RES MEDICA
Journal of the Royal Medical Society

Contents

Copyright Royal Medical Society. All rights reserved. The copyright is retained by the author and the Royal Medical Society, except where explicitly otherwise stated. Scans have been produced by the Digital Imaging Unit at Edinburgh University Library. Res Medica is supported by the University of Edinburgh's Journal Hosting Service: http://journals.ed.ac.uk

ISSN: 2051-7580 (Online) ISSN: 0482-3206 (Print)
Res Medica is published by the Royal Medical Society, 5/5 Bristo Square, Edinburgh, EH8 9AL

Res Medica, Summer 1959, 1(4)
doi:10.2218/resmedica.v1i4.296

Volume I, No. 4 Summer 1959

RES MEDICA

THE JOURNAL OF THE ROYAL MEDICAL SOCIETY

Contents

PUBLISHED AT 7 MELBOURNE PLACE, EDINBURGH

PRICE ONE SHILLING

HEINEMANN

Amputations—GILLIS
430 pp. 342 illus. **84s.**

Atlas of Bone Marrow Pathology—ISRAELS 2nd Edition
96 pp. 13 coloured plates **30s.**

Atlas of Surgery—HARLOW
376 pp. 1,292 illus. **50s.**

Blood Pressure Sounds and their Meanings—MALCOLM
Part I
112 pp. 40 illus. **12s. 6d.**

Part II: The Aetiology of Melanotic Cancer
76 pp. 22 illus. **12s. 6d.**

British Gynaecological Practice—BOURNE 2nd Edition
904 pp. 376 illus. 8 plates **105s.**

British Obstetric Practice
HOLLAND 2nd Edition
1230 pp. 418 illus. 4 colour plates **147s.**

Chromatographic Techniques—SMITH
320 pp. 72 illus. **45s.**

Comparative Aspects of Haemolytic Disease of the Newborn—ROBERTS
208 pp. **17s. 6d.**

Cortisone Therapy—GLYN
172 pp. illus. **21s.**

Cytology of Effusions
SPRIGGS
80 pp. 40 illus. 5 coloured plates **42s.**

Modern Actinotherapy
BECKETT
172 pp. 18 illus. 5 coloured plates **17s. 6d.**

Neonatal Paediatrics
COLLIS
320 pp. 37 illus. **30s.**

Positioning in Radiography
CLARK 7th Edition
660 pp. 2,150 illus. **105s.**

Practical Clinical Biochemistry
VARLEY 2nd Edition
648 pp. 70 illus. **42s.**

Symposium on Nuclear Sex
SMITH & DAVIDSON
212 pp. 48 illus. **21s.**

Textbook of British Surgery
SOUTTAR & GOLIGHER
Vol. I: 552 pp. 238 illus. 3 coloured plates
Vol. II: 650 pp. 350 illus.
Vol. III: 628 pp. 206 illus.
Vol. IV: 704 pp. 350 illus.
105s. each

Unexpected Reactions to Modern Therapeutics: Antibiotics—SCHINDEL
160 pp. **15s.**

WILLIAM HEINEMANN MEDICAL BOOKS LTD

15-16 QUEEN STREET · MAYFAIR · LONDON W.1

PREDSOL

THE WATER-SOLUBLE PREDNISOLONE

PREPARATION	BASE	PACKS	INDICATIONS
Predsol Lotion 0·1%	Water-miscible	20 ml	Anal and vulval pruritus Contact dermatitis Seborrhoeic dermatitis Allergic eczema Nummular dermatitis Food eczema Infantile eczema Neurodermatitis
0·25%		20 ml	
Predsol-N* Lotion 0·1%	Water-miscible	20 ml	
0·25%		20 ml	
Predsol Ointment Nos. 1 & 2 0·25%	No.1—non-greasy	5 G	
0·25%		15 G	
0·5%	No.2—greasy base	5 G	
0·5%		15 G	
Predsol-N* Ointment Nos. 1 & 2 0·25%	No.1—non-greasy	5 G	
0·25%		15 G	
0·5%	No.2—greasy base	5 G	
0·5%		15 G	

** Contains 0·5% neomycin sulphate. Use Predsol-N preparations when infection is present or suspected.*

A STRENGTH FOR EVERY PURPOSE A BASE FOR EVERY SURFACE

PREDSOL = prednisolone 21-disodium phosphate (the water-soluble prednisolone)

PREDSOL-N = prednisolone 21-disodium phosphate (the water-soluble prednisolone) + neomycin sulphate

PREDSOL and PREDSOL-N are British made

GLAXO LABORATORIES LTD, GREENFORD, MIDDLESEX BYRon 3434

GLAXO

The treatment of Urinary Infections

"Sulphadimidine (2.0 g. then 1 g. 6 hourly for 7 days) is the drug of choice in acute urinary infections due to *Esch. coli.* and *Aerobacter aerogenes.*"

SCOT. MED. J. 1958. *3.* 187.

'Mezuran' contains Sulphamezathine (S-Mez.) 0.5 gramme, together with phenazopyridine hydrochloride 0.05 gramme, an effective urinary analgesic. It deals with the infection and at the same time makes the patient comfortable.

Mezuran

TRADE MARK

Basic N.H.S. cost 3/2d. plus purchase tax for 25 tablets.
Dispensary packs of 500 tablets also available.

ICI

IMPERIAL CHEMICAL INDUSTRIES LIMITED

PHARMACEUTICALS DIVISION WILMSLOW CHESHIRE

Ph.913

E. & S. LIVINGSTONE LTD

EARLY DIAGNOSIS

Edited by HENRY MILLER, M.D., F.R.C.P.

408 pages 25s.

"The early recognition of important disease is the special responsibility of the general practitioner, for whom this book has been written. It is he who must appreciate the signs which will lead him to commission on behalf of his patients the elaborate, expensive and sometimes even potentially dangerous machinery of modern medical investigation." — *Extract from Preface.*

Shakespeare and Medicine

By R. R. SIMPSON, M.B., Ch.B., FR.C.S.

275 pages 8 illustrations 25s.

The Mast Cells

By JAMES F. RILEY, M.D., Ph.D., D.M.R.T., F.R.C.S.Ed.

192 pages 65 illustrations 30s.

Cell and Tissue Culture

By JOHN PAUL, M.B., Ch.B., Ph.D., M.R.C.P.Ed.

269 pages 102 illustrations 30s.

Textbook of Physiology and Biochemistry

Fourth Edition. By G. H. BELL, M.D., B.Sc., F.R.S.E., J. N. DAVIDSON, M.D., D.Sc., F.R.I.C., F.R.S.E., and H. SCARBOROUGH, M.B., Ph.D., F.R.C.P.E.

1076 pages 825 illustrations 63s.

Carcinoma of the Lung

Edited by J. R. BIGNALL, M.A., M.D., M.R.C.P.

310 pages 69 illustrations 55s.

Tumours of the Bladder

Edited by DAVID M. WALLACE, O.B.E., M.S., F.R.C.S.

364 pages 249 illustrations 60s.

Treatment of Cancer in Clinical Practice

Edited by P. B. KUNKLER, M.A., M.D., M.R.C.P., D.M.R.T., F.F.R., and A. J. H. RAINS, M.S., F.R.C.S.

About 800 pages. Illustrated. In preparation.

Scottish Social Welfare, 1864-1914

By THOMAS FERGUSON, C.B.E., M.D., D.Sc., F.R.C.P.Ed., F.R.S.Ed.

622 pages 22 illustrations 42s.

Surgery in Infancy and Childhood

By MATTHEW WHITE, M.B., F.R.C.S.Ed., and WALLACE M. DENNISON, M.D., F.R.C.S.Ed., F.I.C.S.

456 pages 355 illustrations 45s.

Principles of General Surgical Management

By H. A. F. DUDLEY, M.S., F.R.C.S.Ed.

212 pages 92 illustrations 27s. 6d.

Subarachnoid Haemorrhage

By J. N. WALTON, M.D., M.R.C.P.

366 pages 36 illustrations 30s.

Textbook of Medical Treatment

Seventh Edition. Edited by D. M. DUNLOP, M.D., F.R.C.P., SIR STANLEY DAVIDSON, M.D., F.R.C.P., and S. ALSTEAD, M.D., F.R.C.P., P.R.F.P.S.G.

944 pages 33 illustrations 55s.

The Principles and Practice of Medicine

Fourth Edition. Edited by SIR STANLEY DAVIDSON, M.D., F.R.C.P., M.D.(Oslo).

1080 pages 109 illustrations 35s.

Human Nutrition and Dietetics

By SIR STANLEY DAVIDSON, A. P. MEIKLEJOHN, M.A., D.M., M.R.C.P., and R. A. PASSMORE, M.A., D.M., F.R.S.E.

844 pages. Illustrated. In preparation.

TEVIOT PLACE, EDINBURGH

JOURNAL

of the

ROYAL COLLEGE

of

SURGEONS

of

EDINBURGH

Published quarterly: October, January, April, July

Annual Subscription: 21s. post free

EDITOR: John Bruce, C.B.E., T.D., P.R.C.S. Ed., Hon. F.A.C.S.

RES MEDICA

THE JOURNAL OF THE ROYAL MEDICAL SOCIETY

Editor:
DAVID J. CLARK

Editorial Committee:
WILLIAM L. FORD, HENRY C. DRYSDALE, E. A. W. SLATER

Editorial

The story of *Res Medica* has been one of success, so far. The Journal was started only two years ago and has prospered enormously. The people responsible for this success are undoubtedly the members of the first Editorial Committee. Our role has been simply to add fuel to the fire which their enthusiasm set alight. Thus, during its second year, the Journal's circulation has doubled. The size has grown considerably, and we are financially stable. It has been our aim to base *Res Medica* on the Society's public business and as many as possible of our Addresses, Talks, and Dissertations are now included. We hope that future editors will follow this policy.

In the present issue we include a most fascinating article by Professor Swann. In those long past lectures to us in our first year, he expressed complicated ideas in a minimum of words. He has a knack of using a short word where others might use a long one, of using one word where others might employ two. Consequently his lectures are stimulating and intelligible even for those whose education has not included any biological study. His article reminds us of this talent and provides us with much to think about. It is easy to see why he was so delighted to obtain that electron microscope.

Mr Dudley writes on the subject of "Electrolyte Imbalance"—a topic with which every student has come to associate his name. Electrolytes, we are told, are not well understood by most undergraduates. Here is a chance for us to improve.

The General Practice Teaching Unit in Edinburgh is the most advanced of its kind. Dr Richard Scott, Director of the Unit, holds the view that the course in General Practice is perhaps more important for those who do not eventually go into General Practice than for those who do. In his article he tells us the place which the Edinburgh Dispensaries have occupied in the past and indicates how the General Practice Teaching Unit attempts to preserve this traditional feature of the Edinburgh Medical School while adapting itself to current trends in medical practice in this country.

The larger part of this issue is devoted to articles from the Society's dissertators.

Mr Boddy writes on "The Changing Face of Medical Practice" and he discusses the development of medicine and its present shortcomings. Much of this article will provoke thought on far-reaching medical problems.

Res Medica's first article on a psychiatric subject is ably presented by

Mr Craddock who gives a distinctly low-powered, down-to-earth—and eminently useful—view of Hysteria.

Mr Crombie's dissertation on "Men, Rockets and Medicine" was enjoyably different. He now discusses the problems of the space age in print. This is a subject of increasing medical importance.

Mr Mailer gave us a most erudite dissertation on Ulcerative Colitis and made it, at the same time, comprehensive and compact. Especially, he sought to improve our knowledge of its more fundamental aspects. In his article he bears the same principle in mind and we commend him for it.

The common, often tragic, problem of Spontaneous Subarachnoid Haemorrhage is thoroughly reviewed by Mr Frank Turner. His dissertation was notable for its clarity and for the high standard of its presentation.

The clinical examination of the patient is the real basis of rational diagnosis, and Mr J. H. Turner's article stresses this point. His article might be read with profit by all four clinical years.

We hope that former members in particular will read Mr Malcolm-Smith's account of "Goings on during the 222nd Session." No doubt it will bring back many memories.

Editing *Res Medica* has been a memorable pleasure and at this time we wish to thank all those friends who have helped by contributing articles, or by reading the Journal. We wish it all success.

FLOREAT RES MEDICA !

GROWTH NORMAL AND ABNORMAL

Based on an Address read before the Royal Medical Society on Friday, 28th November 1958.

By PROFESSOR MICHAEL SWANN
Department of Zoology, University of Edinburgh

Growth as we see it in an animal or a plant, is a smooth continuous process. But the more we delve into it, the more discontinuous we find it to be. Individual cells do not grow indefinitely. When they reach a certain size, they undergo a drastic reorganisation, and divide into two. Even growth between one division and the next is not, as one might have expected, a smooth process of increase by compound interest. Instead, as Dr. J. M. Mitchison of Edinburgh University has recently shown, it is growth by simple interest, until shortly before the cells are due to divide, when they suddenly double their rate of increase, in readiness for the appearance of two daughter cells, each of which will grow at the original rate. The machinery for making new living matter is evidently duplicated quite suddenly.

Various other facets of cell growth and division behave in a somewhat similar, discontinuous way. The chromosomes double some time before division. The main constituent of chromosomes is desoxyribonucleic acid (believed to be the essential substance of the genes) and this, not surprisingly, doubles a little before the chromosomes do. There is evidence too that ribonucleic acid, which is thought to be involved in transferring information from the genes, and in synthesising the appropriate enzymes and proteins, also varies cyclically. Yet further biochemical systems show characteristic ups and downs, in particular the sulfhydryl compounds, which seem to be closely concerned in the actual mechanical process of splitting the cell in two. Several more systems, whose biochemistry is quite unknown, have also been discovered, and all of them show discontinuous behaviour. The most important, perhaps, is one that is peculiarly sensitive to radiations. Another curious system is very sensitive to small changes in temperature, and this has been put to good use by cell physiologists who can now study cell division in mass populations of cells that have been made to divide in unison by means of temperature shocks. A final system enables cells to build up in advance all the energy they need to divide. Once launched they are then unaffected by any accident, except the most drastic.

To say that all these key mechanisms in the growth and division of cells are discontinuous, or to be more accurate cyclical in their behaviour, merely reflects the fact that they must all dovetail in with one another, and reach completion before one cell can divide into two. Holding up one system does not necessarily hold up all the others, though it will prevent division. A dose of X-rays for instance, stops cells dividing, though it does not stop them growing. Indeed they become far too big, and this may have something to do with ultimately killing them.

The fundamentals of cell growth and division have been investigated mostly by experimenting with rapidly growing cells, either microörganisms, or cells in tissue culture. When we turn to growth in whole animals the situation is rather different. In a very young embryo, it is true, most if not all the cells are growing and dividing at full speed. But as time goes on

more and more of them slow down. Some stop completely: the cells of striated muscle, and nervous tissue. Many stop almost, but not quite completely: the cells of liver, kidney, connnective tissue and the glands. A few continue to grow and divide quite fast, even in the adult: the cells of the skin, the alimentary tract and the blood. But even these are not growing at full speed. They can put on a spurt to meet the demands of a wound or of a haemorrhage.

What lies behind this elaborate pattern of growth and division, rapid in one place, slow in another, and non-existent in yet a third? The simplest explanation would perhaps be that one or other of the mechanisms we have talked about earlier should be blocked. But all the evidence goes to show that this is not the case. Even in the more rapidly growing tissues of a whole animal, the bulk of cells are seemingly quiescent and not growing or dividing at all. Their various key mechanisms for division are not blocked; they are apparently just not there. They do not seem even to be making any of the large amount of special protein required for the mitotic spindle. Their energies, on the contrary, appear to be devoted to their particular specialised task in the body—secreting hormones, excreting waste products or whatever it may be.

For such cells to grow and divide, a drastic reorientation of metabolism is clearly needed, away from making enzymes or proteins for some specialised function, and over to making materials essential for proliferation. And the evidence all suggests that the amount of growth and division in an animal at any stage after that of the early embryo, is a question of the availability of various special substances whose job it is to bring about this drastic reorientation.

A certain amount is known about these stimulants, and there appear to be a great many of them, each operative for different types of cell and tissue. The most familiar ones are the various hormones that affect growth—pituitary growth hormone itself, ACTH, thyrotrophic hormones, the sex hormones and a few others. But there are certainly a great many more, and the only reason they are not called hormones is that they are not secreted by obvious recognised glands. Red cell production for instance, is controlled by an α-globulin, erythropoietin, that circulates in the blood. And erythropoietin seems, somewhat surprisingly, to be made in the kidneys, presumably when the oxygen tension falls below normal. Kidney growth is evidently controlled by another specific stimulant. Its nature is unknown, but it must be something that is normally excreted, for if one kidney is removed the other grows rapidly, or if one kidney is prevented from functioning, by ligature of the ureter, both it and the other kidney again start to grow. The control of liver growth follows a rather different pattern. It is effected not by a stimulator, but by the absence of an inhibitor. And the inhibitor seems to be plasma albumin, or some fraction of it. A normal liver produces quantities of plasma albumin, which limit liver growth severely. Partial hepatectomy reduces the plasma albumin production for a while, and this lets the liver grow back to its normal size.

