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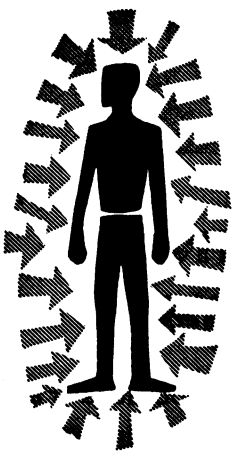

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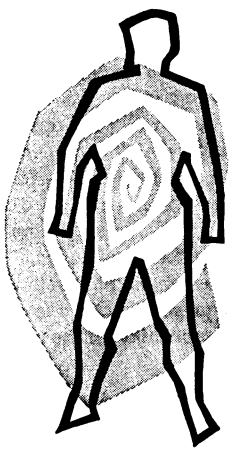

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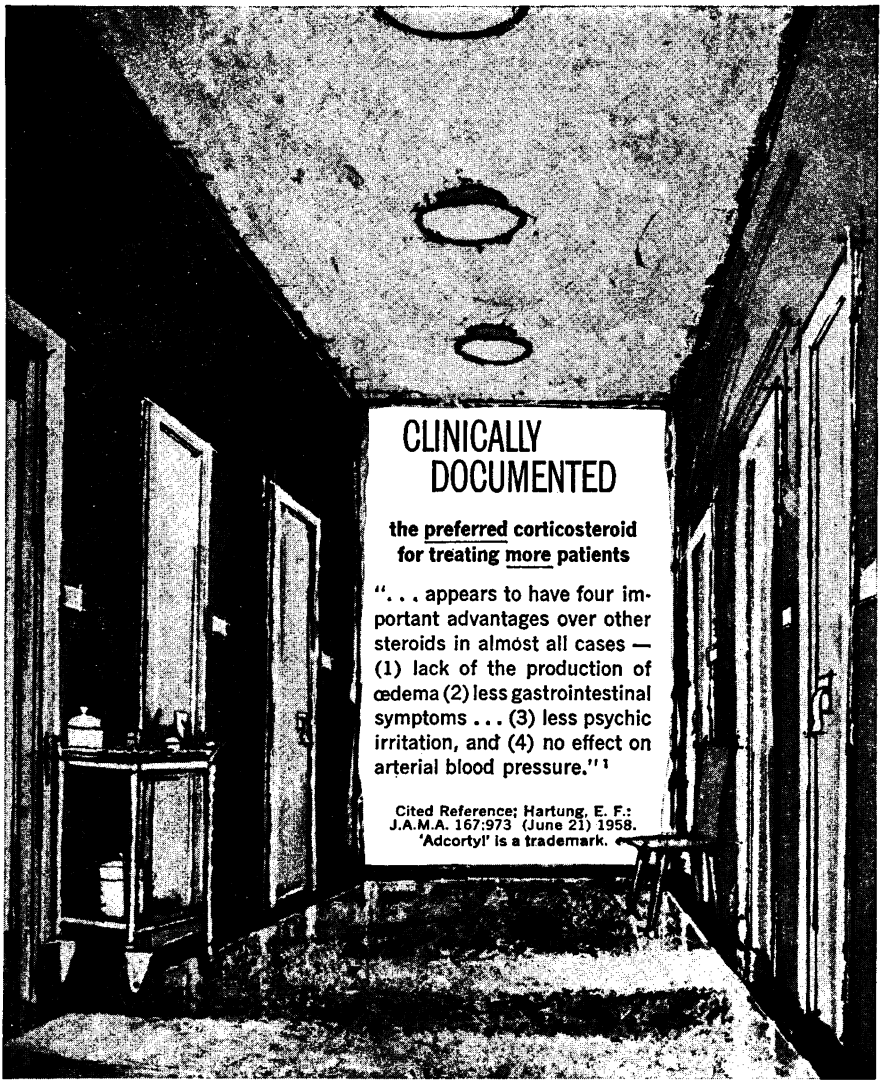

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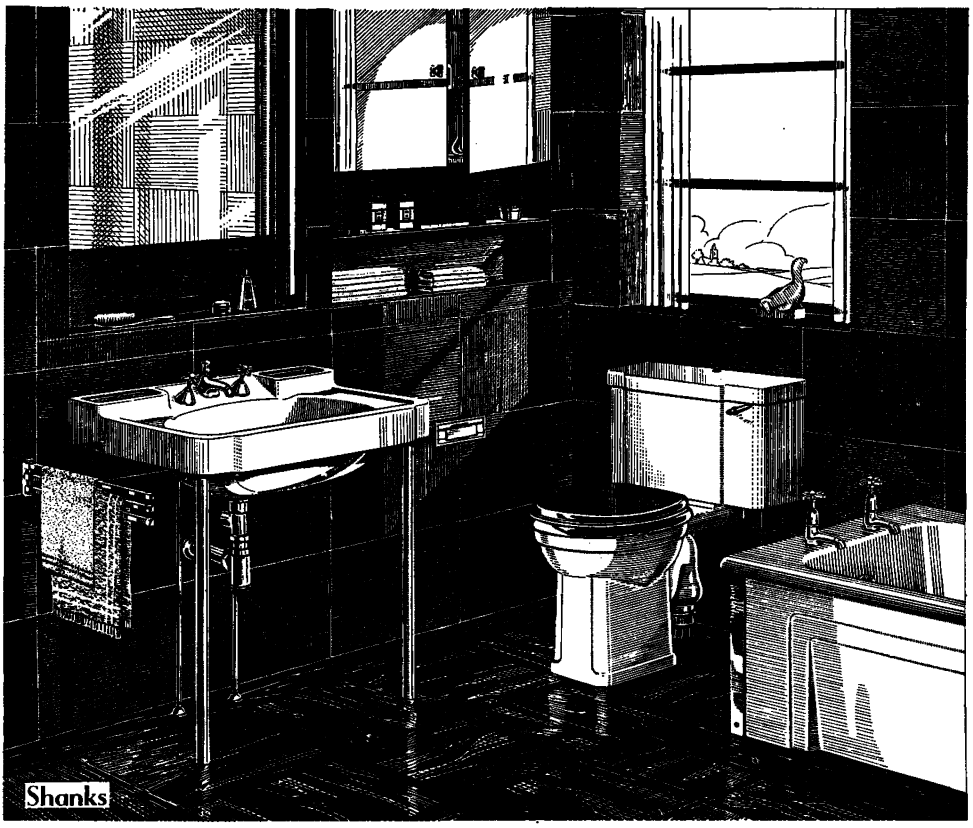

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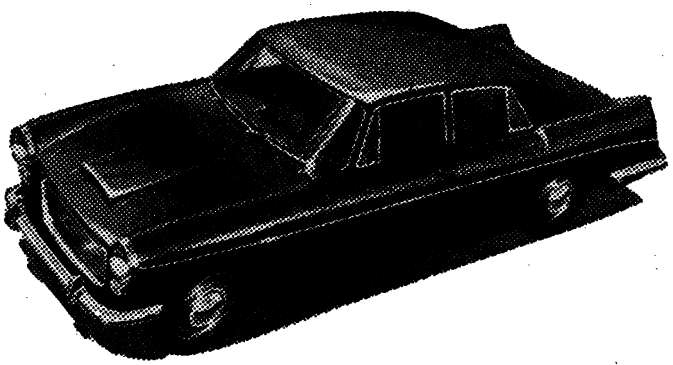

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ULSTER MEDICAL JOURNAL

PUBLISHED ON BEHALF OF THE ULSTER MEDICAL SOCIETY

Vol. XXXI 1st JUNE, 1962 No. 1

"TRACHEOSTOMY, YESTERDAY AND TODAY"

By **TERENCE CAWTHORNE, F.R.C.S.**

The first Sir William Wilde Lecture given to the Irish Otolaryngological Society in Belfast on the 17th November, 1961

TONIGHT I have been honoured with the task of giving the first Sir William Wilde Lecture, a task which I may at once say would have been carried out so well by your President, to whom we are all indebted for his biography of Sir William Wilde, 'A Victorian Doctor,' which I have read and re-read with continued pleasure. In fact it has the place of honour in my bedside bookcase, and most of what I have written and have to say tonight about Sir William Wilde I have learnt from Mr. Wilson's book.

Born in the year of the Battle of Waterloo into a medical family, William Wilde received his medical education at Dr. Steevens Hospital in Dublin, and among his teachers were the physicians Graves and Stokes, and the surgeon Colles. These were all famous men who helped to give Dublin its reputation as one of the leading medical centres in the world. Their names live on in the diseases which they described, and indeed William Wilde earned the right to a place in the hall of eponymous fame by reason of Wilde's incision for mastoiditis. It is curious to recall that his son, Oscar, had an ear operation, for the relief of long-standing suppuration, but two weeks before his death from meningitis in Paris on 30th November, 1900. We know nothing of the details of the operation except that the ear required daily dressing, and it might even be that the operation was the one which carried his father's name. This family connection with otology was carried into the next generation, for Oscar's surviving son, Vyvyan, had a mastoid operation as a boy.

But to get back to William Wilde, a remarkable man by any standards, who wrote the first English text book of otology, who founded and ran a hospital for diseases of the ear and the eye, who became the leading aural surgeon of his day, who wrote travel books, works on archaeology and on the beauties of his own beloved Ireland, and whose official appointments included Surgeon Oculist to the Queen in Ireland and Commissioner for the Census. Like so many Irishmen

past and present, he was a gifted 'all-rounder,' who, despite chronic ill health from asthma, was also gifted with energy and drive, and he was equally at home with the written and the spoken word.

His professional life was devoted to the study of diseases of the eye and of the ear, and he founded the Dublin Eye and Ear Infirmary; his text book on aural surgery was the first of its kind to be published in English. His earliest essay into surgery could have been enough to put him off for life, but because it was successful it may have focused his interest if not to the eye or to the ear at any rate in that direction; for his first recorded operation, carried out while he was still a medical student, was an emergency tracheostomy. This took place one Sunday morning in the 1830's at Ballymagibbon when the young Wilde, still a medical student, was summoned to help a small boy who was suffocating from a piece of potato lodged in his larynx. Wilde was resourceful even then, and with a pair of scissors he carried out a tracheotomy and so saved the boy's life. This was his first successful and unsupervised operation, and one which I feel deserves recognition, for such an operation in such conditions can be extremely difficult. It is one reason why I have chosen 'Tracheostomy' as the subject of my discourse tonight. It is also a subject of topical interest for the way in which during the past generation its indications have extended from the relief of obstructive laryngeal dyspnœa to combating respiratory insufficiency from any cause.

Since 1953 I have been associated with the work of the Batten Unit for respiratory emergencies at the National Hospital for Nervous Diseases, Queen Square, London, and so besides giving you an outline of the development of tracheostomy from the earliest times I would like to say something about the extension of the operation within the past few years.

Any doctor at any time may be called upon to repeat Wilde's brave and life-saving procedure, and it behoves us all not only to know how to do it but also to see that every student who passes through our hands knows how and what to do, if he or she is ever faced with a case of sudden laryngeal obstruction. Such a dramatic situation is a favourite subject in stories of medical life, and the physician-author Francis Brett Young introduces it in his novel, 'My Brother Jonathan,' in which the hero-doctor saves the life of a conveniently rich and influential man who was choking over a piece of impacted food in a restaurant. Fortunately few of us in real life are ever called upon to face such a situation, and if we were we might well be found wanting; as happened some years ago at a dinner attended by not a few doctors when one of the guests, a doctor himself, choked and died. At the time he was thought to have suffered a heart attack, but at the post-mortem a portion of breast of chicken with bone attached was found to be impacted in his larynx.

Tracheostomy was first proposed, though not by that name, by Asclepiades, a Greek physician who practised in Rome in the first century B.C., and who included among his patients both Cicero and Mark Antony. Subsequently most of the notable writers on surgery recommended such an operation, though there is no record of a successful operation having been performed until that described

by Brassavola, an Italian physician, who in 1546 opened the trachea of a boy suffocating from an abscess on the windpipe and saved his life.

In the next century the French physician Habricot described the case of a youth who, fearing that he was about to be robbed, swallowed some nine gold coins, one of which lodged in the upper œsophagus behind the trachea which it obstructed. Habricot opened the trachea relieving the obstruction and with a sound pushed the coins on into the stomach. Eagerly watched by medical attendants and relatives the boy rewarded their vigilance a few days later by what one might term a 'clink in the pan,' and the gold coins were restored to circulation. This case illustrates the fact that in the young, respiratory obstruction can sometimes result from a foreign body lodging not in the larynx or trachea but in the upper œsophagus.

Early in the eighteenth century the English surgeon Chovell made a reputation among highwaymen by performing a tracheotomy the day before a condemned man was due to be hanged; thus in some instances cheating the hangman. So much so that when waylaid by robbers one night, on hearing his name they not only desisted but insisted on ensuring Chovell's safety from further molestation by accompanying him to his lodging.

Thomas Fienus, Professor of Medicine at the University of Louvain, was the first to use the word 'tracheotomy,' and it eventually remained for my teacher and colleague Sir Victor Negus to suggest the term 'tracheostomy' for a maintained opening in the trachea. At the turn of the eighteenth century the Frenchman Pierre Bretonneau advocated tracheotomy for diphtheria, a disease which was rife at that time and to which he gave the name of diphtheria. In Spain at this time diphtheria was popularly known as 'El Garrotillo': the strangler, no doubt after their form of judicial execution by means of strangling. This is depicted by Goya in one of his Caprichos which shows a young man of fashion seeing in a looking-glass a vision of himself being strangled by the garotte. Goya also drew a vivid picture of a doctor trying to relieve a child suffocating from diphtheria, and he should have known for two of his children are said to have died of it.

Then in 1887 the world was startled by the famous case of Crown Prince Frederick of Prussia, who in the early summer of that year developed hoarseness which did not respond to vigorous treatment and so he was suspected of having a carcinoma of the larynx. His Prussian medical advisers recommended a major laryngeal operation. The Crown Prince's wife was Queen Victoria's eldest daughter, and she and many of the family were appalled at the thought of such an operation, which at that time was tantamount to a death sentence. The Prussian doctors suggested an outside opinion and Sir Morell Mackenzie was chosen. Quite independently the Crown Princess had approached her mother, Queen Victoria, who reinforced the Prussian doctors' request with a Royal Command. At that time Morell Mackenzie occupied the same rôle in laryngology as Wilde had done a generation earlier in otology. He was the leading laryngologist in the world, having founded the Throat Hospital in Golden Square, London, and having been President of the Section of Laryngology at

the International Medical Congress in Copenhagen in 1884. Always a controversial figure, he had much in common with Wilde; both were forceful, energetic pioneers in special branches of medicine, and both suffered ill health from asthma. When he saw the Crown Prince in Berlin, Mackenzie recommended that a portion of the diseased larynx be removed through the mouth by means of indirect laryngoscopy in order that it might be examined microscopically. This was a procedure at which Morell Mackenzie was particularly adept and so he was asked to carry it out. Specimens taken on two separate occasions were submitted to the pathologist, Virchow, who reported no evidence of malignancy. In the light of these findings Mackenzie not unnaturally advised against the dreaded external operation.

The German Emperor, at this time aged 91, was not expected to live long. His son, the Crown Prince, was noted for his liberal and peaceful views which were not shared by the Emperor's adviser, Bismarck, nor by the Crown Prince's son who was later to become Kaiser Wilhelm II. There can be no doubt, therefore, that in liberal and peace-loving quarters in Prussia Mackenzie's decision was hailed with a sigh of relief, though the Prussian surgeons made no secret of their hostility towards the English specialist. The health of the Crown Prince improved sufficiently for him to be able to attend his mother-in-law's Golden Jubilee in London in June, 1887, and while in London a further piece of tissue was taken by Mackenzie from the royal larynx and sent to Virchow, who again gave a negative report. By the end of the year, however, perichondritis had set in, and on 3rd February at San Remo a tracheotomy was performed by a German surgeon. Then on 8th March, 1888, the aged Emperor died and the Crown Prince acceded to the throne as Emperor Frederick III, a throne he was alas! to occupy for but ninety-nine days, and he was the only Emperor in history to have occupied the throne with a tracheotomy. During this time Morell Mackenzie was in constant attendance. Knighted by our Queen Victoria the previous summer and decorated, loved and trusted by the German Emperor, Mackenzie came home to face a storm of opposition and criticism. Hated by the German surgeons, he was practically disowned by his own colleagues in England, and in particular by a young German laryngologist living and practising in London, who had come to study under Mackenzie, who had befriended him and helped him. Despite this, Semon, for that was his name, went about saying that Mackenzie had killed his Emperor. Mackenzie never properly recovered from this tragedy which he survived but a few years. One cannot help comparing his end with that of Sir William Wilde, who, at the height of his fame, was broken by a law case, and who was also faced with the ill will of a colleague.

Wilde and Mackenzie were great and fine men, pioneers each of a speciality at a time when to be a specialist was in itself considered to be not quite nice. Which is no doubt why, when things did not go right, they had to suffer as much for being specialists as for what they had done.

No doubt this world-famous case had its effect upon medical as well as general opinion for tracheostomy was always regarded as a dangerous and often

mutilating operation, only to be embarked upon as a last resort in cases when laryngeal obstruction was so great as to threaten life itself.

In the last years of the nineteenth century, Sir Frederick Treves gave a moving description of being called late one Sunday evening to a house in Palace Gate, London, to attend the painter Sir John Millais, at that time President of the Royal Academy, who was suffocating from laryngeal obstruction due to carcinoma. Aided by the family doctor, who gave chloroform and a mysterious, immobile and dumb female who held a lamp, a hurried tracheotomy was performed which ended with the doctors struggling on the floor. The trachea was opened, a cannula inserted, and the patient breathed again. The description of the conditions under which the operation was carried out, made even more graphic by Treves' able pen, must bring back unpleasant memories to many who were faced with similar circumstances. Fortunately nowadays we are usually spared the horrors of a hurried tracheotomy in definitely unsurgical surroundings upon a patient fighting for breath. We owe this to a graduate of Belfast, Sir Ivan Magill, who by his introduction of the wide bore soft rubber intratracheal tube made possible the control of respiration by mechanical means.

But the first steps in employing tracheostomy for respiratory emergencies other than laryngeal obstruction were taken by Wilson (1932) and Davidson (1936), who suggested tracheostomy for the relief of respiratory insufficiency due to bulbar poliomyelitis. At that time paralysis of the respiratory muscles was overcome by placing the patient in an iron lung or tank respiratory, where respiration was carried out by means of rhythmic negative pressure which acted on the chest wall so that it expanded and drew in air through the larynx. Unfortunately, in cases of bulbar palsy when the larynx could not shut, not only air but also secretions from the pharynx were drawn past the paralysed larynx into the tracheo-bronchial tree and so the patient drowned in his own secretions. Tracheostomy, by avoiding respiratory exchange through the mouth, saved many patients and it also permitted mechanical aspiration of the tracheo-bronchial tree via the tracheostomy tube. But the technical difficulties of caring for a tracheostomy patient in an iron lung were great and it was with much relief that in 1953 we turned over to positive pressure with a breathing machine, using a cuffed tracheostomy tube.

All this started in the late 1930's when anæsthetists using a wide-bored intra-tracheal tube and a rubber breathing bag were able to control and maintain respiration by compressing the bag. I well remember being very apprehensive of an anæsthetist who at the beginning of the war was in the habit of paralysing respiration and keeping the patient oxygenated by means of pressing a rubber bag between the anæsthetic machine and the intratracheal tube. Nevertheless, this method was to prove life-saving some twelve years later in Denmark when a bad poliomyelitis epidemic filled their hospitals with respiratory emergencies. There were only a few iron lungs and so the anæsthetists maintained positive pressure respiration through a cuffed intratracheal tube via a tracheostomy opening, using teams of medical students to squeeze the rubber bags and so maintain respiration.

It did not take long to develop a machine that could deliver an air mixture at any speed and quantity. One such machine was developed in 1953 by Dr. Robert Beaver, the anæsthetist attached to the Batten Unit at Queen Square. Other machines have been developed in England, notably the Oxford and the Barnet respirators, and it has been of great interest to me, and indeed my excuse for this lecture, to have witnessed some of these developments.

The next step was the introduction of the cuffed rubber tracheostomy tube which enabled the lower respiratory tract to be shut off from the larynx, and for respiration to be a closed affair, so that air or whatever gaseous mixture was chosen could be delivered at a desired pressure as well as rate.

The part played by the surgeon or tracheotomist in the team for respiratory emergencies, though indubitably essential, is but a small one, and most of the burden and, needless to say, the credit for the development of the modern methods of managing respiratory emergencies belongs to the anæsthetist of the team.

It all started with the Magill wide bore intratracheal tube for general anæsthesia which was sufficiently wide to permit adequate respiratory exchange. From this came the idea of reinforcing shallow respiration during general anæsthesia by means of a rubber bag in circuit between the anæsthetic machine and the intratracheal tube. By compressing this bag the anæsthetist was able to inflate the patient's lungs and by adding an inflatable cuff to the tracheal end of the intratracheal tube the respiratory tract was closed off except for the wide bore intratracheal tube. It was at this stage that during the Danish epidemic the use of positive pressure respiration was evolved as an alternative to the iron lung for the maintenance of respiration in patients whose respiratory muscles were paralysed by poliomyelitis.

Another important aspect of the management of respiratory emergencies which came from the use of positive pressure respiration in anæsthesia was the appreciation of the importance of the dead space in the respiratory tract; that is to say, the airway, be it a rubber tube or the natural passages such as the mouth, pharynx, larynx or trachea, which merely serves for the passage to and fro of air and not for the exchange of respiratory gases. Where there is a depression of respiration so that only 200 cc. of air passes in and out with each respiration instead of the normal 500 cc., then only 50 cc. of inspired air will be available to the lungs with each breath, the rest being occupied in the 150 cc. of dead space in the mouth, larynx and upper trachea. Thus a shallow breathing patient will slowly, quietly but surely die from lack of oxygen. Unconscious patients with shallow respiration from whatever cause can often be saved by a tracheostomy which at once reduces the dead space from 150 to 50 cc.

And so we now find that tracheostomy can be life-saving in many respiratory emergencies. Whereas tracheostomy was as late as 1940 done for laryngeal obstruction in more than 90 per cent. of the cases, now more than 50 per cent. are done for causes of respiratory insufficiency in the lower respiratory tract. Besides being used in the management of respiratory and bulbar paralysis in poliomyelitis and polyneuritis and myasthenia gravis, it has also been effectively

employed for acute and chronic disorders of the lower respiratory tract accompanied by much secretion, for injuries of the mouth, jaws and chest, and for cases of narcotic poisoning with shallow respiration, in head injuries, after severe intracranial disasters and intracranial operations, and for the relief of respiratory spasm due to tetanus.

There is no need in this review to mention the details of tracheostomy except to urge the importance of opening the trachea below the first ring, whenever it is thought that the opening will be maintained for more than a matter of hours. This is, of course, to avoid the possibility of post-operative laryngeal stenosis. Three other points deserve mention. The skin incision should never be sutured for fear of post-operative surgical emphysema. Whenever possible all bleeding should be stopped before opening the trachea. Finally it is usually wise to cut through the isthmus of the thyroid gland which may otherwise encroach upon the tracheal opening.

Finally the operation is much easier now that in most of the cases general anæsthesia and good respiration can be maintained before and during the operation by means of a wide bore intratracheal tube. This applies to those cases in which the operation is for the relief of respiratory insufficiency and the larynx is unobstructed. When there is laryngeal obstruction the need for an emergency airway may be urgent and it may be impossible to pass an intratracheal tube. Then the choice lies between a hurried emergency tracheotomy, or if conditions will not permit, a temporary laryngotomy through the crico-thyroid membrane. This has the advantage that the airway is literally just beneath the skin, and the only equipment needed is a knife and a small oval-shaped laryngotomy cannula; but of course this cannula must be removed within twelve hours if laryngeal stenosis is to be avoided. This will allow time for the patient to be taken to an operating theatre for a formal tracheotomy should the obstruction continue. This procedure is mentioned not because it is the ideal way of establishing an airway but in certain emergency circumstances it may be the only effective operation.

Generally speaking, the first step in a case of respiratory emergency for paralysis or unconsciousness is to pass an intratracheal tube which can safely be allowed to remain for up to twelve hours. With but few exceptions, gone are the days of the hurried emergency tracheostomy, and for this, as for many other favours, we shall always be grateful to our anæsthetists.

Finally may I conclude these observations on tracheostomy by saying that when properly performed it need never harm nor even mutilate a patient, but it can often save life. And so, as I come to the end of this tale of tracheostomy, I would like you to come back with me to the little village of Ballymagibbon one Sunday morning 130 years ago when a dauntless young medical student saved a boy's life by means of an emergency tracheostomy carried out with only a pair of scissors and coram populi. This gives us some indication of the remarkably resourceful and vivid man who was to come; a man who added lustre to the already brilliant Dublin Medical School; a man whose name will forever remain bright in the minds of English-speaking otologists; and a man who was

honoured by his Queen, not only for his services to medicine, but also for his services to his beloved country.

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THE CHANGING PATTERN OF MEDICINE

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The SIR THOMAS and LADY EDITH DIXON LECTURE
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THE Sir Thomas and Lady Edith Dixon Lecture has been given by many distinguished doctors in the past. It is a reminder of the great services of Sir Thomas to medicine in his lifetime and of the continued support of Lady Dixon. I was deeply honoured by the invitation to deliver the lecture this year and almost equally frightened by the title which Mr. Fraser asked me to use. I wonder if any doctor can have the presumption to predict the future of medicine. I must perforce speak as a medical onlooker; my knowledge is all at secondhand; and so I must refer rather to content of service and the way in which service is to be provided than to the progress of medical science.

We all know that medicine is changing more rapidly than at any time in its past history. The first and most impressive part of that change is the rapid expansion of the scientific paraphernalia that surrounds medical practice. The second is that the doctor has ceased to be merely a person to whom a patient goes when he is sick; he is becoming increasingly concerned with the maintenance of health.

If the science of medicine becomes more complex, inevitably it requires more heads to contain the full range of the scientific knowledge. A man can only develop so much expertise, whatever his intellectual capacity. The more he knows in depth the less can he be expected to understand in breadth. That does not mean that the personal physician must forego all scientific knowledge or that the specialist can retain no general comprehension of the medicine in which he is expert in only a part. It does mean, of course, that the patient with some serious medical condition will more often expect to see and perhaps be treated by somebody with specialised knowledge. But the majority of illnesses are not serious and the patient needs someone who can deal with most of his ills and who can choose the moment, should it arise, when he must be sent to a specialist who possesses the particular knowledge and skill he needs. There is, moreover, much to be done to preserve health by the primary prevention of disease and by the early detection of its inception before serious harm has been done. There must, therefore, be a doctor who is nearest to the individual who provides him with most of the care that he needs and sees that he gets the right specialist help if and when the time comes. Otherwise the patient is left to make a provisional diagnosis for himself and choose a specialist accordingly.

There *are* countries where the diversification of specialisms has gone so far that the general or personal physician has been almost eliminated. There are

other countries where specialism and general practice of a kind exist side by side with very little contact between them. Where the patient is left to choose for himself, he may canvass a whole series of medical opinions before deciding where he will put his trust.

I shall now discuss what has been happening in Britain and where I think it is taking our profession.

We have little statistical information about the pattern of medical care in Britain in the 1930s. We know generally that in the teaching centres and some of the larger towns in England and Wales, at least in the voluntary hospitals, there were closed hospital staffs composed mainly of people with full specialist training at least in the specialities of medicine and surgery. In most of these centres some of the other specialties, particularly ophthalmology and ear, nose and throat surgery, were also separate. Gynæcology and obstetrics were not so completely differentiated and anæsthetics was a specialty which was very commonly combined with general practice—or left to the last recruited resident. Psychiatry was completely in the hands of specialists but they were concealed behind high walls and played little part in the work of voluntary hospitals.

Tuberculosis for administrative reasons was a specialty by itself, but completely divorced from general medicine, of which it should really be a part. Radiology might or might not be a separate specialty and too often there was no more than a service of radiography. Pathology was sometimes in the hands of a specialist but more often was a technician service under the general supervision of a physician. Dermatology was commonly combined with general medicine; neurology was only to be found as a specialty in a few main centres, particularly London. Neuro-surgery, plastic surgery, thoracic surgery and radiotherapy, as separate specialties, were hardly developed at all. Orthopædic surgery was very commonly part of general surgery. Physical medicine hardly existed as a specialty and pædiatrics outside the teaching centres was usually in the hands of general physicians. This uneven development is clearly reflected in the age distributions within the different specialties even now. One finds, for instance, the most rapid build-up in anæsthetics.

The National Health Service greatly accelerated the development of specialist services which had already quickened at the end of the war. We can only guess at the increase between 1946 and 1949, but it may have been almost a fifth. Accurate figures are available from the end of 1949 when there were 5,189 consultants in the hospitals in England and Wales and by the end of 1960 the total was 7,292. Almost exactly half the increase has occurred in the specialties of psychiatry, radiology, pathology, and anæsthetics, and only one-seventh in general medicine and surgery. In 1949, of every 1,000 consultants, 270 were working in general medicine and general surgery and 303 in those four specialties. By 1959, only 236 in every 1,000 were working in general medicine (including geriatrics) and general surgery, whereas in the other four specialties there were 365. That is, the share of general medicine and surgery has decreased by almost an eighth, while the share of the other four specialties has increased by a fifth. Proportionately, the increase in some of the smaller specialties was even greater.

Neuro-surgery, neurology, radiotherapy, plastic surgery and thoracic surgery are small, highly specialised fields of practice in which Regional Centres serving populations of several millions are the rule. In 1949, forty-three out of every 1,000 consultants were working in these five specialties, whereas in 1959 the number was fifty-seven, an increase of almost exactly a third.

This increase is paralleled by changes in admission rates to the different special departments. The total of admissions increased by two-fifths in ten years, but out of every 1,000 during 1949, 363 were to departments of general medicine or general surgery and only 20 to the five smaller specialties, whereas in 1959 there were 339 out of every 1,000 to general medical and general surgical beds and 30 per 1,000 to the four smaller specialties, the share of general medicine and general surgery had fallen by one-fifteenth, whereas the share of the five smaller specialties had increased by a half.

