpose, which is to help the nurse, trained or in training, to know what the doctors mean when they talk about certain diseases, why they choose to carry out investigations in some but not all patients, and what are the reasons for the choice of particular forms of treatment. It is not, and never has been, a book on the techniques of nursing care for these can only be learnt at the bedside. But how much more interesting these techniques become when the nurse can understand why the team of which she or he is so important a member is taking a particular line of action.

As a gesture to conformity, and with admitted reluctance, I have given readings in the appendices in S.I. units as well as in their better-known values, in the hope that youth can assimilate what some of us find indigestible.

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## I *NEUROLOGY, NEUROLOGISTS AND NEUROLOGICAL NURSING*

The increasing popularity of books, films, and television plays about doctors and nurses might have been expected to clarify for the public what a neurologist is and what a neurologist does. Quite the reverse seems to be the case. There is still complete confusion in people's minds between neurology and psychiatry, and between neurologists and psychiatrists.

One can hardly blame the layman, for writers and producers frequently show how much they share this confusion, but remarks such as 'another day like this and I shall have to come and see *you*' are frequently made to the neurologist by those who should know better—nurses, physiotherapists, and, regrettably, sometimes even doctors.

Neurology is the study of the nervous system and of the diseases and disorders which affect it. By the nervous system is meant the brain, spinal cord, and peripheral nerves—definite structures which can be seen, felt, X-rayed, operated on, and looked at under a microscope.

Unfortunately the terms 'nervous', 'nervy', and 'the nerves' are often used to describe purely emotional states which are quite unrelated to disease of the central nervous system. In some countries neurology and psychiatry are both practised by the same people, working under the name neuropsychiatrists, and, in fact, the two branches of medicine do at times overlap, for disease of certain parts of the brain can cause profound mental disturbance. It is hardly surprising, therefore, that many think they should see a neurologist when their 'nerves' are in bad shape.

Confusion of this sort would not matter very much if sometimes it did not have rather serious results. Patients may resist being referred to or admitted to a neurological unit because they are convinced it is a 'cover-up' name for a mental hospital, and an early and treatable stage of a disease may be missed. Nurses also, wishing to nurse organic disease, are often reluctant to work in neurological units because they have gained the same impression.

Sadly, however, reluctance to take up neurological nursing has another equally incorrect origin. The idea is widely held that all neurological diseases are chronic, crippling, untreatable, and as depressing to nurse as they are to endure. Nothing could be further

from the truth. Such diseases exist, of course, as in all other branches of medicine, but the advances of the last twenty years have been dramatic, and as most of the patients in an active neurological unit are mentally normal, feel physically well, and are in the younger two-thirds of life, they form a group who are most pleasant to deal with, and most rewarding to nurse.

False ideas about neurosurgery are even worse, for they have spread even amongst the medical profession. The neurosurgeon is thought to spend his time carrying out leucotomies on mental patients, or being called in as a last resort for hopeless head injuries, or inoperable tumours. In fact, a neurosurgeon in an active department concentrates on the vast number of patients with eminently treatable conditions, who are operated on, recover rapidly, and return home to active life. There are, of course, bad cases, as in all other branches, and as these often return from a neurosurgical unit to a general ward or hospital, and there deteriorate and die, they are remembered as 'typical neurosurgical cases'. When, however, general physicians, surgeons, or nurses visit a neurosurgical unit, they are invariably astonished to see how small a proportion of the work is made up of this type of case.

To the nurse the process of diagnosis in neurological disease is itself fascinating. It is easy to see the physical signs being demonstrated; the investigations, particularly the X-ray studies, generally give clear-cut results which everyone can see, so that the nurse need not be just a patient bystander; each case is like a detective story in which the nurses themselves, by using their powers of observation, often furnish the vital clues which solve the diagnostic problem.

Neurology, however, abounds with long words. These may slip off the experienced physician's tongue before he realises that his audience is still thinking about the last one. A chapter is therefore devoted to the meaning of the words which are most commonly used. This is followed by those bare essentials of the anatomy and function of the nervous system which have to be appreciated so that the way in which the various diseases affect the body may be understood. In the rest of the book the nurse will find an outline of all the neurological diseases which occur with any frequency, and as simple an explanation as possible of their causes, if these are known, so that when she hears a particular diagnosis being discussed she will know what it means, how it may have developed, and what is likely to happen to the patient.