What exactly are these specific control mechanisms doing? They are, so far as we can tell, not affecting the detailed mechanisms of growth and division in any intimate way. Rather they are simply switching the whole synthetic machinery of a quiescent differentiated cell into a new pathway, such that the activated cell makes the proteins and enzymes that are needed for division. They are therefore not so much stimulating agents, as *switching* agents. And no doubt this explains why some of the control mechanisms, e.g. that of liver, are negative ones. There is after all no reason why a switching substance should always switch *from* differentiated activity *to* division. It might equally be expected to do the reverse, and liver is a clear case in point.

Recent research makes it fairly certain that enzymes, and indeed all proteins are synthesized by ribonucleic acid containing particles, known as microsomes, which are scattered through the cytoplasm. Any switch from one general pattern of metabolism and synthesis to another presumably therefore, involves activating or inactivating these particles. One may guess then that the recognised growth hormones, and the various humoral substances that control the growth of organs are acting directly or indirectly on the microsomes. This has yet to be shown, though it may be significant that repeated attempts to link them up with enzyme reactions have failed. If they are really concerned at a much more fundamental level with controlling the *synthesis* of enzymes, this is not surprising.

Finally, what is the relevance of all these discoveries to the question of abnormal growth? It may sound too optimistic to suggest that we are at last getting to the heart of the problem. Certainly, to say this in no way implies that there are any practical steps we can now take to cure cancer. But a large amount of evidence seems to show that tumour cells grow and divide just as normal cells do. On the other hand a steadily increasing amount of evidence suggests that it is their *control* mechanisms that are at fault. Cells that should be dependent on hormones for proliferation become less dependent, or even totally independent. At first, hepatoma cells are partially inhibited by plasma albumin; later they are not inhibited. The normal growth controls are evidently lost, quite gradually, as tumours increase in malignancy.

What exactly this means is obscure. Are tumour cells making their own hormones or humoral factors? Or are they contriving to do without them. Or when the system is an inhibitory one, are they failing to respond to the inhibitor? An understanding of cancer undoubtedly lies in this general direction, but it is still a long way off.

BUSINESS BOOKS

LEDGERS · DAY BOOKS · CASH BOOKS

SCROLL BOOKS LETTER BOOKS

ANALYSIS BOOKS NOTE BOOKS

EVERY RULING FOR CORRECT BOOKKEEPING

★

BROWN of the MOUND

Stationers and Printers Telephone CAL 5960

11-12 NORTH BANK STREET · EDINBURGH 2

Spontaneous Subarachnoid Haemorrhage: Some Aspects of its Pathogenesis and Management

Based on a Dissertation read before the Royal Medical Society on Friday, 17th October 1958.

By F. W. TURNER

The recognition of spontaneous subarachnoid haemorrhage as a clinical entity, distinct from the many other conditions all previously grouped under the comprehensive heading of " Apoplexy " was first made by Collier in 1922. A year or so later Symonds reviewed 124 cases described in the literature and concluded that rupture of an intracranial aneurysm was probably the major cause of this syndrome. His opinion is now widely held, and it seems probable that on a proportionate basis the main aetiological factors are:—

1. Rupture of an intracranial aneurysm— responsible for 80% of cases.
2. Arteriovenous malformations— responsible for 10% of cases.
3. Other diseases (e.g. neoplasm, blood dyscrasia)— responsible for 10% of cases.

The content of this article is largely referable to spontaneous subarachnoid haemorrhage following rupture of an intracranial aneurysm.

The importance of this syndrome is now well recognised, and recourse to the figures of the Registrar General shows that ruptured aneurysms are responsible for about 2% of all deaths from cerebro-vascular disease. While an over-all sex ratio of one to one is generally agreed upon, there is less unity of opinion concerning the age incidence. It seems probable however that the peak incidence occurs in a somewhat older age-group than the widely taught " twenty to forties," and most writers are now agreed that " forty to sixty " is a more accurate estimate — the neurosurgeons tending to see younger patents than the neurologists as a result of some degree of selection of cases referred for surgery.

Since the work of Carmichael in 1950 the pathogenesis of intracranial aneurysms has been better understood. Although still commonly called ruptured " congenital " aneurysms, with the implication of sudden rupture in young persons, they are really acquired lesions occurring at the site of a congenital weakness, and not usually causing symptoms until later life. Histological evidence indicates that they arise as the result of the interaction of two factors:—

1. There is an arteriosclerotic lesion of the intima with degeneration of the elastic lamina;
2. There is a focus of medial aplasia which may be substantially enlarged by superimposed degenerative changes, although the developmental deficiency is the dominant lesion in this layer.

The precise combination of lesions varies greatly from case to case, but both developmental and degenerative factors are concerned in the genesis of

all these aneurysms, and no valid distinction can be made between the so-called congenital and arteriosclerotic types.

It would also appear from evidence obtained at operation and later histological studies, that the rupture of an aneurysm is a two-stage process. There is initially a dissecting process affecting the expanding wall of the aneurysm which results in seepage of blood into the subarachnoid space or into surrounding brain substance. This seepage is however insufficient to prevent further distension of the sac which becomes progressively thinner and may develop small daughter aneurysms. Eventually there is total rupture of the sac with extravasation of much greater quantities of blood; if the aneurysm is applied to brain substance there will be considerable destruction of cerebral tissue already softened by the initial leak of blood. This second episode of haemorrhage which is usually considerably more damaging than the first, commonly occurs between the second and twentieth day of the illness.

The above description is of course a generalisation and there are many cases which do not follow the pattern described. Notable among these are the many cases who apparently never experience a minor episode of bleeding but succumb early to a massive extravasation of blood. This is an assumption and must remain so, for these patients are usually unconscious when first seen and commonly remain unconscious. It is therefore not possible to take any history of premonitory symptoms in these cases.

This general rule of an initial small haemorrhage followed after a variable period by a more severe bleed is none the less of extreme importance, for the early recognition of the minor episode for what it is may save many lives. Such recognition is not always easy, and for the busy practitioner it is all too tempting to dismiss a sudden occipital headache, which clears up after a day or two with no residual neurological defect, as due to influenza or sitting in a draught or some such facile explanation. The more obvious cases with neurological deficiencies (e.g. ophthalmoplegic migraine) are less likely to be missed, but if care is taken to test all cases of sudden, severe, unexplained headache for signs of meningism then the diagnosis will usually become obvious. The finding of neck stiffness is particularly important and probably is found in 85% of cases. Absolute confirmation of the diagnosis may be made by the finding of an homogeneously blood-stained cerebrospinal fluid which is under increased pressure. Lindsay in 1950 pointed out that a loss of as little as 3 mls. of blood into the c.s.f. gives approximately 100,000 red cells/cu.mm. of c.s.f., which will appear as heavy blood staining.

The likelihood of a recurrent bleed (or major episode) within three weeks of the ictus has been variously estimated by different authors as between 19 and 45%, but it seems likely that the higher figure is the more probable. This then is the initial period when surgery must be considered, for as previously mentioned the second bleed is likely to be the more serious, and if not resulting in death may well result in neurological deficiencies in the form of hemiplegia, visual or speech disturbances etc., depending to a large extent upon the site of the aneurysm.

Before considering treatment some mention must be made of the prognosis. Many physicians still consider the outlook to be one of gloom and impending death, and may indeed advise their patients so. Such a prognosis is based on ignorance. Walton (1956) collected 1,480 cases and showed that the overall mortality within the first eight weeks of the illness was approximately 45%, the majority of these deaths occurring in the first three week period. Of those surviving the first eight week period about 20% will die of a recurrent bleed at a later date—often within the first six months. This leaves 44% of cases alive and mostly well, although about one third will be to some extent disabled by residual paralysis, epilepsy, headache and often anxiety.

Such a prognosis is based on conservative management. Even better results are obtained by the surgeons, but their results do not give a complete picture for there must inevitably be some selection of cases forwarded for surgery. And besides, in many parts of the world (and even the British Isles) the services of a neurosurgeon are not always readily available.

Treatment

Surgical therapy is not yet universally established, and many cases will continue to be treated conservatively; hence the technique of conservative management is still of considerable importance.

In treating patients conservatively the prime essential is strict bed rest in hospital with careful nursing care. It is probably safest to enforce bed rest until four weeks after headache and neck stiffness have disappeared. Initially the head of the bed should be raised in order to drain blood into the theca. The relief of headache is important and there is still considerable argument as to the best analgesic. Pethidine is advocated by many, and codeine often relieves the milder headaches. The use of morphine is questioned because of a theoretical tendency to raise the intra-cranial pressure, but Walton used morphine in one hundred cases without detriment. Barbiturates are almost invariably unsuccessful.

The headache which occurs in sub-arachnoid haemorrhage is principally the result of the raised intracranial pressure with resultant stretching of blood vessels and meninges. Hence a reduction of pressure helps to relieve headache and may also prevent the development of pressure lesions. The methods available for reducing intracranial pressure are two fold: (1) lumbar puncture, (2) detensifying therapy.

The use of lumbar puncture is also the cause of considerable controversy. Merritt in 1938 advocated twice daily reductions in pressure. Schwartz in 1948 recommended the avoidance of lumbar puncture except for diagnosis. Others such as Sahs and Keil (1943) have suggested that while there is no harm in repeated lumbar puncture neither is there much benefit. The modern view would appear to be that in the average case lumbar puncture should be performed for diagnosis only; but where there is continuing severe headache, restlessness, meningeal irritation or prolonged coma then it may be repeated with slow reduction of pressure to about 100-150 mms. of water. There is no evidence that lumbar puncture causes recurrent bleeding, but there are the ever-present dangers of tentorial herniation or the production of a cerebellar cone. Papilloedema by itself is not a contra-indication since it may be produced by bleeding limited to the sub-arachnoid space.

Detensifying therapy is not of proven value, although it may be effective in decreasing very high intracranial pressures. In many cases the effect is short-lasting and the pressure returns to the previous, or even higher, values. The methods used include the intravenous administration of 50% sucrose, and rectal infusions of 10% magnesium sulphate.

Nutrition and hydration must be maintained. This may prove difficult in the comatose patient since intravenous fluids should be avoided for fear of raising the intracranial pressure or causing pulmonary congestion. Tube feeding may become necessary but most patients recover sufficiently to take food by mouth before the problem becomes urgent. The use of laxatives to prevent straining at stool is important, and the bedside commode may well require less effort than the bed-pan.

The possible advantages of hypotension and hypothermia are interesting Hypotension might be considered of use in the prevention of recurrent bleeds, but it is probable that such an advantage is more than outweighed by the danger of anoxic damage to cerebral tissue. It must be remembered that vascular spasm with the production of small infarcts is one of the commonest complications of sub-arachnoid haemorrhage, and the production of pro-

longed hypotension would undoubtedly increase this risk. Hypothermia by reducing the rate of cerebral metabolism would seem to offer greater advantages.

As in all patients confined to bed for long periods, great care must be taken to prevent renal and pulmonary complications and should they occur prompt therapy must be instituted. Passive physiotherapy should be given to prevent deep venous thrombosis, for should it become established treatment with anticoagulants is obviously not advisable.

The role of surgical treatment has grown apace. In 1934 Ayer wrote that: " Sub-arachnoid haemorrhage has little interest from a standpoint of active surgical procedure." Sixteen years later Falconer is to be found advocating that: "All cases should be investigated and treated surgically." Two factors have been of the greatest importance in this radical change of opinion. Firstly the development of cerebral arteriography by Moniz in 1927 has enabled the accurate localisation of many aneurysms. In 1957 Gillingham showed that with careful bilateral carotid and vertebral angiograms it was possible to demonstrate the lesion in 65% of cases of sub-arachnoid haemorrhage. Nonetheless in about 35% of cases no abnormality is demonstrable and it must be presumed that either the responsible lesion is too small to be outlined, or else it has undergone thrombosis with the " apparent spontaneous healing " described by Falconer. Fortunately however negative angiography indicates a good prognosis. The use of angiography, together with a reduction in operative risk following the introduction of controlled hypotension and hypothermia, has led to a great improvement in surgical results.

The details of surgical techniques may be read elsewhere. Suffice it to say that two methods are available: —

1. Carotid Artery Ligation.
2. Direct Intracranial Attack.

Both methods were pioneered by Dott in the early nineteen-thirties and many of the refinements of technique have come from the Edinburgh School. Direct intracranial attack is probably preferable with clipping or ligation of the neck of the sac; where an adequate collateral circulation is available clipping of the proximal limb of the artery of supply is probably a more reliable technique.

The results of surgical treatment will depend upon the site of the lesion, the time since bleeding occurred, the technique used and of course the condition of the patient. Gillingham in a personal series of eighty patients had an overall mortality of 21%. Like many others he found that the operative mortality was three times as great in those patients treated during the first three weeks after bleeding began, as in those where treatment was delayed. However in a later series of forty-seven patients managed by carefully judged expectant and operative treatment he obtained an overall mortality of 10.9%, although the operative mortality remained at his previous figure of just over 20%.

A direct comparison of medical and surgical results comes down heavily in favour of the surgeons, although it must be remembered that most surgeons carefully select their cases—in fact one surgeon (Poppen, 1951) going so far as to admit that ". . . death occurred in patients who were not carefully chosen." And even those surgeons who do not select their cases see only those patients who are referred to them by their medical colleagues; in other words, those cases which have survived the G.P. and the Physician.

To refer back to Walton's series of 1,480 cases treated medically. He found an overall mortality of 45% in the first eight weeks; these then are the cases where surgery might improve on medical treatment. Of these, approximately 15% died within the first twenty-four hours and at present

lie outside the scope of surgery. This reduces the percentage available for surgery to 38% of the original hundred. When these are examined angiographically a further 30% of this group will be found unsuitable for operation (e.g. negative angiogram, multiple lesions, inaccessible lesions) and so we obtain a final figure of 27% of all cases where surgery can offer improvement over conservative management. But there remains an operative mortality of about 20% and this further reduces the figure to 22%. Thus in only 22% of all cases of sub-arachnoid haemorrhage due to intracranial aneurysm can surgery at present offer any real advantage over medical treatment; it is therefore obvious that there is still an important place for careful conservative management.

In conclusion it must be emphasised that while refinements of surgical technique will continue to improve the prognosis, such improvements can only be used to their full advantage in the light of improved diagnosis and assessment and it is imperative that the early minor episode of bleeding should be recognised in those cases where it occurs and the patient referred at once to the neurosurgeon.

MEDICAL AND DENTAL DEFENCE UNION OF SCOTLAND LTD.

Benefits Offered by the Union:

Defence of claims for alleged negligence in professional work, including unlimited indemnity and costs.

Defence of claims against a principal in respect of acts by an assistant or locum.

Advice on difficulties arising out of professional practice.

All benefits available to members in Scotland, England, Wales, Northern Ireland, Isle of Man, and Channel Islands, and to Short Service and National Service Officers with H.M. Forces in any part of the world, provided the total Commissioned Service does not exceed five years.

Benefits of Membership for new graduates date from date of application provided duly registered at that date.

Subscriptions for new graduates £1 for first three years, thereafter normal subscription of £2. No Entry Fee for new graduates.

Full particulars and Forms of Application for Membership can be obtained from the Secretary.

C. C. MILLAR, T.D., C.A.

105 ST VINCENT STREET · GLASGOW, C.2

THE DIAGNOSIS OF HYSTERIA

Based on a Dissertation read before the Royal Medical Society on Friday, 24th October 1958.

By A. B. CRADDOCK

I must confess at the outset that the subject of hysteria still awaits an adequate definition but the following one is as good as any so far produced. " Hysteria is a person's response to environmental difficulties, which makes it impossible for that person to perform his duties." Hysteria can be considered as subconscious malingering, but this concept too, fails to be comprehensive. In making the diagnosis of hysteria the following aspects should be considered:

The personality of the patient.
Dissociation.
Suggestion.
The actual clinical features.
The rôle of organic and psychological factors.

Perhaps the most salient feature of hysteria is its propensity to occur more commonly in people with what is known as a hysterical personality.

Some people seem to fall into this group because of their childhood environment and experience. Thus, a child who escapes from difficulties through illness, real or imagined, is liable to use this pattern of escape behaviour in adult life. Children who find in their illness, a good method of attracting attention will do the same thing. If the child's upbringing makes it plain that all one has to do to escape from a difficult situation is to develop some incapacity, then, the child will simply develop the incapacity and this is thought to be the explanation of the highly developed fainting ability of Victorian ladies. Training and education are also important at later stages of development, for example the habit of implicit obedience in soldiers has been shown to facilitate the production of hysterical symptoms.