I have used these figures only to underline the way in which changes which were already apparent thirty years ago have been carried forward more swiftly under the National Health Service. This is not a pattern of change initiated by the National Health Service, it is not peculiar to it in any way. It is to be seen in other countries as well as in Britain, sometimes, indeed, carried a good deal farther. The National Health Service does permit the active promotion of the process where necessary and that means that the real benefits are made general and not local to the big cities. But we are seeing the further progress of a change which is both a cause and an effect of the advance of medicine, and not an artificial development introduced by administrative process. I want to suggest to you that these changes are by no means complete and are, in fact, still continuing.

There are some changes in the opposite sense due to the control of communicable diseases. Patients with infectious diseases are now usually in the care of specialists in general medicine or in pædiatrics. The specialty now called diseases of the chest was identifiable at the beginning of the Service much more readily as "tuberculosis." The chest physicians who entered the National Health Service were, in the main, the former Tuberculosis Officers of Local Authorities. The importance of tuberculosis as a cause of morbidity or death has rapidly diminished in the last ten years. The number of deaths in 1960 was less than a fifth of that in 1950, and the number of new cases of pulmonary tuberculosis notified was less than half. Consequently, chest physicians have, in that decade, broadened their interest in other diseases of the lungs and at the same time have come a great deal closer to general medicine, of which they really form a part.

The specialty of diseases of the chest is not likely to merge wholly into that of general medicine. It is an example of the change which is now beginning to become more evident in general medicine, general surgery, and some of the other main specialties. The position of cardiology is becoming more like that of neurology in relation to general medicine. No region is really adequately served unless it has one or more cardiological departments in its main centres. The growth of cardiac surgery has made it imperative that there should be more rapid development in the medical specialty of cardiology. The accurate fore-

knowledge of the condition that will be found at operation and the careful preliminary assessment by the cardiologist matters at least as much as surgical skill. Moreover, the surgeon is powerless without the assistance of the anæsthetist specially experienced in this field of work.

Wherever the more complex techniques emerge in medical and surgical specialties, so small groups or teams develop a special expertise which becomes indispensable to the correct management of major disabilities and also special departments which are consultative and so exert a wider influence. We see this most obviously in the emergence of cardiological departments or the like in general medicine; the special gastro-enterological clinics that have developed in a few places; pædiatric; surgical; and urological departments at the expense of general surgery; the participation of the psychiatrist directly in the care of patients in general wards; the partial emergence of a specialty of rheumatology; the special clinics for diabetes or for the anæmias or migraine.

This work seldom becomes so sharply defined that all cases are referred to a special clinic or to a particular individual. The district general hospitals which are to be the basis of our hospital service in Britain in future will each be served, not by one physician but by a group and the probability is that within that group a pattern of specialisation will emerge, not rigid but playing a steadily increasing part in the division of medical responsibility. Specialisation in general surgery may well develop even farther.

This development of sub-specialisms is likely to be found wherever the district general hospital exists, but there is more than that. Some limited special kinds of medical work are likely to be directed to particular centres where facilities can be provided for them. We already have a number of examples of this kind. For nearly ten years now, in the Newcastle region, there has been a deliberate attempt to concentrate the management of all cases of hæmolytic disease of the new-born at centres where special facilities exist. Most of this work was developed initially in Newcastle, but Carlisle, Middlesborough, and Sunderland now play similar parts. The essential feature is that women known to be sensitised to the Rh antigen should be confined where facilities for exchange transfusion in the new-born are available, and where pædiatricians with experience in the management of severe cases of hæmolytic diseases have a better chance of saving the baby than can be offered by the maternity unit where the number of such cases seen in any year is small.

The major conditions requiring immediate surgical intervention in the new-born also require concentration. The neo-natal surgical unit, which has been operating in Liverpool, for instance, for the last five or six years, and the pædiatric surgical departments in other centres which draw neo-natal surgical cases from a wide area, have shown quite clearly that in these circumstances one can hope for more satisfactory results with, for instance, such conditions as tracheo-œsophageal fistula than can be obtained in the ordinary pædiatric department, where the general surgeons and the nursing staff do not see enough of these cases to acquire the same expertise. The same process occurs in the development of some of the other specialties, for instance, no neurosurgical centre is complete unless it is a combined

neurological and neurosurgical centre with the assistance of an experienced neuroradiologist and a neuropathologist and anæsthetists specially experienced in neurosurgical work. Surgery of the open heart, needing perfusion techniques, is not to be lightly undertaken in every thoracic surgical unit. It requires a special team of surgeon, anæsthetist, clinical physiologist, cardiologist and, not least, pump technician carefully practised in animal surgery in the first instance, before successful results can be expected in using these techniques in man. Most of these conditions are, of course, uncommon, but hæmolytic disease occurs in about one in 200 births and that means approximately 4,000 of these babies to be treated in a year in England and Wales, perhaps one-half to one-third needing exchange transfusion.

Our returns at present list 26 departments or specialties. I am not suggesting to you that that number will be greatly increased in the returns for 1970. I do suggest that concealed within these gross figures there will, by then, have emerged a considerable further element of specialisation; that diseases of the lungs will be more completely in the hands of chest physicians who may, nevertheless, by then be listed with the general medical group; that cardiological departments will be dealing with more of the heart disease; that the medical staff of pathological departments will consist not of general pathologists, but of people who are each expert in hæmotology, chemical pathology, morbid anatomy or hæmatology; that the anæsthetists of a hospital will not be a sort of taxi service with the surgeon calling up the next one on the rank, but a group amongst whom there will be some differentiation of special skills; that the surgery of the new-born and, indeed, a good deal of the surgery of infants will be done by specialists in pædiatric surgery; that the traumatic and orthopædic surgeons will be sharing the care of major trauma with neurosurgeons, plastic surgeons and thoracic surgeons, much more than they do now; that the treatment of serious burns will be concentrated, as it has been already, in a few areas; that the specialty of physical medicine will have become much more generally used (one of the largest regions in England and Wales has only one consultant in physical medicine at the present time); that amongst the ophthalmic surgeons there will have emerged a few ophthalmic physicians and that in ear, nose, and throat surgery the care of the very deaf child will have become the recognised responsibility of some of the otologists specially interested in the subject, though they also will do general otological work.

The diagnostic departments are already key areas in any hospital. They will be larger and even more influential ten years hence.

A part of this process of further differentiation of sub-specialties will, I hope, be a greater interdependence among the members of hospital staffs. The organisation of medical care in British hospitals differs sharply from that of the continental hospitals, perhaps the pattern in England and Wales differs even from that in Scotland in the extent of individual freedom of specialists. We do not have in England directors of surgery or chiefs of very large departments who control other specialists working under them. In theory every consultant with clinical charge of beds is entirely independent amongst his colleagues. To

my mind that is desirable if it is not carried too far. An hierarchial pattern is apt to put the slower moving, older brains too much in control. Wisdom and experience must have their influence, but hospital medicine and surgery should not be wholly given over to conservatism. Nor, on the other hand, should they be given over to anarchy; sometimes our present position almost approaches that.

The process of sub-specialisation must involve a greater degree of collaboration amongst the people working in a whole specialty. There is room for a great deal more consultation between the staffs of one hospital. It is essential that there should be a closer examination of results, a corporate examination in which the clinico-pathological conference, the clinical demonstration, the departmental meeting all have a part. Not the least impressive part of these conferences in good American hospitals is the part juniors play in them. I shall have something to say shortly about the importance of keeping the general practitioner in touch with the scientific medical work of hospitals. It is at least as important that hospital staffs should be fully in touch with each other and should subject their own work to critical evaluation and comparisons. We are far too self-satisfied in this respect. Even obstetric work, in which the ten years of the Maternal Deaths Enquiries have stimulated a closer examination at least of those cases in which a major error may have occurred, shows far too few examples of regular scrutiny such as, for instance, is organised in the Oxford Region on an area department basis. Manchester is the only hospital region which produces a consolidated statistical return; but this is not a matter of statistics, it is a matter of reviewing clinical work much closer to the individual case.

This is perhaps the place to mention research if only to dismiss it as outside my scope. The volume of research within clinical practice must surely increase. The advances in diagnostic and therapeutic methods and especially in chemistry and pharmacology, will inevitably draw more doctors into clinical trials and studies of some kind. Moreover, research as a stimulus must be present at all levels in clinical practice and it has been shown in the recent work of the College of General Practitioners how important is the spur of the enquiring mind in raising the level of clinical work in and out of hospital or laboratory.

So far I have been talking about the established consultant grade in hospital work because, apart from the S.H.M.Os., those are the only doctors in their permanent place in hospital. Consultants and S.H.M.Os. number roughly one out of five of the actively practising doctors in Great Britain. The number of doctors of senior registrar rank and below, including those in pre-registration house officer posts working in hospitals, number almost the same, one out of five of all doctors in active practice. There are, of course, general practitioners working part-time in hospital also, but their exact number is not known, and they probably do not contribute more than about 4 per cent. of all the time available from doctors in hospital. Yet the number of individuals wholly or mainly engaged in general practice certainly exceeds the total of hospital medical staff even allowing for the equivalent contribution in medical time made by general practitioners to hospital work. The number of principals in general practice is a little more than two out of every five of the doctors in active

practice, and when the assistants, including trainees, are added to the total, general practice does absorb approximately five out of eleven doctors. This means that at present few doctors are established in their permanent field of practice by the age of 30 and many wait a good deal longer. At any given moment the doctors in permanent hospital practice as consultants or S.H.M.Os. are slightly less than half the doctors permanently established in general practice. And the number in the consultant grade is rather more than one-third of the number of principals in general practice. This last ratio has changed appreciably in the last ten years with the number of consultants slowly gaining upon the number of principals in general practice. In the same period the number of junior medical staff in hospital has probably increased by as much as a half.

We must also recognise the increasing part played by professions associated with medicine, from the nuclear physicist or the expert chemist to the chiropodist. Much of the increased service in diagnostic departments depends largely upon skilled technicians working with doctors; there are too few of them, yet their numbers have increased by 50 per cent. Much so-called technical nursing consists of work which doctors would otherwise have to do. Social workers and health visitors give invaluable help to medicine. Indeed medicine is no longer effective if it relies on doctors alone and we need to recognise and respect the contribution others make to medical care much more than we sometimes seem to do.

In the last dozen years substantial changes have been taking place in the organisation of general practice in Britain. At the beginning of the service perhaps three out of seven general practitioners were in single-handed practice. By 1960 the number of doctors in single-handed practice had fallen by a fifth and the proportion of single-handed practitioners in the total was just under 30 per cent. There is also a very striking age difference in the distribution of doctors between single-handed practice and partnership. Of just over 3,000 doctors in practice as principals and aged under 35, only one in seven is in single-handed practice, whereas between the ages of 35 and 44, one out of four, between the ages of 45 and 54, one out of three, and between the ages of 55 and 64, two out of five are in single-handed practice. Of 929 doctors who entered general practice as principals in the year ended the 1st July, 1960, 775 entered as partners. And of those who were under 35 at the time of entry more than 90 per cent. joined partnerships.

This steady movement away from single-handed practice has been given financial encouragement since the settlement of general practitioners' remuneration in 1952. Since then there has also been a system of interest-free loans through which assistance can be given to provide group premises for the practice. There is no doubt that with or without interest-free loans the physical facilities for general practice have been steadily improved over the last decade. And although Health Centres are still few in number they also have made a small contribution to this. It is clear then that in the last decade general practitioners have been moving steadily away from single-handed practice. Of course there still remain some who prefer to work independently; but the recent graduate

clearly does not. It seems very likely that this process will continue and indeed important that it should.

The British pattern of group practice is completely different from the North American. Our groups consist of general practitioners, some of whom may have particular interests but none of whom seek to be recognised as specialists. The usual pattern of groups in North America is one of a combination of specialists, with perhaps a small number describing themselves as general physicians, and their number also has been increasing. If these British groupings were no more than a method of obtaining relief from the round-the-clock burden of general practice they would be a convenient, even necessary, device of organisation but would not necessarily contribute anything to the quality of medical care. The group of doctors who share premises, who meet regularly for incidental as much as for planned discussion of their clinical work, who exchange the product of their reading and who pass on their own immediate experience and the information that they must constantly be receiving from a wide variety of specialist colleagues have a far more important gain from the pooling of knowledge. Moreover, in the ordinary process of relieving one another for time off or holidays, each must begin to know something of the patients in the others' practices. They are able to combine to provide well-arranged premises at smaller cost to themselves and to employ ancillary help usually secretary-receptionist, but sometimes including a nurse, a social worker or even a physiotherapist.

Though the groups in Britain are not of specialists, there often is within the group development of special interests. A group that consisted of four or five entirely similar people would be far less effective than one that was made up of people with dissimilar professional experience and interests. One of the oldest groups I know, using premises adapted some thirty years ago, includes members with special interests in pathology, psychiatry, midwifery and pædiatrics, and two of its members have part-time clinical assistant appointments at a local hospital. They have centralised records, well supervised by an experienced receptionist; they operate an appointments system for consultations and they meet regularly for discussion of difficulties. They pool a collection of journals and, though they are a long way from any medical library, they are thus by no means cut off from medical literature. The physical and economic advantage to practice would justify this kind of grouping, but the intellectual stimulus and the mutual support in their work must be far more important to members of the group.

The group practice loans scheme has now been operating for nearly ten years; it has made available over a million pounds in interest-free loans, and until last year this was all provided from the central pool for general practitioners' remuneration, though now the Exchequer contributes. It has been the outstanding financial contribution of the profession toward the betterment of its methods; the cash value alone would be equivalent to an annual contribution of £5 from each general practitioner. The rest of us should not forget that one branch of the profession voluntarily did this. Nearly one in twenty of all general

practitioners works in a group which has had or is about to have the benefit of such a loan.

More recently a new factor has arisen. In 1954 the Medical Officer of Health of Oxford, at the request of a local group practice, agreed to second to them a health visitor to work with the practice, rather than in an area as is the usual pattern of local health authority work. That arrangement still continues and the health visitor has not only proved of the greatest assistance in the running of the practice but she has also been enabled to do her own work more effectively. More recently two groups of general practitioners in Winchester made similar requests to the County Medical Officer for Hampshire and this method of organisation has now been extended through much of the county. It is a relationship similar to that of the District Medical Officer and Public Health Nurse in Sweden. It does not mean that the other professions working in the domiciliary field are being made over as pairs of hands to general practitioners. It means that members of two professions have come to work together. We have been talking for a long time about a home care team. This *is* the home care team, with general practice as its focal point and the supporting services arranged in the most convenient way for them and for the practice. It is no more than recognition that doctor and nurse or doctor and midwife each contribute part of the care for the same patient. They have always done this in hospital and it is only commonsense that they should now be doing it in the home. We have been deterred for too long by the fact that local authority services are traditionally organised within geographical boundaries. We have suddenly begun to realise that function is more important than geography.

Many local health authorities who had been seeking for ways of linking the work of their staffs with that of general practitioners are now accepting that what appears to be a very radical change is in fact no more than a sensible re-arrangement of the work of their staff, so that it can be done better and with economy of effort as a result of direct association with the doctors. We are just in the process of shaking up the pattern and perhaps many, in general practice and in public health, still need to be convinced that it is right to do so. But I believe that in the course of the next decade it will have become almost completely re-shaped, and we will have groups of doctors each working with one or more nurses or health visitors, midwives or social workers of the local health authority in providing care for one group of families. Of course there will still be exceptions, but I believe that that will be the normal pattern of practice.

If this is the organisation of medical work outside hospital what do we expect it to do? At this moment for every 100 of the population, one is in hospital. In the course of the year nine of them will be in hospital, and about 500 to 550 services will have been given by doctors to the 100 people, excluding in-patient hospital care. Only about one-fifth of those services will have been in the casualty or out-patient department of the hospital, the rest will have been provided by general practitioners at surgery attendances or in the patient's own home.

A great deal of nonsense has been talked about the way in which general practitioners are said to have unloaded their work on to the hospitals under the National Health Service. There is no evidence at all that there has been an increasing tendency to do this. In 1949 there were 36,000,000 and in 1960 41¾ millions attendances at casualty and out-patient departments. But when one examines what the increase was, one finds that about a fifth of it was in departments of traumatic and orthopædic surgery, and we know that accidents requiring admission to hospital have increased also. That would imply a substantial and justifiable increase in attendances at casualty departments. Another quarter of a million additional attendances were made at out-patient clinics for chest diseases and much of this represents better ascertainment and follow-up of contacts of tuberculosis. An additional million attendances were at ante-natal clinics, another service that needed to be increased quite aside from the increase in births that has taken place. The 4 per cent. increase of population would have justified a large part of the remainder. As I have already indicated the greatest proportional increases in hospital work have been in the more highly specialised departments; not at all the sort of work which should be done in general practice. True, there are patients who attend casualty departments for conditions their own doctors can easily treat, but that is not mainly the doctor's fault, as a report from Guy's has recently shown. In sum all the services that could properly be considered general practitioner work would not add more than two or three items a week to each practitioner's work.

We know that in the first three years of the Health Service there was an increase of the order of 17 per cent. as compared with the period before the Health Service in the consultation rate, including consultation with general practitioners and visits to out-patient or casualty departments, but not in-patient care. We also know that this increase was mainly amongst children, women, and old people, just the groups which might have gone short before. Of course some of the calls on doctors' time are frivolous; that was true under the National Health Insurance system before the National Health Service began, but there is no evidence that such demands are increasing now.

The General Register Office enquiry found that rather more than a third of males and rather less than a third of females did not consult their doctors during the year at all; so that men who did see their doctors saw them on the average 5.3 times in the year and women 5.8. Just under half of those who had illness had only one such illness. And just over a quarter had two illnesses. About 4 per cent. of men and 6 per cent. of women saw their doctors for more than four separate conditions in the course of a year. Nearly a quarter of all consultations were for respiratory diseases and they accounted for two-fifths of the patients consulting the doctor. Various mental conditions accounted for about 5 per cent. of the consultations and a rather larger proportion of the persons consulting. These conditions were about twice as frequent amongst women as amongst men, and most of them were psychoneurotic conditions. The ill-defined group, which accounted for about a sixth, must include some conditions of no great moment.

These practices were, of course, selected, but one must take the list as a whole and it does not convey an impression of medical practice devoted to irritating minor matters of no great benefit to the patient and of no real interest to the doctor. It does provide evidence of the treatment of a substantial number of serious conditions and particularly of the long-continued treatment of some of the more disabling chronic diseases in older people. The consultation rate for persons in the age group 65 and over was 6,194 consultations per thousand of the population in that age group, and about a quarter of these were for serious cardiac or vascular conditions, one out of nine for bronchitis and 2 per cent. each for pernicious anæmia and diabetes. This may add up to a great deal of repetitive work with infrequent variations, but it is all important work to the patient and it does require medical care and skill. It is of the essence of general practice that in the middle of this continuous attention to a relatively small range of ordinary conditions, the doctor must be constantly on the alert for the unusual which he may manage himself or refer for specialist attention. At the other end of the age range, along with the many minor infections, there is the occasional urgent problem such as the diagnosis of otitis media in an infant. Or the dramatic and unexpected occasion as, for instance, the patient with smallpox who walks into the general practitioner's surgery, as happened in West Bromwich on 30th December last year. That last diagnosis was made by the general practitioner of a condition he may never have seen before in his life, and because he called in the appropriate help, the apparatus of prevention functioned and spread of a deadly disease did not occur. We have just had five separate importations of smallpox, and I have been astonished by the promptitude with which this unfamiliar disease has been suspected.

Touching briefly on another aspect of family practice, midwifery, it is sometimes suggested that the general practitioner is being progressively excluded from this work. This is totally untrue. In 1960 over 245,000 obstetric cases were booked by doctors for delivery at home, and over 102,000 for delivery in hospital under his care. The numbers of labours at home actually attended by the general practitioner did not increase between 1953 and 1960, although the number of patients booked had nearly doubled. In the same period the number of maternity patients for whom general practitioners were responsible in hospital had more than doubled. There had undoubtedly been a great increase in the amount of ante-natal work done by general practitioners in this period, and it is not really important that they were not undertaking the mechanical work of the deliveries. The general practitioners were accepting responsibility for the medical care of the patients, and over these years the maternal death rate was halved and the stillbirth rate and the neo-natal death rate were substantially reduced. The doctors' contribution to maternal care is in fact more medical than obstetric. It is by intensification of ante-natal care as much as by the provision of specialised assistance for the smaller number of cases that go wrong in labour, that we may expect improvement. It is time we ceased arguing about which of the three—midwife, general practitioner, and obstetrician—should assume full charge of the pregnant woman. Each of these professional workers

has something to offer. The general practitioner is to some extent at risk for every expectant mother in his practice even though she may have been booked for a hospital confinement. The consultant obstetrician is equally to some extent at risk for every expectant mother in the area his unit serves, even though she may have been booked for home care, for in emergency he may have to do the vital life-saving job. The midwife is the person who fills in the gaps in ante-natal care by her home visits, who is closest to the woman herself, and who provides most of the physical attendance at delivery whether the patient is delivered in hospital or at home. If the three worked together on an agreed common plan, each contributing an appropriate part of the total care, we could be well on the way to making a further substantial reduction in the maternal death rate and saving a great deal of morbidity that does not cause loss of life.

As has been indicated earlier, general practitioners do not deal only in trivial conditions. The new anti-bacterial drugs of the last fifteen years have made it possible to treat at home all but a small minority of patients with pneumonia. These drugs used by the general practitioner have, for instance, greatly reduced the need for mastoidectomy in children in hospital, and they have made possible the treatment of acute otitis media and the reduction of chronic ear disease in consequence. Others of the new drugs such as anti-coagulants and cortico-steroids may be required for long-term treatment under regular laboratory control. The management of diabetes or of pernicious anæmia may require intermittent guidance from the specialist, but is mainly in the hands of general practitioners, again with some laboratory assistance.

All general practitioners have or should have access to diagnostic facilities, both pathological and radiological. The range required is not great, but it is important both as an aid to diagnosis and for the proper control of the more powerful drug treatment that is now available. General practitioners may vary much in the extent to which they call upon these services, but the younger doctors who have been trained to use them in hospital work make proportionately greater use of them and this will go on. Not only should they have the right to receive reports from diagnostic departments, but they should have the opportunity of discussing results with the medical specialists concerned. It is wholly fallacious to maintain that this is a burden the diagnostic departments cannot bear. Studies in Norwich and Cambridge showed that there was indeed no more increase during the period after these services were made available to general practitioners than might have been expected had they not been so extended. There is less likelihood that the general practitioner will use them wastefully than that some of the young and inexperienced junior medical staff of hospitals will do so.

The domiciliary consultation has made an opportunity for general practitioners and specialists to meet in the patient's home. This is an opportunity that is not taken as regularly as it might be, but it would be quite wrong to blame the general practitioner alone for that. It is not easy to make free times for both types of doctor coincide and the general practitioner can no more be at the beck and call of the consultant than the consultant can always be available at

any time of the day to see the patient for the general practitioner. Over 310,000 domiciliary consultations took place in England and Wales in 1959, that is about 15 for every general practitioner. Those 15 are not distributed evenly round the year, but it should not be impossible to arrange a mutually convenient time in most cases.

Equally it should be possible to arrange for general practitioners and consultants to discuss management of some of the patients admitted to hospital. This is usually shrugged aside as impossible in the time available, under the impression that numbers are prohibitively large. In fact about 1 per cent. of a general practitioner's patients will be in hospital at any one time, that is 22 or 23 from an average list. Of that number not more than about eight will be in acute wards, and not all of the eight will require serious discussion. In the course of a year about 200 admissions will occur from the average practice, and perhaps a third of those will be for elective surgery of one kind or another.

The future district general hospital will make this kind of follow-up much easier, but it must be accompanied by a recognition of the importance of contact between the specialist and the general practitioner. The patient is not wholly taken from the responsibility of the general practitioner when he is in hospital, he has had preparatory treatment and he will require after-care and the hospital doctors ought to look upon the general practitioner as their partner in providing the total care for the illness.

The most rapid recent advances in the application of science to medical practice have been in chemistry and pharmacology. Apart from some endocrine preparations, nearly all the effective drugs twenty years ago were given for anti-bacterial or symptomatic effects; and their performance was judged by clinical or bacteriological methods. The drugs available now are infinitely more potent and require much more accurate monitoring by chemical or other means. Even the evolution of surgical technique is dependent on anæsthesia and physiological and chemical control. Diagnostic skill itself is beginning to require as much the ability to collate the results of laboratory, radiological or electronic tests as clinical acumen. By medical or surgical means, it is possible to produce modifications of the human physiology that require as much more instrumental control as does flying a modern aeroplane, compared with its counterpart of the early 1920s. Medicine which relies solely upon clinical judgement is as outdated as flying a plane "by the seat of your pants." For example, the modern artificial respirator controlled by continuous oximeter readings and CO_2 estimation has revolutionised the prognosis in respiratory paralysis from poliomyelitis. And yet this must be reconciled with the fact that the patient is a person, not just a convenient envelope for body fluids for analysis.

This brings me to the principal reform which seems to me to be necessary in the future evolution of medical care. This is the establishment of a proper relationship between the specialist section of the profession and the rest. The most important part of this is the relationship with general practice, which now receives the least attention. But the relationship between specialists and their juniors is also of great importance. At present British hospitals are staffed as if everyone below consultant rank was aiming to achieving it. The junior staff

organisation is devised for the training of specialists. Not more than one in four, and possibly less, of all the doctors who qualify will become a consultant. We must re-organise the pattern of junior staffiing so that it gives an opportunity for the further training of all new graduates in a way that will help their permanent career. The point is discussed in the Platt Working Party Report. What is needed is the acceptance of responsibility in each hospital group for supervising and assisting the young doctor to obtain the further experience that he needs; to see that the recently qualified practitioner gets a reasonable range of experience to fit him either for subsequent specialist training or for whatever other form of medical work he wants to adopt. There may not be a great deal of time to spare, but ingenuity can do much with what there is. There should be organised facilities that help him to continue to learn. There should be no more talk about ladders. There must be selection based on aptitude and experience for consultant posts, but many of the best graduates also enter general practice and all need organised preparation. Sir George Pickering's recent address to a conference organised by the Nuffield Provincial Hospitals Trust and the conclusions of that conference deserve our attention.

In many hospitals there are neither libraries, organised teaching, clinico-pathological conferences nor demonstrations in diagnostic departments or in the wards. The grand rounds of the better American hospitals are virtually unknown. If the quality of British medicine is to continue to be equal to the technical advances in medical science, the aim must be for the doctor, after qualification, to retain the habit of learning and to have access to the opportunity of continuing study. No one can learn medicine at his school and then stop, if he is to remain an effective doctor even for a year.

It is relatively easy, as the hospital doctor becomes more senior, for him to continue to exchange information with his colleagues and to use the opportunities of reading and of discussion that hospital life provides. It is not easy for the general practitioner to do this. The district general hospital of the future ought to be a focus of scientific medical work for the whole area. It will not control all medical service, nor be the sole repository of medical knowledge and experience, but it does provide the opportunity to maintain the scientific side of medicine throughout medical practice in the area. It should be organised to do this and to give facilities not only to the staff working within the hospital but also to the practitioners in the area. General practitioners should be welcomed in the hospital, should be provided with library facilities, opportunities for consultation with those in the diagnostic departments and opportunities of meeting their specialist colleagues. This is not a matter which should be left to registrars or even less senior grades in the hospital. It is desirable, of course, that these younger men should be able to meet their seniors in whatever branch of practice, but it is quite wrong that specialists should feel free to leave to their juniors alone the contact with the general practitioner. The specialist has much to learn, he is a receiver as well as a giver in this contact. The fact that this is sometimes difficult is not sufficient reason for leaving it undone.

So far I have been talking almost entirely about curative medicine and that part of the functions of local health authorities that is concerned with providing

supporting services for general practice. Preventive medicine is certainly not falling into the background. The traditional pattern of public health work, the prevention of communicable disease and the care of environmental hygiene may not be closely linked with hospital practice, but it is closely associated with general practice at least in so far as the prevention of communicable disease is concerned. Primary prevention of communicable disease by immunising procedures is an accepted part of medical practice now, but it is not a well-organised part. We have had too many episodic campaigns against individual diseases, smallpox, diphtheria, whooping cough, poliomyelitis and even tetanus; we are only now beginning to propound a systematic course of prophylaxis for the child, with planned doses of different prophylactics given in a way calculated to reduce the number of injections that are required. Moreover, some of the other virus infections, notably measles and infectious hepatitis, may soon be controllable. We want all children to be protected in this way and the best chance of securing this is for the public health workers to collaborate with those in general practice to obtain it. This primary prevention is a relatively simple matter, but there is emerging a new field of preventive medicine in which those in clinical practice have a larger part to play. In North America we have seen the evolution of programmes for screening whole populations by one or perhaps by a whole series of laboratory, radiological or electrocardiographic procedures. This sort of campaign, like the old immunisation campaigns, is far too intermittent to be consistently effective. Whether the routine check-up beloved of North American medicine will ever make a major contribution to the maintenance of health is uncertain. It has been tried extensively in preventive measures in childhood, it is certainly effective as ante-natal care, but the experience of the school health service does not suggest that it is likely to prevent a great deal of morbidity amongst adults. There are, however, certain chronic diseases which might be detected early by relative simple screening processes. The earliest, of course, are the congenital abnormalities. Congenital deafness can be detected by quite simple tests such as a health visitor can employ to pick out the small minority requiring more accurate testing at an age when the infant would normally begin to hear and use his hearing, and the child born deaf can best benefit by auditory training with a hearing aid. This is only the simplest example of a congenital abnormality in which early detection promises the best result. There are others from the tracheo-œsophageal fistula, which must be detected at once if the child is to survive, to the congenital heart disease which can be subjected to surgery when the child is several years older. There are also in later life degenerative or malignant diseases and even some communicable disease for which earlier detection is needed. The importance of mass radiography for the detection of tuberculosis is declining, but readily available miniature radiography is an important method of detecting carcinoma of the lung in its early stages. There are other forms of malignant disease where early detection can lead with greater certainty to effective treatment. Cytological methods of detection of carcinoma of the cervix uteri are believed to have reduced the incidence of invasive cancer in British Columbia by more than a quarter, and this is a technique that could be applied to all women in the appropriate age

group. Screening tests for glycosuria could be applied to the particular sex and family groups in which the incidence of diabetes is greatest. Other methods for early detection of disease will certainly emerge. It is by promoting such measures amongst the clinicians that the experts in preventive medicine will make their next advances. Environmental hygiene still has work to do—notably in controlling atmospheric pollution—and there is still epidemic disease to be controlled, as the recent importation of smallpox to England has shown, and it has been given added precision in diagnosis by virological and bacteriological methods.