Knowledge of this sort not only makes it easier to talk to the patients and their relatives, but greatly increases the interest of each problem in what is one of the most interesting branches of medicine.

## 2 THE LANGUAGE OF NEUROLOGY

This chapter gives the meaning of words commonly used in neurology, which are either special to the subject, or have a special meaning when applied to neurological cases. Terms familiar from general medicine are not included, nor are the names of diseases, for these are defined in the chapters that follow.

**A- (or An-).** Absence of—or inability to—.

**Abdominal reflexes.** Abdominal muscle contractions on stroking the skin.

**Air-encephalography (pneumoencephalography).** X-raying the ventricles and subarachnoid spaces after introduction of air by lumbar or cisternal puncture.

**Air-myelography.** X-raying the spinal canal after injection of air.

**Akinesia.** Inability to start a movement; slowness in movement.

**Amnesia.** Loss of memory.

**Anaesthesia.** Inability to feel touch.

**Analgesia.** Inability to feel pain.

**Anarthria.** Inability to pronounce words.

**Anastomosis.** Network of vessels (replacing one that is blocked).

**Aneurysm.** A weak bulge in an arterial wall.

**Angioma.** A collection of abnormal arteries, capillaries, and veins.

**Anosmia.** Loss of sense of smell.

**Anterior horns.** Part of spinal grey matter containing motor nerve cells.

**Anticonvulsants.** Drugs used to control epileptic fits.

**Aphasia.** Inability to speak.

**Aphonia.** Inability to make sounds.

**Arachnoid mater.** The web-like middle layer of the meninges.

**Argyll Robertson pupil.** An irregular pupil reacting to convergence but not to light.

**Arteriography (-gram).** X-raying blood-vessels after injecting an artery with opaque dye.

**Astereognosis.** Inability to recognise objects by size and shape.

**Ataxia.** Unsteadiness.

**Athetosis.** Slow writhing involuntary movements.

**Aura.** Warning symptoms (of an attack of epilepsy or migraine).

**Axon.** The longest process of a nerve cell.

**Babinski reflex (sign).** Extension of the great toe on scratching the sole.

**Bitemporal hemianopia.** Loss of the outer halves of both fields of vision.

**Brown-Séquard syndrome.** Signs produced by damage to one half of the cord.

**Bruit (intracranial).** A sound in time with the heart beat.

**Bulbar.** Concerning the medulla.

**Burr-hole.** A hole drilled in the skull.

**Café-au-lait patches.** Brown skin marks in neurofibromatosis.

**Capsule.** Fibrous barrier around a tumour or abscess.

**Carpal Tunnel.** Channel in wrist through which the median nerve passes.

**C.A.T.** Computerised axial tomography (E.M.I. scanner).

**Cauda equina.** The nerve fibres lying below the spinal cord.

**Cephalgia.** Headache.

**Cerebellar.** Concerning the cerebellum.

**Cerebral.** Concerning the brain.

**Charcot's joints.** Painless disorganised joints in tabes.

**Chiasma (-al).** The X-like crossing of the two optic nerves.

**Chorea.** Very rapid involuntary movements.

**Choroid plexus.** Tufts of vascular tissue in the ventricles forming the C.S.F.

**Circle of Willis.** The arteries at the base of the brain.

**Cisterns.** Collections of C.S.F. (e.g. cisterna magna).

**Clonus (-ic).** Rhythmical contractions of a spastic muscle on stretching.

**Coma.** Deep loss of consciousness.

**Contrast media.** Substances used to show up blood vessels or C.S.F. pathways on X-ray—'positive' if more opaque than bone and brain, 'negative' if less.