Hysteria is commoner in people whose central nervous integration is unsatisfactory. This term includes immaturity and deterioration of the CNS. The following groups of people tend to develop hysteria therefore:—Mental defectives and others of low intelligence, children, cases of presenile dementia due for example to arteriosclerosis and atheroma, people with cerebral tumours, GPI, and meningovascular syphilis.

An action which is normal in a child would often be termed hysterical in an adult. This pseudohysteria in children is distinguished from true childhood hysteria, which is comparatively uncommon, by its emotional accompaniment. The "belle indifference" is found only in the true hysteric.

The traits of the hysterical personality can best be understood if they are considered as being caused by emotional immaturity and instability. The reaction to emotional stimuli is superficial and short lived. The person is immune from deep emotions and withstands stormy situations better than other people because their conflicts and consequences do not reach him. He is quick to forgive and forget and fails to understand people who are not. One well marked feature is an incapacity for insight into the reasons which prompt his actions and other people's. Thus he does not recognise outright lying for what it is and believes himself to be a very candid person—which is not true. He is sexually immature and despite a long series of flirtations he

fails to establish permanent relations with members of the opposite sex. He may suffer from underdeveloped secondary sex characteristics, although the reverse is not necessarily true. A histrionic tendency often leads to success as an actor, a salesman, or popular lecturer. Similarly occupations such as nursing which are popularly associated with strong sentimental appeal attract a large quota of potential hysterics. There is always a need to exaggerate and, in combination with the typical lack of insight, this often produces a paranoid quality. Failure is due, not to lack of ability, but to the blindness, ill will and stupidity of others. A hysterical personality has no core but only an ever changing series of masks.

A constant feature of hysteria is an abnormal dissociation. By this I mean an abnormal disconnection of groups of functioning elements. Not only is there isolation of function, as for example hysterical paralysis, but there can also be independence of function as for example hysterical tremors and vomiting. In some cases hysterical dissociation is almost spontaneous and it is in this group that a hysterical personality is most typically found.

In most cases there is some degree of mental conflict and where mental conflict is extreme even the more normally composed person may become a hysteric. Mental conflict arises when a person must reconcile factors which are for him irreconcilable, and for this reason the more highly intelligent and experienced members of society run less risk than their less fortunate cousins. In some cases the conflict is between the patient's conscious desires and his subconscious desires, or even between different subconscious desires. The hysterical reaction may not solve the problem in a rational or a satisfactory manner but the mental conflict is abolished and the patient's attitude is one of " belle indifference."

The hysterical patient is suggestible. Suggestion is neither a highly reasoned action nor a simple reflex. It is a reaction to a symbol. Thus a patient who on being shown a patellar hammer, produces a knee jerk, is demonstrating suggestibility. Now the presence of this phenomenon depends on three main components. Firstly—previous experience—a patient whose knee jerks have never been tested could not be the subject of this suggestion. Secondly—the presence of an adequately suggestive symbol in this case the tendon hammer. Thirdly—the absence of inhibition of the pathological development. The hysterical personality lacks insight. For this reason he does not try to remain a healthy person. An alternative point of view regards hysteria as a mental dissociation into logic tight compartments so that insight into the condition is precluded by its very nature. Dissociation of this kind has been produced experimentally in students by subjecting them to mental conflict.

Now I wish to consider the symptomatology of hysteria. Any disease or symptom may be simulated. The symptoms may be emotional such as unreasonable disgust, fear, anxiety, depression or elation, or physical diseases may be simulated, and it would take a large text indeed to include even the main possibilities. In general one can say that the hysterical imitation always has some bizarre and erroneous element. Moreover the diagnosis is usually made simpler by the presence of other features of hysteria itself. An interesting aspect of symptomatology that tends to be forgotten is that the hysterical features may be symbolic of the mental conflict which has been solved. It has already been mentioned that hysteria may merge into malingering and in hysterical people elements of both may often exist, or, hysteria may develop from and replace malingering. Hysteria may also merge into obsessional states and the symbolism associated with the latter may be found in some cases of hysteria. For example vomiting may symbolise the patient " being sick of pregnancy," physiological vomiting of pregnancy having

suggested the hysterical vomiting. On other occasions symbolism can be extremely complex and have meaning for the patient only.

In the causation of hysteria, organic cerebral disease or a psychotic disease may play a part. Hysteria in pure culture is, according to some, a rare condition. A diagnosis of hysteria must be accompanied by suspicion that another disease is present and this other disease should be sought out. Hysteria occurring in a previously well balanced, non hysterical adult is always very suggestive of another disease. At the same time one must not allow the suggestible nature of the hysteric to produce in him the features of diseases which he does not have. Bad management at this stage may cause the patient to develop incapacities which are worse than those he had before seeing the doctor. Alternatively the patient may simulate the organic diseases more accurately than before. Hysteria may precede or accompany schizophrenia, anxiety states, psychopathic states, and possibly epilepsy and tuberculosis.

Probably the commonest type of hysteria occurs as an overlay or exaggeration of an organic illness. At other times the hysterical disability may follow an organic or mental illness which has been cured and take on its features.

Hysteria is a condition which should be recognised more often than at present—especially below the consultant psychiatrist level. Paradoxically, cerebral diseases which have contributed to the production of the hysterical state are often overlooked when hysteria itself is recognised. It must be admitted however that the tremendous variety of hysterical features, particularly when they are associated with organic disease, presents a difficult diagnostic problem—but it is the more interesting because of this.

NEW BOOK JUST PUBLISHED

EARLY DIAGNOSIS

BY VARIOUS AUTHORS

EDITED BY

HENRY MILLER, M.D., F.R.C.P.

Physician in Neurology, Royal Victoria Infirmary, Newcastle upon Tyne

TWENTY-FIVE CONTRIBUTORS

★

CAIRNS BROTHERS

2 and 3 TEVIOT PLACE · EDINBURGH 1

Phone CAL 6563

GOINGS-ON DURING THE 222ND SESSION

By NIGEL MALCOLM-SMITH

During the 222nd session the Public Business Committee has provided us with a varied programme of outside activities, apart from the usual Friday evening meetings.

In November the Presidents' Annual Dinner was held in the Hall of the Royal College of Surgeons of Edinburgh. We were pleased to have as our Guest of Honour Mr Thomas McW. Millar, a well-known and well-liked personality throughout the Edinburgh medical school. As usual, undergraduate members went back to Melbourne Place afterwards where the party was continued well into the night. We look forward to next year's Dinner when we will be pleased to have Sir Stanley Davidson with us as Guest of Honour.

Later that month about thirty members of the Society went through to Glasgow as guests of the Glasgow Medical-Chirurgical Society to take part in the debate "That we regret that the student of today is the doctor of tomorrow." We were ably represented by Mr John McNaughton who led the opposition, and Mr John Turnbull who, in his inimitable manner, seconded the motion. The standard of debate was surprisingly high, a good selection of speakers coming from both societies. We should like to take this opportunity to thank the Glasgow Medical-Chirurgical Society and hope that they will be able to join us in debate in Edinburgh during next session.

Perhaps our most refreshing activity this year was the visit in December to Messrs William Younger & Co.'s Holyrood Brewery. We were given a lengthy tour of the establishment by the Company's official guide and were shown all aspects of the manufacture of William Younger's beer from the raw materials to the finished product. At the end we were very kindly invited to come and sample some of the finished product, which the Society seemed to be both very willing and capable of doing.

Another industrial visit in a more serious vein was that made to the Ministry of Pensions Industrial Rehabilitation Centre at Granton. Here we were shown some of the work which goes into getting a person back to full employment after a period of physical or mental illness. The meeting finished with a short film outlining other aspects of such work being done in Rehabilitation units throughout the country.

The third visit of the session was to the Wilkie Research Unit for Experimental Surgery, a visit which was to have taken place in the previous session but which had to be postponed. Dr Delorme, the assistant director of the unit, showed us around and detailed some of the work which was going on, especially with regard to the bone marrow studies on animals.

One evening during the session was devoted to a showing of medical films, the titles being "The Therapeutic use of A.C.T.H." "Acidity," "Dyspepsia and Peptic Ulcer," and "The G.P. and Rheumatic Diseases." The projector and films were lent by J. Wyeth & Co.

The final social event of the session was held in the Carlton Hotel on 16th April when we attended the dinner dance, which has now become an annual feature in the Society's calendar. We have to congratulate Mr John McKendrick on the successful organisation of this function.

From this brief account former members will realise that the R.M.S. is still alive with activity of a social as well as a medical nature. We ourselves hope to maintain this spirit during the 223rd session.

FAMILY MEDICINE

By RICHARD SCOTT

M.D., D.P.H., Reader in General Practice and Director
Edinburgh University General Practice Teaching Unit.

Introduction

The Faculty of Medicine of this University has decided that from now onwards every student shall be provided with the means of not only observing, but of actively participating in, the provision of medical care for patients in their own homes. The task of making the necessary arrangements is the responsibility of the University's General Practice Teaching Unit. It gives me particular pleasure to accept an invitation from the Royal Medical Society to contribute to its journal an article on this Unit, its history, aims, philosophy, and teaching methods.

The Unit has grown out of the nucleus of a practice set up in 1948 in the premises of the Royal Public Dispensary. This, the oldest of the Edinburgh dispensaries for the sick poor, was founded by Andrew Duncan in 1776. The same Andrew Duncan, who ranks amongst the most illustrious of the physician-teachers whom this school has produced, played a leading part in the founding of the Royal Medical Society, and was largely responsible for obtaining for that Society its Royal Charter. Andrew Duncan, like so many of the Edinburgh graduates of his day, pursued his postgraduate studies in the continent of Europe and was profoundly influenced by what he saw and learned in the medical school of Leyden. He returned to Edinburgh deeply imbued with the Boerhaavian enthusiasm for clinical instruction. The lecture theatre and the textbook were inadequate means of training medical students unless reinforced by practical demonstration by the bedside or in the doctor's consulting room. The doctor-patient relationship was no longer merely a subject for academic discourse and disputation, but had become an actual vehicle for the training of the medical student. It is not surprising therefore to learn that from the day of its foundation, under the leadership of Andrew Duncan, the Royal Public Dispensary (and indeed all the Edinburgh dispensaries for the sick poor which were established in the years that followed) served a dual purpose, namely the provision of medical care and the instruction of medical students. The dispensary tradition was a prominent feature of this medical school. In one sense, therefore, there is nothing new in the provision of clinical instruction outside the hospital for all our students. What is new concerns the circumstances under which the patient and the student are introduced to each other.

By the second decade of this century, the service provided at the public dispensaries was beginning to change in many respects. The extension of hospital services—in particular outpatient services—the rapid development of personal services provided by the local authority for school children and for infants and expectant mothers, the provision of medical care by the State for the indigent and for persons suffering from certain categories of illness, e.g. tuberculosis, venereal disease and mental disease, the introduction of National Health Insurance, and the generally increasing prosperity of the 'working classes,' brought profound changes in the kind of patients who used these dispensaries and exerted a specific selective action on the kinds of morbidity which these patients presented. By the 1930s there had come about dramatic changes in the quality and quantity of clinical material

available at these dispensaries for instruction of medical students. In the following decade, the rapid expansion of statutory and voluntary social services and finally the inauguration of the National Health Service rendered the dispensaries completely redundant as a form of medical charity.

It is paradoxical that at a time when the Edinburgh dispensary system was undergoing disuse atrophy, teachers in practically every medical school throughout the country were becoming increasingly preoccupied with the need to bring the student out of the hospital into the community. This desire to provide some practical instruction for the student in a setting outside the hospital came about for a number of reasons. These are inherent in changing trends in the practice of medicine which have become more marked since the introduction of the National Health Service. The changes have come about not so much because of the Health Service. The provision of a National Health Service has merely focused our attention on the nature of these changes.

Changing patterns in medical practice and in the provision of medical care

The post-war era has seen rapid advances in medical science and profound changes in the practice of medicine, both in the hospital and in the community. Each advance in knowledge and every change in the practice of medicine brings its own problem and challenge to the medical teacher. Among current trends the following are singled out because of their particular relevance to undergraduate teaching:

(1) The patterns of morbidity have undergone dramatic change in recent years. One of the most striking features of this change has been the decline of infection as a major cause of morbidity. Degenerative cardiovascular disease and neoplasms dominate the patterns of morbidity seen in hospital where even in the acute teaching hospital the average age of the patient population has risen steeply even during the past decade. Improvements in diagnostic techniques, the greater availability of diagnostic facilities, and in particular dramatic additions to the therapeutic armamentarium of the family doctor, have all contributed to the virtual disappearance from hospital practice of many illnesses which were commonplace a few years ago, and are no longer seen except in the setting of domiciliary medicine. Diseases and syndromes which account for the great bulk of our national morbidity are very sparsely represented in the material available for clinical instruction in the teaching hospital. It is no longer possible to demonstrate to the student in this setting that the common diseases are the common diseases. It may therefore be that these qualitative and quantitative changes in the patterns of morbidity presenting at our teaching hospitals have themselves caused us to consider the possibility of taking the student out of the hospital into the community, in order to give him adequate practical instruction in ordinary clinical medicine.

(2) Alongside this decline is the actual and relative incidence of disease of infective origin, there has come about a relative and actual increase in disease which has its origins in faulty adaptation to the normal stresses and strains in the human social environment. The increasing importance of faulty human relationships in the etiology of disease, the importance of considering the inter-personal relationships of the patient in the management of disease, have led to an increasing preoccupation with what is happening to the patient in the

home, in the family, in the community, and at work. In this way we hope to increase our understanding of the diagnostic and therapeutic problems confronting us at a particular point in time during an episode of illness which has brought about the patient's admission to hospital.

(3) The rapid development of specialisation is probably the most striking single feature of current trends in the practice of medicine in our generation. The increasing tempo of specialisation is bringing about a state of affairs in which the more junior clinical teaching staff of medical schools is largely composed of specialists who of necessity have to concern themselves with a narrowing field of clinical interest. The pressure to specialise early in one's postgraduate years frequently denies to the future teacher the opportunity to gain a substantial personal experience of dealing with patients in their own homes. The specialist by definition must limit his field, and in so doing pre-determines the kind of clinical situation to which he is exposed. His efforts to advance knowledge in his particular field frequently leave him with little opportunity of gaining practical experience of dealing with the ill-differentiated clinical and social problems in diagnosis and management which daily confront the doctor practising medicine in the homes of his patients. One of the by-products of specialisation is that it conditions the doctor to adopt an analytical approach to the professional problems with which he is confronted by his patient. By breaking down the problem into its component parts, he reaches the diagnosis—he advances medical research. As a result the students whom he teaches absorb this philosophy, this attitude of mind, and it is essential that they should do so because this is the essence of the scientific approach. At the same time the practice of medicine and the attitude required of the doctor who is actually treating the patient, is in essence a synthesis—a putting together of the known clinical facts alongside the doctor's knowledge of the patient as a person, as a member of a family, as a member of a community. One of the unfortunate but not inevitable by-products of specialisation is that it can lead to a separation of the teaching of medicine from the practice of medicine. Here again, since many of the factors involved in the provision of integrated comprehensive medical care are concerned with the patient as a member of a community, the specialist working entirely within the walls of the hospital is peculiarly handicapped in the resources available to him for the instruction of students.

(4) The fourth set of circumstances which require special consideration are the changes which have occurred and which are still taking place in the provision of medical and social services for the community on a national basis. Probably the most significant single facet of the National Health Service is that it granted to every citizen in this country access to the services of a personal medical practitioner. It is important to remember that little more than ten years have passed since we began to accumulate experience on a national scale of the professional, educational, administrative and other problems which arise when medicine is exposed to the full pressure of society. The idea that medicine must serve society is not new, but the fact that society in the form of a personal domiciliary medical service has an eloquent means of expressing its needs in respect of compre-

hensive and integrated medical care is something new. The challenge to medical schools is obvious since they must provide the basic training for all doctors who man this service.

Re-orientation of Medical Education

The significance of these trends in the evolution of medicine and of our medical services has been the subject of considerable detailed discussion by teachers in every medical school in this country. The General Medical Council, governmental commissions and committees, the Royal colleges, the British Medical Association, and many other bodies and individuals, have reported on one facet or another of the problems involved. All have emphasised the need for widening our horizons in medical education. Many of these reports have emphasised the need to focus the students' attention on the social and community aspects of health and sickness.

One of the features of this post-war era in medical education has been the expansion which has taken place in many medical schools in the teaching of social and preventive medicine. These departments have often taken the initiative in developing schemes whereby the student is introduced to the medical and social services which exist in the community. Alongside these attempts to introduce the student to the community aspects of health and sickness, there have grown up a great variety of schemes for effecting the personal introduction of the student to the general practitioner. There is now practically no medical school in this country which has not made some arrangement, usually on a voluntary basis, which permits the student to pay visits of observation to a family doctor. These schemes all have one thing in common, in that they provide the student with an opportunity of seeing the patient as a person with his own unique family environment. In some of these schemes the student is introduced to the patient by the family doctor. In others, the student is encouraged to visit the patient's home with the primary objective of making his own appraisal of the social, economic and cultural factors in the patient's environment, which have contributed to the etiology of his disease or which complicate the management of the patient and his illness. In yet other schemes the attention is focused particularly on the medical and social resources available in the community for the care and after-care of the patient seen in the first instance in hospital.