Finally, I want to say something very briefly about the relationship with patients. The commonest cause of complaint about health services now is failure to transmit information—much more often directed at hospitals than at general practitioners. Patients today know much more of medicine than patients of twenty years ago, despite the parodox that there is now so much more to know. They do not place simple faith in the experience and clinical judgement of the doctor alone, any more than he does himself. They know that pathology is detectable and assessable, often in quite precise terms, and they feel that they are entitled to be told more precisely what is wrong with them and what is to be done. On the other hand, the elaboration of specialism and the increase in the number of people dealing with each patient makes the task of explanation more complex and less clearly the duty of one of them. It is perhaps this responsibility which particularly lies upon the doctor who has nominal charge of the patient in hospital. It is an exercise in communication which we need to perfect and to practise regularly within the limit of the understanding of the particular patient and his relatives.

I am afraid that this discourse has gone on for a very long time. It was indeed presumptuous to attempt to deal with this subject. The view of the future of medical care that I have tried to put before you is that it must be provided by a group rather than an individual. The tempo of scientific progress will not diminish and the difficulty of keeping abreast will grow. We must preserve time for all doctors to continue graduate study, and make the means for it more accessible. Specialisation in hospital techniques will continue and go further, so that although the nominal charge of the patient will remain with one consultant in hospital, he will be seen only as the centre of a group and his work will be related also to that of the personal physician who has had the care of the patient before he entered hospital and who will care for him on his discharge. Continuity of medical care will be the distinguishing feature of general practice and close and two-way communication between specialist and group practice, to my mind, is the only method that will preserve general practice. We must somehow contrive, on the one hand, to keep up with the progress of medical science and see that it is available to all, and on the other, retain the human relationships between doctor and patient which have been characteristic of British general practice. Doctors must see their contribution to society as part of a larger pattern of social service, not as an esoteric mystery in which no others have a part. The greatest problem before us is to retain the humanity of medicine in a world of science.

THE CHEMOTHERAPY OF INFECTIONS*

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THE report of the red dye, prontosil, as a chemotherapeutic agent (Domagk, 1935) was followed by the demonstration that its activity depended upon sulphanilamide. Analogues with a wider antibacterial range soon became available. A decade getting to know the sulphonamides was followed by another learning to use penicillin. The nineteen-fifties witnessed the introduction of broad-spectrum antibiotics and several further antistaphylococcal agents (Table 1).

TABLE 1.

HISTORICAL BACKGROUND TO THE CHEMOTHERAPEUTIC AGENTS.

YEAR	DRUG	SOURCE	YEAR	DRUG	SOURCE
1935	Sulphonamides	Germany	1952	Isoniazid	U.S.A.
1939	Tyrothricin	U.S.A.	1953	Tetracycline	U.S.A.
1940	Penicillin	Gt. Britain	1955	Novobiocin	U.S.A.
1944	Streptomycin	U.S.A.	1955	Oleandomycin	U.S.A.
1945	Bacitracin	U.S.A.	1956	Vancomycin	U.S.A.
1946	Para-amino. salicylic acid (P.A.S.)	Sweden	1956	Amphotericin	U.S.A.
1947	Polymyxin	Gt. Britain and U.S.A.	1957	Ristocetin	U.S.A.
1947	Chloramphenicol	U.S.A.	1957	Kanamycin	Japan
1948	Chlortetracycline	U.S.A.	1958	Griseofulvin	Gt. Britain
1949	Neomycin	U.S.A.	1959	Paromomycin	U.S.A.
1950	Oxytetracycline	U.S.A.	1959	Phenethicillin	Gt. Britain
1951	Nystatin	U.S.A.	1960	Methicillin	Gt. Britain
1952	Erythromycin	U.S.A.	1961	Ampicillin	Gt. Britain
			1961	Brocillin	Gt. Britain

It seems likely that the present decade will be dominated by a new family of semi-synthetic penicillins. Thus far we have seen and used only a few, but one of them has already dealt a major blow at naturally resistant staphylococci, by its indifference to the penicillinase which they produce. The potential for providing new synthetic penicillins appears to be limitless. It is hoped that they will be chemically dissimilar, for only on this basis can they be expected to be therapeutically distinctive.

*Based on the Beecham Lecture delivered to the Ulster Medical Society on November 9, 1961.

What has been the impact of a quarter-century of sulphonamides penicillin and broad-spectrum antibiotics on the natural history of infections? That is what Finland and his colleagues at the Boston City Hospital set out to assess in a sweeping, twenty-two year survey. They have reviewed the changing pattern of septicæmia, meningitis, empyema, and autopsy material in the hospital during certain years carefully chosen to reflect the changing fashion in chemotherapy. The year 1935 was selected as a baseline for the pre-sulphonamide era; 1941 to reveal the impact of the sulphonamides before they had been joined by penicillin; 1947 when both penicillin and streptomycin had been widely used; and 1957 to define recent trends influenced by most or all currently available antibiotics (Table 2).

TABLE 2.

THE NUMBER OF PATIENTS ADMITTED TO THE BOSTON CITY HOSPITAL WITH SEPTICÆMIA, MENINGITIS, AND EMPYEMA DURING 1935 COMPARED WITH 1957.

	1935		1957	
	No.	% MORTALITY	No.	% MORTALITY
Septicæmia - -	286	60	588	40
Gram positive -	250	67	406	33
Gram negative -	36	42	182	54
Meningitis - -	55	80	90	20
Empyema - -	172	22	83	32

During 1935 about three hundred septicæmic patients were hospitalized and three-fifths died; by 1957 nearly two-fifths died. Thus, as a result of all advances between 1935 and 1957, an additional one in five septicæmic patients can be saved. Interestingly enough, that decline in mortality coincides with the use of the sulphonamides during the years 1935-41. Since then, even with the advantage of penicillin, streptomycin and the broad-spectrum antibiotics, the mortality rate has indeed increased. By way of contrast, meningitis and empyema have become less of a challenge although they have by no means been overcome.

Over the years the bacteria isolated from these infections have changed significantly and the changing flora does, in fact, mirror both the success and failure of the antibiotics. In essence, the antibiotic era has witnessed a change from pneumococcal and streptococcal to staphylococcal and coliform septicæmia.

The significance of the findings from the unique survey at the Boston City Hospital might be less certain had they come from other centres, but the special circumstances of this study command respect and authority. In the first place it was conducted at a large general metropolitan hospital admitting four patients every hour round the clock, and performing three autopsies daily throughout the years of the survey. To such a wealth of clinical material may be added the uniformity of viewpoint which makes this comparative study worthwhile.

Throughout the years the senior author of the report, Dr. Maxwell Finland, has himself been responsible for the management of infections in the hospital. That has ensured both the hospital's continuous interest in the study of infectious disease and also the high yield of bacteriological data without which such an investigation would have been valueless. It is hoped that he and his co-workers will pursue this survey to include the impact of the new synthetic penicillins, agents which now show promise of controlling the remaining problems of staphylococcal and Gram-negative infections.

The Sulphonamide Family.

The absorbable sulphonamides and the poorly-absorbed or "gut-active" compounds have now been joined by long-acting sulphonamides, which are more extensively bound to plasma protein. The more prolonged blood levels claimed

TABLE 3.

Relative Cost of Various Agents used in the Treatment of Acute Urinary Tract Infections.

Chemotherapeutic Agent	One Tablet (G)	Costs (pence)	One Week's Costs (shillings)
Sulphadimidine	0.5	1	7
Sulphamethoxypyridazine	0.5	7	5
Bimex, comprising:	0.5	–	–
Sulphadimidine	0.375	3.5	4
Sulphamethoxypyridazine	0.125		
Nitrofurantoin	0.05	8	19
Tetracycline	0.25	18	43
Chloramphenicol	0.25	12	30

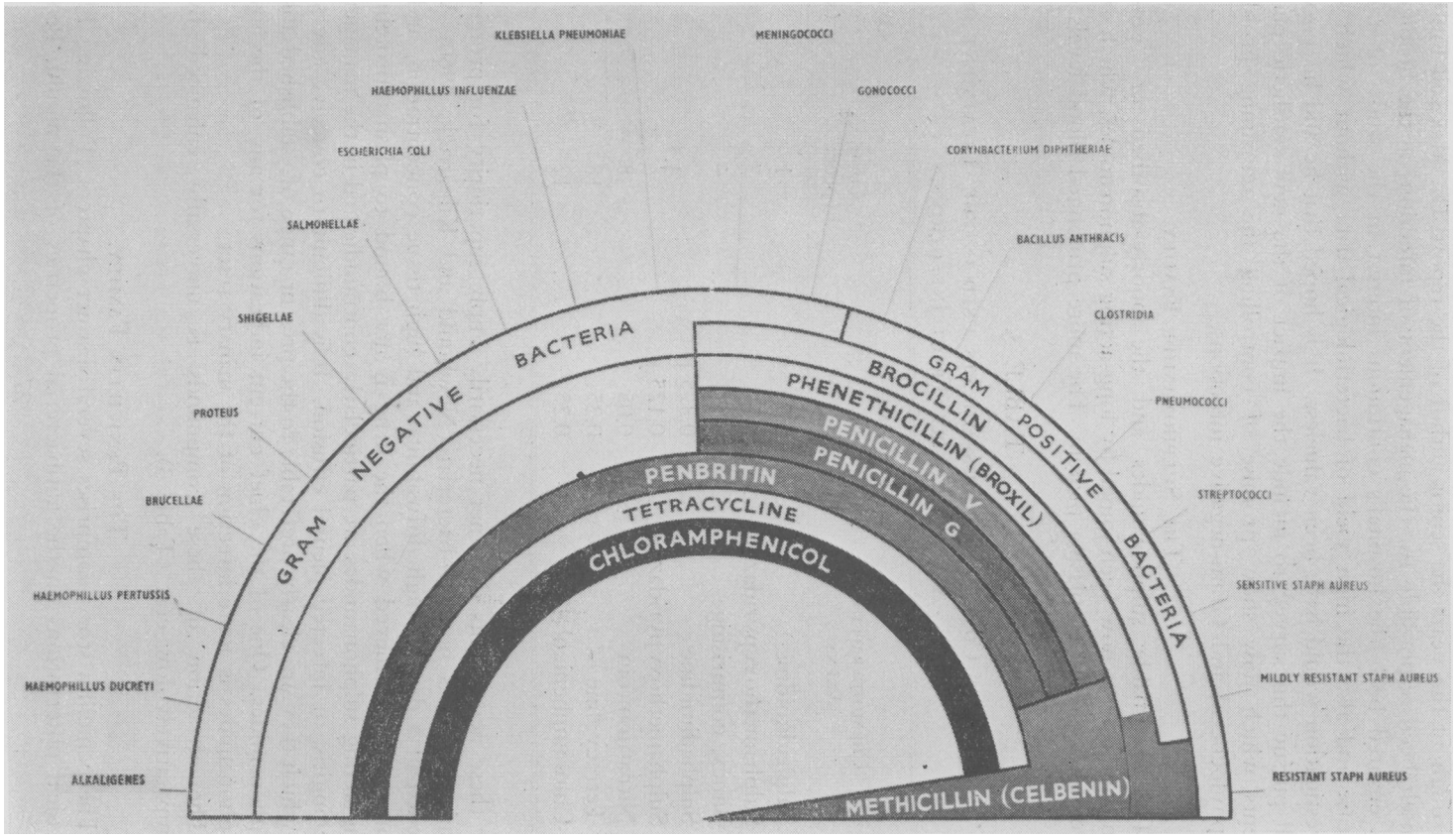
for these new agents does not necessarily imply superiority for protein-bound sulphonamide is not anti-bacterial (Newbould and Kilpatrick, 1960). What is needed of a drug is high diffusibility and high tissue concentration, and this is more readily achieved when the drug is not bound to plasma protein. Thus, long-acting sulphonamides are particularly contraindicated in the management of meningitis, or infected pleural effusion. It is difficult to conceive any situation in which they are clearly preferable to the present range of established absorbable sulphonamides. One of the chief current indications for any of the absorbable sulphonamides is acute infection of the urinary tract.

The attraction of these compounds is universally enhanced by their comparatively low cost (Table 3).

The Penicillin Family.

The penicillin story comprises several distinct chapters. Following Fleming's classical observations on the antibacterial properties of the mould, Penicillium

SENSITIVITIES OF BACTERIA TO VARIOUS ANTIBIOTICS



(Fleming, 1929), there was a hiatus of eleven years until Florey, Chain, and their colleagues introduced penicillin into the realm of clinica medicine (Chain *et al.*, 1940). This was soon to be followed by its mass production, and by the development of new salts and other compounds designed to improve its already high therapeutic activity. Large-scale production of pure benzylpenicillin by submerged ærobic culture of the mould, penicillium chrysogenum, is now being challenged by a series of semi-synthetic penicillins. To the penicillin nucleus, 6-amino-penicillanic acid, which is produced by fermentation, may be attached various side chains (Batchelor *et al.*, 1959); this synthetic manipulation holds the potential promise of an endless series of new penicillins. If it is remembered that phenoxymethylpenicillin is penicillin V, then in turn have come phenoxyethyl-

TABLE 4.

THE DAILY DOSE AND COST OF THE NEW PENICILLINS.

NAME OF PENICILLIN		TABLET SIZES (mg.)	DAILY DOSE (gm.)	DAILY COST
Methyl - -	Penicillin V ...	125 250	... 1 ...	2/8
Phenoxy—Ethyl—Penicillin -	Phenethicillin ... (Broxil)	125 250	... 1 ...	4/4
Propyl - -	Brocillin ... Ultrapen ...	125 250	... 1 ...	4/4
Dimethoxyphenylpenicillin -	Methicillin ... Celbenin ... Staphcillin ...	Intramusc. Injection 1 gm. 4-hourly	... 6 ...	60/–
Aminophenylacetamido-penicillanic Acid - -	Ampicillin ... Penbritin ...	250	... 1 ...	12/3

penicillin (phenethicillin, 'Broxil') and phenoxypropylpenicillin ('Brocillin'; 'Ultrapen') (Table 4). They are not destroyed by gastric acid, and are all well absorbed following oral administration. Higher blood levels are attained with the most recent ones, but their relative merits still need to be assessed. It seems that none of them is as effective as benzylpenicillin for any but staphylococcal infections, which will be discussed later. Thus, the introduction of novel synthetic penicillins has not changed the treatment of pneumococcal pneumonia, gonorrhœa, meningococcal, and streptococcal infections, syphilis, actinomycosis, or anthrax.

Methicillin (dimethoxyphenylpenicillin, 'Celbenin,' 'Staphcillin') (Douthwaite *et al.*, 1960, 1961; Stewart *et al.*, 1960) is a synthetic penicillin which is unaffected

by staphylococcal penicillinase. It is therefore the antibiotic of choice for drug resistant staphylococcal infections. This, its sole indication, should be respected. Undoubtedly it will be, for it must be given by injection (it is destroyed by gastric acid) every four to six hours (it is rapidly absorbed and excreted) and it is expensive (a week's course of treatment costs £21).

Another recent synthetic penicillin is ampicillin ('Penbritin') (Rolinson and Stevens, 1961) which is active when given by mouth and has a broad-spectrum activity against both gram-positive and gram-negative organisms. Its range is about the same as the bacteriostatic tetracyclines, but it carries the advantages of being bactericidal. For the present, it should be considered as an alternative to tetracycline, or instead of penicillin-streptomycin or penicillin-sulphonamide mixtures, and for proteus infections (Brumfitt *et al.*, 1962). Ampicillin itself may be but the forerunner of other more effective broad-spectrum bactericidal agents; if so, a major advance in chemotherapy will have been achieved.

The Tetracycline Family.

Chlortetracycline ('Aureomycin'), oxytetracycline ('Terramycin'), tetracycline ('Achromycin,' Tetracyn') and demethylchlortetracycline ('Ledermycin') are so similar in their antimicrobial range, indications, and complications that there is little to choose between them. There is no point in switching from one to another because of bacterial resistance, for they would all prove ineffective. Thus, the clinician is wise to keep to the one to which he is accustomed. A slight advantage claimed for demethylchlortetracycline is that higher and more prolonged blood levels allow it to be given every twelve hours rather than every six hours.

The tetracyclines are bacteriostatic for most gram-positive and gram-negative bacteria, the spirochætes, all rickettsiæ, and for the small group of psittacosis-lymphogranuloma viruses. Indications for their use (James, 1957) may be broadly grouped as follows:

1. An alternative to penicillin, particularly if the patient is hypersensitive to penicillin. Let us face the fact that they are a poor alternative to penicillin in the management of gram-positive infections, and these bacteriostatic agents are markedly inferior to bactericidal drugs in the control of such severe infections as subacute bacterial endocarditis.
2. Sulphonamide-resistant urinary tract infections.
3. Brucellosis.
4. All rickettsial infections.
5. Virus infections—psittacosis, lymphogranuloma venereum, trachoma, inclusion conjunctivitis.
6. Pneumonia associated with raised cold hæmagglutinins.
7. Acute or relapsing amœbic dysentery, used in conjunction with the emetine group of drugs.

8. Acute exacerbations of chronic bronchitis. This is probably the most frequent use of the tetracycline antibiotics, for they can be expected to control a mixed infection of pneumococci, streptococci, staphylococci, and hæmophilus influenzæ. It remains to be seen whether tetracycline will be superseded by ampicillin, which is alleged to have the same broad spectrum, and is bactericidal rather than bacteriostatic (Fig. 1).

Antistaphylococcal Agents.

Antibiotic-resistant staphylococcal infections have become commonplace in hospitals during the last decade. Indeed most antibiotics introduced during that time have been directed towards control of this hospital menace. For penicillin-sensitive staphylococcal infections, the antibiotic of choice is still the well-tried crystalline benzylpenicillin. It may be combined with procaine penicillin, benethamine or benzathine penicillin to produce more persistent blood levels. Simultaneous use of the renal tubular blocking agent—probenecid ('Benemid') will approximately double the blood level of penicillin, an advantage which may be worth considering especially in protracted infections, or where it is required to lessen the number of injections in children.

The introduction of methicillin has eased, at least for the present, the management of penicillin-resistant staphylococcal infections. It is given by injection in a dose of one gram every four to six hours.

The manufacturers now acclaim the value of phenoxypropylpenicillin ('Brocillin'; 'Ultrapen') for what they term the mildly-resistant staphylococcal infection. Not only does this antibiotic need further evaluation but the clinical condition for which it is being suggested needs to be defined more clearly.

If it succeeds, then the least important aspect of an antibiotic is its cost, but the economic implications are of interest particularly since some antibiotics are imported (Table 5).

TABLE 5.

The Cost of Treating a Staphylococcal Infection in Great Britain in October, 1961, with Various Antibiotics.

Anti-Staphylococcal Agents	One Tablet or Vial (grammes)	Costs	One Week's Costs (sh.)
Benzyl penicillin ...	0.5 megaunit ...	11d. ...	20
Methicillin ...	1 ...	13/- ...	416
Tetracycline ...	0.25 ...	1/6 ...	43
Chloramphenicol ...	0.25 ...	1/- ...	30
Erythromycin ...	0.25 ...	10d. ...	24
Novobiocin ...	0.25 ...	2/- ...	58
Oleandomycin ...	0.25 ...	2/6 ...	72.5
Ristocetin ...	0.5 ...	32/- ...	660
Kanamycin ...	1 ...	30/- ...	210
Vancomycin ...	0.5 ...	50/- ...	1,400

Special Indications.

Certain chemotherapeutic agents have a limited range of activity but within these limitations they may be dramatically successful. It is advisable to endeavour to restrict their use to such responsive disease states (Table 6).

Griseofulvin was originally isolated from a penicillium species as long ago as 1939, but has only been recognised since 1958 as a valuable oral antibiotic against animal and human ringworm. It is indicated for superficial dermatophyte infection and it is ineffective in the management of systemic mycoses or moniliasis.

TABLE 6.

Special Conditions in which certain Antimicrobial Agents should be considered.

Infection		Chemotherapeutic Agent
Dermatophytosis	...	Griseofulvin
Systemic mycoses	...	Amphotericin B
Moniliasis	...	Nystatin
Due to pseudomonas pyocyanea	...	Polymyxin Colomycin
Diphtheria	...	Erythromycin (together with antitoxin)
Amœbiasis	...	Paromomycin (together with other antiamœbic agents)
Typhoid fever	...	Chloramphenicol or ampicillin
Hepatic coma (gut sterilisation)	...	Neomycin
Meningitis due to hæmophilus influenzæ	...	Chloramphenicol
Meningococcal meningitis	...	Sulphonamides
Tuberculosis	...	Streptomycin, isoniazid and P.A.S.

Amphotericin B is a polyene antifungal antibiotic obtained from streptomyces nodosus. It should be considered in the management of such serious deep-seated mycoses as blastomycosis, coccidioidomycosis, cryptococcosis (torulosis), histoplasmosis, and disseminated moniliasis. Amphotericin B is poorly absorbed following oral administration so it is usually administered in dextrose solution by slow intravenous infusion.

Nystatin, a polyene antibiotic obtained from streptomyces noursei, is active against several fungi and yeasts but is particularly indicated for Monilia (Candida) albicans infections. Whenever possible, it should be given topically in the form of suspension, ointment, pessary or by inhalation, for infections of the mouth, skin, vagina or respiratory tract. It is poorly absorbed from the gut, so, following oral administration, its effect is primarily in the intestinal lumen. It should be

given by mouth with tetracycline if prolonged treatment with such a broad-spectrum antibiotic is indicated.

Polymyxin was isolated from bacillus polymyxa, simultaneously but independently in Great Britain (Ainsworth *et al.*, 1947) and in the United States (Benedict and Langlykke, 1947; Stansly *et al.*, 1947). It is available as polymyxin B sulphate powder in vials containing 500,000 units. It is not absorbed from the gut, but it can be administered by intravenous, intramuscular, intrathecal, subconjunctival, and intrapleural routes. Polymyxin is reserved for pseudomonas infections.

Colomycin is a polypeptide antibiotic similar to polymyxin in its range of activity and with reciprocal cross-resistance but apparently less toxic. The side-effects of neurotoxicity and nephrotoxicity are infrequent and only transient

TABLE 7.

THE COST OF SOME ANTI-TUBERCULOUS DRUGS, OCTOBER, 1961.

ANTI-TUBERCULOUS DRUGS	ONE DAY'S DOSE (G.)	COSTS	ONE WEEK'S COSTS (shillings)
Streptomycin ...	1 ...	1/6 ...	10.5
P.A.S. ...	12 ...	9d. ...	5
Isoniazid ...	0.3 ...	1½d. ...	0.75
Pycamisan B.D. ...	8 cachets ...	—	—
P.A.S. ...	12 ...	1/6 ...	10.5
Isoniazid ...	0.3 ...		

(Kirby and Roberts, 1961). It is likely that colomycin will supplant polymyxin in the management of pseudomonas infections, and it should also be considered for other infections due to gram-negative bacilli.

Erythromycin is superior to penicillin in the sterilisation of diphtheria carriers. Forbes (1954) obtained negative cultures in fourteen carriers who had failed to respond to two courses of penicillin. It should be given with antitoxin to patients with diphtheria. It has been relegated by methicillin to a reserve position as an antistaphylococcal agent, but its potential value for this purpose remains. It would be indicated once again if staphylococcal infections developed resistance to the current synthetic penicillins.

Chloramphenicol remains the drug of choice for the treatment of Salmonella infections; and also for hæmophilus influenzæ meningitis because it crosses the blood-brain barrier so effectively. It remains to be seen whether the bactericidal effect of ampicillin in gram-negative infections eventually proves superior, particularly in preventing relapses of typhoid fever.

Neomycin and *paromomycin* are effective in suppressing gut infections, and should be considered especially (a) as part of the management of impending

hepatic coma; (b) as an additional measure in intestinal amœbiasis; (c) to control a virulent epidemic of gastroenteritis in a closed community; and (d) also, when necessary, pre-operatively.

Streptomycin, isoniazid and *paraminosalicyclic* acid remain the standard drugs used in the chemotherapy of tuberculosis (Table 7). Their use is well established and does not merit special attention.

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THE PATIENT'S NEED AND THE DOCTOR'S RESPONSE

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PEOPLE who consult doctors fall into four broad categories, namely,

(1) Those who are sick in body.
(2) Those who are sick in mind.
(3) Those who are sick in mind and body.
(4) Those who are not sick at all.

A statement such as this is deceptive in its simplicity, for the assignment of a patient to the appropriate category involves not only the correct interpretation of what the patient is trying to communicate, but also a need to avoid making the information obtained fit into some perceptual framework that is not sufficiently elastic to take into account all the facts.

Considerable barriers to communication can exist between patients and doctors. Difficulties are not always resolved when these barriers have been broken down, for there may still remain problems as to how to respond to the patient's needs once they have been correctly discerned. If the doctor finds that the patient's somatic complaints are a smokescreen, he is then in a position to look for the emotional factors that brought the patient to him in the first instance. He has to classify the information obtained, make a diagnosis, and prescribe accordingly. The doctor is faced with the fact that his prescription may have to go far beyond what can be written on an E.C.10, and may take him into uncharted waters where the lure of psychopharmacological chants are hard to resist. He may find that he has been asked to respond to a call for help, because the patient felt that there was nobody else to whom he could turn. Finally, the doctor may be faced with the patient whose problems arise out of a conflict with society, but which nowadays are recognised by Church and State as features that cannot be eradicated by punishment or categorised as spiritual. The doctor's task is indeed considerable if he is to apply his scientific training to all the facts, and not just those having a physical basis.

Of the six years that medical students spend in preparing themselves for the task of investigating and treating sick people, about five and a half years are devoted to the understanding of the first category I mentioned amongst the reasons for people consulting doctors, namely—physical illness. Into the fourth category, namely, those who are not ill at all, will fall those who use the doctor's waiting-room as a kind of social club. There are others who hope that they can convince the doctor that a medical certificate is justifiable, although they know

that they have a condition that is not found in the International List. It is not a criticism of the Welfare State with its monetary rewards that category 4 should exist. We should be able to recognise these problems, but as their solution is not medical, but moral and political, their treatment should be left to the appropriate agencies.

It is with the second and third categories that I am primarily concerned, not because these are of more importance than the first, but because they do not yet enjoy the same privilege of objective appraisal of their proper place in medicine, as do other aspects of medical practice. It is really only since the Second World War that psychiatry has been effectively rejoining the mainstream of medicine, and the time has not yet come for emotionally toned attitudes to the subject to be replaced by objective evaluation. There is no lack of precedent for this in science generally, and in medicine in particular. In the realms of bacteriology, obstetrics, anæsthesia, medicine, and surgery there has often been initially great resistance to the introduction of new knowledge on the grounds that it was not in accordance with the concepts of the past. Often scientific evidence was temporarily overwhelmed by the weight of prejudice thrown against it.

Psychiatry is a subject that is overburdened with emotionally determined attitudes because of its past links with archaic ideas of demoniacal possession and witchcraft as the basis for mental illness. If little has been done during the doctor's training to replace phantasy with fact, then there is a tendency to work within a known framework of knowledge and to deny the existence of psychological factors because they have little or no place in the scheme of medicine as it was taught. The result is that recognised disease categories may be stretched beyond the limits of credulity to embrace what cannot otherwise be understood and classified. The remainder are left undiagnosed because the map of illness is too small to include them. Such a method of reasoning tends to be reinforced by a common belief amongst doctors that it is a cardinal sin to miss some rare physical disorder, whereas some major crippling psychiatric illness can pass unrecognised without much harm coming to the patient. The amount of suffering incurred both by the patient and his relatives is not appreciated, nor is the fact that a missed abdominal emergency and a missed depression can have the same outcome, namely, the death of the patient.

The tendency mentioned earlier, namely to try to make patients fit into too narrow a framework consisting of physical disorders only, has as its counterpart the opposite tendency to regard nearly everything as psychological in origin. This results in a percentage misclassification of illness of the same order as the former group. Here too, the facts are being denied, and the approach is just as unscientific as is the opposite. Adherence to these two extreme points of view may well be responsible for figures of the incidence of psychiatric disorders in general practice as widely divergent as 5 per cent. and 75 per cent.

It is worthwhile to consider some of the reasons for the variety of attitudes towards psychiatric illness found in medicine today. A useful index of the present state of affairs is the wide range of figures given for the incidence of emotional disorders found amongst patients in general practice. Lord Taylor's opinion

(1954) is that the neuroses account for 5 per cent. to 10 per cent. of the general pracitioners new cases, whereas the Council of the College of General Practitioners (1958) refers to a 'generally accepted figure in the region of 30 per cent.' It is true that part of this discrepancy might be due to the effects of different social factors operating in the areas surveyed, but a more likely explanation is the varying attitudes of doctors determining their readiness or otherwise to make a psychiatric diagnosis.

The barriers to communication between the patient and doctor add to difficulties in diagnosis. Two of the reasons for such are to be found in the patient's concept of the doctor's approach to medicine. The first is that the patient may use somatic language to describe symptoms because the doctor gives the impression this is the only coin in which he is prepared to deal. The way in which the history is taken reinforces this idea, leaving little or no room for the reply that could open the door to the exploration of emotional problems. Some patients are afraid that if they do take the plunge, and introduce their emotional difficulties into the history, that the doctor's defence mechanism of denial will quickly be brought into play in the form of the patient being told either it is their imagination or that they should pull themselves together. They go away feeling a little hurt in that they have exposed themselves to the indignity of a rebuff. A skilfully taken history can overcome this difficulty, for the doctor can decide on the evidence adduced (a) whether there are emotional factors present, and if so (b) whether they have a direct bearing on the patient's presenting complaints.