**Co-ordination.** Smooth and efficient movement.

**Corneal reflex.** Normal blinking on touching the cornea.

**Cortex.** The surface layer of the cerebral and cerebellar hemispheres.

**Cranial nerves.** 12 pairs arising from or running to the brain and brain stem.

**C.S.F.** The cerebro-spinal fluid, bathing brain and spinal cord.

**Deficiency disease.** One due to lack of a normal food substance.

**Degeneration.** Death of tissue, often of unknown cause.

**Déjà-vu.** A sense of familiarity.

**Dementia.** Deterioration of intellect.

**Demyelinative.** Due to loss of the myelin sheath.

**Diabetes insipidus.** Passage of large amounts of sugar-free urine.

**Diplopia.** Seeing double.

**Disc (optic).** The optic nerve leaving the eye, seen through an ophthalmoscope.

**Disc (intervertebral).** The fibro-cartilaginous cushion between the vertebrae.

**Discriminative sense.** Ability to detect difference in size, shape, texture and number of stimuli.

**Disorientation.** Confusion as to time, place, person.

**Dissociated sensory loss.** Loss of pain sense with light touch preserved.

**Dominant hemisphere.** The cerebral hemisphere controlling speech.

**Dorsiflexion.** Bending backwards (usually wrist or ankle).

**Drop attacks.** Sudden falls without loss of consciousness.

**Dura mater.** The outer, toughest sheet of meninges.

**Dys-**, Difficulty in—.

**Dysarthria.** Difficulty in pronouncing words.

**Dysgraphia.** Difficulty in writing.

**Dyslexia.** Difficulty in reading.

**Dysphasia.** Difficulty in expressing thoughts in words.

**Dystrophy.** Degeneration with loss of function.

**Echo-encephalography.** Using ultra-sound to detect intracranial lesions.

**Electrocorticography.** Recording electrical activity direct from the cortex.

**Electroencephalography (E.E.G.).** Recording the electrical activity of the brain.

**Electromyography (E.M.G.).** Recording the electrical activity of muscle.

**Electrophoresis.** A method of separating the proteins in blood or C.S.F.

**Encephalitis** (plural, **encephalitides**). Inflammation of the brain.

**Encephalopathy.** A disorder of brain function.

**Euphoria.** A casual cheerfulness.

**Extensor plantar response.** The big toe goes up on scratching the sole.

**Extracranial.** Outside the skull.

**Extradural.** Between the dura and the skull.

**Extrapyramidal.** Motor fibres arising from cells other than the pyramidal cells (often basal ganglia).

**Extrinsic.** Outside and separate from nervous tissue.

**Fasciculation.** Flickering contractions of muscle fibres.

**Flaccid.** Limp; floppy; loss of tone.

**Flexor plantar response.** The normal downward movement of the big toe on scratching the foot.

**Flexor spasm.** Painful contractions of muscles in spastic limbs.

**Focal.** Arising from, or limited to, one part.

**Focal epilepsy.** A fit affecting one part of the body, arising from one point in the brain.

**Foramen.** An opening.

**Fortification spectra.** Zig-zag patterns seen in migraine.

**Fossa.** A compartment of the skull holding a part of the brain.

**Functional.** Due to a disturbance in the working, not the structure, of some part.

**Gamma-camera.** Apparatus for photographing uptake of radioisotopes in intracranial lesions ( $\gamma$ -scanning).

**Ganglia.** Collections of nerve cells.

**Generalised fits.** Convulsions affecting all parts of the body.

**Girdle pains.** Constricting pains around the trunk.

**Glia.** The supporting cells and fibres of the nervous system.

**Glioblastoma.** The most malignant glioma.

**Glioma.** Tumours growing from the supporting cells.

**Gliosis.** Overgrowth of glial fibres.

**Glove and stocking anaesthesia.** Impaired sensation over the periphery of all four limbs.

**Grand mal.** Epilepsy characterised by major fits.

**Grey matter.** Nervous tissue containing nerve cells.

**Gyri.** The folds of the cerebral cortex.

**Hallucinations.** Sensory impressions of something which is not there.

**Hemianaesthesia.** Loss of sensation down one side of the body.

**Hemianopia.** Loss of half the visual field.

**Hemiplegia (-paresis).** Paralysis (weakness) of one half of the body.

**Heredo-familial.** Passed both from generation to generation and to several members of one family.

**Herpes simplex.** The virus of 'cold sores'.