The great variety of teaching schemes which involve the demonstration of the patient in his social habitat leaves one with the impression that there is no single discernible purpose common to all these schemes. In some schools it is the paediatrician who is concerned that his student should have a vivid picture of the importance of the background of the patients whom he is seeing in hospital. In others, the teacher of psychological medicine takes this opportunity to demonstrate the significance of human relationships within the family, at home, in the work situation, or in the community. In at least one school, the interest and enthusiasm of the teacher of bacteriology has led to the development of a scheme whereby the student is encouraged to go out of the hospital into the homes of his patients. In other schools the motivation is less specific and is more directed at broader educational objectives. The Dean of Clinical Studies in some instances is the person primarily responsible for making arrangements of this kind. The great variety of these schemes for sending students to work for varying periods with family doctors suggests that there is more than one cause operating in this educational malady. They do suggest, however, that there has come about a growing awareness of the possibilities of exploiting the family doctor-patient relationship for the purposes of undergraduate teaching.

While therefore there was nothing unique in the educational challenge

with which this medical school was faced in post-war years, and while we were not alone in our appreciation of the potentialities of family medicine as a vehicle for instruction, this school possessed two unique assets which have enabled us to make our own special contribution in this field. The first was the long and intimate association between the medical school and the city's dispensaries for the sick poor. Although the material contribution which these dispensaries could make to our teaching resources was continuing to decrease year by year, the traditional and sentimental attachment of the school to the dispensaries was still probably stronger and more vividly appreciated than in any other medical school. Our second and even more important asset was Professor F. A. E. Crew. Immediately after the war, when we were seeking a new definition of social medicine as an academic discipline, F. A. E. Crew was appointed to the Chair of Public Health and Social Medicine in this medical school. It was the vision of this man which was largely responsible for our setting up a teaching general practice in the premises of the Royal Dispensary with a view to obtaining a field laboratory to be used by the medical school for research and teaching in social and preventive medicine. While Crew's original concept of the function of this unit and the contribution which it could make to medical teaching has been considerably modified, he was undoubtedly the source of inspiration which led to the establishment of this Unit.

The General Practice Teaching Unit

On 5th July 1948, the day on which the National Health Service Acts came into force, Professor Crew prepared the way for the acquisition by the University of a teaching general practice by seconding his senior lecturer, who was given the task of using the premises at the Royal Dispensary as practice premises from which he offered a full-time family doctor service to any patient who chose to register with him as a principal under the terms of the National Health Service Act. In time this doctor was reinforced and as the practice grew the service offered to the patients was provided by a team comprising two family doctors, a nurse, a medical social worker, and a secretary. From the beginning a limited number of senior medical students were permitted to attend on a voluntary basis for practical instruction. By 1951 this practice was able to provide a three months' course of instruction to some 30 students.

By that time the only remaining dispensary in the city, the Livingstone Memorial Dispensary which was used as a training ground by the Edinburgh Medical Missionary Society, was about to wind up its affairs. At this stage the University received a generous grant from the Rockefeller Foundation to enable us to extend our teaching facilities by acquiring a second practice which used as its headquarters the premises of the former Livingstone Dispensary, now known as Livingstone House. The Unit thus became established on an experimental basis in 1951, and consists of two general practices each manned by a family doctor team comprising two doctors, a nurse, a medical social worker, and a secretary. The total patient population being looked after by these two practices was in the region of 5000 persons. By 1956 when we were nearing the end of the period of support from the Rockefeller Foundation, the Unit was offering a course of instruction to some 60 students per annum. It was then that the Faculty of Medicine recommended that the Unit should become an integral part of the medical school and should expand its teaching facilities as rapidly as possible so as to be able to offer instruction to every medical student. We have now reached this goal. Some of the expansion of clinical and teaching facilities has been achieved by recruiting to the part-time staff of the Unit a number

of selected local general practitioners. According to our teaching load, we can now attach up to a maximum of four such part-time colleagues to each of our two practices. This arrangement not only increases the number of students we accept, but it also provides us with an opportunity of arranging for each student to spend part of his time working in the University practices and part of his period of attachment seeing how a family doctor works under conditions which approximate more closely to those which obtain in general practice under the National Health Service. One further development should be mentioned to bring up-to-date this brief account of the evolution of this Unit.

Through the generosity of the Nuffield Provincial Hospitals Trust there has been set up in Edinburgh a Family Doctor Diagnostic Centre providing full range of X-ray diagnostic facilities, laboratory facilities including haematology, biochemistry and a limited amount of bacteriology, and the services for diagnostic purposes of a trained medical social worker. It is the intention that this Family Doctor Centre, which will become the responsibility of the Department of Health for Scotland, shall be open to all family doctors practising in the city of Edinburgh. This Centre is located in the premises of the General Practice Teaching Unit at its headquarters in Livingstone House. To begin with the number of doctors using the Centre will be limited. The services however will be available to the members of staff of the University's General Practice Teaching Unit, and will add considerably to our teaching resources.

Teaching Arrangements

Each student in his Fifth Year is attached to the Unit for one academic term. During that term he is allotted a minimum of two weekly afternoon sessions in the Unit. Each student is attached to a particular doctor, and on a fixed day per week he is the only other person present when the doctor is at work in his surgery attending to whatever patient appears during that consulting period. He also accompanies the doctor on home visits either in response to new calls which have been initated by the patient, or on follow-up visits initiated by the doctor. At the beginning of the term, the role of the student is that of observer, of seeing a family doctor at work. As the term progresses, however, he takes an increasingly active part in the diagnostic assessment of the patient and in working out, under the immediate supervision of the patient's own doctor, the regime of therapy. The student gradually takes over with the patient's consent and under the supervision of the doctor, delegated responsibility for the management of a patient and his family. He thus becomes the doctor's apprentice.

Each student and his doctor attend a weekly tutorial. This tutorial is made up of not more than ten students, half of them working in the Unit and the other half in the practices of our extra-mural colleagues. The students and their doctors come together to discuss and review the work they have been doing during the previous week. The students are reminded that patients have an elementary right of direct access to the doctor of their choice, that the final responsibility for all decisions both major and minor must rest with the doctor, that the consent of the patient must be sought literally on all occasions on which the student is introduced. This means that this teaching mechanism is necessarily costly. While the students can make a worthwhile contribution to the work of the practice, they may not interfere with the establishment and continuing maintenance of a true doctor-patient relationship between the patient and the doctor of his choice. This however means that it is the patient, in the last analysis, who is the teacher. The patient has a family doctor, he knows what a family doctor

is, the kind of work he does, the kind of problems which he is willing and able to tackle. The student does not know, and thus the student is manoeuvred into a situation in which the patient tells him what he must do, what he must know, what kind of things he has to be able to tackle if he hopes to become a family doctor.

Teaching Objectives

Our immediate objective is of course to exploit the opportunities which exist in the setting of family medicine for allowing the student to see and himself take part in, the actual provision of medical care. In doing this we hope to provide the student both with the opportunity and the challenge to integrate all that he has learned so far in his clinical teaching in the hospital. We are not so much concerned with teaching the student anything new as with providing him with an opportunity of assimilating and integrating the knowledge and skills with which he has already been equipped. Although the student will learn a great deal about the nature of general practice, we are not primarily interested in or concerned with vocational training for general practice. The teaching experience to which the student is exposed and the lessons he can learn have just as much relevance for the young man or woman who is not going to enter general practice but is taking up some other branch of medicine. Indeed, rather than emphasise the purely vocational aspects of training for general practice, we are particularly concerned with the necessity of demonstrating to the student that medicine is indivisible. In a practical situation in which the doctor is placed vis-a-vis the patient, there is no such thing as preventive medicine, curative medicine, social medicine, or any other kind of medicine. There is just medicine. We are more concerned therefore with demonstrating an attitude of mind than with the demonstration of techniques or the imparting of information. Among the practical situations which can be exploited in this context for the purpose of teaching are the following:

(1) The patient is the teacher. In the familiar setting of his own home, clad in his working clothes instead of hospital pyjamas, surrounded by the familiar objects of his daily existence instead of the paraphernalia of the hospital, and in the presence of his family, neighbours and friends, the patient is obviously more relaxed, more at ease, more loquacious, better able to express himself and to describe and discuss intimate personal relationships. At a home visit the salient features of his socio-economic circumstance can often be taken in at a glance without recourse to a formal structured social case-taking inventory. The patient takes an active part in the consultation. He talks back to the doctor. He has fewer inhibitions about discussing his problem, about mentioning the trivialities which are often highly significant. He is more likely to ask the simple, direct or sometimes tentative question which might remain frozen on his lips in the unfamiliar setting of the hospital or clinic. Under these circumstances it is not surprising that the student's history, his account of the illness, and his appreciation of the significance of the relative clinical and social factors, is more rounded and complete.

(2) In the consulting room the student sees for himself the wide range of undifferentiated clinical problems which present in rapid succession and in a completely unrehearsed fashion to the family doctor. He sees the trivialities, the acute emergencies, the beginnings of major organic disease, the terminal illness, the incurable, the hopeless. He thus acquires some insight into the significance of the direct access of the public to medical care.

(3) This direct access of the patient to the doctor enables the student to gain some insight, not only into the very wide range of organic and functional disorder which exists in the community, but also introduces him to the notion that there is no strict dividing line between clinical and social pathology. The student is thus introduced to this border land which is the concern both of medicine and of sociology. He discovers that he must concern himself, not only with human anatomy and physiology, but also with the anatomy and physiology of society.

(4) The continuity of care which is inherent in the nature of family medicine lends itself particularly to directing the student's attention to the natural history of disease. In discussion with the patient's family doctor and from consulting the medical notes of the patient and of his family accumulated over a period of years, he can see a disease process in continuity. The family doctor includes among his patients children who have not yet been conceived.

(5) Another major objective is to exploit the opportunities which exist for demonstrating that the care of the patient involves an adequate assessment of the home and family circumstances of the patient, the nature of his personal relationships at home, at school, at work, and in the community. Having been introduced to the idea that it is essential to make a social diagnosis, the student becomes involved in considering how to prescribe the appropriate social therapy. As well as a new drug the patient may require a new house, a new job, a new wife, or a new attitude to his old wife. Although he may be familiar in broad outline with the statutory and voluntary agencies which are available to the doctor for writing the social prescription, these agencies become more meaningful and realistic when discussed against the background of the peculiar needs of a particular patient and his family.

(6) One other facet of medical practice which can be particularly well demonstrated in the setting of family medicine is the need to develop and practice the skills of team work and collaboration. The family doctor has to look more and more to the hospital, to his consultant and specialist colleagues, to obtain for his patients the benefits of modern techniques, both in diagnosis and therapy, but he also has to turn away from the hospital to services which are available in the community to assist him in the care of his patients. He has to be ambivalent. He very often is required to take the lead as an integrator of the medical and social services already existing in the community which require to be harnessed, co-ordinated, and streamlined to meet the peculiar needs of a particular patient. This role of medicine as an integrator—the role of the doctor as a person who co-ordinates the medical and social services on behalf of his patient, who interprets his patient's needs to a medical or social agency, and interprets the agency and its functions to the patient—is one which specially lends itself to practical demonstration in the setting of family medicine.

(7) Finally, it is one of our objectives to introduce the student to the situation where the doctor has to learn to live with his problem and to differentiate between the patient's problem and his own emotional reaction to it. The doctor may have to accept the facts of the patient's socio-economic circumstance without necessarily doing anything about it. The student may have to be shown not only the potentialities but also the limitations of the contribution of scientific medicine. In this setting he can begin to appreciate the significance of the aphorism 'to cure sometimes, to relieve often, to comfort always.'

THE CHANGING FACE OF MEDICAL PRACTICE

Based on a Dissertation read before the Royal Medical Society on Friday, 9th January 1959.

By F. A. BODDY

Medical Practice has seen considerable change in the past century: during this time there has been a greater revolution in medical standards and activities than in the whole previous history of the profession. Medicine has evolved from the gentle art of the eighteenth century to the practice of the precise rationalism of the present day. In applying the techniques of modern science, Medicine has involved itself in almost every aspect of our environment and is becoming more and more a major factor in human ecology. The purpose of this article is to attempt to evaluate, albeit very briefly, the manner in which this change has come about.

The baseline of modern medicine may best be drawn in the Middle Ages. The legacy of superstition and mysticism of the Dark Ages, which influenced all branches of learning and which reduced critical enquiry to its lowest ebb, had almost obscured the essential philosophy of the ancient physicians at this time. The physician merely followed the teaching and instruction of the established ancients without true criticism or even doubt. Roger Bacon expounds the faults of the period in his essay: "On the Errors of Physicians" . . .

> "Physicians give themselves up to disputes about numberless problems and useless arguments and give no time to experience as they ought. . . . They multiply infinite and casual questions and still more infinite dialectic and sophistic arguments in which they get absorbed so that they are ever seeking and never finding the truth. For discovery is by the path of sense, memory, and experience—especially in the applied sciences of which medicine is one."

It was about the ancient authorities that the "schoolmen" argued and debated—but it was not debate about the fundamental truth of their theories: to be acceptable an idea must have proof from established authority. This was a discipline closely allied to, and conditioned by, a church that was at this time preoccupied with the problems of imagery and symbolism. The age of chivalry had little time for originality.

The academic upheaval described as the Renaissance constituted a complete upheaval in almost all philosophical attitudes. Its scientific aspects are paralleled by successful political and theological challenges to the supremacy of the church—seen, for example, in the activities of Henry VIII and Martin Luther. Within this general trend to more liberal ideals there came a revision of established views and a distrust of established authority. In medicine this is seen in publication of *De Humani Corporis Fabrica* by Vesalius and is well summarised by Harvey in the Preface to *De Motu Cordis* ." :

> "I profess," he wrote, "to learn and teach, not from books, but from dissections; not from the positions of philosophers but from the fabric of nature."

With the discovery of the circulation of the blood in the seventeenth century, and, more important, with the acceptance of this theory and its substantiation during this century, came the acceptance of the empirical, "observational" approach to medical practice. Vesalius and, later, Harvey, in their effect on biological science are comparable to Copernicus and Galileo in their service to physical science. All found expression in the philosophy of Francis Bacon. Bacon insisted on two requisites for scientific knowledge: first, the purging of prejudice, and second the importance of combining empiricism with rationalism and careful observation with valid reasoning—in short, a sound methodology. These ideas gained gradual acceptance as the basis of scientific thought and were fully established by the middle of the eighteenth century. Since then they have exerted a slow, but profound effect on medical practice for they form the basis of modern thinking.

Despite the advances of biology, medicine itself saw little change before the beginning of the eighteenth century. The whole nature of the community had changed in the preceding hundred years. It was to change even more dramatically before the century was done. The eighteenth century was an age of secularism—of an interest in the world and its doings; it was an age of rationalism—confident of the competence of human understanding and not needing to rely on the dogmas of others. Lastly, it was an age that accepted the natural order of things without any need for magical interference. Such attitudes were found in Athens at the time of Aristotle: they constitute a mentality which permitted free thought and tolerance of behaviour.

The eighteenth century applied such an approach to all its problems; it was the earnest endeavour of its citizens to make their age "the age of reason in all things," to secure free expression and to resist State interference in all their activities and beliefs. One result of this was a closer rapprochement between science and technology: demonstrated by the Agricultural and Industrial revolutions. Medical practice shared in this rapprochement and, whilst the fundamentals of the basic medical sciences were still largely unappreciated, the opportunities offered by scientific discovery were recognised and used to advantage.

It is at this stage that the beginnings of modern medical practice become evident—notably in the writings of Thomas Sydenham. The problem of the eighteenth century physicians lay in the philosophical differences between the theorists on one hand and the empiricists on the other. The latter adhered to the Baconian ideal; the former rejoiced in hypothesis and conjecture. The attitude of the empiricists, championed by Sydenham, slowly received almost universal adoption. "It is my nature," says Sydenham, "to think where others read; to ask less whether truth would agree with me than whether I agree with Truth."[1] Such an attitude was appropriate and desirable at the time; it was to have interesting and far-reaching effects. Its adoption in the eighteenth century produced the applied sciences of Pathology and Bacteriology, the revision of the pharmacopoeia and a revolution in medical education.

Practitioners of medicine were of many sorts falling roughly into two groups: the physicians and the chirurgeon-apothecaries. Only the former possessed academic qualifications, usually obtained on the continent and often of doubtful quality.

The chirurgeon-apothecaries were the General Practitioners of the eighteenth century. They were trained by apprenticeship for three years. At the end of this time they were examined and licensed by the various

[1] In the preface to Sydenham's *Treatise on Gout*.