The second barrier to communication is that some patients themselves make the doctor's task more difficult because of their preoccupation with the somatic concomitants of psychiatric disturbance. Normal people, by introspection, may become aware of all kinds of bodily sensations, for instance, tingling, slight aches and pains, a fullness in the stomach or rectum. These sensations usually pass, but when the patient is psychiatrically disturbed, they may form the central focus for preoccupation. The patient may then complain of symptoms suggestive, for instance, of cardiac disease, gastric intestinal illness, or rheumatism. Special investigations are usually carried out, and when the results of these are found to be negative, the doctor is faced with the dilemma either of regarding the case as one of some obscure physical illness, or returning to the history to see whether or not some new light can be thrown on the setting in which the symptoms have occurred. Such patients may in reality be suffering from one of the varieties of affective disorder. In depressive states it may be found that somatic complaints vary from the hypochondriacal to the frankly delusional. These patients may even deny feeling depressed when directly questioned, but the cardinal symptoms of early morning wakening, loss of appetite, of energy and interest can all be elicited on further enquiry. There may be some minimal physical disorder as the basis for somatic complaints, but it is clear that the degree of disability complained of cannot be reconciled with the physical findings.

When a depressed patient has delusional beliefs these are characteristically of sinfulness, of poverty, or of ill health. In the case of the latter the patient may

believe that he has some incurable disease, and however weighty may be the scientific evidence to the contrary, the patient cannot accept reassurance that all is well. He may go from one out-patient department to another, turning away from each dissatisfied and disillusioned because he has been told that there is nothing wrong. If one looks at such a statement in the light of the patient's distress, one can see immediately that it is not true to fact, because there is definitely something wrong with the patient, although it is not a physical complaint. The doctor making such a statement may well have intended the patient to interpret his remark only in terms of absence of physical illness, but it is more than likely that the patient will interpret literally what was said, and go away feeling disillusioned and even more isolated than before. A further barrier to communication will spring up between the patient and his doctor, for what is seemingly an innocent and well-intended remark will be quickly distorted by the all-pervading gloom of the patient to mean either that the patient's condition is so serious that the doctor is trying to hide the true facts from him, or else it may be seen as indicating that not even the doctor can understand his misery. To believe that he is either beyond or outside of medical understanding and help may add to his despondency, and suggest that there is nothing left but to commit suicide. Psychological isolation with all its inherent dangers can often be avoided by the doctor carefully confining his remarks to the fact elicited. If he tells the patient that the investigations reveal no physical cause for the symptoms complained of, but that in spite of this he realises the patient's distress is very real, then no barrier to communication will arise, the patient will feel that he is not beyond help, and he will be more ready to accept appropriate treatment.

There are other psychiatric conditions where the patient's somatic complaints cloud the issue, and often form an effective barrier to accurate communication with the doctor. Such patients may be suffering from an obsessional or an hysterical illness. If the somatic complaints are bizarre, their extraordinary nature may indicate fairly readily that the patient is suffering from a form of schizophrenia. Other aspects of the patient's abnormal mental state may be readily apparent, and so no great diagnostic difficulty arises.

So far I have dealt with conditions that fall well within the scope of ordinary everyday medicine. There are other more controversial issues regarding which patients turn to their doctors for help. All these involve some conflict with society as is demonstrated by the fact that the community has attempted to control or abolish the problems by legislation. These legal measures have been about as effective as were the prohibition laws in the United States. Social recognition of the fact that legislation is at best only a partial answer is demonstrated by the repeal of some legislation on the one hand, and the issue of White Papers on the other. History is repeating itself in that society is asking the medical profession to study anew some of the problems with which it has unsuccessfully tried to deal by legislation. Apart from those who consider punishment to be the only answer, some sceptics tend to regard this challenge to medicine as futile on the grounds that the psychiatrist can do very little to

help. This criticism is valid only in so far as there has been very little opportunity to build up a solid body of knowledge, using all the modern techniques of physical and psychological investigation. It is true that the doctor has at present little to contribute to the solution of some of these problems. The fact that this is also true of a whole range of obviously physical disorders—to mention multiple sclerosis, the dystrophies, certain blood dyscrasias, and chronic nephritis, as only a few examples—makes them no less worthy of study by every means at our disposal.

The first group of these conditions that I would like to deal with comprises suicide and attempted suicide. In England and Wales there are some five thousand successful suicides each year. It is very difficult to obtain a reasonable estimate of the number of suicidal attempts because only a proportion is known to the police. If the ratio of successful to attempted suicides found by the Suicide Prevention Centre in Los Angeles is used, there would be some forty thousand attempts each year. At a conservative estimate there are about thirty suicides annually in Belfast, so that there may be about 240 attempts. It has been found by Davidson (1960) that of those who committed suicide in Belfast in the six-year period 1953-1959, more than four out of every ten did not turn to their doctors for help. If four out of ten people with acute surgical conditions did not consult their doctors, there would be considerable consternation. The concern of modern medicine for the recognition and treatment of illness must include those who are mentally ill. If this is to be implemented, then it is important to ensure that barriers to communication between the patient and doctor be reduced to a minimum.

Sainsbury's work (1955) suggests that those who make a suicidal attempt tend to fall into a different category from those who succeed, and that it is not the outcome only that distinguished them. Successful suicide occurs more frequently amongst the upper social classes, particularly those living in isolation. There is a peak incidence in the spring, and a peak age group of 55-64. The rate is high in economic adversity. Divorce and illegitimacy, reflecting diminished social surveillance of conduct, correlates highly with the suicidal rate.

There is a definite tendency amongst those who commit suicide to remove themselves with contact with other people prior to the act. It was formerly thought that those who were intent on ending their own lives never communicated their intent, but this is not so. In a detailed survey in the United States it was found that in 75 per cent. of cases the victims communicated their intent to at least one person beforehand. Thus the old adage that someone who talks about committing suicide will never do so is quite wrong.

In contrast the pattern found by Stengel (1958) amongst attempted suicides is different in some respects. The maximum age incidence is 22-44 in both sexes, but women predominate. The upper social classes are under-represented, narcotics are used far more freely in this group, and the social effects of the act are fairly clear; namely the attempt acts as an alarm signal to mobilize long overdue medical and social help, or it leads to a revision of human relationships. Less than 1 per cent. per annum of follow-up of those admitted to a general hospital

eventually commit suicide. There are indications, however, that the rate is higher for those referred to a general hospital than those admitted to a psychiatric unit. It might be suggested that the more severe cases find their way to a psychiatric unit, but if this is true, then a higher rate might be expected subsequently if the essentials of the treatment were the same in both. The facts suggest that more attention is paid to the reasons for the attempt in a psychiatric unit, hence its lower rate of suicide on follow-up.

Here then are patients indicating their need in considerable numbers. In England the law has stepped aside to allow the medical profession and social agencies to do their work. In this respect it is no longer a criminal offence to be ill and in need of help. It is hoped that Stormont will soon follow the example of Westminster in this respect, but if it does, then the medical profession will have to accept more responsibility for the solution of a problem that society no longer regards as legal, but medical.

The prevention of suicide, and the interpretation of what the patient is trying to communicate through the medium of a suicidal attempt carry the same need for diagnostic accuracy as do other medical conditions. There is likely to be an increase in the incidence of attempted suicide and suicide with increased population mobility. This applies particularly to new housing estates where there is social instability, and a lack of a sense of belongingness when compared with that found in the areas from which people have moved. It is important to realise that those who feel psychologically isolated in such surroundings should not have their isolation increased by a failure to understand what they are trying to tell their doctors.

It could be said with some truth that the attitude of the Churches and the State to certain disorders reflects fairly accurately the degree of tolerance and understanding of any particular time in history. The attitude to lepers became the model for the subsequent reaction of society to any condition it feared, and was unable to understand. In some instances the bell was replaced by the Statute in the hope that incarceration alone would protect society and eradicate the offence. Psychopathic personality disorders and homosexuality fall within this category. The English Mental Health of 1959 placed responsibility for the care of certain kinds of psychopaths on the medical profession, thus recognising formally that not all kinds of anti-social behaviour should be punished, but that it should be investigated and treated where possible. Thus whilst it may be morally wrong, a value judgment is withheld because of the possibility of diminished responsibility outside the individual's control. In the case of homosexuality, it was probably thinking along the same lines that led to the establishment of the Wolfenden Committee, but Parliament did not amend the law in accordance with its recommendations.

Not all patients in these categories are referred to the doctor by the courts. In the case of the psychopath it is usually the patient's family that asks for help, and in the case of the homosexual it is the patient himself who consults the doctor for a variety of reasons, least amongst which is the fear that he cannot escape the rigours of the law indefinitely.

The provision made for psychopaths in the Mental Health Act, 1959, of England makes it possible to invoke compulsory powers of admission to hospital of those who conform to the legal definition of psychopathy. This legal concept is a narrow one, and includes only a small part of those who fall within the medical category so described. Briefly, according to the English Act, a psychopathic disorder means a persistent disorder or disability of mind, whether or not including subnormality of intelligence, which results in abnormally aggressive or seriously irresponsible conduct on the part of the patient, and requires or is susceptible to medical treatment.

It might be argued that all this new Act has done is to shift responsibility for the detention of certain psychopaths from the Home Office to the Ministry of Health. This is certainly involved, but the essential difference is that the opportunity now exists in England for the systematic study of these patients, and the evolution of the most appropriate methods of discipline and treatment to meet the needs both of the patient and of society. The fact that special hospitals are being designed for this purpose does not mean that the need for prisons will cease to exist. Some psychopaths will still require detention in prison along with other offenders, but we should be nearer to the solution of the crucial question of which individuals should be dealt with in this way.

In the Mental Health Act (N.I.), 1961, there is no separate category for psychopathy, but Clause 80 empowers the Hospitals Authority to have a separate institution for those with dangerous, violent or criminal propensities directed to hospital by the courts. This does not mean that other forms of psychopathy cannot be treated, for mental illness is construed to include all those categories found in the International List of Diseases. Thus psychopathy in its widest medical sense is included. The anti-social, the aggressive, the paranoid and the sexual psychopath cannot be satisfactorily treated in ordinary psychiatric hospitals, and so special accommodation will be required for their full investigation and treatment. Because of the serious lack of knowledge of the ætiology of these conditions, adequate facilities for all modern methods of physical and psychiatric investigation must be available. Custodial care as the main aim has no place in the modern hospital, whatever its nature.

It is not uncommon for homosexuals to seek medical help. In Northern Ireland, in common with the experience in psychiatric clinics elsewhere in the British Isles, about 1 per cent. of the male patients attend because of overt homosexuality. They come because of their distress, seldom because they have been ordered to do so by the courts. The law relating to homosexuality has an interesting history in England. According to Lafitte (1958) it was an ecclesiastical offence until a Statute of Henry VIII in 1533 brought it within the criminal code, and made it a capital charge. This Statute has survived by re-enactment of its essentials, but the death penalty was removed in 1861. Some historians are of the opinion that the Statute of Henry VIII had the same aim as had the charges brought by Phillip the IV and Pope Clement in France, in the fourteenth century, when they wanted to bring discredit to individuals for political purposes. The law as it stands today has no such aim, but it would seem to be kept as a

statutory measure to act as a guardian of morals. In other words, the State would seem to have assumed ecclesiastical responsibility. Homosexuals in prison are aware of the futility of a prison sentence to alter their sexual orientation.

Overt homosexuals consult doctors for various reasons. They may have turned to their Church for help and been advised to consult a doctor. This is happening more often nowadays, because it is recognised that the basic problem is beyond the reach of volition, and any sin lies in its mode of expression. Again they may ask for help to prevent them indulging in homosexual acts. A third mode of presentation is the extreme anxiety that the condition may generate; an anxiety that is not based on fear of discovery, but on difficulties in relationships with others that may not be consciously related to homosexual drives. It is very rare for homosexuals to earnestly seek a change in orientation. Sometimes they ask for such help because they feel that they ought to conform to society's standards. This is quite different from wanting to conform.

All the physical investigations that have been carried out so far, including nuclear sexing and steroid estimations, have not thrown any light on the problem. Their drive can sometimes be temporarily reduced by the administration of stilbestrol, but not infrequently they feel even more distressed while taking it, and discontinue. Treatment is very difficult, but is not entirely without hope. Homosexuals can display a wide range of psychiatric disorders, and it is in the treatment of these secondary manifestations that often a lot can be done to help such patients. An opportunity to discuss problems with a doctor whom the patient knows will neither judge nor condemn often helps to strengthen their defences against overt behaviour. The doctor can forewarn the patient that such factors as alcoholism and untreated affective disorder will weaken their defences. If the patient is young, and not exclusively homosexual in orientation, then systematic psychotherapy may be helpful. It should be remembered that homosexual fears may form only part of another illness, such as depression or schizophrenia. Here the treatment is that of a basic disorder.

I hope that I have been able to indicate some of the ways in which the doctor can help patients who suffer from personality disorders that can bring them into conflict with society. The physician's response may make a great difference to the lives of some of these patients in that they have one to whom they can turn and will at least listen to their problems, and attempt to treat the symptoms that threaten their defences.

Zilboorg and Henry (1941) give a lively description of Johann Weyer, who was born in The Netherlands, and lived during the greater part of the sixteenth century. He was a physician and psychiatrist, with a truly scientific approach. Some of the concluding comments in his major work are perhaps relevant.

"Some will attempt by any available means to defend the old opinions which have been rooted in the mind of man for many long years; they will try to corroborate them as if by right of custom. There will be frowning theologians who will cry out, and say an injury was done to them by a physician passing beyond the limits of his vocation. If I have not sufficiently satisfied certain learned and sensitive men, I feel that at least within the limits of my capacity

I have offered them an opportunity to weigh and investigate the whole problem more precisely, by more learned means, in a more orderly manner, with clearer sequence, with more appropriate words, and with arguments more powerful on behalf of truth. If these men admonish and convince me of having committed some errors, I shall be very grateful to them. I stand ready to correct myself if I am convinced that in any part I have made a mistake."

The patient's needs would be adequately met if every doctor's response could be measured by the words of Johann Weyer written four centuries ago.

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REVIEW

THE FIGHT AGAINST CANCER. By Charles Oberling, translated by Eric Mosbacher; introduction by Sir Cecil Wakeley, Bt., K.B.E., C.B., LL.D., F.R.C.S. (Pp. 164. 18s.) London: Andre Deutsch, 1961.

THE author of this most interesting book was a leading experimental pathologist who had studied under Borrel, a pupil of Pasteur. The original German edition was published in 1959, a year before his death, and has now been translated into excellent English. The title implies that cancer cannot be conquered until its nature is understood and, indeed, the *treatment* of cancer is not considered. However, we are given a thoroughly readable and up-to-date account of the aetiology and pathogenesis of cancer, set in historical perspective and in a framework of general biology. All aspects of the subject are dealt with—radiation, parasites, heredity, chemical carcinogens, hormones, mutations and viruses. We are left in no doubt that the author favours the viral rather than the mutational theory of origin of all cancers, but the evidence for and against both is weighed fairly. The general medical and biological reader and the interested non-scientist will find this book of great value. Anyone who is about to undertake research in the field of cancer will do well to read it. He will find that his horizons are widened and he will appreciate the unusual patience and pertinacity that will be required of him if he is to make any worthwhile contribution to knowledge.

R. B. W.

I have offered them an opportunity to weigh and investigate the whole problem more precisely, by more learned means, in a more orderly manner, with clearer sequence, with more appropriate words, and with arguments more powerful on behalf of truth. If these men admonish and convince me of having committed some errors, I shall be very grateful to them. I stand ready to correct myself if I am convinced that in any part I have made a mistake."

The patient's needs would be adequately met if every doctor's response could be measured by the words of Johann Weyer written four centuries ago.

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R. B. W.

MODERN TRENDS IN THE TREATMENT OF CHRONIC SUPPURATIVE MIDDLE EAR DISEASE*

By G. D. L. SMYTH, M.D., F.R.C.S., D.L.O.
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WE are now at a most exciting period in the history of otology—you might even call it a renaissance. Certainly the basic structure of the subject is undergoing vast changes, and to keep in the front line of these changes and the impact they make is a challenge in itself. Even the theories about the pathogenesis of chronic suppurative otitis media, unchallenged for one hundred years, are being critically reassessed.

A patient suffering from this condition usually gives a history of a discharging ear, often intermittent, frequently beginning in early life and sometimes accompanied by pain. Hearing is impaired to a variable degree, often severely, but

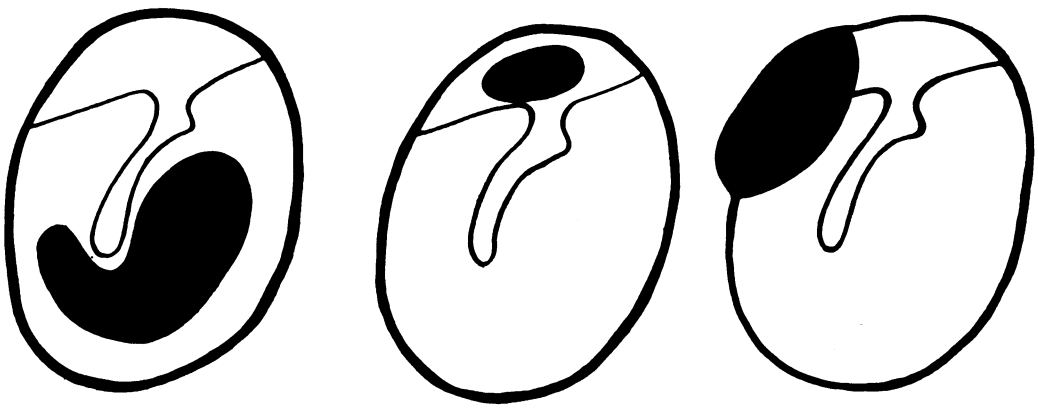

Fig. 1—Types of perforation of the ear drum.

because this symptom has usually progressed gradually, it causes less concern than does the discharge. This is particularly the case when the other ear is normal.

Always in the affected ear, there is a perforation of the drum, and perforations may be classified into two distinct groups (Fig. 1):—

"Benign" perforations which do not reach the drum margin, and usually indicate only mild changes in the middle ear.

"Malignant" perforations which involve the posterior margin of the drum or the 'attic,' that is the upper $\frac{1}{3}$ of the drum.

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*An address to the Surgical Journal Club, Belfast.

A perforation of this type is frequently accompanied by chronic inflammation in the middle ear and mastoid, with granulations, ulceration of the mucosa, and underlying osteitis. These changes frequently appear to start close to the perforation, and to extend in time to involve the attic, and its contents, particularly the incus and the mastoid air cells. The thing which gives these perforations their sinister character is the frequency with which squamous epithelium migrates from the perforation edge into the middle ear. In doing this the epithelium is merely obeying an inherent tendency to cover raw surfaces. Another inherent characteristic of squamous epithelium is that of desquamation, and as this skin grows around the middle ear, and into the mastoid air cells, it deposits an increasing mass of squames in the area. This mass either discharges itself through the perforation like toothpaste from a tube or it erodes all the surrounding bony structures which may lead to facial paralysis, labyrinthitis or intracranial abscess.

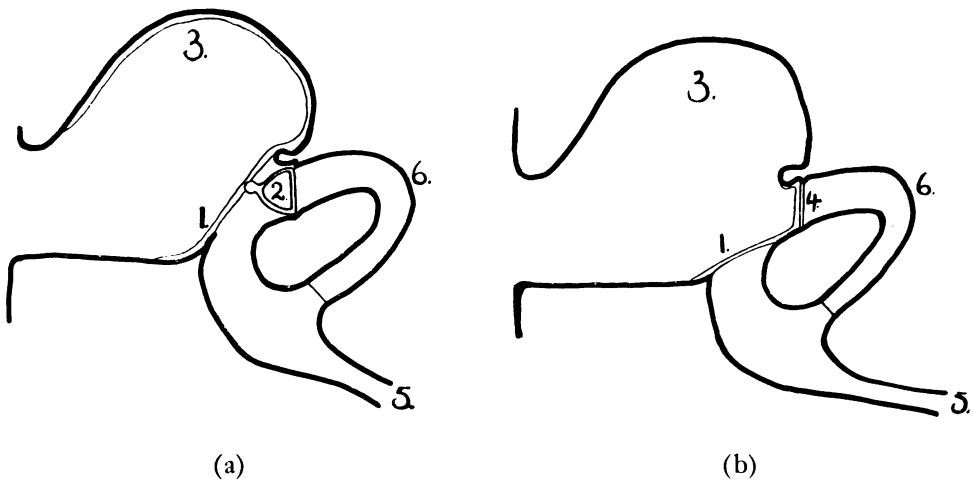
Treatment.

Until recently the treatment of this condition had remained virtually unaltered for eighty years. When a central benign perforation was diagnosed, discharge and debris were removed from the meatus and middle ear, and antiseptic solutions were instilled. On the other hand, surgery has been the treatment of choice for the ears with marginal and attic drum perforations.

Radical mastoidectomy was performed to remove diseased bone and mucosa, as well as to eliminate the danger of the expanding mass of squamous epithelium. The old maestros of Vienna designed and performed the most delicate operations with gouge and chisel. The skill with which they removed infected cells from around the labyrinth, without our modern aids such as magnification, is scarcely credible.

This operation leaves the patient with a cavity in his temporal bone, open to the exterior through the orifice of the external auditory meatus. Permanent healing is achieved with difficulty. Recent reports show that even in the best hands up to 40 per cent. of cavities discharge either continually, or intermittently. When one remembers that a running ear was the complaint which brought the patient to the doctor in the first place, it is obvious that a persisting discharge leads to disappointment. Even when healing does occur, the patient is obliged to attend the clinic for periodic removal of wax and epithelial debris; swimming is out of the question. Radical mastoidectomy may have cleared up the infection, but if it did not worsen the hearing it certainly did not improve it. This was much more serious, both economically and socially, for the patient who had both ears diseased. However, there were exceptions. A few patients "inexplicably" did hear well after the operation. In the 30s several otologists, expert in the fenestration technique, and using binocular magnification, examined the ears of a few such fortunate patients and interpreted what they saw. They realised that nature had healed these ears in such a way that a pathway still existed to conduct sound energy to the inner ear. They recognised that a new vibrating membrane had been formed from remnants of the drum and middle ear mucosa. This sealed off an air-containing space in the lower part of the middle ear, in continuity

with the Eustachian tube. If the stapes had survived infection and surgery, its head was frequently adherent to the under surface of the new "drum" (Fig. 2, a). In this case it was postulated that hearing was present because of direct transference of sound energy from the "drum" to the oval window, through the stapes. If the stapedial crura were absent, the upper edge of the "drum" was often adherent to the medial tympanic wall near the lower margin of the oval window (Fig. 2, b). In this case it was suggested that hearing was present because of direct stimulation of the stapedial footplate by sound waves. In both situations the presence of an air pocket in the lower part of the tympanum is an absolute essential for good hearing. Its importance lies in the fact that sound energy is conducted through air less quickly than through tissue. Thus stimulation of



(a) (b)

Fig. 2—Types of natural healing of the middle ear.

1, drum; 2, stapes; 3, cavity; 4, stapes footplate; 5, Eustachian tube; 6, inner ear.

(a) The new drum has sealed off the middle ear and is in contact with the stapes head.

(b) Of the ossicles, only the stapes footplate remains. The new drum has sealed off the lower half of the middle ear, leaving the footplate exposed to sound waves entering the cavity.

the windows is aphasic. It seems likely that these two situations can occur only when considerable amount of drum and mucosa have been spared destruction.

Nature's work having been observed, otologists set about trying to imitate her. Progress was made in Germany by Wullstein, and later by Zoellner, who began publishing the results of what they called tympanoplasty in the second half of the 1940s. Zeiss produced a binocular operating-microscope with magnification up to 40, and suitably delicate instruments began to become available.

The operations originally described by Wullstein had two absolute prerequisites:—First, a healthy Eustachian tube and upper respiratory tract, and, secondly, adequate cochlear function.

The operation itself was in two parts.

(1) The removal of what Wullstein termed "irreversible pathology." By this he meant diseased bone, granular mucosa, and squamous epithelium. Œdematous mucosa, not grossly altered, he considered to be in a reversible state, and tried to preserve it whenever possible.

(2) The reconstruction of the middle ear. The method employed depended entirely upon what structures remained after the ravages of the disease and when all "irreversible pathology" had been removed. In all cases a vibrating membrane was constructed from free grafts of full thickness post-aural skin.

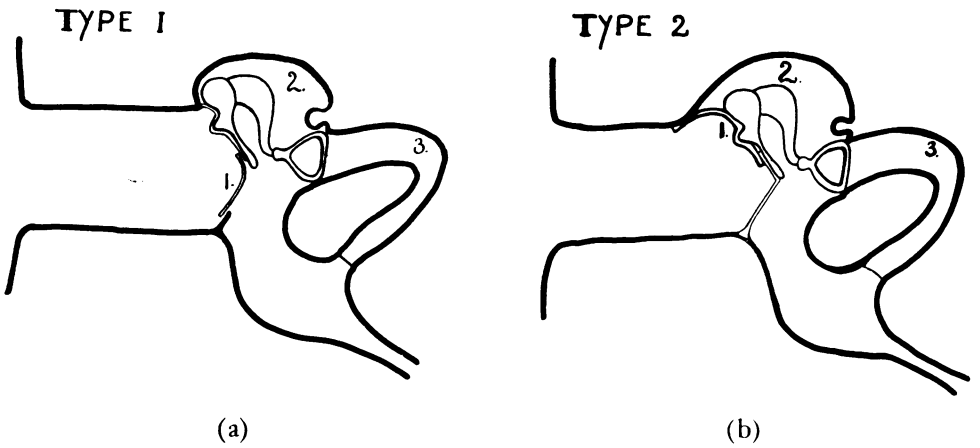


Fig. 3—Wullstein's types 1 and 2 operations.

1, graft overlying perforation; 2, middle ear; 3, inner ear.

(a) TYPE 1. The graft is placed on the previously prepared drum remnant so as to cover the perforation.

(b) TYPE 2. The outer wall of the upper third of the middle ear and adjacent drum have been destroyed by disease. The graft is placed on a prepared bed so that it seals the middle ear from the external meatus.

Wullstein classified the following five possible types of reconstruction.

Type 1 for cases where the only defect is a "benign" perforation of the drum. In this the graft is placed on a bed prepared by removing the epithelium from the drum surface and a few millimetres of the surrounding meatal wall (Fig. 3, a).

Type 2 for cases in which the perforation is "malignant," i.e., posterosuperior and marginal or in the attic part of the drum. A portion of the annulus has been either destroyed by disease or, being infected, is removed surgically. There is no mastoid disease. In this type the graft is laid on a bed prepared as in the Type 1 operation. It frequently lies in contact with, and becomes adherent to the head of the malleus and the incus, because of the lack of annular bone. This may result in restricted ossicular mobility (Fig. 3, 6).

Types 3, 4, and *5* are designed for cases with more extensive disease necessitating preliminary modified radical mastoidectomy. The tympanic reconstruction is carried out as part of the operation.

Type 3 in an ear in which, after the removal of all "irreversible pathology" from the middle ear of the ossicles, only the stapes remains. The graft is placed anteriorly and inferiorly on a bed prepared by removal of epithelium from the meatus and the drum remnant. It extends across the middle ear, in contact with the head of the stapes, on to the medial wall of the mastoid cavity.

Type 4 for cases in which the stapedial crura have been destroyed by disease. The graft, laid on a bed prepared as in the Type 3 operation, extends across the lower half of the middle ear, including the round window niche, so that its upper edge reaches the inferior margin of the oval window. The footplate of the stapes thus lies exposed to sound waves in the cavity. Type 3 and 4 operations are designed to imitate "nature's tympanoplasty" (Fig. 1, b and c).

Type 5 for cases where, as in the preceding group, the stapedial crura are absent, but in addition, the footplate has become fixed by fibrosis or osseous overgrowth. In this case the graft is placed as in the Type 4 operation. Later, when the graft and cavity are healed, the lateral canal is fenestrated, as in the Lempert operation for otosclerosis. This provides a port of entry for sound energy into the inner ear.

The following table shows the results obtained with these operations in some American, German, and British Centres.

Author	Type 1	Type 2	Type 3	Type 4
Wullstein	96% (322)	86% (196)	80% (490)	68% (280)
Beales	70% (17)	23% (13)	62% (21)	50% (8)
Proctor	—	63% (57)	52% (44)	28% (60)
Schuknecht	82% (40)	80% (17)	66% (44)	42% (58)
Thorburn	82% (17)	79% (19)	48% (56)	26% (23)
Livingstone	73% (26)	44% (16)	56% (59)	20% (37)

% gaining socially adequate hearing. Number of cases in brackets.

One interpretation of these results is that extensive disease necessitates a less physiological operation with less hope of useful hearing. The curse of extensive disease is scar tissue and adhesion formation which immobilises the ossicles or obliterates the air-containing space in the lower part of the middle ear—both with equally devastating effect on hearing.

Various methods are used in an attempt to prevent the formation of adhesions. For instance, oxidised gelatin, soaked in solutions of antibiotic and hydrocortisone, is placed between raw mucosal surfaces, in the hope that these will have healed before the gelatin is absorbed. Again, raw areas in the middle ear have been grafted with conjunctiva, antral mucosa, and even amnion, but without great effect. Frequently separation of raw surfaces can be secured by means of a polythene tube positioned at operation to lie across the floor of the middle ear,

forwards through the Eustachian tube and out through the anterior naris. Not only does its physical presence keep the layers apart but air can be blown up the tube daily. This produces movement of the drum and ossicles and so discourages the formation of adhesions. The tube is withdrawn through the nose at the end of three months.

The uncertain behaviour of skin grafts has been another unsatisfactory feature of Wullstein's operations. An embarrassingly large number of these fail to settle completely in their new environment, forming crusts and exudate. Others behave well for a variable time, even up to one year, then break down without warning. Wullstein cut his graft so that it extended backwards from the middle ear to line the larger part of the mastoid cavity. He hoped that this would result in more stable healing of the cavity. Experience everywhere has shown that this method and all other forms of grafting aggravate the cavity problem.

These criticisms are not intended in any way to denigrate the very great achievements of Wullstein, but rather to show that there is still a very great deal to learn about the problem—there is a hard core of patients with extensive disease, for whom Type 3 and Type 4 operations are unlikely to prove successful. The need to find alternative methods has been more widely recognised in America than in Europe—possibly because there the German influence is less powerful. It is to the U.S.A. and to a lesser degree to Scandinavia that we are now looking.