**Herpes zoster.** Shingles.

**Hiatus.** A large gap.

**Homonymous.** The same on both sides.

**Hydrocephalus.** Enlargement of the ventricles.

**Hydrocephalus (low pressure).** Ditto, when C.S.F. pressure is not high.

**Hyper-.** Increased.

**Hypertrophy.** Enlargement.

**Hyperventilation.** Excessively deep and fast breathing.

**Hypo-.** Decreased.

**Hypoglycaemia.** An abnormally low blood sugar.

**Hypopituitarism.** Loss of pituitary function.

**Idiopathic.** Of unknown cause.

**Impulses.** Electrical waves travelling along nerves.

**Inborn.** Part of an individual's make-up.

**Infarct.** A zone of tissue deprived of blood supply.

**Intracranial.** Inside the skull.

**Intracranial hypertension.** High pressure inside the skull (not high blood pressure).

**Intrinsic.** Inside the substance of the nervous system.

**Involuntary movement.** Muscular activity not under the patient's control.

**Ischaemia.** Shortage of blood supply.

**Jacksonian fits.** Convulsions starting at one point and spreading to involve wider areas.

**Kernig's sign.** Inability to straighten the knee with the hip flexed, in meningeal irritation.

**Labyrinth.** The semi-circular canals of the inner ear.

**Lange curve.** A test carried out by adding C.S.F. to colloidal gold solution.

**Lasègue's sign.** Limitation of straight leg raising.

**Leucodystrophy.** Degeneration of white matter.

**Lightning pains.** Needle-like pains in the limbs in tabes.

**Lobe.** A major division of the cerebral hemispheres or cerebellum.

**Local; localise.** One point affected; to determine the exact point affected.

**Lower motor neurone.** Cells and fibres of motor cranial and spinal nerves.

**Medulla.** The lowest part of the brain stem.

**Meninges.** The three membranes clothing the brain and cord and lining the skull and vertebral canal.

**Meningioma.** A benign tumour growing from the arachnoid.

**Meningism.** Signs of irritation of the meninges, not due to infection.

**Meningitis.** Inflammation of the meninges.

**Meningocele.** A bulge of the meninges through a breach in the bony coverings.

**Meningo-encephalitis.** Inflammation of both brain and meninges.

**Meningomyelocele.** A meningocele containing spinal cord tissue.

**Mixed nerve.** One containing motor and sensory fibres.

**Monoplegia (-paresis).** Paralysis of one limb.

**Motor.** Concerned with movement.

**Multiple sclerosis.** Disseminated sclerosis.

**Myasthenia.** Weakness of muscle.

**Myelin.** The white sheath to nerve fibres.

**Myelitis.** Inflammation of the spinal cord.

**Myelography (myelogram).** X-raying the vertebral canal by introducing opaque fluid into the C.S.F.

**Myoclonus.** Shock-like muscle contractions.

**Myopathy.** Degenerative disease of muscle (muscular dystrophy).

**Myositis.** Inflammation of muscle.

**Myotonia.** Contraction of muscle persisting after the need for it has passed.

**Neck-stiffness, rigidity, retraction.** Signs of irritation or infection of the meninges.

**Nerve conduction time.** Time taken for an electrical impulse to travel along an known length of nerve.

**Neuralgia.** Pain in the distribution of a nerve.

**Neuritis.** Inflammation of a nerve.

**Neuromuscular junction.** A point where a nerve fibre ends in a muscle.

**Neurone.** The nerve cell, its fibre and all its branches.

**Neurosyphilis.** Involvement of the nervous system in the later stages of syphilis.

**Nucleus (-ei).** A collection(s) of nerve cells.

**Nystagmus.** Rhythmical oscillation of the eyes.

**Oculomotor.** Concerned with eye movement.

**Olfactory.** Concerned with the sense of smell.

**Oligophrenia.** Mental retardation.

**Ophthalmoplegia (-ic).** Paralysis of eye movement.

**Opisthotonos.** Backward arching of the whole body.

**Optic.** Concerned with the eyes or visual pathways.

**Organic.** Due to structural disease.

**Otorrhoea.** Running from the ear.

**Overflow incontinence.** Constant dribbling due to over-distension of an insensitive bladder.

**Panencephalitis.** Inflammation of the whole brain.

**Papilloedema.** Swelling of the optic nerve seen with an ophthalmoscope.

**Papillitis.** Swelling of optic nerve due to 'inflammation'.

**Para-.** Alongside (e.g., paraventricular).

**Paraplegia (paraparesis).** Paralysis (weakness) of both legs.