Incorporations authorised to do so. Standards were very low, there was little or no theoretical teaching and no organised instruction. Alexander Monro, who started teaching in Edinburgh in 1724 was the first in Scotland to teach medicine in the modern sense. Many apprentices did not bother to become licensed for, as Graham[1] points out, "the threats of a few surgeons in Glasgow could not frighten quondam apprentices from posing as full-fledged doctors in Galloway or hinder them dispensing their hideous drugs in Inverness."

Such a state gradually gave way to higher standards. The outstanding feature of eighteenth century medicine was the development of hospitals which provided facilities for clinical teaching and permitted more organised study of disease and its clinical presentation. The foundations of this system of medical education were laid in the middle of the seventeenth century by Sylvius de Boe, Professor of Medicine at the University of Leiden. This beginning was taken up by Boerhaave: a man who was, in the words of an eighteenth century writer,[2] "an ornament of his profession and of his species." His sympathetic approach to the patient, his desire to understand disease from his own observations and his refusal to accept fanciful doctrines inspired great confidence. His enthusiasm as a teacher inspired his students --and it is there that his greatness lies for he was the inspiration of a group of students through whom he influenced the development of medical practice. The great medical schools of Gottingen, Vienna, Edinburgh, Paris and London, founding a new tradition in medical education, received their inspiration from Leiden.

One of the major advances resulting from the empirical approach to Medicine came from Jenner's observations on cow-pox vaccination for small-pox. Even though the mechanism of infection was unknown, it had been appreciated from the fifteenth century that many diseases were infectious. By observing the natural history of small-pox and by experiments based on these observations Jenner gave the world an antidote against "a disease that has ever been considered the greatest scourge of the human race." The pharmacopoeias of the period also show the gradual change from the enthusiastic decoctions of an earlier age to a more rational therapy based on observed effect.

In the early nineteenth century these trends continued. Empiricism flourished despite the romantic atmosphere induced by such potent influences as the French Revolution and the Napoleonic Wars. The romantic ideal of the nation reappeared, patriotism was reborn. Pope gave way to Shelley and Tennyson, Wagner composed the Meistersinger. The classic dignity of Georgian mansions was replaced by the eccentricities of a "Gothic revival." The sciences did not succumb to this spirit and medicine remained in a position to benefit the social developments concomitant with the general mood. That science remained independent permitted rapid developments in technology. Medicine, as always, remained closely bound to both. The development of Dollond's achromatic microscope enabled advances in pathology and bacteriology. The invention of photography in 1827 had potential significance. The study of organic chemistry was begun. The medical researchers were often engaged in scientific studies at the same time and so there was rapid investigation on the medical potentialities of developments in physical sciences.

Pasteur's demonstration of the germ theory and the achievements of

[1] H. G. Graham: *Social History of Scotland in the Eighteenth Century* (Chapter on Medical Education). Edinburgh, 1896.

[2] *Monthly Review* 16, p. 97 (1757).

bacteriology in general during the latter half of the nineteenth century with their derivatives of sterilisation, vaccination, immunisation etc., gave rise to the concept of specific aetiological factors in the causation of disease and induced a search for antidotal curative agents—the "wonder drugs" of the lay press. This approach has produced results that appear eminently satisfactory. By the turn of the century the micro-organisms of most of the infestive diseases had been isolated. Anaesthesia and asceptic techniques were well founded. Since then a palliative pharmacopoeia has been restocked with a host of remedial drugs. The science of nutrition has been mastered in its essentials. Endocrinological disease, notably diabetes and the thyroid disorders can now be controlled. Antibiotics are potent against infection.

In the administration of hormones or nutritional factors the physician replaces or fortifies the patient's metabolism. In prescribing antibiotics he protects the patient from the threat of a parasitic micro-organism. In each case he is applying a specific antidote to combat the immediate causal factor producing the diseased state. Whether in terms of the modern community this concept of therapeutics is adequate merits later consideration. To appreciate its full significance it is necessary to review measures designed to protect the public's health.

The origins of state medicine are well stated by Sir Arthur McNalty[1]: "Humanitarians and men of good will, looked on the social evils about them, the disease, and poverty which affected a large proportion of the community and was responsible for prevailing unrest and misery. They enquired of the medical profession whether these calamities were preventable, and as soon as certain medical pioneers informed them how much could be done to combat disease, a small but influential body of public opinion arose which brought pressure to bear on Parliament and made health an issue of practical politics.

The eighteenth century saw few attempts at sanitation. Disease was widespread and, despite an expanding economy, disease and death rates rose continually. Between 1740 and 1760 the death rate in London greatly exceeded the birth rate. It is estimated that for certain years 74% of all children born in that city died under two years of age, accounting for about half the total deaths. There were extreme degrees of poverty, drunkenness and depravity. The lack of governmental or judicial control left things in the hands of private citizens. The only exception to the general indifference to public health was in the fear of epidemics: quarantine laws appeared in the seventeenth century though prevailing conditions made effective control impossible.

General conditions tended to improve after about 1750. Prosperity brought new and better building. Cheap cotton improved clothing. The drainage of fenland in rural districts, associated with improvements in agriculture decreased the incidence of malaria. The activities of medical humanitarians led to the founding of hospitals and dispensaries, all of which relied on private support. A significant advance was in the field of maternal and infant welfare, both of which engaged the attention of the profession at large for the first time about 1740.

John Robertson of Edinburgh was one of the first to point out the utilitarian aspects of public health. The statesman must consider the effect of disease on the "productive powers" of all classes, he argued; "let him calculate the decrease of a country's wealth from this subtle, active and wide-wasting destroyer." These ideas made little impression, partly because

[1] Sir Arthur McNalty: *The History of State Medicine in England.*

the Malthusians continued to preach the dangers of an increasing population. The death rate, which had fallen after 1760 began to rise after 1800. The romantic spirit, the war and its aftermath, and a reaction against political and social liberalism prevailed, but in 1831 a force far greater than humanitarianism appeared: the spectre of Asiatic cholera advancing on an unprotected Europe created a great and effective demand for social health control. When cholera reached Paris there were 7000 deaths in 18 days. It was quickly apparent that medicine held no cure and that isolation and quarantine were of little use. In Glasgow, closing the pulpits had no minimising effect. The need of some sort of prophylaxis was then given greater emphasis and it seemed that fresh air, cleanliness, pure food and water offered protection. A long series of smaller epidemics of both cholera and typhoid kept the demand alive: the great sanitary reforms of the nineteenth century were begun.

The social reform movement were not slow to take advantage of the prevailing wind and reform followed. Liberal thoughts were again coming to the fore politically. Trade Union activity began. The connections between Liberalism and health reform are again seen in the sympathies of Virchow for the revolution of 1848 and the framing of Engels' indictment of English society largely in terms of unnecessary disease and death. Simon summed up the situation in his book, *English Sanitary Institutions*:

> "If given wages will not purchase such food and lodgement as were necessary for health, the ratepayers, who sooner or later have to doctor, or bury the dead labourer, when starvation or filth diseases have laid him low, are, in effect paying the too late arrears of wages which must have hindered these sufferings and sorrows."

The weight of propaganda was considerable and the movement grew. It did in fact make health an issue of practical politics. Between 1850 and 1900 there were 27 Acts of Parliament dealing with houses alone. The establishment of the Local Government Board and the appointment of Municipal officers of health between 1870 and 1900 mark the growing importance of the subject. The influence of bacteriology was great, the discovery of the causative organisms of infectious disease inspired greater activities of preventive medicine. Later National factors play an increasing part.

The ultimate realisation by Parliament of the validity of Robertson's arguments of a century earlier was the creation of the Ministry of Health in 1918 "for the purpose of promoting the health of the people." Such an action was principally a political advance but it received a spur from the experience of the war, from a realisation of the problem of venereal disease and tuberculosis and from the fact that almost one in five of the recruits to the war-time army were found unfit in one or other respect.

The National Health Insurance Act of 1946 constitutes the most recent landmark in the evolution of socialised and preventive medicine. It allied this aspect of practice with its remedial opposite; it brought into being a rapprochement between the profession and the community it serves for the change from "private" to "state" practice on this scale has one great advantage. Medical practice is now to a large extent freed from the economic ties of the past and has greater facilities for expansion than ever before. It is thus enabled to advance its influence in the community and more thoroughly exploit what has been termed "the matrix of medicine."

The bilateral progress of remedial and preventive medicine in the past century has produced great changes in the structure of our society. In this respect improvements in commerce, agriculture, education and housing, which may indeed have played the larger part, should not be overlooked.

Leprosy, malaria, smallpox—the diseases of the Middle Ages—have been eradicated. Cholera, typhoid and typhus and diphtheria—the diseases of the industrial revolution—have disappeared. Another of these, pulmonary tuberculosis now stands low in the tables of mortality. These are the triumphs of the medicine inspired by Sydenham and evolved in the eighteenth and early nineteenth centuries. In the past fifty years the expectation of life at birth has increased by more than 17 years, yet in assessing the influence of medicine in the community we should be as much and more concerned with the influence of disease than the incidence of death. Preventing a man from dying and yet failing to make him well enough to "live" is not satisfactory therapy. Examining the increase in life expectancy we find that the gain is not shared by all. The increase at 20 years is only 6·8 years, at 40 it is but 3 years and at 65 but one. Thus we are carrying to the third, fourth and fifth decades many of those who, in former years, would have died earlier. Data concerning persons with chronic diseases in the United States demonstrate that, whilst these people live longer, they are not better organisms. One sixth of the population is thus affected. More than half are under 45 years of age.

We are faced with the conversion of mortality to morbidity and the challenge of an ageing population. Taking 1935 as a standard of 100%, a Baltimore survey estimated that the services of physicians for cases lasting seven days or more, and resulting from chronic diseases in an ageing population would increase to 130% by 1960 and 150% by 1975. These are staggering figures.

The overwhelming emphasis on immediate causal agents of disease has produced results in the treatment of specific conditions. The classical diseases are gone. On the other hand, medical practice has fallen short of its objective ideal of the elimination of disease and the promotion of health. Queues in both doctors' surgeries and out-patient departments grow longer. Hospital wards are filled with what is commonly termed "poor teaching material." These are the symptoms of communal disease and increasing morbidity. The physician neglects his art in the pursuit of intricacies of specialisation and the minutiae of physical diagnosis. I cannot believe that the control of disease can come from the study of specific entities or from the pursuit of physical investigation—for the true cause of disease is not here. Only temporary benefit can accrue from pondering the raised serum cholesterol of an individual with atherosclerosis. It is as pertinent and as important to ask why the incidence of cardiovascular disease has doubled in fifty years. We should not seek the reason for the increase in bronchogenic carcinoma in cigarette smokers but in the reason for the increase in cigarette smoking in recent years. Here, and in the deeper strata of human behaviour, we may seek the causation of disease. Medical practice must explain why one man should succumb to infection whilst another is unaffected. It must explain the causation of epidemics and the reasons for their varying severity. It must understand and treat the rising endemic of stress disorders. It must recognise the symptoms of disease of the community and attempt to correct the condition. Answers to these problems are already being sought: there is a growing awareness of the concept of social medicine and an increasing appreciation of the place of stress—or maladaption to environment—in the causation of illness. The development of these concepts will affect the development of Medical Practice. Only as they are appreciated and pursued and only when the practitioner comes to treat man in, and in relation to, his environment, can medicine, in terms of its remedial and preventive approaches, proceed to overcome the problem of communal morbidity.

THE DIAGNOSIS OF CHEST DISEASE

Based on a Dissertation read before the Royal Medical Society on Friday, 5th December 1958.

By J. H. TURNER

This is not an article on the latest means available for the diagnosis of chest diseases, but simply a consideration of history taking and of signs and symptoms. Medicine is without meaning unless we think in terms of patients. It is by developing our powers of observation and interpretation while we are in contact with our patients that we learn medicine, rather than from books and articles.

Hippocrates is our great master of the art of inspection—he stands for the fundamental importance of seeing clearly. To-day if we read his reports of 2,400 years ago we can often make an almost instantaneous diagnosis. Descriptions which cannot be bettered are the squeaking of leather for a pleural friction rub, or the boiling inside the chest of pulmonary oedema. In the time of Hippocrates as much as now thoroughness in examination produces more correct diagnoses than sudden flashes of brilliance.

Pathology did not become respectable until well after the Renaissance and even then doctors were rather slow in making an attempt to correlate signs and symptoms with their pathological observations. Laennec did more than any other in this respect. In 1819 he published his treatise on Mediate Auscultation, and 7 years later there was a second edition. Between these there is a great difference—in the first he used the analytical method describing the different signs and their corresponding lesions, but in the later edition he used the reverse—each disease here is described in diagnosis, pathology and treatment, this in fact became the first important book on chest disease. Here we have a synthesis to give the picture of a diseased patient.

We too should describe what we see and hear, remembering that the object of the exercise is not just to say that we hear a patch of bronchial breathing, but to come to a definite diagnosis. What is wrong with this patient? Not—What do you find in the patient's chest?

" Listen—by this command I do not mean to stress the importance of auscultation and percussion, but to listen to the patient as you hear his history." These are the words of Lilienthal when he was describing the diagnosis in empyema, but they can be applied to a much wider field. It surprises us to recall that not long ago physicians had to make their diagnoses without the aid of specialized techniques. Naturally they made many mistakes, their diagnoses were often late ones, but they took more pains with history taking and what is also important they saw the patient as a person and not as an appendage to a chest. Writing with a very guilty conscience I would say that we do not pursue the symptoms far enough—we are content to write down " breathless on exertion " without further analysis of this, and consequently we miss much of clinical importance.

Ideally, alas not always under the National Health Service, the doctor will know his patient well, he can take time to observe the appearance, the quality of a cough, the nature of sputum, the character of breathing and so forth. Very often the diagnosis is not made on the presence or absence of one specific symptom or sign but by the use of associated impressions, often

drawing from past experience. The physician has frequently made the diagnosis before even touching the chest and as students we may be entitled to suspect that the crepitations which the chief knows should be present are not really audible at all.

Certain general points can be mentioned about history taking. A recent history is much better told than one which stretches over many years, an illness of acute onset is also better described because the events are fresh in the patient's memory. In taking a history some time after the onset of an illness, not only may the initial events be poorly remembered but the patient may not even be aware of any ill health until he has been cured. These are obvious points but like all such things we are liable to forget them.

On first going in to a medical ward, we have no conception of what conditions are most likely in any particular patient—our differential diagnosis includes the whole list in the text-book. Let us take chest disease in different age groups and to begin at the beginning we shall take the newborn infant. The respiratory movements of the newborn are predominantly diaphragmatic with but little assistance from the intercostal muscles—if you see the latter working hard then your guess of there being severe respiratory difficulty is probably correct. Percussion is of negligible value and auscultation is very difficult for early breathing is so shallow that you are lucky if you hear any vesicular sounds. When the baby cries you won't hear any breath sounds at all and for the whole of the early neonatal period crepitations are quite normal as the pulmonary alveoli are gradually inflated.

Therefore in the diagnosis of respiratory infection one has to look outwith the chest altogether. A history of the labour will help—a long labour with early rupture of the membranes and foetal distress will suggest that the foetal inspiratory gasps sucked infected liquor into the lungs. The signs in the infant are general ones—disinterest in feeding, apathy, and cyanosis. There need not necessarily be any raised temperature or a marked leucocytosis. To distinguish a pneumonia from the development of pulmonary hyaline membrane can be very difficult. In the latter you have typically a premature infant and a slightly different clinical course. X-rays are not much help at this time of life. It would need a very brave radiologist to distinguish areas of consolidation from areas of residual atelectasis.

Stepping forward a few weeks the next serious lung disease is staphylococcal pneumonia. Here again examination of the chest can be unconvincing but the systemic upset can be very real. This is a rapidly progressive condition, the organisms are very virulent, often drug resistant, and complications are frequent. In the infant there is every likelihood of an abscess rupturing into the pleural cavity and forming a pyopneumothorax.

There is one childhood disease which as a general practitioner you will often see. You are called to see a child and find him very ill, you may notice conjunctival haemorrhages, you ask the mother why he is in the dark, you hear that feeding provokes an attack of coughing with cyanosis, retching and vomiting. This is all typical of whooping cough which is the most serious infectious disease of the child before school age mainly due to the complications of bronchopneumonia and residual bronchiectasis.

Consider now a young person in his late teens. On getting up out of bed he notices a pain in the chest, particularly around the scapula. He is surprised by this but carries on normally. During the course of the day he is rather breathless and someone may comment on pallor or cyanosis. In all it may take some time before a doctor is called and the diagnosis of spontaneous pneumothorax will soon be obvious.

Post-operative complications are frequently pulmonary. We may all know about calling out for the bedpan, but in the patient who has recovered from

the wiles of the surgeon and anaesthetist we may fail to notice pulmonary collapse before infection supervenes.