Some of these new methods, at present in use in Belfast, with, so far, encouraging results, are worthy of mention. For example, drum repair can be accomplished by inserting a square of vein or periostium below the perforation so that it acts as a scaffolding for regenerating epithelium and mucosa. This frequently heals the perforation almost without scar. Partly eroded ossicles, instead of being thrown away, can be taken out of the ear, cleaned up and repositioned. In this way, a gap in the lever system may be closed and a Type 1 or 2 effect achieved instead of a Type 3. Again, where no stapedial crura are present, an incus or malleus can be used to connect the drum to the footplate and so avoid a Type 4 operation. Used in this way, the ossicles quickly get a blood supply from the mucosa with which they are in contact. What is more, the hearing results are encouragingly better. Again, a lever system can frequently be kept by bridging gaps in the ossicular chain with polythene or stainless steel wire. As far as possible the normal position of the drum is maintained. This results in fewer adhesions between the drum and the medial tympanic wall, together with more normal vibrating characteristics.

I have obtained the following results by combining these methods with the techniques of Wullstein. (In this series the Type 1 group includes those cases in which prostheses have been used to close gaps between the incus and stapes.)

Type 1		Type 2		Type 3		Type 4
82% (26)	...	80% (11)	...	60% (33)	...	50% (10)

% gaining socially adequate hearing. Number of cases in brackets.

The great problem of the unhealed mastoid cavity is likely to become less, partly because we can now actually obliterate the cavity by swinging a pedicled flap of temporalis muscle into it, and partly because, in fact, we are making fewer cavities than before. We have realised at last that, in the early stages, the disease can often be dealt with from the middle ear without opening the mastoid air-cell system at all.

In conclusion, it must be emphasised that not every patient with chronic suppurative otisis media is a candidate for tympanoplasty. Rather it should be reserved for two particular groups:—

(1) Those with bilateral disease, where hearing improvement is highly desirable.

(2) Those with "benign" perforations for whom a career in the armed forces or swimming, and aquatic sports generally, are very important.

I should like to take this opportunity to thank Mr. MacLaughlin, Mr. Hunter, Mr. Craig, and Mr. McCrea for giving me the time and opportunity to become interested in this fascinating problem.

REVIEW

THE ORIGIN OF MEDICAL TERMS. By Henry Alan Skinner, M.B., F.R.C.S. Second Edition. (Pp. 420; figs. 350. 100s.) London: Baillière, Tindall & Cox, 1961.

THE purpose of this book is to facilitate the medical student and others in finding the meaning of standard medical terms, particularly those used in the basic sciences of Anatomy, Physiology and Pathology. Such a reference book has become more necessary since the medical student has discarded the study of Latin and Greek, and the meaning of many of the words and phrases which he meets in his everyday reading has become more than ever before 'Greek' to him.

There are brief historical sketches of many of our predecessors who have given their names to structures and syndromes. The earliest representation of the serpent and staff is surely not that of Aesklepios since similar emblems are to be found in some of the temples of healing in Sumaria. It is interesting that these latter show two snakes and not the single snake of the Greek god.

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A FOLLOW-UP OF ONE HUNDRED CASES OF FRACTURE OF THE HEAD OF THE RADIUS WITH A REVIEW OF THE LITERATURE

By G. W. JOHNSTON, M.B., F.R.C.S.

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THE elbow joint tolerates trauma poorly and even radiologically minor injuries can be followed by major disability. Fracture of the radial head is the commonest elbow injury, accounting for 37 per cent. of this injury at the Royal Victoria Hospital in the period under review (44 per cent. Murray (1940); 30 per cent. Mason (1954)).

In the two-and-a-half-year period, 1st January, 1958—30th June, 1960, 175 fractures of the radial head were treated at the Royal Victoria Hospital. This represented 1.7 per cent. of a total of 10,200 fresh fractures. Of the 175, for various reasons, only 100 could be reviewed. These form the basis of this paper. Seventy per cent. were female. The average age was 41 years, with extremes of 14 and 66 years. The elbow was X-rayed at the time of review in all cases and in those patients in whom the head of the radius had been excised X-rays were also taken of the wrist. The minimum period between injury and review was one year.

MECHANISM OF INJURY.

Cutler (1926), in one of the earliest comprehensive reviews, considered that direct trauma was the commonest mechanism of injury to the radial head. It is now generally accepted that indirect injury through the long axis of the radius is the usual cause. The direction of the force and the longitudinal trabecullar pattern of the head account for the usual longitudinal direction of the fracture line. Hein (1931), in a discussion of a paper by Key, considered that the same force carried to extremes caused dislocation of the elbow. These two injuries are frequently combined (6 per cent. of a series of 459, Murray (1940), and 5 per cent. of this present series). Between these extremes there can be severe cartilaginous and ligamentous damage not shown on X-ray. Thus, fracture of the head of the radius is not a localised injury but part of a widespread damage to the whole elbow joint.

CLASSIFICATION.

Although the actual damage is much greater than that seen on X-ray, a radiological classification is the only easily standardised one and has been used in this series.

Type I.

Fissure fracture or marginal sector fracture without displacement.

Type II.

Marginal sector fractures with displacement causing widening of the head and depression or tilting of the segment.

Type III.

Comminuted fracture of the radial head.

Type IV.

Fracture of the radial head associated with dislocation of the elbow.

Treatment.

Type I.

Most authorities agree on conservative treatment, avoiding any forcible manipulation. They rest the injured limb in a sling of plaster-of-Paris back-slab for one to three weeks, depending on the severity of the lesion (Murray (1940); Mason (1940); Castberg and Thing (1953); Watson-Jones (1955); Bonnin (1957)). Wagner (1955) and Jacobs and Kernodle (1946) aspirate the joint prior to immobilisation. Gaston, Smith, and Baab (1949) also aspirate the joint but then start active motion in twenty-four hours within the limits of pain. They found that, although the final results were the same in six months whether or not aspiration was carried out, there was a more rapid restoration of movement if aspiration had been performed. Thus, 70 per cent. of the aspirated group, as compared with only 40 per cent. of the non-aspirated group, had a full range of movement in four weeks. Fontaine and Muller (1960) inject local anæsthetic into the fracture site and avoid all immobilisation.

Fifty-five per cent. of our series were Type I fractures and all were treated conservatively with one to two weeks' rest in sling or plaster-of-Paris back-slab. We consider that if the trauma of the original injury has not displaced the fragment, gentle active exercises are unlikely to do so. Thus relief of pain in the more irritable joints was the only indication for plaster-of-Paris immobilisation. The majority regained a full range of movement in one to three months. At the time of review all had a virtually painless elbow, but eleven patients (20 per cent.) stated that after heavy work and in cold weather they experienced an occasional ache. Five cases had slight limitation of movement consisting of an average loss of fifteen degrees extension and minimal loss of pronation. Approximately one-third had persistence of the fracture line on X-ray.

Type II.

It is in the treatment of Type II fractures that the greatest difference of opinion occurs. Jacobs and Kernodle (1946) and Böhler (1956) use conservative treatment with plaster immobilisation for two to three weeks unless there is marked displacement of the fragment. Bonnin (1957) attempts reduction of the displaced fragment by manipulation. He considers that the intact annular ligament pulls the fragment into position. Murray (1940) states that he has had little success with manipulation. Key (1931) excises the head if the fracture involves more than one-third of the circumference. Mason (1954) excises if the segmental fracture is more than one-quarter of the head or if there is even minimal tilting.

Wagner (1955) operates if he considers that the fragments will interfere with movement. He determines this by attempting to carry the joint through a full range of movement following intra-articular injection of a few cubic centimetres of local anæsthetic. Any bony block or persistent click are considered positive indications for resection of the radial head. Murray (1940) and Fontaine and Muller (1960) emphasize that removal of the displaced fragment alone is followed by poor results and advise removal of the whole head and part of the neck.

Twenty-nine cases (29 per cent.) in this series were Type II fractures. All except one were treated conservatively by immobilisation in a back-slab for one to two weeks, followed by active exercises. One was treated by complete excision of the head. More than 50 per cent. had a completely full range of movement at the time of review. In the remainder there was an average loss of ten degrees of extension but rarely any limitation of rotation. Ten (35 per cent.) complained of occasional pain after heavy work or in cold weather. The only patient with a poor result was the one treated by excision of the head. Unfortunately she developed wound sepsis, resulting in a painful elbow with a very limited range of movement. X-rays showed persistent radiological deformity in most cases. There was, however, no correlation between the final range of movement obtained and the degree of deformity seen on X-ray.

Type III.

Most surgeons agree that Type III fractures should be treated by total excision of the head within a few days of injury, followed by post-operative immobilisation for periods varying from one to three weeks. Gaston et al. (1949) consider that the operation should be performed within twenty-four hours, and active exercises commenced the following day. The results of excision are not uniformly good, and this has led some to use acrylic, stainless steel or vitallium prostheses. (Cherry, (1953); Titze (1955); De Borja-Araujo (1958); Waibel and Nigst (1959).) Surgical excision or replacement are inadvisable in the aged.

In this present follow-up there were eleven cases in Group III. Five were treated conservatively with two to three weeks' plaster-of-Paris immobilisation, and six by excision. Those treated conservatively had an average loss of 10 per cent. of rotation and five degrees of extension. Two were completely free of pain. One of these, in which the loose piece was displaced outside the joint, had also a full range of movement. In the six cases which were treated by excision within an average of four days, there was full rotation in all, but an average loss of ten degrees of extension. All complained of some elbow pain and two had mild myositis in this region. Four complained of wrist pain. This was due to subluxation of the inferior radio-ulnar joint in three and osteo-arthritis in one.

Type IV.

In this injury the discloation is usually reduced without difficulty and the fracture of the head of the radius is then treated as an isolated injury. Thus, if there is a displaced marginal fracture or comminution of the bone the whole

head should be removed two to three weeks after reduction of the dislocation (Watson-Jones, 1955).

There were five patients in this group in our series. In four the head of the radius was excised two to three weeks after injury, and within twenty-four hours in one case. The five patients had an average loss of ten degrees flexion, twenty-five degrees extension, and 20 per cent. rotation. All complained of elbow pain after heavy work or in cold weather. Four patients had some degree of myositis ossificans. Three complained of wrist pain and X-rays showed osteo-arthritis of the inferior radio-ulnar joint in two of these and subluxation in one.

Discussion.

Type I fractures practically all get a good result irrespective of treatment and therefore require no further discussion.

The main controversy revolves around Type II fractures. Mason's axiom (1954) is "If in doubt resect," but we consider that conservative treatment yields good results and operation is usually unnecessary in this group. Excision of the radial head should not be undertaken lightly as its results can not be described as uniformly satisfactory. There is danger of local new bone formation, valgus deformity of the elbow, and proximal displacement of the radial shaft with subluxation of the inferior radio-ulnar joint. As early as 1933 Swartz and Young found that although excision improved supination and pronation it was frequently followed by valgus deformity and relative instability of the elbow. The problem of subsequent subluxation of the inferior radio-ulnar joint has not been emphasized in the literature. Murray (1940) found no subluxation in a series of 459 patients with 58 excisions; Jacobs and Kernodle (1946) none in a series of 42 with nine excisions; Gaston et al. (1949) none in a series of 261 patients; Jeffrey (1953) none in a large series (number not stated) and Mason (1954) none in a series of 100 patients with 23 excisions. Gaston et al. (1949) believe that this complication occurs only in children and McFarland (1953) found no tendency for upward migration of the radius even in children. Both Colbert and Stack (1955), however, in a discussion of Wagner's paper, stated that they were plagued with the complication of wrist pain following resection of the radial head. Wagner (1955) considered that this was due to subluxation occurring at the time of injury. Curr and Coe (1946) report one such case and Essex-Lopresti (1951) two cases associated with comminuted fractures of the radial head. McDougall and White (1957) consider that the subluxation occurs subsequent to the excision and not at the time of injury. In a careful clinical and radiological follow-up of 100 patients, 44 with resection of the radial head, no less than 25 developed some degree of upward shift of the radius post-operatively. Although our series contains only 11 excisions of the radial head, no less than seven of these complained of wrist pain. Subluxation of the inferior radio-ulnar joint was present in four and osteo-arthritis of this joint in the other three. Thus we would say "If in doubt, treat conservatively." Since 40 per cent. of the articular circumference of the radial head, on the lateral side, does not articulate with the ulna, damage in that region would theoretically not interfere with rotation. In practice

Murray (1940) found that if the fracture involves no more than 70 per cent. of the lateral circumference, rotation is not impaired. Thus we would expect many Type II fractures to regain full rotation on conservative therapy.

Excision of the radial head in Type III fractures is the generally accepted procedure. Fowler (1953) considers, however, that this is meddlesome and unnecessary when the fragment has been displaced right through the capsule into the soft tissues. One patient illustrated this point by regaining a full range of painless movement on conservative therapy. The unsatisfactory results following excision have led some surgeons to use prosthetic replacement of the radial head, but general acceptance of this is not the rule. Residual loss of flexion and extension in the elbow with these fractures is usually attributed to damage to the capitellum, against which the head of the radius is crushed. Laceration of the articular cartilage is frequently seen at operation (12.5 per cent. of Murray's series (1940) and 30 per cent. of a series reported by Gaston et al. (1949)). Flexion and extension of the elbow, however, is often still impaired even after excision of the radial head, although there can now be no mechanical barrier in the radio-humeral joint. Murray (1940) considers that this limitation of movement is due to associated damage to the cartilage of the humerus and the trochlear notch of the ulna. It has not been emphasized, however, that there must also be serious soft tissue damage in the region of the joint. The initial injury often causes partial rupture of the medial ligament, laceration of the brachialis muscle and tearing of the capsule. Subsequent fibrous repair causes soft tissue contracture. Should this be the cause of limitation of movement, there is probably a place for gentle manipulation under general anæsthesia. This is the practice of Wagner (1955), who obtained an increased range of movement in 16 out of 18 cases manipulated six months after injury.

Type IV injury carries the worst prognosis due to the complete disruption of joint and high incidence of new bone formation. It is probably that the complication of myositis ossificans could be reduced by excision of the radial head within twenty-four hours of injury instead of the more conventional two to three weeks. Gaston et al. (1949) illustrate this point with two series of patients. In their first series of 20 cases, 10 had excision performed within twelve hours of injury and none developed myositis ossificans. The remaining ten did not have their operations until two to four days after injury and five patients (50 per cent.) developed myositis. In a second series of 12 patients, operated on within an average of six hours from the time of injury, none had new bone formation.

Our series of five cases in this group is too small to be significant, but it is interesting that the four patients operated on two to three weeks after reduction of the dislocation all developed some degree of myositis. The remaining patient had excision carried out within twenty-four hours of injury and did not get any local new bone formation.

Summary.

One hundred cases of fracture of the head of the radius have been followed up clinically and radiologically. The methods of treatment in the four groups

of fractures have been discussed and the results assessed. The complications of excision of the radial head are emphasized and a more conservative approach favoured. When excision is considered necessary, operation within the first twenty-four hours gives best results.

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CÆSAREAN BIRTH*

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In the oldest literature reference was made to Cæsarean birth; this became the Cæsarean operation, and it is only during the present century that Cæsarean section, a term coined by Guillimeau in 1598, has been in common usage. We are in debt to Dr. Samuel Johnson (1755) for providing as good a definition of the term as any: "The Cesarean Section is cutting a child out of the womb, either dead or alive, when it cannot otherwise be delivered." Although this might include an operation per vaginam and his indication is rather absolute for our day, the definition is succinct and his spelling excludes the diphthong (æ) which has made a search of the bibliography so tiresome. There is much discussion as to the reason for the name and the usual views are as follows:—

1. Julius Cæsar owed his life to the operation. This is an unlikely explanation as, according to Suetonius, Cæsar's mother Aurelia, was still alive when he invaded Britain. Pliny the elder is given as the source for this belief and an eighteenth-century French antagonist of the operation, Saccombe, wrote, "Pliny was a lying historian whom it would have cost no more to have split the belly of Aurelia with his pen in order to deliver Cæsar, than to split the rocks with vinegar to open up a way across the Alps for the troops of Hannibal." This may be a little hard on Pliny as it seems possible that he was alluding to the first of the Cæsars, who was Prætor of Sicily in 208 B.C.

2. The Lex Regis of Numa Pompilia (715-672 B.C.) forbade the burial of a pregnant woman before the young had been excised—"qui contra feceret, spem animantis cum gravida, peremisse videtur." At the birth of the Empire this law became the Lex Cæsaris and the operation may have derived its name from the law decreeing it.

3. The operation may simply have been considered too grand for ordinary mortals—the Germans named it Kaiserschnitt on the same principle.

4. Finally, the name may be derived from the Latin verb, Cædere to cut (a cæso matris uteri), and this appears the most likely explanation.

The Age of Legends.

The beginnings of Cæsarean section are lost in mists of antiquity. A tablet, dating from the second millennium B.C., deals with the legal adoption of a child, aged 2 years, which was pulled out of its mother's womb and this may well be the first recorded case. There is no mention of the operation in the Bible, but discussion in the Mishnah (A.D. 200), the Gemara (A.D. 450), and the Talmud

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suggests that the Rabbinical writers were familiar with it. Children must have survived as they were called Yotse Dofan (go out of the body wall). Discussion about the ritual sacrifices, the days of uncleanness and the days of cleanness, which a woman should observe after the operation, is implicit, if not explicit, evidence that she survived.

Legend has it that, when his mother fell off her horse at Paisley Abbey, Robert II of Scotland (1316) was born by Cæsarean section and that the incision injured his eye, earning him the nickname of "King Blear-Eye." Sir Arthur McNalty states that Dr. George Owen, F.R.C.P., delivered Edward VI in this way and that Jane Seymour, his mother, died of puerperal sepsis twelve days later.

The Primitive Age.

It may well be that the first successful operation was at the hands of a soldier in war or on the horns of a rampant bull. However, a Swiss sow gelder, Jacob Nufer, is given credit for the first success. In A.D. 1500 when he could obtain no help in his wife's extremity, he operated himself. His wife subsequently had five vaginal deliveries, including twins, and the child lived to the ripe old age of 77. A number of similar cases occurred in France during the sixteenth century and in primitive communities they probably still occur to-day. In 1738 history was made in Charlemont, Co. Armagh, when a woman survived a Cæsarean section for the first time in the British Isles. The details of the case were published in Medical Essays and Observations by a Society in Edinburgh by Mr. Duncan Stewart, Surgeon in Dungannon, in 1741.

> "Alice O'Neill, aged about 35 years, wife to a poor farmer near Charlemont, and mother to several children, in January, 1738, was taken in labour, but could not be delivered of her child by several women who attempted it. She remained in this condition twelve days; the child was thought to be dead after the first day.
>
> "Mary Donnelly, an illiterate woman, but eminent among the common people for extracting dead births, being then called, tried also to deliver her in the common way; and her attempts not succeeding, performed the Cæsarean operation, by cutting with a razor, first the containing parts of the abdomen, and then the uterus; at the aperture of which she took out the child and the secundines. The upper part of the incision was an inch higher, and to one side of the navel, and was continued downwards, in the middle betwixt the right os ilium and the linea alba. She held the lips of the wound together with her hand till one went a mile, and returned with silk and the common needles which tailors use. With these she joined the lips in the manner of the stitch employed for the hare lip; and dressed the wounds with whites of eggs. . . . The cure was completed with salves of the midwife's own compounding. In about twenty-seven days the patient was able to walk a mile on foot."

Stewart goes on to say that she was subsequently able to walk the six miles to market in Dungannon regularly. In the same journal there is confirmation from Dr. Gabriel King of Armagh who saw Alice O'Neill and removed the needles from her wound.

In the early days a doctor took his life in his hands when he did a Cæsarean section, as John Bullawanger of Buckden, Huntingdon, discovered in 1573. He was indicted before the Justices of Assize for the Norfolk Circuit. "Alice Redborne, spynster, on or about 17th June, 1573, was labouring under diverse infirmities. Bullawanger, claiming to be a Physician and Surgeon, took upon himself at Folkesworth on 18th June, to cure Agnes' infirmity by making an incision in her belly on the left side with a knife, giving her a blow 6 inches long and 3 inches deep, carelessly penetrating with the knife. He put his hand into the belly and womb, and drew thence through the wound a child with which the woman was then gravid. Agnes languished until the 28th June, and died of the wound," Bullawanger was found guilty but, as he was the first doctor to do the operation in the British Isles, it is pleasant to be able to record that he was pardoned.

In 1582, Francois Rousset, Physician to the Duke of Savoy, published his book in favour of the Cæarean operation. He had not done the operation himself but he described seven cases and his translator, Bauhin, added others including that of Jacob Nufer. Rousset described two further cases in 1590, in one of which the operator was drunk; "And if the operation succeed with him when drunk, what may not he expect, who perform it when sober, according to the justest rules of his art." His views were not taken up with enthusiasm, perhaps because Ambrose Pare considered them to be barbarous. Rousset was even accused of being a secret agent of Catherine de Medici, and of contriving to have Huguenot women despatched in this way!

Little of value was contributed during the seventeenth century, but whilst earlier reports tended to be circumstantial, there is clear evidence that Dr. Trautmann of Wittenberg performed a Cæsarean section on 21st April, 1610. He operated in front of Professor Sennert, the Archdeacon, two midwives, and seven other honourable women. The baby survived but the mother died twenty-five days later. Dr. Van Roonhuyze of Amsterdam did a successful operation in 1663, and published diagrams showing his technique. However, probably the most significant event of the century was the decision by Louis XIV that his Court Physician, Jules Clement, should deliver at least one of his mistresses. Whether he felt that a man would be more discreet than a woman, is unknown, but he launched the fashion of the male midwife, and the stage was set for doctors to come to grips with obstetrics during the eighteenth century. Difficult cases became the focus of learned consultation and Cæsarean operations were done in the full glare of publicity. Details were published and failures became as well known as successes. In 1737, Mr. Smith of Edinburgh operated in the presence of seven colleagues and there were eighteen further operations in the British Isles during the century. Six children survived but Mary Donnelly and Dr. Barlow (1793) are usually quoted as the only operators to save the mother. However, the following interesting account was read at the Meeting of the Medical and Philosophical Society, Dublin, on Thursday, 1st September, 1751: "On the 25th of last month the Cæsarean operation was performed by Surgeon

Bell, Junior, on a poor woman in Galloway, and the bodies of two children, which were mostly decayed, were extracted, and the woman is now out of danger. Her case is the more extraordinary, as she was emaciated to the last degree, and hectical, having carried the dead bodies twelve months, or more, after she came to her full term and during that space had been in the last stage of an ascites, the water of which was discharged by the navel." Dr. Jesse Bennett chalked up the first success in the United States in 1794 when he operated on his own wife, removing her ovaries so that he would not be called upon to face the same experience again!

British criticism of the operation was started by Sir Fielding Ould, second Master of the Rotunda in 1742. "I have taken upon myself absolutely to explode the Cæsarean operation as repugnant not only to all the rules of Theory and Practice but even of humanity . . . a detestable, barbarous, illegal piece of inhumanity." Dr. Dease (1783) added, "It is only practised by rash and ignorant men who have no reputation to lose and are anxious to acquire one." Dr. Simmonds of Manchester in 1798 published a tract condemning it. Dr. Hull, his colleague, translator of Baudelocque's famous book, the first Englishman to do two sections, took violent exception: "A compound of unjust and malicious insinuations against a man who never gave you the least offence. . . . Pernicious precepts, false assertions, garbled extracts, ribaldry, libel, hypocrisy, nonsense." Our forefathers did not pull their punches!

Briefly, the critics considered that a good man could always get the baby out somehow and that Cæsarean results did not justify the barbarity of the operation. A case of Dr. Osborne's in 1776 illustrates the point. His patient had rickets and her height was 3 ft. 6 in. She was unable to stand without crutches. The left half of her pelvis had an antero-posterior dimension of only $\frac{3}{4}$ inch, and the right half $1\frac{3}{4}$ inches. She was tired after seventy-two hours in labour and had a substantial venesection. After eighty-four hours four colleagues assisted in perforating the baby's head. Three colleagues and thirty students all examined the patient vaginally twelve hours later, and Dr. Osborne succeeded in getting a crotchet into the foramen magnum 120 hours after the onset of labour. Embryulcia took three hours and much endeavour, the patient exhibiting great fortitude throughout. Premature induction of labour (1756) and symphysiotomy (1768) added to the armentarium of the diehards.

During the first half of the ninetenth century there was little change in Cæsarean results. There were two operations in Ulster, the first by Dr. McKibbin, Surgeon to the Belfast Lying-In Hospital, in 1829. The patient had obstructed labour due to a sacral exostosis. The operation was conducted in the presence of several medical gentlemen, took twenty minutes and was performed "with great neatness, dexterity and coolness." The baby was stillborn and the patient died seventeen hours later. The second patient, a fifth para, suffered from osteomalacia. She was bedridden and lived in a miserable hovel near Dromara. She was seen by Dr. John Campbell of Lisburn after she had been in labour for forty-eight hours. Embryulcia failed because one finger and the perforator could not be accommodated in the pelvic cavity at the same time. A Cæsarean

operation only detained Dr. Campbell a further five minutes, and chloroform anæsthesia, in 1849, suggests that he was very much abreast of the times. The patient succumbed eight days later, but the child survived.

Before going on to describe the stirring events of the latter part of the century it may be of interest to reconstruct the knowledge available to Dr. Campbell at the time he operated. Cæsarean section was an appalling experience to patient and operator alike. It had an 80 per cent. mortality and should only be contemplated when all other methods failed. If obstruction could be overcome by the destruction of a living baby, this was quite in order and continental views to the contrary were based on bad theology. The decision to operate should be backed by several colleagues. Venesection and a bath were useful preoperative measures. A woman possessed a large share of passive courage but strong attendants should assist her in case her fortitude proved unequal to the occasion. The use of laudanum or alcohol was being supplanted by the new anæsthetics but they were not without danger. There was a choice of abdominal incision—through the side (semi-lunar line) oblique across the abdomen or mid-line. Operation through the side avoided the bladder which was usually distended with urine—Hamilton (1784) removed four pounds of urine during an operation at which he assisted. The uterus could be incised in front, at the side, in the fundus and even through the posterior wall and the incision could be vertical, transverse or oblique (as late as 1923 a grid-iron uterine incision was recommended by Burns). The placenta might be removed or allowed to extrude vaginally later. There was no need to suture the uterine incision and many reasons why it was not advisable. Three or four silk sutures were used to approximate the abdominal wall. Sepsis was the usual post-operative problem and purges, fomentations, and leeches were the remedies. If Dr. Campbell had read the literature extensively he would have found suggestions that the uterine incision should be sutured (Lebas, 1769) and that the incision should be transversely through the lower segment (Osiander, 1805). A lateral extraperitoneal approach to the lower segment had been suggested by Ritgen (1820), a midline approach by Physick (1824) and finally Blundell (1828) had recommended extirpation of the uterus after the baby had been delivered. However, none of these ideas had caused any stir in the profession.

The Age of the Obstetric Surgeon.

Many things contributed to the success story of the latter half of the nineteenth century, not least the work of Semmelweis, Pasteur, Lister and Simpson. However, comment will be restricted to changes in the operative approach to Cæsarean birth.

Laparo-elytrotomy.

In 1870 Gaillard Thomas of New York resurrected Ritgen's idea of an extraperitoneal Cæsarean section by a lateral approach and did a number of operations. Edis of London tried it in 1878. He made an incision above and parallel to the right inguinal ligament. After pushing the peritoneum upwards he exposed the vagina and incised it parallel to the ileo-pectineal line. The child was extracted

with forceps and survived but the mother died forty hours later. The operation never became popular because bladder damage and serious bleeding from the uterine vessels were usual complications. Latzko successfully modified the operation in 1908. Through a midline incision, he gained access to the lower segment by displacing the bladder to the right side. In 1940 Waters devised a midline approach to the lower segment over the fundus of the bladder. The midline approach is much more attractive than the lateral but does not seem to have sufficient advantages to outweigh the increased difficulties of the operation.

Cæsarean hysterectomy.

The appalling post-operative mortality after Cæsarean section was rightly attributed by Professor Porro of Pavia to the practice of retaining the open, infected uterus in the peritoneal cavity. In 1876 he took what he considered to be the logical step in eliminating this risk. After delivering a living baby and the placenta, he applied a Cintrat constrictor, like a tonsillectomy snare, round the cervix. When the constrictor had been tightened he excised the uterus, tubes, and ovaries. He brought the stump out through the abdominal incision, which he closed round it. The Cintrat was removed in four days, the pedicle sloughed in fourteen days, and the patient recovered. This was a great advance and, from 1885-1889, 158 Porro operations were done with a 29 per cent. mortality. It is fortunate that such a mutilating operation was soon superseded by something better.

Classical Cæsarean section.

To our generation, it seems extraordinary that for centuries the uterine incision was left unsutured. Lack of a suitable suture material may well have played a part but numerous other reasons were advanced for leaving the uterus to bleed and drain into the peritoneal cavity. Max Sanger was a youth of 28 and assistant to Professor Crede of Leipzig when he wrote a paper on Cæsarean section. In this paper he advocated three measures—

(1) The uterine incision should be sutured in two layers—the method has changed but the principle remains today;

(2) Infection should be reduced by the use of antisepsis—this has given way to asepsis;

(3) Operation should be done early in labour and not simply as a means of preventing a woman dying undelivered.

His ideas were not new but he brought them together in such a way that others were stimulated to test them, including Sir Francis Champneys and Murdock Cameron. Their success and powerful advocacy caused the Porro operation to be stillborn in the British Isles. In Ireland Sir Arthur Macan was successful at the Rotunda in 1890 and Sir John Campbell did the first operation in Belfast in 1899. Routh was able to collect details of 1,282 cases in 1910 (forty in Dublin, nine in Belfast, and four in Cork), and the mortality had dropped to 12 per cent.

Lower segment operation.

The last development started with Osiander (1805), continued with Kehrer (1882), but owes its success to the work of Frank (1906) and Kronig (1912). The former advised exclusion of the peritoneal cavity by suturing the upper edge of visceral peritoneum to the parietal peritoneum before incision the lower segment—the latter performed the operation as it is done today. Munro-Kerr and Sir Eardley Holland were the pioneers in Great Britain and their discussion about a transverse or a vertical incision in the lower segment ended in Munro-Kerr's favour. There were thirty-three cases to report by 1921 but it was not until the 1930's that the lower segment operation became pre-eminent.

Cæsarean birth has now lost much of its former terrors but feasibility is not necessarily an indication for use. The art of surgery should not be allowed to submerge the older art of obstetrics and Davidson's criticism should not go unheeded: "Some obstetricians regard the birth canal as a mere make-shift exit to be used only when they are otherwise engaged."