The three big lung diseases of adult life are the pneumonias, tuberculosis and bronchial carcinoma. Bear in mind constantly complications of the pneumonias—pleurisy, empyema, lung abscess, collapse and remember that pneumonia is not a complete diagnosis until you know what caused it. Recurrent pneumonia may be indicative of an underlying bronchiectasis, or again a pneumonia which fails to resolve on chemotherapy may indeed be a virus pneumonia but it may also be due to an obstruction caused for example by carcinoma or by a foreign body.

At the other end of life as the recent Scottish tuberculosis campaign has reminded us, an upper lobe fibroid tuberulcosis with emphysema can often masquerade as a simple chronic bronchitis. In the very old the patient is often dead before you realise that he has had a hypostatic pneumonia. We almost come to regard basal crepitations as physiological in the elderly. With this type of basic clinical knowledge we already approach the patient with a prepared mind and further examination is much easier.

The first clinical teaching we get is a training in physical diagnosis. Naturally enough we start with gross departures from the normal and we study these changes in isolation. However this method has severe limitations for it applies to the advanced stages of disease and further we are apt to forget that physical signs are signs of lesions and not of diseases. When we open a book on physical diagnosis and compare that with our own clinical observations and again with what we see our seniors doing in their clinical work we soon realise that many of the physical signs written of in the books are unconvincing and the value of others is debatable. It is safe to say that judging by the use to which the physician puts into practice the signs as described in the books it is a waste of effort to learn some of them. It is remarkable how quickly most physicians manage to forget many of the standard signs. This is not to deny that these had their period of clinical usefulness but many have been superceded in the wards but remain in the books. It is noticeable that when surgery advances into a new field then we find that physical diagnosis has to be correspondingly more accurate than it was before. Whereas the physician of 20 years ago was content with the label bronchiectasis, now through the use of bronchography the dilated bronchi can be, and should be, located precisely and the stimulus to this advance has come from surgery. Now more than ever before, we need to diagnose lung disease early, and physical examination needs to be even more precise, but with the changing emphasis on diagnosis we must alter our attitude to the significance of individual signs—above all they are a means to an end and not an end in themselves. They cannot be isolated from their context—the patient.

All this can be illustrated from a short consideration of the early diagnosis of bronchogenic carcinoma. Here the most important factor is an awareness of its possible presence, for this diagnosis is no longer tantamount to signing a death-warrant. There are no diagnostic early features. It is no great feat to diagnose this condition in a wasted cachectic patient for at this stage the patient is already doomed. It is important to realise that almost any chest disease can be simulated by carcinoma, and we cannot afford to waste time in coming to a diagnosis. Regrettably even the first indication, e.g. a cerebral metastasis may be too late, and we must be most on guard when dealing with symptoms like persistent cough, vague chest pain, repeated colds, slight haemoptyses or simply the patient who says, "I've never felt the same, doctor, since that attack of flu last winter." Symptomatology is often more important than physical examination for this latter is here most unreliable. A negative examination means nothing, though help may be

obtained from unilateral stridor or areas of dullness. Too often as with the palpable lymph glands in the neck it is too late.

Radiology is our chief help and perhaps you may suspect that every patient with mild chest symptoms should have an X-ray. In Britain this would not be practicable for with our much-loved climate, our homes, our tobacco and our smoke, respiratory diseases are far too common. In selecting cases clinical judgment will have to be used and this is only learned from practical experience, including our mistakes.

In conclusion here are 3 short quotations—the first is from Leslie Stephen who says—" The hardest of all feats is to see what lies before our eyes." The second is from the Bible—"An evil and adulterous generation seeketh after a sign; and there shall no sign be given to it." And ending on a more optimistic note the third is a description of Sydenham by our own Dr. John Brown. " Human life was to him a sacred, a divine as well as a curious thing, and he seems to have possessed through life in rare acuteness, that sense of the value of what was at stake, of the perilous material he had to work in."

BOOKS

on

MEDICAL

and

ALL ALLIED SUBJECTS

WE WOULD WELCOME YOUR ENQUIRIES

WILLIAM BRYCE

54 LOTHIAN STREET · EDINBURGH 8

CAL 1577 CAL 1577

ELECTROLYTE IMBALANCE

Based on a talk given to the Royal Medical Society on Friday, 25th October 1957.

By H. A. F. DUDLEY
Senior Lecturer in Surgery, University of Aberdeen

The subject of this paper is Electrolyte Imbalance. Unqualified, such a title may sound like an overambitious attempt to embrace within the span of forty-five minutes the whole gamut of the disordered physiology of the anions and cations. Mindful of the penalty of such vaulting ambition which would, I think, without doubt " fall on the other " its content will be limited largely to some of the more acute and dramatic examples of disturbances of body fluid that are commonly encountered in surgical patients. Surgery deals with the sort of patients of whom John Donne might well have been thinking when he said " this minute I was well and I am ill this minute " and consequently the pattern of electrolyte imbalance encountered by the surgeon is usually drawn in starker and bolder lines than is the more subtle, long drawn out problem with which the physician is often confronted. This makes life considerably easier for the surgeon who is not uncommonly a simple man of action rather than a profound thinker; an extrovert rather than an introvert, a Roman rather than a Greek. Therefore, this account is mainly from a surgeon's point of view with an occasional digression.

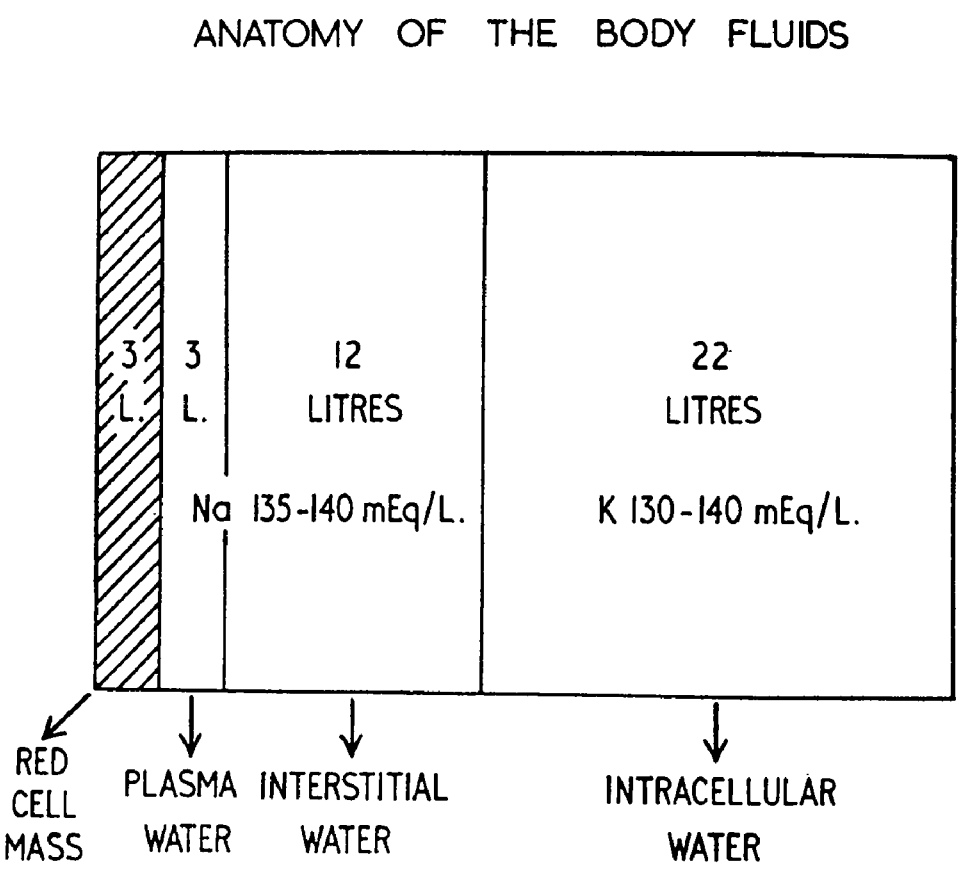
CLINICAL PHYSIOLOGY

Before the subject of electrolyte imbalance in its practical aspects can be considered it is necessary to review, in the words of Humbert Wolfe, our knowledge of " the incessant molecules that bind you," because without some appreciation of the normal anatomy of the body fluids it is difficult to understand in a rational manner the abnormalities which may occur. It is here that the first stumbling block to the study of electrolyte balance is encountered for to many who are neither chemically nor mathematically inclined the nomenclature of fluid and electrolyte anatomy may at first encounter be somewhat disheartening. It should be said at once that milliequivalents represent convenient units of combination and are of great value in the summation of acid and base factors in biological systems. However, to the clinician they are merely a method of expressing results to which too much mystical symbolism need not be attached.

Knowledge of amounts is incomplete without some information on distribution and turnover. In the former case—distribution—we encounter at once one of the great enigmata of cellular physiology—how and why is an apparently normally semipermeable membrance capable of holding apart the two ions sodium and potassium so that the greater part of sodium is outside the cell and the greater part of potassium is within it. Many theories have been developed to explain this phenomenon but none is as yet satisfactory. However, all have in common the concept of the expenditure of energy: indeed it is probably the maintenance of this ionic imbalance at the cell membrane that accounts for the large part of the energy expenditure of the so-called " resting " cell: it is one of the properties of the cell inseparable from life and disappears when the cell dies (Robinson and McCance, 1952).

With this knowledge the body fluids can be arbitrarily divided into extracellular phases (Fig. 1). Water, but not ions, can move freely across the cell

membrane. Ions do cross in small or sometimes in quite large quantities but the factors governing their mass exchange are largely unknown. The extracellular fluid includes, of course, the blood plasma and provides the vehicle by which materials can be transported to and from the cell. The extracellular phase is in direct communication with the gastro-intestinal juices and these and all the other external secretions are largely composed of it. The integrity of the extracellular fluid is dependent upon a proper restriction of sodium and water to this phase within the body; by contrast the intracellular fluid is



built upon a scaffold of potassium ions. However, intracellular fluid is certainly more complex in its structure than the extracellular fluid and the potassium ions are enmeshed—metabolically speaking—with protein and with glycogen. Indeed the interior of the cell is probably not properly a fluid at all, but a thixotropic gel which can change its physiochemical properties as a result of a variety of stimuli.

Finally in this brief review of body fluid metabolism, what of control? All body constituents are in a dynamic state, some coming, some going, none static: even bone apparently so stable, is a vast, active chemical factory. Sodium, potassium and water are constantly entering and leaving the body. For all three, the only usual route of entry is the mouth. Losses of water are about equally divided between insensible pathways (the sweat and the lungs) and the urine. Sodium and potassium losses are predominantly by the urine. The *rates* of urinary excretion are controlled by a complex system of neuro-endocrine servo-mechanisms* based upon the pituitary and the adrenal cortex. For example, cessation of the intake of water or excessive loss stimulates

*A device which maintains a steady state but is susceptible to alteration by outside stimuli.

the production of antidiuretic horomone by the posterior pituitary and so reduces urinary output. Deprivation of sodium stimulates the production of an adrenocortical steroid, aldosterone, and reduces the renal elimination of sodium. At the same time and because of the renal biochemistry involved, the output of potassium tends to rise. However, unlike sodium, diminution of the intake of potassium is not accompanied by much change in the renal elimination of this ion, a fact of considerable importance in management, because if starvation is long-continued, then a severe loss of potassium from the body may occur.

The predominant routes for the exchange of water and electrolytes are the mouth and the kidney. Christopher Wren, by placing in man's hands a hollow needle, has encouraged attempts to bypass these routes by the intravenous administration of all sorts of solutions and although this had undoubtedly saved countless lives since its introduction by a certain Doctor Latta in the city of Leith during a cholera epidemic more than a hundred years ago (Latta, 1832), it enables the physician to flood the body at will and not always wisely with a variety of substances of a nature and in a quantity which may prove embarrassing. The body may treat itself in the same way by bypassing the normal routes of elimination and causing large losses of liquid and ions by the so-called extra-renal routes which are summarised in Table I.

CLINICAL DISORDERS

Simple Deprivation of water

This is probably the most common form of electrolyte imbalance, although not necessarily the commonest in surgical practice. Deprivation of water is the scourge of shipwrecks and life rafts, of desert travel and mountain climbing, of the ark and of the submarine. The early attempts to climb Everest were probably failures not only because of technical problems but also from an inadequate appreciation that man must drink to live and that the gasping respiration of oxygen lack promoted large insensible losses of water from the lungs (Hunt, 1953). Wherever water is in limited supply, water insufficiency may develop. If Alaine Bombard (1953) is to be believed, 50,000 people a year are lost at sea, many because of water deprivation. It only remains to add that a great many people suffer a like fate in hospitals where they are either unable or unwilling to drink or the medical and nursing staff have insufficient time to provide them with water.

When water is withdrawn or lost in excessive amounts, in the sweat for example, then the urine volume falls to a very low level, but insensible water loss continues and the total body water contracts. As this happens, the concentration of electrolytes within the body rises until it reaches a level at which life is no longer possible, and the patient dies of generalised hypertonicity of the body fluids—stewed, as it were, in his own juices. Before this occurrence there is insufficient water to provide for the production of natural secretions and therefore mucous surfaces become cracked like the bed of a dry swamp, and infection with ulceration is inevitable and may contribute to or cause death.

How much loss of water is necessary for this sorry state of affairs? Francis Moore (1952) has pointed out that loss of water is unique in that it requires only a 5 per cent. change in total body water to produce severe effects. At a rate of loss of 2 litres a day, which might be expected in a thirsting man or a patient in a temperate climate, this would take about four days which is, of course, in agreement with all our knowledge of disaster and shipwreck since biblical times. How does the victim look at the end of this time? Not as in the classical description—hollow-eyed and with lax skin. In fact surprisingly

normal and it is only by his restless mien and constant pleading for water and by the dryness of his mucous membranes that it is possible to tell that he is in imminent danger of death. Consciousness is unimpaired and there is usually no alteration in the blood pressure or in the pulse rate. Why is this? The explanation lies in the small percentage loss of water involved—no single body compartment has suffered enough to produce gross haemodynamic or other visible changes. Four to five per cent. of total body water is an insignificant amount quantitatively in terms of changes in the extracellular or plasma volume. If the victim is unconscious or for some other reason unable to complain, then this degree of loss of water may go undetected, a fact that has certainly accounted for the death of many patients in hospital, comatose for reasons such as a head injury. Another striking observation on exsiccated patients is that all the symptoms of thirst and dryness can be relieved very rapidly by the intake of an amount of water far less in total volume than the known deficit (Black *et al.*, 1944). Why it should be necessary only to " prime the pump " is unknown and I commend it to you as a subject for further study.

The prevention of exsiccation rests on the provision of, in temperate climates, an intake of approximately 2-2.5 litres of water daily. In surgical patients less may suffice because oxidation of fat and the destruction of lean tissue may provide a considerable quantity of " endogenous " water for the body's uses, water that is kept within the body by the restriction on urinary excretion that always follows surgical operation and which is the result of prolonged intense secretion of antidiuretic hormone (LeQuesne and Lewis, 1953; Dudley *et al.*, 1954). If under any circumstances water cannot be assimilated by mouth or through a naso-gastric tube then it should be provided by a carefully controlled intravenous infusion of 6 per cent. dextrose which should not under any circumstances exceed the amount of water that is known to have been lost. If excess water is added to the body of surgical patients they are usually quite unable to get rid of it. Patients with too much pure water in the body do not become bloated or oedematous, indeed they have as few signs as the exsiccated patients until quite suddenly the concentration of electrolytes in the body falls too low for normal cellular function and they become comatose, may have convulsions and die—another not infrequent happening when intravenous therapy was not well understood (Zimmermann and Wangensteen, 1952; Wynn and Rob, 1954; LeQuesne, 1954).

Extracellular volume deficit

It has already been remarked that the gastro-intestinal secretions are largely drawn from the extracellular space. Under normal circumstances, these secretions are constantly formed from and returned to the extracellular fluid so that although the total volume of turnover of this fluid is high in any given period, actual net reduction is small at any single instant.

This delicate equilibrium is lost if for any reason such as intestinal obstruction, a fistulous opening, or diarrhoea, gastro-intestinal secretions escape to the exterior. In such circumstances there develops an acute drain upon the extracellular volume, a drain that is qualitative as well as quantitative. Were it merely a matter of loss of water this could be partly made good by transfer across the cellular membrane; but in extracellular deficit it is a fluid rich in sodium that is lost and there is no change in extracellular osmotic pressure to entice water out of the cell. The extracellular volume shrinks and the patient does also. His skin loses its normal turgor, the eyes become shrunken into their sockets, the patient takes on an anxious haggard look. Latta's description of " the sharpened features and sunken eyes and fallen jaw pale and cold bearing the manifest imprint of death's signal " has

never been surpassed. As the extracellular fluid falls so does the plasma volume, and if this latter deficiency becomes acute, circulatory failure or shock may develop. Often, however, it is an operation or some added stress —even standing the patient upright—that unmasks a state of circulatory embarrassment, so that a patient to all intents and purposes well, collapses dramatically and sometimes irreversibly. Such effects develop quickly in a patient losing a litre of stool, gastric aspirate or fistula daily and four days of such loss unreplaced or unchecked may lead to death. It is of some interest to speculate as did the late Hans Zinnser (1936) that this mode of death has probably done more to alter the face of history than all the treaties, pacts and successful and unsuccessful wars for this is the way that patients with typhoid, cholera and bacillary dysentery often succumb. It was extracellular volume deficiency which stopped Napoleon in his Russian campaign—dysentery and cholera with their acute reductions in extracellular volume decimated his forces in six months and reduced them from 500,000 to 80,000 men (Table II). A similar physiological derangement was also rife in the Crimea.

Treatment rests upon two principles, the first of which is the more important. If the body is losing fluid very rapidly it is far better to stop the loss rather than to try to go on replacing it for any length of time. A leak in the bottom of a ship should be repaired rather than reliance placed on the pumps. However, in the emergency, before the loss can be stopped, it is wise, as Andrew Wilkinson first showed, to concentrate on the replacement of circulating plasma volume, particularly if the patient is already in, or verging upon, shock. Such resuscitation is best carried out with blood, plasma or a plasma expander and in acute extracellular volume depletion there is little indication for any other fluid.

Acid-base imbalance

This is a subject to which text-books of physiology give a great deal of attention and space. It was probably, as Marriott has remarked (1947), an unfortunate historical accident that these acid-base considerations were thoroughly investigated before any detailed study of cationic—sodium and potassium—movements proved possible. There is a fruitful field for investigation of the effects of such accidents in the timing of discovery: A. N. Whitehead has touched upon the subject in his considerations of climates of intellectual opinion necessary for the acceptance of ideas, but there is still much to be learnt in organising future research from the more positive aspects of the effect of the acceptance of an idea ultimately proved to be false. Be this as it may, temporal primacy has invested changes in pH and U acid and alkali reserve with a physiological importance which in clinical surgical practice at least they do not possess. Unless some gross metabolic disturbance is present—the commonest is diabetes—alkalosis and acidosis are more usually the secondary result of changes in the intake and output of cations such as sodium and potassium. The occurrence of alkalosis for example in patients who are deficient in potassium probably partly represents the effects of such a cation depletion on the acid base balance at the cell membrane. Attempts to " tailor " the serium electrolytes by the administration of acid ions—the usual thing is ammonium chloride—are unlikely to succeed but energetic potassium therapy alone is not often a failure. The therapeutic corollary is that in clinical acid-base imbalance an underlying cause in either metabolic disorder or in cation loss should first be sought for; unreasoned, meddlesome interference with the serium electrolyte values should be avoided.

Chronic potassium depletion

This is depletion of *intracellular electrolytes* and the circumstance in which

this condition is encountered is in chronic starvation when lean tissue and therefore intracellular electrolytes are lost over a long period of time. The surgeon sees this chiefly in outflow obstruction to the stomach—pyloric stenosis. However, it is characteristic of any state of starvation; had more been known about potassium losses it is possible that many of the concentration camp victims might have been saved because it was undoubtedly the gastro-intestinal atomy of potassium deficiency that rendered them unable to take the food that was proferred them by their liberators. The symptoms of chronic starvation and of potassium depletion are thus almost identical—an apathetic, lisless, weak patient who drops off into sleep or semicoma if his attention is not constantly held and who reacts badly to any form of surgical procedure and often even to attempts to restore a normal intake of food. Such patients require two things—early restoration of a normal diet and rapid repletion of total body potassium which is often reduced to half its normal value. These two principles accepted, they do not often require complex electrolyte therapy, but in the case of surgical patients an expeditious operation and a well-balanced diet. The management of such patients with pyloric stenosis forms a doubly interesting chapter in surgical history. First it indicates that for many years—and indeed still to-day—there can exist confusion of thought about a simple problem, and secondly it demonstrates how therapeutic measures have run through a cycle which has brought the physician back to practices first advocated at the beginning of the century—that is to surgery as the mainstay of treatment. First, the misconception: a patient with pyloric stenosis vomits and his vomit is often dramatically large —1½, 2, 2½ litres in the day. In his own words he " vomits everything doctor." It has long and quite incorrectly been assumed that this represents a net loss of this quantity of gastric juice in the body—that is a loss of extracellular fluid. However, an extracellular fluid loss at this rate is scarcely compatible with life for more than a few days and is certainly not the picture of the patient with stenosis who may go on vomiting for months before coming to hospital in an advanced state of starvation. Before it was appreciated that the patient was in fact drinking to excess in order to absorb enough water across the gastric wall to survive and that the daily reject was in fact part of his daily intake, energetic attempts were made to replace this supposed loss by the continuous intravenous administration of saline, a procedure first cautiously and intelligently introduced in the 1920's by Rudolf Matas (1924). This, because starving patients are for a variety of reasons intolerant of salt water, not uncommonly drowned a patient who might have been saved by a judicious operation. As knowledge increased it came to be realised that this was not a good thing, and that potassium and energy were the chief needs. By far the best way to administer both is by a good mixed diet and this is possible in the patient with pyloric stenosis only if the mechanical defect is corrected. Moynihan and others had advocated this many years before and practised it with success. To-day surgery is once more the mainstay of treatment although on a more rational basis.

This last example may be utilised as an illustration of a general text in clinical surgery or indeed in clinical medicine as a whole. Physiological disorders such as those of electrolyte imbalance develop in the vast majority of cases either because of dysfunction of organs or because of mechanical derangements of some of the intricate control mechanisms of the body. Although it is frequently possible by a sort of inspired biochemical juggling, temporarily to restore normality to the system and such empirical alchemy may be more permanently successful, quite often a lasting result cannot be achieved until a malfunctioning organ works normaly again, a blocked conduit is cleared or an inflamed surface resolves. Fascination with the physico-chemical systems that make up our body fluids should not divert our atten-

tion from the organs which subserve our life processes. Claude Bernard's *milieu intérieur* is as much the liver as the extracellular fluid, the heart as the blood.

Further, in the management of problems of electrolyte imbalance it should be impressed upon all that, if a famous definition of conservation may be freely adapted, " when it is not necessary to interfere it is necessary not to interfere." Some of the disturbances of electrolytes and of water are the result of over-energetic or misguided treatment: the best doctors are those who are not for ever sticking needles into people out of idle curiosity or out of a frenzied desire for therapeutic effort. The hardest thinking in clinical physiological problems must, as Wilkinson has emphasised, be done at the bedside before complex chemical or other analyses are made and the result of such investigations can usually be only confirmatory and rarely of themselves diagnostic.

REFERENCES

Black, D. A. K. McCance, R.A. and Young, W.F. (1944). *J. Physiol., 102,* 406.

Bombard, Alaine (1953). Naufrage Voluntaire. Paris: Editions de Paris.

Dudley, H.A.F., Boling, E.A., LeQuesne, L.P. and Moore, F.D. (1954). *Ann. Surg., 140,* 787.

Elkington, J. R. and Taffel, M. (1942). *J. clin. Invest., 21,* 787.

Hunt, J. (1953). The Ascent of Everest. Appendix VII by Pugh, G. and Ward, M. London: Hodder and Stoughton.

Latta, T. (1832). *Lancet, 2,* 274.

LeQuesne, L. P. (1954). *Lancet, 1,* 172.

LeQuesne, L. P. and Lewis, A. A. G. (1953). *Lancet, 1,* 153.

Marriot, H. L. (1947). American Lecture Series No. 32. Springfield: Charles C. Thomas.

Matas, A. (1924). *Ann. Surg. 79,* 643.

Moore, F. D., Haley, H. B., Bering, E. B. Jr., Brooks, L. and Edelman, I. S. (1952). *Surg. Gynec. Obstet., 95,* 155.

Robinson, J. R. and McCance, R. A. (1952). *Ann. Rev. Physiol., 14,* 115.

Wynn, V. and Rob, C. G. (1954). *Lancet, 1,* 587.

Zimmermann, B. and Wangensteen, O. H. (1952). *Surgery, 31,* 654.

Zinnser, H. (1936). Rats Lice and History. London:

TABLE I

Extrarenal Losses of Fluid and Electrolyte

Nature of Loss	Nature of Fluid	Electrolyte Content
Vomitus	Gastric and small intestinal juices	Weak solution of sodium and water. Only small quantities of potassium
Intestinal fistulae	Small bowel, pancreatic and biliary	High concentration of sodium. Moderate to large potassium content
Diarrhoea	Small and large bowel secretions and exudates	Moderate sodium. High potassium. Exudates rich in potassium
Sweat	Insensible Sensible	Pure water. Weak solution of sodium

TABLE II

Russian Campaign of 1812

Initial strength (June)	450,000
After Battle of Ostrovo (July) Men on sick list	80,000
Beginning of retreat from Moscow (October) Men fit for duty	85,000
Vilna (December) Men fit for duty	20,000

(From de Kerhove and Zinnser)

ROCKETS, MEN AND MEDICINE

Based on a Dissertation read before the Royal Medical Society on Friday, 7th November 1958.

By A. L. CROMBIE

"I was thinking this globe enough until there sprung out so noiseless around me myriads of other globes."

—WALT WHITMAN: *Night on the Prairie.*

Space Medicine has at last become an accepted entity in the vast field of medical research after many years of ridicule and scorn. The recent successes of the U.S.S.R. and U.S.A. in launching earth and sun satellites would seem adequate to justify the existence of space medicine. It seems Man's avowed intention to conquer the third dimension, the vertical, which leads to space and as such it is the duty of the medical scientist to make this journey as safe as possible for the would-be space traveller.

Space is not a well defined region since it has no accurate topographical boundaries and in the context of this article the best way of defining space is to think in terms of levels of space equivalency, i.e. levels at which various protective functions of the Earth's atmosphere are lost so creating a space-like state for a certain phenomenon at a particular altitude. From the viewpoint of respiratory physiology space begins at a height of 52,500 feet since the effects of explosive decompression assume a constant value at and over this level. In similar terms the atmosphere acts as a filter against cosmic factors and this function of itself provides a variety of space equivalencies ranging from sea level in the case of infra-red rays, to 10-20 miles for cosmic primaries and as high as 75 miles for visible light. Space, therefore, is a concept which of necessity is a variable and its effects may be just as varied.

Man has chosen the rocket to be his vehicle for reaching other parts of the Universe because the rocket if adequately fueled is independent of its environment, unlike conventional aircraft. But the rocket is a short duration, high performance engine and this entails large initial accelerations to reach an "escape" velocity of approximately 7 miles a second. There is a limit to the final speed of a single stage rocket due mainly to practical engineering problems and the "step" or multi-stage rocket has become the standard type. Theoretically any desired terminal velocity may be reached because of the efficient transfer of kinetic energy from one "stage" to the next.

Space travel is not only concerned with problems of rocket engineering. Human engineering will play an important part in the design of a spaceman's environment and of the instruments he will use. The aim and purpose of human engineering is to improve operator efficiency and safety by minimising the stresses induced by the machines which the engineer designs for him. This becomes increasingly important in space travel for even with carefully selected and highly trained personnel the amount of instrumentation needed will be colossal and control finding and decision making will be done as much by mechanical brains as by human ones. Probably the best way to deal with some of the problems of space flight is to deal with them as they would arise in an actual rocket flight and accordingly acceleration will be the first.

An escape velocity can be achieved by varying the acceleration and the duration over which it is applied; thus 7 miles a second could be achieved at an acceleration of 3 "G" for 9½ minutes, or 6 "G" for 3 minutes 48 seconds, or 10 "G" for 2 minutes 6 seconds, this last acceleration hardly being necessary as a more gradual take-off involving orbiting is contemplated. The human frame can stand acceleration best when it is applied in the chest-to-back direction, which is of course the prone position in vertical acceleration, 9 "G" being tolerated for 3 minutes before blackout occurs. Any reduction in the head-heart distance will increase tolerance to acceleration, and the "G" suit is merely a device to prevent pooling of blood in the legs and abdomen while the subject is being accelerated in the upright position. Cardio-vascular compensation occurs after 15 seconds of acceleration, the systolic and diastolic rising with the heart rate; but at prolonged high "G" various cardiac airythemias occur, probably due to coronary insufficiency though this has never proved fatal. Impairment of peripheral vision due to retinal ischaenia occurs when acceleration is applied. The auditory system functions for some time after vision has been lost. A counter-balanced oblatospheroid may be the answer to acceleration problems if it is mounted on gimbals so that vertical and angular accelerations will act as one vector cutting a line joining the vestibuli at right angles, which is the optimum position in which an acceleration should act. The launching of a rocket will have to be automatic since cognitive processes decrease in efficiency with increasing acceleration. Whether this mental impairment is central or due to peripheral sensory impairment is not known; what is known is that kinesthetic reflexes have a higher theshold stimulation value under acceleration. Much work remains to be done in the investigation of the relationship between acceleration patterns and subsequent behaviour.

The next big problem is that of weightlessness . So far, a true weightless state in which gravity is balanced by inertia has only been obtained in parabolic flying for periods up to 30 seconds, and therefore the physiological effects of long-term weightlessness must be based on known physical principles. Most of the important functions of the body depend on muscular action and not upon weight difference, thus respiration and digestion will not be affected although disposal of excreta may present a problem. Muscular effort will be at a minimum and some disuse atrophy may occur in skeletal muscle and the myocardium. The idea of an orbiting satellite as a cardiac convalescent home is an attractive one.

The central nervous system may also be affected by a zero-gravity state since the otolithic and kinesthetic reflexes which depend on gravity and other accelerations will be rendered non-functional. It is not known if reorientation is possible using the visual and semi-circular canal systems, for there will certainly be a conflict of information received by the cortex from these systems due to the endolymph being "left behind" when the head is turned sharply and a deviation in the path of purposeful movement will result. "Synthetic gravity," i.e. centrifugal force of 1 "G" at the periphery of a spinning, wheel-shaped space ship has been suggested but this may well be worse than weightlessness as very complex patterns would be produced by head movement.

A most important task will be the maintenance of respiratory function including all processes directly or indirectly contributing to oxidative metabolism. Normal atmospheric pressure may be unattainable in a space ship because of engineering limitations and thus low pressures will have to be used. All inert gases will be replaced by oxygen at a pressure of approximately 425 mm. Hg since at this pressure it can be breathed indefinitely without toxic effect. Carbon dioxide and water elimination

also constitute a problem although a limited tolerance to a raised partial pressure of carbon dioxide can be acquired at the expense of the acid-base balance. If prolonged, however, it may be fatal. Many elimination methods have been suggested. That involving the alga, chlorella pyesenoidosa seeming the most promising. In ideal growing conditions 2·3 kilos of this could supply one man with his daily requirement of oxygen as well as absorbing all his exhaled carbon dioxide. The one drawback which this plant possesses is that it produces a lot of heat. This could be dissipated by a solar powered refrigeration system in the space cabin, which might also be used to drive a ventilation system since convection and evaporation will be minimal otherwise. The temperature of the outside of the craft could be controlled by a series of folding shutters which would expose black or silvered areas to the radiant heat of space and control the temperature of the silicon monoxide painted hull.

Meteors and meteorite streams are a much exaggerated hazard. It has been calculated that a 3 cubic metre craft would have a 1-2000 chance of being hit by a penetrating meteorite in 24 hours. Whipple has advocated the use of a meteor-bumper one-tenth of the thickness of the hull and placed 1-2 cm. from it, which would decrease the risk of penetration by a factor of 10. If a small penetration occurred there would be ample time for a self-sealing system to function and even if explosive decompression occurred the space traveller would have a 99% chance of survival provided he allowed himself to decompress quickly by keeping his mouth open. Adequate recompression could be effected by a protective suit within 70-90 seconds to offset the anoxia caused by the resurge of oxygen from the blood to the alveoli due to the sudden decrease in the alveolar oxygen pressure. There now remains but one cosmic hazard, that of radiation. The soft X-ray fractions and the ultra-violet fraction of solar radiation are relatively innocuous and adequate shielding would be provided by the hull of the craft. Cosmic rays, on the other hand, are far from innocuous and are a definite hazard though difficult to evaluate. The alpha particles and heavy nuclei only comprise 20% of cosmic radiation on a particle basis, the rest being protons. They do however provide no less than 50% of the radiation as radiation depends directly on the number of nucleons which comprise the particle. From the latest information it seems that there is an intense band of radiation 5-6000 miles thick at a distance of 10,000 miles which gradually fades out at 60,000 miles. But, whereas cosmic radiation at 45,000 feet is nearly all composed of electrons, protons and mesons due to collisions, at 140,000 feet the same amount of radiation is produced by protons and particles and heavy nuclei. This has far-reaching consequences because although radiation is quantitatively the same, it may differ greatly in its biologic effectiveness. It has been worked out that 50 R of X-ray radiation equals 5 R by alpha particles, equals 1 - 5 R by heavy nuclei taking biologic effectiveness as the criterion. This difference in biologic effectiveness can be explained by the larger size of alpha particles and heavy nuclei, and the much greater energy which they carry to cause ionisation and thus cell death. Shielding space personnel with metal would be an engineering impossibility but it may be possible with a hydrogenous fuel such as kerosene.