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SUCCESSFUL PREGNANCY FOLLOWING CHEMOTHERAPY FOR GENITAL TUBERCULOSIS

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A CASE REPORT

MRS. N., aged 23 years, first attended the Fertility Clinic at the Samaritan Hospital, Belfast, on 7th November, 1957. She had been a premature baby of 3½ lb. Her mother had died from unknown causes when she was about 1 year old. Her father was still alive and well. An only brother had committed suicide. She had no known tuberculosis contacts.

The previous medical history included pulmonary congestion four and a half years earlier, following which the patient had had regular X-ray examinations at a chest clinic, the last being about four weeks previously, when she stated she was told her "chest was clear." On drawing the attention of her family doctor to this story she was submitted to further chest X-ray examination in January, 1958. The report on this stated, "Some infiltration with suggestion of fibrosis in both apices and right first space consistent with active tuberculous lesions. No tubercle bacilli were isolated by the culture method of examination from a sample of her fasting gastric juice."

In 1953 she had submitted to appendicectomy in the Royal Victoria Hospital, Belfast. In June, 1955, at the same hospital she was examined under anæsthesia because of pain and vomiting during her periods. The uterus and adnexa were thought to be normal. Dilatation and curettage was carried out on the tenth day of her menstrual cycle. The endometrium was reported to be in the proliferative phase and tuberculosis was not reported as being present.

The menarche had occurred at 13 years. The menstrual cycle was 3/30-31 and the loss was described as somewhat scanty.

The patient had been married for two years. She had never practised birth control. Intercourse took place about six times monthly and the fertile period was known by her.

Apart from her very short stature of 4 ft. 9½ in. the patient's general condition appeared satisfactory. The vulva was marital in type and the cervix was healthy. The uterus was anteflexed, mobile, and seemed normal in all respects. Nothing definite was noted about the adnexa, though an impression was formed that the fornices were a trifle tender, the right more so than the left. Tubal insufflation was attempted in the out-patient department but was abandoned due to failure of the cannula to pass the internal os. A semen analysis from the husband was requested pending her admission to hospital for dilatation of the cervix and insufflation under anæsthesia. The report on the semen was as follows: Amount

4.5 ml. pH 8.0, motility two hours after emission 50 per cent. with 30 per cent. abnormal forms. Count 85,600,000 per ml. or 192,600,000 active spermatozoa in the specimen.

On the 6th December, 1957, examination under anæsthesia confirmed the earlier findings. The cervix was dilated to size 4 Hegar, after which tubal insufflation proved positive at a slightly elevated pressure of 100 mm. of Mercury. Dilatation of the cervix was then completed and curettage carried out. This was on the fifteenth day of the menstrual cycle. The curettings were not sent for culture as there was then no strong suspicion in view of the insufflation results. The pathologist's report, to our surprise, read as follows: "The endometrium shows glands in a proliferative phase. There is an inflammatory reaction in the stroma with aggregates of large mononuclear cells. The appearances are those of a tuberculous endometritis." At this time the patient's weight was 6 st. 4½ lb., the hæmoglobin 65 per cent. (Sahli), and the blood sedimentation rate was 7 (Westergren).

Treatment with isoniazid and P.A.S. was commenced in the form of therazid cachets (Smith and Nephew), of which three were taken four times daily, or a total daily dose of 600 mg. isoniazid and 12 G. of Calcium B-P.A.S. This was well tolerated but an oral iron prescribed at the same time was not and was discontinued. The patient's weight promptly began to increase and the B.S.R. dropped to 4. In July, 1959, after twenty months' treatment, her weight was 7 st. 4½ lbs., an increase of 14 lb. The chest lesions responded satisfactorily and chemotherapy was discontinued with advice to return in six months.

On the 28th January, 1960, a bimanual examination revealed no notable tenderness as on the first occasion but thickening of the adnexæ was suspected, the right again more so than the left. It was decided to do a follow-up endometrial biopsy and culture, but it soon transpired that the patient was at this time actually pregnant, her last menstrual period having occurred on the fourth of the month.

In March, 1960, she was admitted to another hospital with a threatened abortion where she was treated conservatively for three weeks. Thereafter she remained well until the thirty-eighth week when she was admitted to the Belfast City Hospital with pre-eclamptic toxæmia. This failed to respond to the usual measures and on the 7th October, 1960, when her blood pressure was 154/90 mm. Hg. and there was one plus of albumen in the urine, a surgical induction of labour was decided on with a view to a short trial of labour. The following afternoon, after twelve hours of niggling pains and non-engagement of the fœtal head which was in the left occipito-posterior position, a routine lower uterine segment Cæsarean section was carried out. A female infant of 8 lb. 1 oz. weight was delivered and cried immediately. Following the closure of the uterine wound the uterus was eventrated. This manœuvre revealed a considerable number of adhesions around the right tube which was, however, easily freed. This tube was seen and felt to be thicker and firmer than its fellow, which was also thought to be slightly indurated. There was a light scattering of small tubercle-like

points over both. The fimbriæ of the right tube were shorter than those on the left as though partial indrawing had taken place earlier. The appearances were consistent with an arrested tuberculosis of the tubes. Follow-up radiograph of the patient's chest showed that the apices were almost clear and the disease was considered to be arrested.

Neither the mother nor the infant was isolated. The latter was bottle fed and B.C.G. vaccinated. A six-day course of streptomycin was given to the mother, post-operatively followed by a ten-day course of isoniazid. Her temperature never exceeded 98.4° throughout a completely uneventful puerperium and she was dismissed on the thirteenth day.

Six months after confinement a hysterolipiodogram was carried out. This showed a normal uterine shadow. Both Fallopian tubes filled promptly and there was immediate peritoneal spill from the left tube. There was no immediate spill from the right tube in which the medium was temporarily retained in a slightly dilated ampulla. A 24-hour picture showed no evidence of medium being retained in either tube and there was generalized peritoneal smearing.

Comment.

In view of the negative endometrial pathology in 1955 and the limited lesions found at operation it seems likely that the genital tuberculosis was a late acquisition in this case and that it was indeed so recent as to permit chemotherapy to prevent the usual serious tubal damage.

Acknowledgments.

My thanks are due to the Royal Victoria Hospital and Durham Street Chest Clinic, Belfast, for access to their case notes and Dr. J. H. N. Ferris, who performed the Cæsarean section.

1961 ANNUAL REPORT

VIRUS REFERENCE LABORATORY*

Department of Microbiology, The Queen's University of Belfast

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During 1961 the following have contributed to the work of the Virus Reference Laboratory: J. H. Connolly, M.D.; J. R. L. Forsyth, M.B.; D. I. H. Simpson, M.B.; M. Haire, M.B.; J. Evans and J. Cummings.

THIS is the fifth report of the Virus Reference Laboratory. These reports are not intended to be an analysis of all the investigations done during the year, but to present the more interesting and rewarding aspects of the work.

POLIOMYELITIS.

Laboratory Diagnosis.

During 1961 there were 16 notified cases of poliomyelitis in Northern Ireland, of whom 15 were paralysed. The viruses isolated from these cases were as follows:—

Notified Cases	No.	Poliovirus Type I	Poliovirus Type III	Other Enteroviruses Untyped
Paralysed	15	1	12†	2‡
Not Paralysed	1	–	1	–

†Includes two deaths. ‡Includes one death.

It will be seen that Type III poliovirus was the most common paralysing virus during 1961. Over the past few years this virus has become relatively more frequent as a cause of paralysis in many parts of the world.

The Type III viruses recovered in Northern Ireland during 1961 behaved rather differently from strains previously isolated here as far as its growth in tissue cultures and neutralization by standard antisera were concerned. Studies of the differences between various strains of polioviruses are being made in the Department of Microbiology so that attempts may be made if possible to recognize vaccine viruses when they are liberated into the community when oral poliomyelitis virus vaccines are used for immunization.

There were two paralysed patients (notified as paralytic poliomyelitis) from whom untyped enteroviruses were isolated. The C.S.F. protein of both these patients was raised to high levels suggestive of polyneuritis rather than poliomyelitis. One of them was a 2-year-old girl who died and the other a 39-year-old

*This laboratory is supported by a grant from the Northern Ireland Hospitals Authority.

male (whose nine children were also excreting untyped enteroviruses but had no symptoms of infection).

The ages of the patients with paralytic poliomyelitis were as follows:—

Years	$\frac{5}{12}$	1-2	2-3	3-4	4-5
No.	1	4	2	5	1

All of these patients were under 5 years of age and lived in or near Belfast. The two deaths occurred in a 5-month-old girl and a 3-year-old boy. The cases occurred during the following months:—

	May	June	July	August	September
No.	1	8	1	1	2

Poliomyelitis Vaccine Surveillance.

Investigation of the vaccination status of the thirteen paralysed children from whom polioviruses were isolated showed that ten of them had received no vaccine. Of the three paralysed children who had received vaccine one was a 3-year-old boy who had received only two injections. The other two children had received three doses of vaccine and one of them—a girl of 3 years and 9 months—was found to have an abnormally low level of gamma-globulin. The other—a boy of 3 years who died—had a normal gamma-globulin level. The occasional unfortunate occurrence of paralysis or death in an immunized child serve as a reminder that the vaccines available in the past have had an effectiveness of only 80-90 per cent. It is now possible to make killed vaccines which can provide a near 100 per cent. protection against all three types of virus.

The age distribution of the paralytic cases which occurred during 1961 is the usual pattern for Northern Ireland. For years we have been stressing that the pre-school child is the most important candidate for immunization against poliomyelitis. It is easy to get immunization programmes carried out among schoolchildren; but it is much more difficult to "get at" pre-schoolchildren, and a greater effort is required to immunize this age group who are the most important, not only because they have the greatest probability of becoming paralysed, but as disseminators of virus in the community.

Outbreak Prevention.

During 1961 an effort was made to restrict the spread of poliovirus from paralysed patients and their siblings by measures discussed by Dick and Dane (1961) and outlined in the 1960 Annual Report of the Virus Reference Laboratory (1961). Briefly, these measures consisted of isolation of the patient, house and garden quarantine of any siblings, the distribution of a pamphlet explaining the method of spread of poliomyelitis and of the importance of personal hygiene, etc., in its control, and the immunization and "boosting" of contacts in the neighbourhood. An attempt was made to test the effectiveness of these measures by collecting throat swabs and fæcal specimens from familial, play, and school contacts of children with acute poliomyelitis. (The viruses

isolated from these contacts were two Type I polioviruses and fifty-four Type III polioviruses. In addition to these isolations from contacts seven Type I and nine Type III polioviruses were isolated from specimens from people with no known history of contact.)

It is not possible to say what effect the measures had in controlling the spread of polioviruses. They were intended to be applied to reasonably well-immunized communities and not in poorly immunized areas where most of the cases in 1961 occurred.

The generally low immunization status of the contacts of paralysed individuals who were found to be excreting poliovirus may be seen from the following table:—

		No. of Doses of Salk Vaccine			
	No.	0	1	2	3
Known contacts	56	45	1	2	8
Others	16	6	1	3	6

In one area, of seventeen contacts who were found to be excreting Type III poliovirus only one had been immunized and at least, in such areas, the door-to-door immunization achieved a vaccine coverage of population groups who had failed to take advantage of the clinics.

These attempts at outbreak prevention were also applied in a children's hospital where a child was admitted for a brief period prior to the onset of paralysis and transferred to the Northern Ireland Fever Hospital. Tests of all patients and nurses in the ward revealed only one other infected person—this was a young nurse who had been vaccinated and who continued to excrete Type III poliovirus for ten weeks.

We think that the experience gained in trying out measures of outbreak control, although often under most unfavourable conditions, makes it worth further trials.

Aseptic Meningitis.

The common causes of aseptic meningitis diagnosed in the Virus Reference Laboratory during 1961 were:—

Virus	Poliovirus	Mumps	Coxsackie	ECHO
No. of cases	5†	42*	14	25

*Includes twelve cases of encephalitis.
†Includes one case of encephalitis who died.

This is in contrast to 1960, when the commonest cause of aseptic meningitis was Coxsackie B5. Of the five patients with aseptic meningitis due to polioviruses one had Type I virus and four had Type III virus. Their ages were 8 months, 2, 4, 18, and 21 years.

Three of these patients had received no vaccine, and one had received one and the other two doses. The death occurred in an unvaccinated 8-month-old boy who had fulminating encephalitis without obvious paralysis. He was excreting Type III poliovirus.

Mumps Virus Infections.

Mumps Meningo-Encephalitis.

The diagnosis of mumps meningo-encephalitis is of importance because of the good prognosis associated with the condition. A diagnosis of infection with mumps virus was made in thirty patients with a provisional diagnosis of aseptic meningitis and in twelve patients with encephalitis. The age and sex incidence in these cases was as follows:—

	0-1	2-3	4-5	6-7	8-9	10-15	15-20	Over 20	Total
Male	1	2	6	7	3	3	2	3	27
Female	0	2	5	2	3	0	2	1	15
Total	1	4	11	9	6	3	4	4	42

As in previous studies (see Murray, Field, and McLeod, 1960) about twice as many males as females were affected, and about half of the cases occurred in the 4-7 year old age groups. The four adults affected were 35, 38, 45, and 50 years of age. The monthly incidence of laboratory diagnosed mumps was as follows:—

Month	1	2	3	4	5	6	7	8	9	10	11	12
No.	1	1	–	3	9	6	7	6	1	5	1	2

Most cases occurred between April and August with a secondary peak in October.

The number of cases in which a diagnosis of mumps meningo-encephalitis was confirmed by laboratory diagnosis during the past five years has been as follows:—

1957	1958	1959	1960	1961
5	40	5	4	42

Without the total number of mumps virus infections in Northern Ireland it is not possible to say whether the increased incidence of mumps meningo-encephalitis during 1958 and 1961 merely represents an increased prevalence of mumps during these years.

ECHO Viruses.

The ECHO viruses isolated from patients with aseptic meningitis were as follows:—

	ECHO Type		Untyped		Total
	3	14	'Fast' Growing	'Slow' Growing	
No.	1	2	6	16	25

Infections with these viruses were sporadic and there was no evidence of an outbreak caused by ECHO viruses during 1961.

Coxsackie Viruses.

It is now well established that Coxsackie viruses can cause aseptic meningitis, Bornholm disease, and pericarditis. The types of viruses known to be involved in these infections during 1961 were:—

	Coxsackie Virus						
	A9	B1	B2	B3	B4	B5	All
Aseptic meningitis	3	–	1	2	7	1	14
Bornholm disease	–	–	–	4	4	1	9
Pericarditis	–	1	3	–	4	–	8

During 1960 infections with Coxsackie B5 virus were quite prevalent in Northern Ireland: this year all but one of the six B types of Coxsackie virus were recovered.

The eight patients in whom a diagnosis of Coxsackie pericarditis was made had ECG changes and six of them were males.

In addition to the above, Coxsackie B4 virus infection was diagnosed in three cases of prolonged pyrexia, also in two cases of epididymitis with marked general malaise and in a case of vertigo and nystagmus.

Other Enterovirus Infections.

After excluding polioviruses, Coxsackie and the common ECHO viruses there remain a number of untyped enteroviruses which were isolated from a variety of conditions. Until more information is available it would seem wisest to consider these viruses as "fellow-travellers" and not necessarily ætiological agents of the illnesses in question.

Respiratory Viruses.

Laboratory Diagnosis.

The laboratory continues to take part in the W.H.O. influenza-spotting scheme so that the earliest information may be available of the appearance of influenza and of the type of virus. The success of this scheme is dependent on the co-operation of members of the College of General Practitioners.

During 1961 both influenza A and influenza B viruses were present in Northern Ireland. The influenza A virus caused an outbreak of illness in January and February which was associated with a sharp rise in the notifications of "Acute influenzal and acute primary pneumonia." The virus responsible was a variant of the A2 Asian type and similar to the A/England/60 strain. A laboratory diagnosis of influenza A virus infection was made in twenty-one patients.

In the summer there were isolated outbreaks of influenza in Co. Antrim and in Co. Fermanagh. These outbreaks were largely confined to schoolchildren, were very localised and were caused by a strain of influenza B virus related to the influenza B/Japan/56 strain (Forsyth, in press). They heralded a more wide-

spread outbreak of influenza B virus infections in late October and November. This winter wave of influenza B virus infections was not correlated with any marked rise in notifications of "Acute influenzal and acute primary pneumonia." A laboratory diagnosis of influenza B virus infection was made in sixty-two patients.

Adenovirus infection was diagnosed in two patients with virus pneumonia, also in three patients with pharyngitis and in a patient with bronchitis.

Influenza Vaccine Trials.

Two small trials of influenza vaccines are being carried out in nurses at the Royal Victoria Hospital in collaboration with Dr. Margaret Campbell and at Altnagelvin Hospital under the supervision of Dr. Hopkins.

M.R.C. Bronchitis Trial.

Specimens collected for bacteriological examination during the M.R.C. bronchitis trial have also been tested for viruses. Viruses were isolated from these specimens only at a time when influenza viruses were causing infections in the community.

Sera taken at intervals from more than sixty separate patients from this trial have been tested against seven different respiratory viruses. The results have been disappointing, for only in a very few of these patients was there serological evidence of recent infection with a respiratory virus.

Special Investigations.

Vaccinia Virus.

Two rare complications of smallpox vaccination were investigated during 1961. One of these was a case of progressive vaccinia in a baby girl. After routine vaccination the vaccinial lesion spread slowly over her shoulder on to the chest and neck and there were secondary lesions on the sole of one foot and thumb. This baby had a low level of gamma-globulin in her blood. Intensive treatment with antivaccinial gamma-globulin, immune serum, immune blood transfusions, interferon and N-methylisatin β-thiosemicarbazone failed to retard the progress of the disease over a period of about ten months and the baby died.

The other was a case of vaccinial osteitis. After vaccination a large swelling developed in the scapula of a baby boy. A biopsy was done from which vaccinia virus was isolated. This child had a normal level of gamma-globulin and antibody to vaccinia virus in his serum. In spite of this and treatment with antivaccinial gamma-globulin a second focus of osteitis (presumably of the same ætiology) appeared in his mandible. These lesions are, however, now regressing.

Mesenteric Adenitis.

Virus studies were made in thirteen cases of mesenteric adenitis, including three of intussusception. Although different enteroviruses were isolated from the fæces or throat swabs of six of these patients, it cannot be said without further evidence that any of them were ætiologically associated with the adenitis. Paired sera

from each of the patients were tested for the development of adenovirus antibody and one was found to be positive. This association of an adenovirus infection and intussusception is confirmed by the reports of Rutten and Oudejans (1961) and Gardner (1961).

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REVIEW

INTRODUCTION TO PSYCHIATRY. By Max Valentine, M.D., D.P.M. Second Edition. (Pp. viii + 316. 21s.) Edinburgh and London: E. & S. Livingstone, 1962.

SUITABLE textbooks to provide introductory reading for medical students are so few that any new edition is worthy of careful consideration. Dr. Valentine presents psychiatry on as broad a front as possible, trying to integrate the views of the psychologists, the neuro-surgeon, the neuro-physiologists and the philosopher, both as foundation stones and as bridges for the newcomer. Stanley Cobb's views influence his approach to causation.

Some of the chapters present rather unusual groupings of clinical disorders. Affective disorders are dealt with alongside hysteria and sexual abnormalities, whilst under the heading of "psychoses of unknown origin," schizophrenia and more severe affective disorders are found together. This could be perplexing to the more critically-minded student when he considers what is known of the fundamentals of the disorders described together. Some topics receive only passing mention; for example, anorexia nervosa. The chapter on mental sub-normality is more administrative than clinical in its content.

The extent to which drugs are dealt with makes it almost inevitable that certain preparations will have become obsolescent between writing and publication. This is understandable in such a rapidly-growing field, but the retention of intramuscular paraldehyde (p. 218) as a sedative cannot be explained in this way. More emphasis on the toxic effects of drugs would have been an asset to the student and the general practitioner, both of whom will find in this book, interesting, stimulating and useful information. The publication is very attractive in its presentation. J. G. G.

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CHANGING TRENDS IN SURGERY: A TEN-YEAR REVIEW FROM A PROVINCIAL HOSPITAL

By G. W. VAUSE GREIG, F.R.C.S.
Daisy Hill Hospital, Newry, Co. Down

AFTER the advent of the National Health Service there was a rapid expansion of the hospital services, especially in the staffing of the provincial hospitals. Prior to 1948 most provincial hospitals had one senior medical officer who was surgeon, physician, obstetrician, gynæcologist, and oto-laryngologist, often also radiologist; anæsthetics were usually given by a general practitioner who worked part-time in the hospital. In the circumstances the value of the work done cannot be over-estimated and the standard was remarkably high. However, the advances in the various specialities made it obvious that changes were necessary.

The medical services of the armed forces provided many potential specialists. "Post-war registrarship" gave these potential specialists the opportunity to gain further experience and higher qualifications. Thus a pool of trained men was available for the necessary increase in staffing consequent upon the introduction of the National Health Service. The smaller provincial hospital soon had at least one consultant in all the major specialities. Inevitably there was, in the mind of the local population, an increase in the status of the hospital which was helped by much structural improvement of the actual hospital buildings. This coincided with the increased demands of the general public, who were no longer prepared to tolerate recurring ill health from a peptic ulcer, to wear a truss for a hernia, or to endure the discomfort of a prolapse when a safe operation could cure them in most cases. Thus the surgeon taking a post as consultant in a country hospital found an abundance of work awaiting him—there was clinical "gold in them thare hills."

The author commenced work as Consultant Surgeon in a provincial area (South Down) in 1950.

Have there been any changes in the surgical work of that area since then?

This question was prompted by the impression that, over the past few years, there had been a decrease in the actual number of surgical operations done in the main hospital of this group (South Down) and also by the diminished number of beds in use by the surgical unit. For the past seven or eight years there has not been any "waiting list" for admission to the unit and any change in the quantity of work done is directly related to the demands made.

In an attempt to answer the question a survey of some of the work done in the period 1952-61 was carried out. The figures relate only to Daisy Hill Hospital, where practically all the operative work of the group is done.

Those diseases for which it is agreed operative surgery can offer a probability of cure, but which can be treated by medical means or by minor surgical procedures, were considered. Chronic peptic ulceration, cholelithiasis, goitre,

OPERATIONS PERFORMED.

Year	Peptic Ulcer	Cholelithiasis	Thyroidectomy	Inguinal Hernia	Prostatectomy	Appendicitis
1952	52	41	15 (6)	74 (12)	29	154
1953	62	35	22 (4)	88 (12)	43	164
1954	39	37	13 (4)	78 (12)	39	172
1955	63	32	19 (6)	109 (15)	32	135
1956	40	48	21 (7)	85 (17)	34	170
1957	58	43	20 (8)	89 (14)	44	140
1958	54	28	9 (5)	85 (15)	39	156
1959	29	27	7 (4)	92 (22)	29	139
1960	16	22	8 (4)	95 (26)	36	138
1961	24	18	4 (3)	75 (20)	32	144

inguinal hernia, senile enlargement of the prostate, and appendicitis were chosen. These conditions were selected because, although techniques may have changed, opinion as to the value of radical surgery as the method of cure in these types of case has not materially altered in the past fifteen years. Also, if the surgery of malignant disease and trauma is excluded, they cover the major part of the work of the general surgeon.

Chronic Peptic Ulcer.

The operations done each year for chronic duodenal and gastric ulcers are shown in the table. They include emergency operations for hæmatemesis but do not include operations for perforated ulcers.

The numbers stayed around fifty per annum until the marked fall in the last three years. This fall is not due to any change in the criteria demanded before surgery is carried out; on the contrary, the demand for earlier surgery is being pressed by many of the general practitioners in the area following good results in other cases. Discussion with the general practitioners reveals that no longer have they their "regulars" who, two or three times a year, were off work with exacerbations from a chronic ulcer. Similarly it is rare now to see a new patient in the surgical out-patient department whose symptoms have been in any way incapacitating for longer than two or three years—many of the cases done in the past two years were ones that had been seen three or four years previously with a short history and whose symptoms had persisted despite medical treatment. The inference is that the many *very* chronic cases which, for various reasons, had not been operated upon, have now been dealt with and that, unless there

is a general increase in the percentage of the population who will develop chronic ulceration, the number requiring operation in the future will stay at its present low level.

Cholelithiasis.

Cases of cholelithiasis being operated on show the same fall in numbers as shown with peptic ulceration but not to such a marked degree. However, 27 per cent. of the cases done in the first five years under review also had exploration of the common duct because of the presence of stones or a history of recurring jaundice whereas in the last five years only 14 per cent. were considered to need choledochotomy. Similarly the average age (in years) of the patients has steadily dropped each year from 53.5 in 1952 to 46.9 in 1961.

This supports the impression that patients are being referred to hospital earlier and, except in those over 60 years of age, it is now uncommon for them to have had more than two or three attacks of gall-stone colic with or without cholecystitis. Fewer of the later events of the natural history of this disease are being seen and thus fewer of the more hazardous surgical complications associated with the late case.

Goitre.

As with peptic ulcer operations, there has been a marked decrease in the number of operations on the thyroid gland during the last three years of the period. Approximately twenty goitres per annum were treated by operation during the first six years, but less than ten in the last four years.

In the accompanying table the number in brackets after the number of thyroidectomies gives the numbers of thyroidectomies done for thyrotoxicosis and it will be seen that the number of cases operated on because of toxic symptoms has not varied very much over the ten years. It is believed that the cause for the fall in the number of non-toxic goitres coming to operation is the same as the cause for the fall in numbers of chronic duodenal ulcer operations, viz., before the upgrading of the hospital there were many people with nodular goitres who did not seek surgical treatment. The increased status of the hospital resulted in these cases attending, but this supply "from the past" is finished and now only new cases are seen. The slight reduction in the number of toxic cases operated upon may be the result of some of the more elderly cases being treated by radio-active iodine, but the present number will not change until a safe, certain, permanent non-operative treatment is evolved.

However, even with the toxic cases, the number of goitre operations each year is likely to remain a mere handful.

Inguinal Hernia.

Age or chronic ill health is not regarded as a contra-indication for cure of a hernia and it is exceedingly rare for operation to be refused (many of the cases were done under local anæsthesia). The wearing of a truss as an alternative is strongly discouraged. This view was made known to the practitioners of the area and in the middle fifties a large number of long-standing herniæ were dealt

with. It is now uncommon to see an out-patient with a hernia of longer than three months' duration.

Although the total number of operations for inguinal hernia has remained fairly constant (apart from a fall in 1961), over the last few years there has been a reduction in the number of adults with an increase in the number of children being operated upon (shown in brackets in the table).

It is considered that the numbers may decrease further, but not to any marked extent.

Prostatectomy and Operations for Retention of Urine.

It could be anticipated that, over the years, there would be little change in the numbers of old men needing treatment for diseases of the prostate in an area where 70 per cent. of cases with prostatic disease present with retention of urine. Between thirty and forty cases are done each year and this number should remain constant apart from the possible increase consequent upon an increasingly aged population.

Appendicectomy.

As with prostatic disease it appeared unlikely that the number of cases of appendicitis could change. This was so. The number of cases of acute appendicitis has shown very little variation in the ten years. The diagnosis "acute appendicitis" was made on the gross macroscopic appearance of the appendix—not on histological findings—and thus varied to a certain extent with the experience or view as to what was an "acute appendix" of the surgeon who removed the appendix. There has been some reduction in the number of appendicectomies done where no obvious change was found on macroscopic examination—average per year for the first five years: 76; for the last five years: 54. The cause for this has not been determined, but may be related to earlier use of antibiotics by general practitioners resulting in fewer cases of "abdominal pain" being admitted to hospital, together with a more conservative line of treatment in doubtful cases.

Discussion.

The figures quoted suggest that the answer to the question—"Has there been any change in the surgical work in the area" is: "Yes." Whether this applies to all the areas in Northern Ireland might be argued, but casual conversation with colleagues from various parts of the province suggests that, to a greater or lesser degree, the answer in most areas is: "Yes." Comments such as—"Rarely see a nodular goitre now"; "A really *chronic* duodenal ulcer is much less frequent," are commonplace.

The reason for this is given in the opening paragraph above—an enormously increased specialist surgical staff in the provinces having, initially, to treat large numbers of chronic cases which had previously been untreated. This back-log of cases has been, or is being, dealt with, and when it is dealt with so the extent of the techniques required of the provincial surgeon is narrowed—in the author's opinion almost to danger-point in certain instances. The surgeon who is regularly doing a gastrectomy for carcinoma (a disease which is not decreasing) can

equally well carry out any of the operations used in treating a chronic peptic ulcer, but would the results of thyroidectomy by a newly appointed surgeon (no matter how well trained) doing six or seven cases a year compare with those of his more experienced colleague doing thirty or forty thyroidectomies a year? This also applies to other conditions, for example, surgical diseases of the kidney, the pancreas, and, to a lesser degree, the prostate, where the facilities of a large hospital are needed to produce the best result. These facilities include specialised nursing, laboratory, and X-ray services—a lone radiologist can no more be expected to be a master of *all* the newer techniques of his speciality than the lone surgeon of his.

In the larger hospital with three or more consultant surgeons each surgeon, although remaining a "general" surgeon, acquires (or has thrust upon him) a minor degree of "superspecialisation" and the dangers outlined above are largely avoided. Also, apart from the increased efficiency of the larger staff in the associated specialities (anæsthesia, radiology, microbiology, etc.) in the larger hospital group, the regular association with his colleagues in his own speciality must improve the service the surgeon can give to his patient.

As a direct contrast to the trends in the surgical requirements for some chronic lesions there has been a marked increase in the amount of surgery needed to deal with the results of accidents of all kinds. With more vehicles on the road, more industry and more machinery on the farm the demands for this type of surgery will continue to expand. Again the larger hospital might be expected to provide a better service because of better ancilliary facilities and because, if they number three or more, a senior surgeon is more likely to be available to deal with the victim immediately.

SUMMARY.

It would appear that, over the past ten years, there has been a change in the surgical work and requirements in provincial hospitals. Fewer facilities for dealing with some of the more chronic surgical diseases are needed, but more facilities for the treatment of the results of trauma. It is suggested that this change could best be met by the gradual elimination of the smaller hospitals and the setting up of larger "group" hospitals with a minimum of three consultant surgeons in each large hospital.