Many problems and unanswered questions have arisen in this discussion of space travel; the greatest problem, i.e. what will the overall effect be on a human in space, is a mystery. The solution of such problems and difficulties may demand sacrifices, as other scientific projects have done, but at the moment we can only tentatively grasp an idea which, in assuming reality, will become a symbol of our age.

AN APPRAISAL OF ULCERATIVE COLITIS

Based on a Dissertation read before the Royal Medical Society on Friday, 14th November 1958.

By C. M. MAILER

In writing about a subject like ulcerative colitis, it would be comforting to imagine oneself to be somewhere near the "growing edge," if not just exactly in the front line. And yet, this "growing edge" is so often disappointing, if not positively misleading, for too many of the new advances are reminiscent of the Seed which fell on stony ground:

"and because it had no root it withered away."

This is particularly true about researches into the aetiology and nature of ulcerative colitis. The fact that the disease is a cruel scourge of healthy young people, treatable to some extent, and yet imperfectly understood, has produced the attitude of mind that ulcerative colitis is a challenge. Although many valuable advances have resulted, it is probable that more pet theories have gained hold in this disease than in any other, and consequently there is considerable diversity of opinion regarding its nature and its treatment. Ideally, there should be a team, consisting of physician, surgeon and psychiatrist, each with something to offer in the treatment of the patient, but, in the international congress on ulcerative colitis, co-operation was curiously lacking, and the individual members seemed unable to concern themselves with approaches which were not their own.

ULCERATIVE COLITIS

Ulcerative colitis is an inflammatory disease of obscure aetiology, primarily involving the colon and rectum. It is a disease of young people, perhaps slightly commoner in women than men, characterised clinically by persistent attacks of diarrhoea, acompanied by blood, mucus and pus. The condition is prone to remissions and exacerbations and death may occur during an attack.

HISTORY

The condition was first described in 1875 by Wilks and Moxon of Guy's Hospital, who, in their "Lectures on Pathological Anatomy," declared that, "Our usual language has been too indefinite, nay incorrect, in speaking of all infections of the large intestine as dysenteric. For the true dysenteric process, though like ulcerative colitis, is a disease with definite characters." Previously, the term "Bloody Flux" as used by Thomas Sydenham in 1609, had covered all conditions associated with diarrhoea and bleeding.

INCIDENCE

Every conceivable channel has been used in the attempts to discover the cause of ulcerative colitis. Quite recently, it has been suggested that the condition should take its place alongside myocardial infarction, peptic ulcer and diabetes as one of the stress disorders and with the knowledge that these disorders were more common in civilised countries, Melrose attempted to

correlate the numbers of such patients admitted to European general hospitals with their countries or origin. It was known already that ulcerative colitis was uncommon in the Tropics, and that it was more prevalent in the north than in the south of the United States. Melrose obtained the following results:

Switzerland	5·8
Scotland	6·9
Finland	7·0
Denmark	7·8
Belgium	10·8
England and Wales	14·8

Diverticulitis

While these figures suggest that geographical factors may be significant, and that the disease is more prevalent in the North of Europe, they may simply reflect difference in management. It is possible that a higher percentage of cases are never admitted to hospital in Switzerland, though the divergence between Scotland and England is difficult to explain on that basis, unless there is, in fact, greater stress South of the Border.

NATURE OF ULCERATIVE COLITIS

Brook is of the opinion that ulcerative colitis is not a single condition, but rather a group of diseases: true idiopathic ulcerative colitis, ileocolitis and proctosigmoiditis. Whereas proctosigmoiditis is rare as an independent condition, Brooke stresses that it is important to differentiate ileocolitis from ulcerative colitis, as their treatment differs. Ileocolitis responds favourably to vagotomy, whereas such a procedure is harmful in patients with true colitis. In ileocolitis, the process starts in the ileum and extends to the colon. Differentiation is made from the fact that in ileocolitis, there is continuous diarrhoea, without blood and mucus, steatorrhoea is present, and there is marked ileal involvement as shown by barium follow-through X-ray studies.

True ulcerative colitis affects the descending and sigmoid colon maximally. It extends into the rectum and back towards the ileocaecal valve or beyond, for a short distance, if that valve is incompetent.

SYMPTOMATOLOGY OF ULCERATIVE COLITIS

The important symptoms of ulcerative colitis are diarrhoea with blood and mucus, crampy abdominal pain, anorexia and marked loss of weight. There may also be fever . The onset is either insidious or sudden and in the acute fulminating variety, the condition developes within a few hours. The commonest presentation however is that of low grade diarrhoea with frequent remissions, spanning a period of months or years. The longest remission recorded lasted 25 years! Many of the patients admitted to surgical wards have been sent up to Out-Patient departments as sufferers from piles, while the more acute cases are referred from the medical side.

DIAGNOSIS

Diagnosis depends more on special investigation than on ordinary clinical examination. Sigmoidoscopy is the key investigation, whilst radiology serves to define the extent of the disease and show the presence of complications, e.g. pseudopolyposis and strictures. Stool examination is performed to eliminate possible specific factors, particularly the shigella of dysentery. In the tropics, new concentration methods have been developed for the improved detection of E. Histolytica, Ascaris, Ankylostoma and Schistosoma.

The mucosa, as seen by sigmoidoscopy, is virtually diagnostic in this country, and is hyperaemic, oedematous and finely granular. Raw and angry in appearance, it may bleed on gentle swabbing.

DIFFERENTIAL DIAGNOSIS

The principal disorders from which ulcerative colitis should be differentiated are:

1. Carcinoma of the Colon and Rectum
2. Diverticulitis
3. Amoebic and bacillary dysentery
4. Crohn's Disease
5. Familial Polyposis
6. Radiation Proctitis
7. Antibiotic Colitis
8. Tuberculosis Colitis

Carcinoma

The commonest age of onset of carcinoma of the colon is between 40 and 60 years, but it may occur in younger people. There is a short history of altered bowel habit, with bleeding per rectum and mucus on occasion. Characteristically, diarrhoea alternates with constipation. Some growths are palpable, and the majority can be visualised by rectal and sigmoidoscopic examination. A barium enema X-ray examination often demonstrates the lesion, though not always, and a proportion are first diagnosed at laparotomy.

This is also a disease of the older age groups, associated with a long history of pain commonly in the left iliac fossa. The passage of blood and mucus is uncommon. Diagnosis is usually made by X-ray examination after barium enema, and occasionally by sigmoidoscopy.

Dysentery

With amoebic dysentery, there will be a history of residence abroad, and diagnosis is made by demonstrating E. Histolytica in the stool, using concentration methods if necessary. The fact that ulcerative colitis is often confused with bacillary dysentery is shown by the large number of patients with ulcerative colitis, who are admitted to fever hospitals.

Crohn's Disease involving the Colon

This condition may be confused with ulcerative colitis. The "string stricture sign" of the X-ray examination may reveal the correct diagnosis, but laparotomy is often performed.

Familial Polyposis Coli may present with diarrhoea, blood and mucus, but there is usually a strong family history of bowel disturbance, with frequent death in midlife of colonic cancer. The polypi may be seen through the sigmoidoscope. **Radiation proctitis** results from the use of X-rays, radium, or radioactive cobalt. There is congestion of the mucosa, but the history of radiotherapy and the concomitant telangiectasis should signify the correct diagnosis. Antibiotic Colitis is associated with diarrhoea following the taking of antibiotics for some unrelated condition. Stool Culture may reveal staphylococci or monilia. **Tuberculous Colitis** is comparatively uncommon, but by no means rare. It is a sequel of pulmonary tuberculosis, and may be "ulcerative" or "hyperplastic" in type. Diagnosis is difficult for the mycobacterium is but infrequently isolated.

Finally, ulcerative colitis should be distinguished from simple mucous colitis, the ileocolitis described by Brooke and colitis due to bilharzial dysentery.

AETIOLOGY

The study of aetiology is important, because, without a knowledge of this, treatment must be non-specific. The study, however, is unsatisfactory. Innumerable theories have been put forward since 1924, when Bargen isolated the notorious "diplostreptococcus" and announced to a credulous medical world that he had found the cause of ulcerative colitis. From the possibility of an infective aetiology, there have been the allergic and lysozyme theories and an interesting suggestion by Robertson and Kernohan, that ulcerative colitis might be due to a hypertrophy of the ganglia of the myenteric plexus—the reverse of what the same workers discovered in Hirschsprung's disease, where spastic obstruction is produced by absence of the same ganglia.

It is perhaps encouraging to note that the most discussed theory, at the moment, was first put forward by a medical student in 1930. This psychosomatic theory is the only one with any standing now, and it has considerable supporting evidence:

1. A history of emotional conflict preceding the onset of symptoms.
2. Personality Studies.
3. Various physiological observations on the colon, which show mucosal reaction to emotional stress.

The supporters of this theory, a group including many psychiatrists, sometimes become so lyrical in its praise that a few have advocated leucotomy before colectomy. French surgeons are performing this operation using electrocoagulation of the grey matter. It is no doubt a consolation to note that this is conducted under the supervision of "psychiatristes qualifiés."

The opponents of the psychosomatic theory of causation hold the so-called "common sense view" that a patient who is passing up to 20 dribbling motions a day is bound to be emotionally disturbed. Result rather than cause, they say.

THE TREATMENT OF ULCERATIVE COLITIS

A discussion about treatment is difficult, owing to the wide variation in expert views. This is partly due to the fact that the surgeons are, on the whole, seeing more severe cases than the physicians. Psychiatrists in Britain seldom receive the chance to cure, though success "with 50 hours of continuous psychotherapy" has been reported from America.

MEDICAL TREATMENT

It is hard to judge the comparative merits of different forms of treatment, as the disease may remit spontaneously. The usual measures of rest and supportive therapy (e.g. parenteral fluids, whole blood, protein hydrolysates) will usually suffice, the diarrhoea being controlled by belladonna, tincture of opium and agar or tragacanth. The Americans are impressed by a multiple intestinal absorbent called Resion. This is supposed to remove toxic amines, leaving essential minerals, vitamins and amino acids.

Both sulphonamides and antibiotics can be given in the hope that they will sterilise the bowel of secondary invaders. Their use has undoubtedly been stimulated by the possibility that ulcerative colitis might after all be caused by an undiscovered bacterial agent. Bargen, though he is reputed not to believe in his own theory that the condition is caused by a bacterium, finds sulphonamides more effective in treatment than any other single drug, including the steroids. His favourite is a new drug, "salazopyrin," a com-

bination of sulphonamide with salicylic acid with a special affinity for the submucosa, hence rationalising the treatment of a disease localised here.

Most clinicians regard cortisone and A.C.T.H. as the sheet anchor of treatment in the severe case. In some cases, 300 mg. of oral cortisone can be used. In very acute cases, intravenous corticotrophin is very valuable, and recently rectal hydrocortisone has been used by Truelove, in the form of water-soluble hydrocortisone hemisuccinate sodium. Why steroids are effective is not known. One might have expected their contraindication in what appears to be an inflammatory affection. Probably the sense of well-being, and a strong desire to "get well" is at least contributory, and in this euphoric mood, the patients have improved appetites and tend to gain weight. The combniation of cortisone with A.C.T.H. is thought to enhance the action of the former, but it is important not to persist with steroid therapy, if there is no response within 14 days, as operative risks are otherwise considerably increased. If operation becomes necessary in a patient who has been having steroid therapy, it is important to cover the operation and recovery period with cortisone. This is to avoid post-operative collapse through adrenal insufficiency.

SURGICAL TREATMENT

The indications for surgical treatment are:

1. Chronic invalidism: failed medical treatment
2. Acute fulminating disease
3. Presence of complications (arthritis, stricture etc.)
4. The risk of carcinoma (particularly in patients with longstanding disease)

Operative treatment is based on two principles. The faecal stream must be diverted (hence ileostomy) and the damaged bowel should be removed. Undoubtedly, the most widely practised operation is total proctocolectomy, with a permanent ileostomy. This is done in one or two stages, depending on the condition of the patient. The first stage should include the establishment of the ileostomy and removal of the colon, with excision of the sigmoid colon and rectum as a second stage. There is a possibility that lesions in the rectum, if present, might heal after diversion of the faecal stream, and this possibility has prompted attempts to preserve the rectum, with subsequent ileorectal anastomosis. Aylett has produced the most favourable results with this latter procedure and has saved patients from condemnation to the ileostomy life. In Aylett's series (38 cases), the average number of bowel motions is 5 in the 24-hour period, but unfortunately few other surgeons can equal these good results. Dukes considers that the procedure is only valuable in children and mentally defective patients, who could not manage an ileostomy. Many such anastomoses have had to be taken down, owing to the daily passage of an incapacitating number of motions and to the resurgence of the disease in the rectum. The new "Chiron" disposable ileostomy bag has found great favour, and the various ileostomy associations ("O.T. Associations") have done much to help their members. Ileostomists can live full and happy lives, and, with sensible management of their ileostomy, they are scarcely handicapped in any way.

And yet, this is not the final answer to the ulcerative colitis problem, for as one French writer put it, "colectomy is merely the extirpation of an anatomically destroyed organ, and not the cure of the disease."

MATERIA MEDICA RIKER

RIKER

PENTOXYLON*

A more complete treatment for angina pectoris, combining the bradycardic and tranquilizing effects of Rauwiloid with the prolonged vasodilating action of pentaerythrityl tetranitrate.

RAUWILOID*

A standardised Rauwolfia product containing all the desirable alkaloids of the crude drug in purified form.

RAUWILOID + VERILOID*

A balanced combination of 'Rauwiloid' and 'Veriloid' enabling higher doses of the latter to be administered with no undesirable side effects.

MEDIHALER Epi & Iso*

The 'Medihaler' is the first self-propelled aerosol for internal inhalation therapy. It delivers a measured dose of predetermined particle size. There are two forms: 'Medihaler' Epi; Each propellant unit contains 7 mg./c.c. of adrenaline bitartrate suspended in an inert propellant. 'Medihaler' Iso; Each propellant unit contains 2 mg./c.c. isoprenaline to 0.075 mg. isoprenaline sulphate B.P. suspended in an inert propellant.

DEANER

'Deaner' is the para-acetamido benzoic acid salt of 2-dimethylaminoethanol indicated for the treatment of debility and mild endogenous depression. Good reports have also been received on the use of 'Deaner' in chronic and migraine headache.

FERROIDS (Regd.)

A new iron compound containing iron aminoates in which the iron is partly chelated with a mixture of amino acids. The compound provides an exceptionally high degree of utilisation of iron with negligible side effects. Daily rises in haemoglobin of up to 2% a day have been reported.

INTRALGIN (Regd.) Liquid & Gel.

A percutaneous analgesic for the treatment of acute trauma, sprains, strains and all forms of non-articular rheumatism. 'Intralgin' is not a rubefacient but is absorbed through the skin into the affected muscles. 'Intralgin' is available in liquid form for application as a wet dressing. Intralgin gel is intended for gentle massage in less severe cases.

CALCIUM DISODIUM VERSENATE*

The specific treatment for lead poisoning.

** Regd. Trademark. Regd. Users:*

RIKER LABORATORIES LIMITED
LOUGHBOROUGH, LEICS.

ANATOMY
of the
HUMAN
BODY

R. D. LOCKHART, M.D., Ch.M., F.R.S.E.
Regius Professor of Anatomy, Aberdeen University

G. F. HAMILTON, B.Sc., M.B., Ch.B.,
Senior Lecturer in Anatomy, Aberdeen University

F. W. FYFE, M.A., M.B., Ch.B.
Formerly Lecturer in Anatomy, Aberdeen University
Associate Professor of Anatomy Dalhousie University

A direct, modern approach to the study of Anatomy based on a drastic reduction in the length of the written text and in the use of extensive visual illustration.

A full account of the book is given on a prospectus which also includes three full-size specimen pages showing the remarkable colour work and the unique instructional method employed, and is available on request.

Crown 4to, with 965 illustrations of which approximately 600 are in colour. £5 5s net.

★

Obtainable from

DONALD FERRIER

MEDICAL, DENTAL, NURSING, VETERINARY, SCIENTIFIC
& TECHNICAL BOOKSELLER

8, 9, 10 & 18 TEVIOT PLACE · EDINBURGH 1

PHONE CAL 5325 AND 5689 PHONE CAL 5325 AND 5689

Macdonald Printers (Edinburgh) Limited, 18 West Nicolson Street, Edinburgh 8