ELECTRODIALYSIS OF BLOOD USING ION-EXCHANGE MEMBRANES

By **D. LYTTLE**

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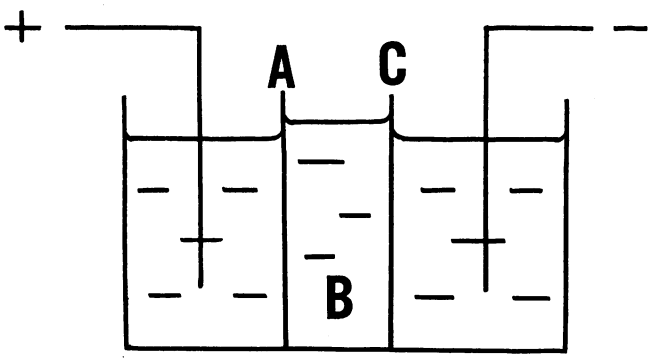
THE correction of electrolyte imbalance and the removal of retention products of the blood during renal failure is at present achieved by the use of artificial kidneys which permit the diffusion of solutes through a semi-permeable membrane. Several types of apparatus used successfully for hæmodialysis include those described by Kolff and Watschinger (1956) and Alwall, Norviit, and Steins (1948). Unfavourable reactions which sometimes occur during dialysis are changes in the arterial blood pressure, hæmolysis, pyrogenic reactions, leukopænia, and thrombocytopænia. The maintenance of blood pressure is hazardous because of the large and variable volume in the extra-corporeal circulation; in the case of the Kolff twin-coil artificial kidney the volume of the blood in both loops is 750 ml. The other reactions are probably caused by the extensive surface area of cellophane tubing in contact with blood. To achieve a satisfactory clearance of solutes this area must be about 18,000 sq. cm.

The use of an electric current to accelerate the diffusion of blood electrolytes across cellophane membranes has been described by Sorrentino (1958). As a current is carried through a solution by charged ions, the rate of movement of ions across a membrane is directly proportional to the current passed, and is not determined by the surface area of the membrane. The apparatus to be described was constructed in order to determine what rates of ion-exchange could be safely achieved by electrodialysis. Instead of cellophane membranes, stiff sheets incorporating ion-exchange resins were used, as in the apparatus described by Anderson and Wylam (1956) for the demineralization of plant extracts. In principle, it consists of a sheet A of resin permeable selectively to anions, and a sheet C permeable to cations (see fig.). The electrolytes in solution



B are removed by the constituent anions passing to the anode through sheet A, and the cations to the cathode through sheet C. The substitution of blood for solution B would cause the blood to become depleted in water and electrolytes, without removing blood corpuscles, protein or unionized solutes.

Methods.

The apparatus consists of three perspex plates 15 x 15 cm. The centre plate, 2 mm. thick, has a continuous channel 5 mm. wide milled in a zig-zag pattern to conduct the fluid for dialysis. Grooves in the outer plates are made to correspond with the centre channel, and through these are threaded platinum wire electrodes. The plates are separated by two ion-exchange membranes, "Permaplex A-20 and C-20," supplied by the Permutit Company Ltd., London. The volume of fluid required to fill the centre channel is 16 ml., and with a perfusion pressure of about 20 cm. saline, the flow is 20 ml./min.

Results.

Electrodialysis of Saline.

A solution of 0.9 gm. per cent. NaCl was perfused at 20 ml./min. through each of the three channels. A potential difference of 10 volts was applied across the electrodes and a current of 1 amp. passed. Bubbles of gas forming around the electrodes were carried away by the stream of saline. The concentration of the effluent solution from the centre channel was found to be 0.72 gm. per cent. NaCl. By calculation, the rates of transport of sodium and chloride ions were 0.6 mEq./min., which is equivalent to 0.01 mEq./min./sq. cm. of membrane surface, as 60 sq. cm. of the membrane surface was utilized. Thus, with a current density of only 0.016 amp./sq. cm., the rate of ion-exchange per unit area of membrane was four times that obtained by diffusion in the Kolff twin-coil artificial kidney. By increasing the P.D. across the cell until a current of 2 amps. was obtained, the rates of ion transport were doubled. The apparatus functions as a demineralizing cell, but by increasing the concentration of saline in the anode and cathode channels, some actual exchange of ions takes place; some decrease of the osmolarity of the fluid in the centre channel always occurs, however, unless plain cellophane membranes are used.

Electrodialysis of Plasma.

Reconstituted plasma was passed through the centre channel at a rate of 20 ml./min. A constant P.D. of 13 volts was maintained, with an initial current of 1 amp. passing across the cell. There was a gradual decline of current over a period, and after 30 min. the current was only 0.5 amp. Measurement of the pH of the plasma before and after passage through the cell showed no significant change. On dismantling the cell, a scum was found on the membrane surfaces, more deposit being on the A-20 than on the C-20 membrane.

Electrodialysis of Blood.

Citrated blood was passed through the centre channel at 20 ml./min., and a P.D. of 13 volts applied to the cell. The decline in current was similar to that seen during plasma dialysis. The effluent blood was centrifuged and found to be

partially hæmolysed. Hæmolysis ceased when the current was switched off. Perfusion of the cell with 0.9 gm. per cent. NaCl, immediately after the blood, failed to increase the conductivity of the cell, and the rate of extraction of NaCl was 0.25 mEq./min., with a current of 0.5 amp. Replacement of the saline in the anode and cathode channels by a buffer solution at pH 7.4 continued to cause hæmolysis except at currents below 0.5 amp. The ion-exchange membranes were removed and sheets of cellophane were inserted. Blood was passed through the cell, and hæmolysis again occurred when the current was increased to 1 amp. or more. A red scum rapidly formed on the membrane surfaces.

Discussion.

The rate at which ions can be removed from blood by electrodialysis is several times greater than that achieved by diffusion methods, but appears to be limited by the current density that can be passed through the blood without hæmolysis. Presumably a greater membrane surface would allow greater currents to be passed with safety, but this would require a much larger apparatus and would negate the advantages of a small instrument containing a small constant volume of blood and with a small membrane surface area, rapid ion-exchange, and high clearance rate. The process causing hæmolysis is probably local variation of pH and osmolarity on the actual membrane surfaces, although no gross change in these factors is obvious in the effluent blood. The progressive loss of efficiency by deposition of protein and blood cells on the membranes is another disadvantage which might be expected to increase with increasing current densities. Although there were no significant rises in temperature during these experiments, damage by heat might also be expected to occur with greater currents.

Summary.

An apparatus is described for electrodialysis of blood, employing anion and cation exchange resin membranes. Although achieving greater rates of ion transport per unit area of membrane than simple diffusion methods, disadvantages as yet not overcome are hæmolysis and protein precipitation, and these indicate that a practical dialysis instrument working on this principle is unlikely to be developed.

I wish to thank Professor G. M. Bull for suggesting this study, and for his advice on the preparation of this paper. The Permutit Company Ltd., London, kindly supplied the ion-exchange membranes.

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INFECTIOUS MONONUCLEOSIS AND PORPHYRIA

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Introduction.

Liver involvement in infectious mononucleosis is a well-recognised entity usually causing "hepatitis" or a hepato-cellular dysfunction. Various authors (Evans, 1948; Cohn and Lidman, 1946; Davis et al., 1945; and Allen and Kellner, 1947) have reported a focal infiltration of mononuclear cells with reticulocyte proliferation and necrosis, and in fact one series of fifteen cases (Cohn and Lidman) all showed impairment of the liver as judged by abnormal biochemistry. Sherlock (1958) states that the changes indicate hyperplasia of the reticulo-endothelial system rather than hepato-cellular disturbance. She states that portal zone fibrosis is not a sequel and that cirrhosis is not a complication of infectious mononucleosis. It is also well recognised that porphyrinuria may be a manifestation of various types of liver dysfunction.

Porphyrinuria associated with glandular fever does not, however, appear to have been described. Two cases are reported here in detail showing such an association and the significance is discussed. One of these patients died from liver failure as a sequel to infectious mononucleosis.

Case 1.

An 18-year-old male, employed as a laboratory assistant, was admitted to a general medical ward in April, 1960, with a pyrexia of unknown origin. This had failed to respond to novobiocin and erythromycin which had been prescribed by his family doctor. He gave a history of intermittent attacks of dull pain in the right iliac fossa for approximately one year, but this had been present daily for five days prior to admission, accompanied by nausea, vomiting, anorexia, headache, and urinary frequency without dysuria. There was also a history of postural dizziness with one vaso-vagal attack a few days before admission.

Examination revealed a well-built, hirsute, young male with signs of an acute toxic process, his temperature being 103° F. A sinus tachycardia was present with pulse of 132/min. and blood pressure 160/95. Tender lymph nodes were present in both axilliæ and later in the posterior cervical chain. The liver was palpable four finger-breadths below the right costal margin and the spleen was just palpable.

Blood Count.

Hæmoglobin = 14.6 G. per cent. (100 per cent.).
White cell count = 3,000 per c.mm.
Differential white cell count showed 25 per cent. polymorphs; 20 per cent. small lymphocytes; 50 per cent. monocytes, and 5 per cent. eosinophils.

The Paul-Bunnell titre was initially 1:64, rising to 1:256 four days later. It was absorbed by ox cells, but not by guinea-pig kidney.

Negative investigations included:—Blood cultures; throat swab; Abortus Widal and leptospiral agglutinations.

The erythrocyte sedimentation rate was 9 mm/1 hour (Westergren) and X-ray chest was normal.

Apart from an initial course of tetracycline (which had no effect on the pyrexia) he gradually improved, and on discharge in May, 1960, he was symptom-free. He was frequently reviewed and had been complaining of occasional preprandial fainting attacks coming on half an hour before meals. Before every meal he experienced vertigo in which his environment rotated around him with accompanying diplopia. Unless he sat down during these episodes he would faint and he found that sweets and sugar lumps were of no benefit.

In August of 1960 he was re-admitted from the review clinic. He had again complained of attacks of pain in the right hypochondrium associated with orange-coloured urine. There was a pyrexia of 99.2° F. The liver was tender and was found to be two or three finger-breadths enlarged below the costal margin. The spleen was easily palpable and several tiny, spider nævi were found on the posterior aspect of the thorax.

Fasting blood sugar was 80 mg. per cent.

Paul-Bunnell titre 1:4.

His blood count was normal, as was the plasma protein pattern.

His general condition and pyrexia again rapidly improved without treatment. Liver function tests then and subsequently were as follows:—

	9/8/60	24/10/60	7/11/60
Serum bilirubin	0.5 mg.%	1.0 mg.%	—
Thymol turbidity	2 units	2 units	—
Zinc sulphate flocculation	6 units	7 units	—
Alkaline phosphatase	16 units	8 units	—
S.G.P.T.	70 units	90 units	120 units

	21/11/60	15/2/61	—
Serum bilirubin	1.2 mg.%	5.8 mg.%	—
Thymol turbidity	2 units	3 units	—
Zinc sulphate flocculation	9 units	15 units	—
Alkaline phosphatase	12 units	12 units	—
S.G.P.T.	115 units	90 units	—
S.G.O.T.	—	108 units	—

His third admission was on 5th December, 1960, with a recurrence of the same symptoms together with severe, colicky abdominal pain in the right iliac fossa. These pains, which radiated to the right testis and the right renal area, made the patient writhe and sweat. There was urinary frequency but no dysuria. While clinically this closely mimicked ureteric colic, the absence of calculus on X-ray of the renal tracts and the finding of normal urine aroused the suspicion of porphyria. Before the laboratory report of "excess urinary porphyrins" returned, a duty house physician, who was called to see the patient because of several "transient blackouts" occurring in bed during the night, witnessed an attack in which the patient flopped back on the pillows, flaccid and apparently unconscious for approximately fifteen seconds with his eyeballs turned upwards and fluttering as in a petit mal seizure. He recorded the comment in the patient's chart that he was undoubtedly hysterical.

Central nervous system examination revealed a medium/coarse, rapid, horizontal nystagmus on left and right lateral gaze with a fine vertical nystagmus. There was marked weakness of the lower limbs and the patient was unable to support his own weight while standing. In spite of being fully orientated and mentally alert, he displayed a curious inversion of his replies: for example, on testing visual fields on confrontation, he pointed to the examiner's right forefinger when the left was moving and vice versa. There was similar but accurate inversion of replies when testing proprioception of the left great toe!

Twenty-four hour specimens of urine taken when the acute phase was resolving showed:—

Coproporphyrins = 206 μg/24 hours.
Protoporphyrins = 204 μg/24 hours.
Uroporphyrins = 0.0.

Electrophoresis showed total protein of 5.3 G. with reduction in albumin to 2.5 G. per cent., but no rise in gamma-globulin.

Liver biopsy was not possible due to low prothrombin times in spite of treatment with vitamin K.1 oxide.

Examination of the urine from the patient's parents and one sibling showed no excess porphyrins.

From this time there was a fairly rapid deterioration with development of ascites, palatal petechiæ, constipation, gaseous distension of the colon and stomach, and anorexia. He rapidly lost weight and became jaundiced with dark urine but normal coloured stools. His parents insisted on taking him home from hospital, but final investigations before his death on the 15/2/1961 were as follows:—

Electrophoresis showed marked reduction in albumin associated with gamma-globulin rise. Albumin 2.1.
Globulin 3.2 G. per cent.

Prothrombin 6 per cent.

Blood count normal.

The fæcal excretion levels of copro and uroporphyrin were within normal limits.

In the urine porphobilinogen was normal at 1.12 micromoles/24 hours; coproporphyrin 200 μg/24 hours; d-Amino-Lævulinic acid was just at the upper limit of normal, being 21.6 micromoles/24 hours.

Permission for autopsy or post-mortem needle biopsy of the liver was refused.

Discussion.

The cycle of events in this case strongly suggests that liver dysfunction developed as a result of infectious mononucleosis and this in turn was responsible for the altered excretion of protoporphyrin. It would thus appear that this was an example of secondary protocoproporphyrinuria and not a true endogenous porphyria, although the patient manifested classical symptoms of acute, intermittent porphyria (as described in the classification of C. J. Watson), namely:—

i. Colicky abdominal pain closely mimicking acute appendicitis and ureteric colic on different occasions.
ii. Neurological manifestations of diplopia, marked weakness in all four limbs, true rotational vertigo, and
iii. Behaviour in "petit mal" which strongly suggested hysteria.

While, as Gajdos and Gajdos-Török (1961) pointed out, d-Amino-Lævulinic acid and prophobilinogen have never been shown to produce toxic effects, they are none the less the substances which are found in excess in the acute intermittent type of porphyria. Porphobilinogen may be present in the urine only during exacerbations, but its precursor, d-Amino-Lævulinic acid, is constantly elevated in the serum even in the quiescent phase. Our patient, however, never showed porphobilinogen in the urine and the d-Amino-Lævulinic acid level was normal.

Disturbed porphyrin metabolism has been known to occur in liver disease for almost seventy years (Garrod, 1892); this is mainly a coproporphyrinuria, but protoporphyrinuria may also occur; the existence of the latter is never normal. As Vanotti (1954) has shown, the liver transforms protoporphyrin into coproporphyrin and it is readily understandable that these materials may appear in the urine in liver disease. Such disturbance has been reported in acute yellow atrophy, syphilitic, and other forms of cirrhosis, malignant hepatic metastases, chronic hepatitis, hyperemesis gravidarum, toxæmias of pregnancy, hepatic stasis of congestive heart failure and obstructive jaundice. Vanotti has described a case of acute porphyria precipitated by liver disease, but this was a latent porphyria unmasked by an intercurrent disease. Such would appear to be the case with our second patient.

Case 2.

A young man, a schoolteacher by profession, gave a history of a 'flu'-like illness beginning in September, 1958, with shivering, sweating, headache, low-back pain, and anorexia. He continued to feel unwell despite treatment with sulphadiazine for four or five days which had been prescribed by his family physician. On admission to a general medical ward in mid-September, the patient was toxic with a temperature of 101.4° F. Small discrete glands were palpable on both sides of the neck and in the axilla. The spleen was palpable on inspiration but there was no hepatomegaly. There were no lesions in the throat and no skin rashes. He complained of a tendency to constipation.

Investigations.

Blood Count showed hæmoglobin of 15.2 G. per cent. (103 per cent.). White cell count of 7,100 per c.mm., of which 52 per cent. were monocytes, 28 per cent. lymphocytes and 20 per cent. polymorphs.

Paul-Bunnell titre was 1:4,096, which was absorbed by ox cells but not by guinea-pig kidney.

X-ray chest was normal.

LIVER FUNCTION TESTS:—

Serum bilirubin - - -	= 0.9 mg.%.
Thymol turbidity - - -	= 3 units.
Zinc sulphate flocculation -	= 10 units.
Alkaline phosphatase - -	= 14 units.

On routine ward testing of the urine a red colour was noted.

One week later he developed crampy abdominal pains in both iliac fossæ, but particularly on the left side. At the same time hyperæsthesia of the anterior abdominal wall was present and even the stimulus of bedclothes acted as an irritant. There were also pains in the upper chest and in both adductor regions in the thighs associated with hyperæsthesia. There was, however, no objective evidence of neurological abnormality. During this time a persistent sinus tachycardia of between 100 and 120 per minute was present. In retrospect, at the age of 11 or 12, there was a history of abdominal cramps with high temperature which was diagnosed as sunstroke!

The abdominal symptoms predominated and as these continued for several days a surgical opinion was sought. He was treated during this time with phenobarbitone sedation (gr. 1½ b.d.) and it was at this time that porphobilinogen was found in the urine with the Watson-Schwartz test. The total coproporphyrin excretion in the urine was 2,250 μg. and uroporphyrin 43,000 μg. in twenty-four hours. After two and a half weeks' hospitalisation he was discharged feeling well and continued to progress satisfactorily. Urine specimens from the patient's family showed that his parents and one sibling had no excess porphyrins but that a young sister, then aged 14, showed a definite excess of porphyrins. (She has since been admitted to a surgical ward with the diagnosis of acute appendicitis, but fortunately the hospital records were consulted before an unnecessary laparotomy was undertaken.)

DISCUSSION.

In this case there is a more obvious sequence of events. The family history, the presence of porphobilinogen in the urine, and the enormous rise in the uro and coproporphyrin levels indicate an endogenous acute intermittent porphyria. Here the infectious mononucleosis was merely the *coup-de-grâce*, aided and abetted by the administration of sulphonamide and barbiturate.

SUMMARY.

Two cases of porphyrinuria are described as a sequel to infectious mononucleosis and their significance discussed. Liver involvement in infectious mononucleosis is also briefly discussed.

ACKNOWLEDGMENTS.

Thanks are due to Dr. J. T. Lewis for permission to publish case summaries and for his assistance.

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REVIEW

HENRY HEAD CENTENARY: ESSAYS AND BIBLIOGRAPHY. (Pp. 41; plates 3. 3s.) London: Macmillan, 1961.

A series of Essays written by K. W. Cross, R. A. Henson, Macdonald Critchley and Russell Brain, illustrate some of the principal qualities and works of Henry Head who was born on 4th August, 1861, at 6 Park Road, Stoke Newington. Educated at Charterhouse and Trinity College, Cambridge, and qualifying in 1890, his first interest was in sensation, the study of which he began at a time when it was widely taught that diversity in form and function of the peripheral end—organs with which man is endowed—ensured the transmission of specific stimuli along specialized nerve fibre tracts to the appropriate cortical centres. It was whilst testing an aphasic patient with compasses for tactile discrimination that he observed that, although unable to say whether he was being touched by one point or two, the patient could promptly and correctly indicate the answer when a strip of paper was put before him upon which were printed the visual symptoms of one and two. This caused doubts to enter his mind as to correct theories on aphasia and led to his clinical studies during the First World War on brain-injured young men with head injuries who were suffering from various disorders of speech and language. Three principal results followed: The Linacre and Hughlings Jackson lectures in 1920, both of which dealt with aphasia, the Cavendish lecture in 1923 upon speech and cerebral localization, and in 1926 the publication of a two-volume monograph, entitled "Aphasia and Kindred Disorders of Speech." In these communications he emphasized that the clinical picture presented by an aphasic often depended more on the acuity and severity of onset than upon the extent of the lesion and that brain disease, however focal in its extent, can never affect speech and speech only. His approach to the subject, which was so much at variance with traditional teaching at the time undoubtedly marked an important turning point in clinical methodology. As one of the contributors remarks, "Much of what we believe and teach to-day we owe to Head, possibly without realizing the magnitude of our indebtedness."

This modest but wholly admirable collection of Essays is recommended to all those interested in neurology and in the history of medicine. R. S. A.

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THE CHANGING OUTCOME OF MENTAL ILLNESS IN OLD AGE

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FOR more than half a century the age structure of the population has been changing, the young showing a decrease and the elderly an increase. As this trend is likely to continue, we are faced more and more with the problems of physical and mental health of the older person. Many have stated that the present rate at which old people are admitted to hospitals, particularly mental hospitals, is a cause for real alarm and the realistic view is widely held that the geriatric wards of mental hospitals in the near future will be irretrievably packed beyond capacity.

The urgency of the need to provide medical and welfare services for the care of mentally ill old people has evoked a wide response, and recent years have been marked by advances made in this field. These advances, however, have been accompanied by speculation and controversy. Whereas it has been realised that more geriatric accommodation is a pressing requirement, some have viewed the benefits with reservation. Cosin (1958) stressed that in the absence of fact-finding of local needs authorities in the United Kingdom have been misled into building "vast institutional structures of no value whatever." Busse (1957) pointed out that a great deal more research must be done before the actual reasons can be clarified why increasing proportions of the old-aged population require institutional care. He argued against controversy and called for extensive fact-finding inquiry into particular area needs.

Purdysburn Hospital serves the catchment area of the city of Belfast and undertakes the greatest proportion of hospital care of the elderly mentally ill in this area. Over ten years ago a detailed survey of case load and outcome was carried out at this centre (Robinson, 1951). Gibson (1961) has postulated that the pattern of psychosis in the elderly has changed during this period, so it was felt worthwhile to investigate what changes have occurred during the intervening years, and in particular to present evidence of an altered prognosis for mental illness in old age.

METHOD.

One hundred patients, aged 60 years and over, were randomly selected for study from a series of consecutive admissions to Purdysburn Hospital of this age group. They were examined along standard lines set down by a proforma technique. As well as physical and psychiatric examination there was a structured interview with the staff, a questionnaire to the relatives, a behaviour rating scale and a battery of psychological tests. The clinical and demographic characteristics of the sample were examined (Kidd, 1961). When more than one year

had elapsed since the last patient in the series had been admitted, a second survey was carried out to note whether each patient had since been discharged, discharged and subsequently readmitted, had died in hospital, or was still under in-patient care.

The hospital records were examined to determine statistical trends in admission figures (Purdysburn Hospital Reports, 1950-60).

Results.

Study of the hospital records disclosed that the total admission figure for patients aged 60 years and over has doubled during the last ten years. In 1950, 263 patients (97 males, 166 females) were admitted, while in 1960, 528 patients (204 males, 324 females) were admitted. This has been a gradual but persistent rise.

However, from Table 1 it can be seen that the percentage of all admission of patients aged 60 years and over during this period has not varied. It has remained constant around 33 per cent., and in ratio of three males to four females.

TABLE 1.

Total Hospital Admissions and Percentage aged 60 Years and Over.

Year		All Admissions		Percentage aged 60+
1950	...	788	...	33
1951	...	756	...	33
1952	...	777	...	31
1953	...	846	...	31
1954	...	939	...	34
1955	...	988	...	32
1956	...	1091	...	34
1957	...	1319	...	33
1958	...	1503	...	35
1959	...	1589	...	32
1960	...	1626	...	32
	Total	12,222		33

The random sample of 100 admissions comprised 37 males and 63 females. They were made up of 34 cases of affective disorder, 22 of arteriosclerotic psychosis, 8 of senile dementia, 8 of paraphrenia, 14 confusional states, and 14 cases in a miscellaneous category which comprised 9 alcoholics, 2 cases of G.P.I., and one case each of chronic schizophrenia, obsessional neurosis, and psychosis due to brain injury. This diagnostic classification conforms with that suggested by Roth (1955), and the distribution by diagnosis of this sample is very similar to those described elsewhere (Gibson, 1961; Roth, 1955; Post, 1951; Sainsbury, 1960).

TABLE 2.

OUTCOME OF PATIENTS AGED 60 YEARS AND OVER ONE YEAR AFTER ADMISSION IN 1960.

	Admissions over Sixty	Discharged	Dead	Remaining
Male	37	18	10	9
Female	63	24	16	23
All	100	42	26	32

Table 2 shows the outcome of these patients one year from the date of their admission. Of the three possibilities, most were discharged, less than one-third were still in hospital, and least had died. Of those who were discharged, only five were readmitted, three of whom were again discharged before one year had elapsed since the date of their original admission. It is further seen from this table that twice as many men were discharged as were still in hospital, while equal numbers of women were discharged and still in hospital ($X^2 = 1.7$, $p > 0.2$).

TABLE 3.

OUTCOME OF PATIENTS AGED 60 YEARS AND OVER SIX MONTHS AFTER ADMISSION DURING SELECTED YEARS FROM 1928-1949.
(After Robinson, 1951.)

	All Admissions over Sixty	Discharged	Dead	Remaining
1928	111	24	40	47
1933	148	58	61	29
1938	143	53	50	40
1943	74	27	16	31
1948	203	64	71	68
1949 (first six months)	117	31	42	44
Totals	796	257	280	259

For comparison, Table 3 gives the outcome figures for the same hospital published by Robinson in 1951. Here the reverse is seen; of the three possibilities most had died, least were discharged, and the remainder were still under hospital care. Robinson's figures were based on follow-up six months after admission, while this study refers to outcome one year after admission. When correction is made for this, the figures are only minimally altered, and the pattern of outcome is not affected.

Discussion.

It is widely held that the increase in mental hospital admissions of patients aged 60 years and over is commensurate with the increase of this same age group in the general population. Incorrect conclusions can too readily be made from the deceptive information that admissions in this age group have doubled in ten years, until it is seen from Table 1 that total hospital admissions have also doubled, while to date the proportion of the elderly among the total has remained constant. At the present time there is no excessive increase in admissions of patients aged 60 years and over that is not explained by the total increase in number of persons of all ages admitted for psychiatric treatment.

The mean age of this and other mental hospital populations has been steadily rising for some years. It is now clear that at this centre this is due to age increase of the longstay resident patients, and not to a rising preponderance of old people among the admissions.

Comparisons between Table 2 and Table 3 show that a striking change has occurred in the outlook for the elderly mental patient. Up to ten years ago most died within six months, and least were discharged. Now the reverse is true. It would be invalid to assume that this radically altered picture results solely from the impact of modern advances in technique and treatment on psychiatric patient recovery. This may well be true in respect of general paresis which has been shown during a similar period at the same hospital to have changed from a disease of high morbidity and mortality to become a rare clinical entity (Kidd, 1959), but many other psychoses occurring in the senium still pursue a chronic or progressively downhill course. It is therefore most important to interpret these findings in the light of the categories of illness contained in the two series under comparison. In this present series the most frequent single diagnosis recorded was affective disorder from which, in contrast to senile dementia and arteriosclerotic psychosis, most patients who are treated early recover. In fact, more than half of those who were discharged were in the affective group, while, as one might expect, very few of those with dementia were discharged. In Robinson's (1951) series over 70 per cent. were made up of dementia cases, while the load of affective disorder was so slight as to be included under the heading of "23.3 per cent.—other types of mental disorder." These diagnostic group proportions were not unique to Purdysburn: in the same year Post (1951) reported similar distributions by diagnosis and outcome in a series of old people admitted to a mental observation unit in South London. It is likely that Robinson's figures reflect national trends at this time.

From this the conclusion can be drawn that in recent years the diagnostic pattern in admissions of elderly mental patients has altered to show a predominance of affective disorders over senile dementia and arteriosclerotic psychosis, while formerly the opposite was true. Since affective disorders in the elderly can be readily treated, more elderly people, largely those admitted with affective disorders, are being discharged from hospital. There is no noticeable change in prognosis for those admitted with dementia. The shift in the relative proportions of discharges and deaths gives a favourable impression of

a changing outcome of mental illness in old age, but it is cautionary to realise that this is largely due to the relative increase of affective disorders within the range of all diagnoses occurring in this age group.

Summary.

Changes in morbidity and outcome of mental disorders in old age are examined from the experience of a large mental hospital serving an urban community. It is shown that while the admission figure for patients aged 60 years and over has doubled during the last decade, the proportion of the elderly among total hospital admissions has remained constant.

A random sample of one hundred admissions aged 60 years and over was followed up for one year. The outcome of these patients was compared with findings of a similar study carried out ten years previously.

It is shown that prognosis for the elderly mental patient is much more favourable at the present time than formerly, and it is discussed that this change may be largely due to the relative increase of affective disorders within this age group.

Thanks.

I am grateful to Dr. C. B. Robinson and his staff at Purdysburn Hospital, Belfast, for permission and facilities to carry out this survey and to publish its findings.

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REPORT OF THE MYCOLOGICAL DIAGNOSTIC SERVICE

QUEEN'S UNIVERSITY, BELFAST, 1961

By **D. W. R. MACKENZIE, B.Sc., Ph.D., L. CORKIN, A.I.M.L.T. and LESLEY W. RUSK**

THIS is the third annual report from the Mycological Diagnostic Laboratory, Department of Microbiology, Queen's University, and covers the work done during 1961. During the year, 1,428 specimens were examined for the presence of fungi, a slight increase (4 per cent.) over the 1960 figure. The majority of specimens (88 per cent.) again originated from hospital clinics and dermatological practices, but there was an increase in the number received from general practitioners. Pathogenic fungi were cultured on 391 occasions from 357 patients, an additional 32 specimens showing the presence of pathogenic fungi by microscopy alone. Accompanying the increase in number of isolates was a marked increase in the number of different species recorded.

RINGWORM.

As in 1959 and 1960, ringworm fungi were the most common group representing 70 per cent. of the pathogens obtained in culture. Eleven different species were represented (Table 1). Their respective incidences showed marked variation from those obtained in 1959 and 1960.

TABLE 1.—RINGWORM FUNGI ISOLATED DURING 1961.

SPECIES	No. OF PATIENTS
Trichophyton verrucosum	67
T. mentagrophytes	37
T. rubrum	23
Microsporum canis	22
T. tonsurans var sulfureum	15
Epidermophyton floccosum	16
T. mentagrophytes var interdigitale	13
M. gypseum	3
T. terrestre	2
Unidentified	1
Positive by microscopy alone	8

TOTAL—207

Trichophyton tonsurans (var *sulfureum*) has been regarded for some years as the most common cause of scalp ringworm amongst children in Northern Ireland (Beare, 1958). In 1961, however, only three such infections were confirmed, and it would now appear that infections caused by this fungus are uncommon. No adult cases were confirmed. If the number of infected specimens submitted to the mycological laboratory are related in any way to the true incidence of ringworm, it would appear that tinea capitis has become a comparatively rare disease. It is interesting to note that *T. verrucosum* (the cause of "cattle ringworm") was the most common dermatophyte, usually originating from lesions on the scalp and body.

"Human" ringworms were greatly outnumbered by infections derived from animals such as cattle, cats, and dogs. One outbreak affecting seven children, and caused by *T. mentagrophytes* (Mackenzie, 1961a and b) originated from infected pet mice, all animals being bought at the same pet shop. Mice evidently harbour this pathogen in many cases without symptoms, and apparently this type of ringworm constitutes at least a minor hazard to the owners of pet mice and to laboratory personnel handling mouse populations.

Another "animal" ringworm isolated primarily from children was caused by *Microsporum canis*, but the 1961 total of 22 infected patients is the lowest recorded in Northern Ireland for many years. This has perhaps been brought about by the location and destruction of infected animals, with the subsequent removal of reservoirs of infection.

Diagnoses of tinea pedis were confirmed mycologically in 43 patients, the number of infections caused by *T. rubrum* being higher than ever reported in this country. Although orally administered griseofulvin has done much towards controlling these most intractable of ringworm infections, it is still only partially successful in eradicating infections of the toe spaces. Infections with *T. rubrum* have become more common in other parts of the United Kingdom since the war, but in Northern Ireland this increase has been less pronounced.

Rare or unusual dermatophytes isolated during 1961 included *T. persicolor* (1 isolate) and two soil-borne species, viz., *M. gypseum* (3 isolates) and *T. terrestre* (2 isolates). The last-named species has not previously been reported from Northern Ireland. Its pathogenic status is doubtful, and although isolated from lesions diagnosed clinically as ringworm, its ætiological rôle is uncertain. One isolate was made from a lesion on the thigh of a 4-year-old boy. *T. verrucosum* had previously been obtained from the infected site. The second isolate was made from a woman apparently suffering from tinea pedis, but further attempts to isolate the fungus from the toe spaces were unsuccessful.

Other Pathogenic Fungi.

Candida albicans was isolated from 69 patients as follows:—Buccal cavity (17), toespaces (13), nails (8), groin (6), genitalia (3), perineum (3), fæces (2), peritoneal abscesses and urine (1). Additional isolations from skin were also made from hands (6), buttock (3), face (3), scalp (2), breast (1), and axilla (1).

Other yeasts included *C. guilliermondii* (5), *C. tropicalis* (1), *Geotrichum sp.* (1), and *Trichosporon capitatum*. Diagnoses of Pityriasis versicolor (*Malassezia furfur*) were confirmed on six occasions.

Twenty fungal infections of the middle ear and mastoid cavity were confirmed, being attributed to the following groups: *Aspergillus niger* (5), *A. terreus* (5), *A. flavus* (5), and *A. fumigatus* (5). Species of *Aspergillus* were also obtained from sputum (*A. fumigatus*, 1 isolate), pus (*A. terreus*, 2 isolates) and fingernail (*A. flavus*, 1 isolate).

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REVIEWS

THE SENILE BRAIN: A CLINICAL STUDY. By R. S. Allison, V.R.D., M.D., F.R.C.P., D.P.M. (Pp. vi + 288; figs. 16. 50s.) London: Arnold, 1962.

MOST of the best neurological text books have been written by clinicians of long experience, who have gathered their favourite flowers from the gardens of their best years and made of them a gift to their friends and followers. This is such a book. To call it a textbook is not quite correct, for it is rather a series of interdigitated essays on the general subject of the intellectual disorders of organic cerebral disease.

Over twenty years, Dr. Allison has studied intensively 198 patients with "senile brains," that is brains damaged by trauma, atherosclerosis, tumour or toxins in such a way that they present a symptom complex of organic dementia.

The essays are first, last and all the time, clinical. The first part of the book deals with methods of casetaking and examination, and the reader is taken through a wide field of medicine, surgery and neurology, showing at how many points the "senile brain" touches on the daily problems of them all. The second, and largest part is the real meat of the book, covering disorders of consciousness, memory, speech, language, orientation and the many specific agnosias. In the third part problems in differential diagnosis and treatment are considered, and here again the author's wide knowledge and familiarity with all the fields of medicine related to his own is evident.

The preface opens, "This work is principally a record of personal experience," and so it is, but it is a great deal more. Dr. Allison's own meticulous observations and thoughts are set against a wide background of European and American literature—the bibliography contains three hundred references—and the essays are full of distilled wisdom. Their main charm, however, is in their teaching style. Dr. Allison writes as he teaches, and, as well as being a valuable contribution to British Neurology, this book will be an especial delight to all his colleagues, who have enjoyed listening to him, and to his multitude of student friends who have sat at his feet so attentively and in such large numbers over the years.

A. R. T.

CARE OF THE NEWLY BORN INFANT. By W. S. Craig, B.Sc., M.D., F.R.C.P. Second Edition. (Pp. 568; figs. 262. 40s.) Edinburgh: E. & S. Livingstone Ltd., 1962.

THIS is an admirable and delightful book which covers the essential embryology necessary for the understanding of normal and abnormal development; the care of the healthy neo-nate in all its aspects; and all varieties of misadventure from congenital malformations to trauma and infection.

The technical difficulty of obtaining sizeable samples of blood, etc., from the new-born has helped to ensure that neo-natal paediatrics retains a strong clinical bias, but it is refreshing to find so much emphasis given to the importance of precise personal observations and such detailed interpretations of them. This makes the book of special value to the family doctor and the midwife, but will also please those paediatricians who have been beginning to feel slightly old-fashioned in relying mainly on the evidence of their senses.

A reference to the "Midwife as Paediatric Nurse" gives great satisfaction to the reviewer, who has always believed that a midwife's wide experience of healthy babies makes her particularly alert to the slight departures from normal which are the earliest signs of impending trouble, and also encourages her to expect, and often secure, survival even in the most desperate case.

The chapter on breast feeding is excellent, but the remark (true though it is!) that "references to human milk as 'the food intended by nature' are more likely to foster scepticism than to provoke response" started up a philosophical digression! Assuming (a generous premise) that mothers do, in fact, consider only their babies' welfare and not

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their own convenience, why should the natural method be thought intrinsically inferior? What makes it seem likely that the natural food of the calf—that rather rough, tough, hairy quadruped, will be better for a human baby than his mother's milk? Or does "*Nature*" convey an impression of a blind, impersonal, unsympathetic process and should we be wiser, even at the risk of seeming indelicate, to say, frankly, that God, who planned motherhood and infancy, certainly knows what food suits babies best? To return to the text, however, it is pleasant to see in cold print the practical fact that every woman knows—but few medical men seem to realise—"in giving advice, account must be taken of the fact that artificial feeding carried out with necessary precautions entails more and not, as is commonly supposed, less work for the mother." Methods of calculating and preparing artificial feeds are described and illustrated in detail and will be specially useful to medical students, who do not usually have much practical experience in these mysteries and yet will be expected to discuss them intelligently with mothers. Pupil midwives will find this section useful for revision purposes.

The second half of the book is mainly concerned with departures from the normal. Each condition dealt with is described clearly, often with well-chosen illustrations; the risks are stated and treatment is dealt with in detail, including warnings of possible errors. Not all of us would use every detail of these treatments: the reviewer has a strong preference for nystatin (Prof. Craig's second choice) in treating Thrush; a disinclination for potassium permanganate baths; and a tendency to resort to radical drainage of empyemata at an earlier stage. These, however, are unimportant idiosyncrasies and equally good results will doubtless be obtained by the methods described. Operative procedures, being outside the scope of the book, are not dealt with in detail.

The chapter on "Selected Clinical Signs and Problems," which discusses the differential diagnosis of such conditions as Cyanosis, Dyspnoea, Oedema, etc., is excellent, but that on "Emergencies and their Immediate Management" is quite outstanding. Where so much depends on skilful speed it is invaluable to have every move set out in its proper order. The section on "Sudden Collapse" is well worth memorizing—nothing is overlooked, even the fact that the baby must have unremitting attention and the nurse must "Call for assistance and issue intructions for the cot to be warmed and (in hospital) for oxygen to be brought."

Scattered throughout the book there are phrases which deserve to become clinical aphorisms: "An infant is an individual from the moment of his birth"; "Too often the fact that crying is evidence of a deep and natural desire for affection and love is ignored." And, at this time when it is fashionable to charge doctors and midwives with treating mothers in an impersonal and authoritarian manner, it is both encouraging and salutary to read, "Suggestions made by a mother concerning the management of her baby frequently prove successful although contrary to accepted professional practice. A mother's suggestions, especially those made by the mother of a large family, should never be lightly brushed aside."

Altogether, this is a book which it has been a joy to read and a privilege to review.

M. J. L. F.

MODERN TREATMENT YEARBOOK, 1962. Edited by Sir Cecil Wakeley, Bt., K.B.E., C.B. (Pp. 306 + xxii; plates 24. 35s.) London: The Medical Press, Baillière, Tindall & Cox, 1962.

THIS twenty-seventh annual volume is presented in the usual form as heretofore. There are twenty-nine chapters, each dealing with a subject of present-day medical interest, such as the surgery of malignant tumours of the pancreas, the modern treatment of diabetes, of rheumatoid arthritis, of acute infantile gastro-enteritis and of certain psychoses.

While comprehensive, the articles have been written with an eye to the needs of the general practitioner and convey to him the essentials of their subjects.

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LECTURES ON THE METHODOLOGY OF CLINICAL RESEARCH. By Max Hamilton, M.D., D.P.M. (Pp. viii+139. 21s.) Edinburgh and London: E. & S. Livingstone Ltd., 1961.

THIS book is based on twelve lectures designed to give the beginner in clinical research an insight into the basis of experimental design. There is no attempt to explain statistical methods in detail but the principal statistical techniques available are described. The choice of material is good and the book succeeds in presenting a balanced picture of the problems of clinical research. Any beginner in this field would profit by reading it. G. M. B.

GREAT IDEAS IN THE HISTORY OF SURGERY. By Leo M. Zimmerman and Ilza Veith. (Pp. 587; figs. 83. 120s.) London: Baillière, Tindall & Cox, 1961.

THERE are few books devoted to the history of surgery and fewer still that are written with understanding. A surgeon and a historian, both from the University of Chicago, have collaborated in the writing of this one and have produced an attractive and scholarly work. They trace their story from the earliest known papyrus of Ancient Egypt to the beginning of the present century and concentrate on the lives, ideas and achievements of some fifty surgical pioneers. They present the growth of surgical thought and practice in its true perspective by outlining the background of general history and the state of general medicine during the lifetime of each of their subjects, and they stress the inter-dependence of all branches of learning. Long and informative abstracts from original surgical writings and numerous illustrations bring the whole saga to life.

All the well-known names in surgical history are here—Hippocrates, Vesalius, Paré, Pott, Hunter, Scarpa, Cooper, Dupuytren, Sims, Lister and many more. The beginnings of the modern, post-Listerian period are described particularly well—Bassini and hernia, Billroth and adominal surgery, Kocher and the surgery of the endocrine glands, Horsley and neurological surgery, Sauerbruch and thoracic surgery. A further chapter on Hugh Owen Thomas and Orthopaedic surgery might not have been out of place.

The book is expensive, but it is excellent value and well produced. It should be available in all surgical libraries and would be welcomed by any surgeon, who received it as a gift.

R. B. W.

THE WILL TO HEALTH. By Harley Williams. (Pp. 140. 12s. 6d.) London: Museum Press Limited, 1962.

DR. Harley Williams is well-known as a writer on the philosophical and historical aspects of medicine.

This book has been written for the layman and has nothing to do with the complex and interminable techniques of modern medicine. The impulse to write it came from a chance remark of Lord Horder, who said: "Throughout the ages many human individuals have enjoyed perfect health—with no aid whatever from medicine."

The author says: "Much of modern medicine comes too late, and only when we are ill do we realize the disconcerting truth that much of the effort needed for cure, and nearly all the effort required in prevention, depends upon us." This personal interest and energy he calls the will to health.

As a prime requirement for the maintenance of health he postulates the possession of a "faith," using the term in a wide sense, not necessarily religious. He deals with the subjects of stress and tension in life, the use and abuse of exercise, food and alcohol, how to face an operation or retirement, how "to travel healthily and arrive."

The book presents a way of life rather than a striving after health for its own sake, and as such it should be helpful to those thoughtful people who would endeavour to walk in this way. W. G. F.

LECTURES ON THE METHODOLOGY OF CLINICAL RESEARCH. By Max Hamilton, M.D., D.P.M. (Pp. viii+139. 21s.) Edinburgh and London: E. & S. Livingstone Ltd., 1961.

THIS book is based on twelve lectures designed to give the beginner in clinical research an insight into the basis of experimental design. There is no attempt to explain statistical methods in detail but the principal statistical techniques available are described. The choice of material is good and the book succeeds in presenting a balanced picture of the problems of clinical research. Any beginner in this field would profit by reading it. G. M. B.

GREAT IDEAS IN THE HISTORY OF SURGERY. By Leo M. Zimmerman and Ilza Veith. (Pp. 587; figs. 83. 120s.) London: Baillière, Tindall & Cox, 1961.

THERE are few books devoted to the history of surgery and fewer still that are written with understanding. A surgeon and a historian, both from the University of Chicago, have collaborated in the writing of this one and have produced an attractive and scholarly work. They trace their story from the earliest known papyrus of Ancient Egypt to the beginning of the present century and concentrate on the lives, ideas and achievements of some fifty surgical pioneers. They present the growth of surgical thought and practice in its true perspective by outlining the background of general history and the state of general medicine during the lifetime of each of their subjects, and they stress the inter-dependence of all branches of learning. Long and informative abstracts from original surgical writings and numerous illustrations bring the whole saga to life.

All the well-known names in surgical history are here—Hippocrates, Vesalius, Paré, Pott, Hunter, Scarpa, Cooper, Dupuytren, Sims, Lister and many more. The beginnings of the modern, post-Listerian period are described particularly well—Bassini and hernia, Billroth and adominal surgery, Kocher and the surgery of the endocrine glands, Horsley and neurological surgery, Sauerbruch and thoracic surgery. A further chapter on Hugh Owen Thomas and Orthopaedic surgery might not have been out of place.

The book is expensive, but it is excellent value and well produced. It should be available in all surgical libraries and would be welcomed by any surgeon, who received it as a gift.

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THE WILL TO HEALTH. By Harley Williams. (Pp. 140. 12s. 6d.) London: Museum Press Limited, 1962.

DR. Harley Williams is well-known as a writer on the philosophical and historical aspects of medicine.

This book has been written for the layman and has nothing to do with the complex and interminable techniques of modern medicine. The impulse to write it came from a chance remark of Lord Horder, who said: "Throughout the ages many human individuals have enjoyed perfect health—with no aid whatever from medicine."

The author says: "Much of modern medicine comes too late, and only when we are ill do we realize the disconcerting truth that much of the effort needed for cure, and nearly all the effort required in prevention, depends upon us." This personal interest and energy he calls the will to health.

As a prime requirement for the maintenance of health he postulates the possession of a "faith," using the term in a wide sense, not necessarily religious. He deals with the subjects of stress and tension in life, the use and abuse of exercise, food and alcohol, how to face an operation or retirement, how "to travel healthily and arrive."

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REVIEW OF "OPHTHALMIC OPERATIONS." By Seymour Philps. Second Edition by John Foster, F.R.C.S. (Pp. 368; figs. 456. 70s.) London: Baillière, Tindall & Cox, 1961.

THIS is the second edition of a well-known ophthalmic textbook, the first Editor of which was Seymour Philps, F.R.C.S. The first edition was published in 1950 and now it is brought up to date. Although Philps undertook the preparation of a new edition of Grimsdale and Brewerston's "Ophthalmic Operations," he entirely rewrote the book and supplied most of the illustrations. This second edition is presented very much as was the original, and Foster states that as a practising surgeon of wide experience, he has sorted the various alternative operations, and has sifted out his own preferences—these he describes in his textbook. He does not attempt to give a choice of methods but only those techniques which have stood the test of time in his hands. One does not necessarily agree with his technique, but it has to be admitted that the whole book is sound from all points of view.

John Foster, in his introduction, claims that his book has been written for the occasional ophthalmic surgeon and those reading for the higher degrees and diplomas, and he has fully achieved this aim. When one has to call on someone else's experience it is much easier not to have to glean through a dozen different ways of doing a thing but to be told dogmatically that one way works, and works well. Some of the recent major advancements in ophthalmic surgery have been left out but the edition admits this and draws attention to it. For example, with light coagulation he states that his experience in this is very limited and he would not give a dogmatic opinion on the procedure. This is a hiatus which one feels could have been filled by the editor in association with an authority on the subject. The chapters have the same headings as in the first edition with one or two exceptions, and general points watched both by surgeon and theatre staff are well covered. Such things as sterilising, care of instruments and dressings are touched upon, and the book supplies most of the answers required again by the occasional surgeon who has to keep an overall supervision on his theatre staff and even prepare his own instruments. Many of the original illustrations are retained, and numerous new ones have been added. There has been no slavish attempt to just alter sufficiently the original book to create a new edition, but obviously the good parts have been retained, and parts not agreed with have been removed. Many up-to-date procedures have been included, and many adaptations of old procedures have been put in also, with the exclusion of the obsolete.

There is one point which echoes throughout the whole book, and with which one must disagree very strongly, namely the attitude of Foster (and Philps) to General Anaesthesia in ophthalmic surgery. Having had experience of both local and general, general anaesthesia with a good anaesthetist who knows what is required, presents none of the hazards which this book, and its previous edition suggest. It is not only safe, but desirable. One very good innovation is a slightly longer theoretical introduction to each chapter, and included at the end of each section are some references. These are extremely handy for the person reading for higher degrees, in that he can enlarge on any point of special interest to him.

A point which one notices when comparing the two editions is that Foster emphasises that repeated probings for dacryostenosis are useless. This, I think, should be put in large print and underlined, but I would like to see it advised that a child's naso-lachrymal duct should be probed through the upper punctum. Canaliculus surgery is described as a new insertion, but other parts of this chapter on tear drainage are unchanged.

In keratoplasty the techniques described are the old well-tried methods suitable for the occasional surgeon. A small point like Fuchs dystrophy being a contra-indication to grafting, one again cannot agree with it now being accepted that this is not true. A change of attitude is that towards congenital cataract. Here linear extraction is preferred to needling, and the chapter on post-cataract needling has been replaced by the one on unilateral aphakia. Here again the new ideas are brought forward, and the insertion of intra-ocular acrylic lenses is fully described. This new chapter is as lucid as the rest of the book, and ends with a note of caution on the widespread use of these lenticuli, especially in correcting refractive errors. The chapter on glaucoma is prefaced by a résumé of the treatment of the various types of

glaucoma and a table summarising this is provided. This is again excellent for quick reference, and for examination preparation. The recent advent of Diamox is emphasised and its uses given, and cyclo-diathermy after the method of Castroviejo is described, using multiple penetrating diathermy needle points instead of surface application. In detachments the use of binocular indirect ophthalmoscopy again brings this chapter up to date, and a photograph is given of various new designs of diathermy apparatus, including that of Stanworth of Manchester. One thing which I think is a major error of omission is that the operation of lamellar scleral resection is not described, this operation being replaced by that of scleral imbrication. This is rather a pity as resection is still the recognised procedure for a large number of detachment cases. Vitreous implantation in the chapter on retinal detachment is well described. The chapter on radiotherapy of retinal tumours has been entirely rewritten to include the use of Cobalt beam therapy, linear acceleration, etc., as well as surface application of radium and radon seeds. No mention of plastic scleral implants is made as an alternative to enucleation. These are widely used in America, and, having used them often, I think they should have a place in such a book.

All in all John Foster set out to supply a book containing detailed description of operative procedures of all the common and uncommon ophthalmic operations. He has succeeded fully in doing this, and in supplying more theory at the beginning of the chapter and bibliography at the end. He has filled in most of the gaps, if there were any, in Philp's original book. This is a book which is an absolute necessity for anyone who practices opthalmology, whether he be a student of two-month's duration, or of fifty years, and one can only congratulate the author in this second edition. The book is some thirty-seven pages shorter but, on reading through it, one wonders at the amount of substance in the text and cannot find how the author managed to take these thirty-seven pages out and keep his book so full. The fact that the book is now one pound dearer than the first edition is not to be wondered at, but at the present price it is one of the most reasonable books in the speciality of ophthalmology. E. C. C.

DIABETES MELLITUS IN THE TROPICS. By J. A. Tulloch, M.C., M.D., F.R.C.P.E. (Pp. x + 294. 37s. 6d.) Edinburgh and London: E. & S. Livingstone, 1962.

UNTIL recently medicine in the tropics was concerned mainly with infectious diseases. Now, with improved anti-malarial measures and the widespread use of antibiotics, infectious diseases are taking a smaller share of medical resources and more attention is being paid to the important non-infectious diseases. Among these diabetes ranks high on the list. It is world-wide in its incidence and effective treatment depends on a good medical service and an educated population. In some areas diabetic care is advanced and this is largely due to the devoted care and enthusiasm of dedicated physicians. Professor Tulloch, the author of the book under review, is such a physician, and during his stay in the West Indies he devoted much time to the study of diabetes, and its management and control among a population much less sophisticated than our own. He was, for six years, in charge of the diabetic clinic of the University College Hospital of the West Indies. There he carried out original work on the dietary control of diabetics and related problems in a poor population. His book is the outcome of his interest in the subject and his industry in collecting the opinions and methods from physicians all over the world who are caring for diabetic patients in tropical zones. The result is a most valuable compilation of specialised knowledge in this sphere of medicine and the work will be indispensable for physicians treating diabetes in under-developed countries. Throughout the book diabetes is discussed in relation to the special problems of tropical countries. Difficulties in educational standards, and the distances which patients have to travel to obtain treatment, are stressed. While pointing out the problems, Professor Tulloch shows how they may be met in a practical manner. Useful appendices containing diets and food exchanges for native populations in different parts of the world are an added attraction. In all a most helpful and important addition to the literature on diabetes mellitus. D. A. D. M.

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STATISTICS FOR MEDICAL STUDENTS: A PRACTICAL GUIDE. By D. E. Gray. (Pp. 52. 9s.) Hong Kong University Press. London: Oxford University Press, 1962.

THIS book is an introduction to the use of statistical methods in the analysis of small samples of data. The author describes, with simple numerical examples, the arithmetic steps in computing averages, measures of dispersion, correlation coefficients, including partial coefficients with one variable held constant, and regression equations. He shows how to obtain the standard errors of most of the relevant estimates and how to estimate the probability of observed differences between means of samples arising by chance. Comparison of two qualitatively classified distributions using the chi-squared test is the only example given of dealing with qualitative data. Tables of the "t" and chi-squared distributions and of the squares and square roots of integers from 1 to 1,000 are appended.

The chapter on frequency distributions, particularly the part dealing with the binomial and Poisson distributions, is too brief to be of value, and the implication that all continuous distributions are "normal" is misleading. The formula given in chapter III (page 11) for the standard deviation shows $\sqrt{n}$ (where n is the number of observations) in the denominator; it is customary, particularly when n is small, to use $\sqrt{(n-1)}$. If $\sqrt{(n-1)}$ is preferred, then the alternative formula on page 12 and the formula for the variance on page 13 will require alteration. In chapter IV it is wrongly suggested that the formula for the standard error of the mean should be modified, when n is less than 30, by dividing the standard deviation by $\sqrt{(n-1)}$ instead of $\sqrt{n}$. In chapter V, where comparisons are made between the means of samples, the differences, involved by the use of $\sqrt{n}$ rather than $\sqrt{(n-1)}$ for the standard deviation and $\sqrt{(n-1)}$ rather than $\sqrt{n}$ for the standard error of the mean, cancel each other; these departures from customary practice could be misleading in other contexts.

In the chapter on regression further use is made of standard errors of means to compute the regression coefficient; for no stated reason the standard deviations in this chapter are divided by $\sqrt{(n-2)}$ which is clearly inconsistent with earlier expressions. On page 38 the formulae given for the standard error of estimate are incorrect. The second formula gives the standard error of the regression coefficient and is, in fact, used as such later in the chapter.

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ARTIFICIAL FEEDING IN EARLY INFANCY. By Andrew Bogdan, M.D., M.R.C.P.E., D.C.H. (3s. 6d.) Leeds: Austick's Medical Bookshop, 1961.

THIS is a brief guide to the principles of artificial feeding of infants. It is not intended to be a manual, but rather an introduction to the subject which must be studied in one of the larger textbooks. Blank pages are provided for notes which may be necessary to amplify the text. F. M. B. A.

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GENETICAL VARIATION IN HUMAN POPULATIONS. Edited by G. A. Harrison. (Pp. viii + 115; illustrated. 35s.) Oxford: Pergamon Press, 1962.

THIS book comprises six papers read at the fourth annual Symposium of the Society for the Study of Human Biology. This Society was founded in 1958 with the object of furthering the study of the biology of human populatons and of man as a species, and the present symposium reviewed the considerable recent advances towards an understanding of human variation. Each paper is a discrete entity with its own bibliography and is by an acknowledged authority. The subjects (with authors) are: Blood Groups (A. E. Mourant), Abnormal Haemoglobins and Erythrocyte Enzyme—Deficiency Traits (A. C. Allison), Haptoglobins and Transferrins (N. A. Barnicot), Urinary Amino acids (S. M. Gartler), Dermatoglyphic Patterns (Sarah Holt) and Pigmentation (G. A. Harrison).

The remarkable progress in the last few years in haematology, serology, biochemistry and cytogenetics, amounting in certain instances to substantial breakthroughs, have opened up vast and exciting territories and each fresh discovery leads on to others, producing a rapidly growing snowball of almost illimitable potential size. Its pace, already fast, is accelerating, and the periodical review article, and the published papers of a symposium, are more than ever essential if one is to keep abreast yet not be engulfed. The present volume, well conceived and produced with clear illustrations, fulfils some of the purposes, while at the same time displaying some of the inadequacies, of published symposial material. For example, the chapters précis the treated subjects admirably, but, since they were initially delivered to a specialist audience they demand a basic knowledge of genetic processes and nomenclature beyond that normally obtaining amongst doctors. In the present instance this drawback is of slight consequence because there are few points of particular interest to, or specifically directed at, the clinician, the closest exceptions perhaps being Professor Barnicot's disquisition on haptoglobins and transferrins and Dr. Allison's sections dealing with erthrocyte enzyme-deficiency traits, especially that associated with low activity of glucose-6-phosphate dehydrogenase deficiency (G 6 PDD).

Clinicians wishing to acquire a knowledge of the basic mechanisms of inheritance of clinical entities, an introduction to polymorphism and human variation, and a guide to prognosis and counselling in inherited disease, will not find them here, instead they should consult Fraser Roberts (1959) and Penrose (1959); those wishing to keep abreast of recent advances in inherited conditions encountered in everyday practice can refer to the British Medical Bulletin (1961), the Second International Conference of Human Genetics (1961), and Avery Jones (1961); those wishing to read more widely can do no better than start with Penrose (1961). But, although the earliest of these works was published in 1959, already some are, strictly speaking, dated for factual knowledge, so great has been the recent tempo of progress. Having caught up, to stay abreast involves regular perusal of the main clinical journals including the correspondence columns, or periodically referring to published papers of symposia specifically directed at the non-specialist. Finding the time might be difficult but the field of inherited disease is one of increasing importance and perhaps now offers the best chance of achieving prominence through the eponym. P. F.

THE PSYCHOLOGY OF INSANITY. By Bernard Hart. Fifth Edition. (Pp. xi + 127. 6s. 6d.) London: Cambridge University Press.

THIS paperback reprint of the 1957 edition of Dr. Bernard Hart's popular book is a useful addition to the growing number of paperbacks. The period covered by the five editions and reprints of this book has been one of considerable expansion in academic psychology. In spite of this, the medical student and trainee psychiatrist have not found that the passage of time has outmoded the usefulness of the clinical psychology to be found in its pages. Some theoretical concepts and terms may have changed, but what is set out provides a useful point of departure for further reading.

The book firmly holds its place in under-graduate and early post-graduate education.

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GENETICAL VARIATION IN HUMAN POPULATIONS. Edited by G. A. Harrison. (Pp. viii + 115; illustrated. 35s.) Oxford: Pergamon Press, 1962.

THIS book comprises six papers read at the fourth annual Symposium of the Society for the Study of Human Biology. This Society was founded in 1958 with the object of furthering the study of the biology of human populatons and of man as a species, and the present symposium reviewed the considerable recent advances towards an understanding of human variation. Each paper is a discrete entity with its own bibliography and is by an acknowledged authority. The subjects (with authors) are: Blood Groups (A. E. Mourant), Abnormal Haemoglobins and Erythrocyte Enzyme—Deficiency Traits (A. C. Allison), Haptoglobins and Transferrins (N. A. Barnicot), Urinary Amino acids (S. M. Gartler), Dermatoglyphic Patterns (Sarah Holt) and Pigmentation (G. A. Harrison).

The remarkable progress in the last few years in haematology, serology, biochemistry and cytogenetics, amounting in certain instances to substantial breakthroughs, have opened up vast and exciting territories and each fresh discovery leads on to others, producing a rapidly growing snowball of almost illimitable potential size. Its pace, already fast, is accelerating, and the periodical review article, and the published papers of a symposium, are more than ever essential if one is to keep abreast yet not be engulfed. The present volume, well conceived and produced with clear illustrations, fulfils some of the purposes, while at the same time displaying some of the inadequacies, of published symposial material. For example, the chapters précis the treated subjects admirably, but, since they were initially delivered to a specialist audience they demand a basic knowledge of genetic processes and nomenclature beyond that normally obtaining amongst doctors. In the present instance this drawback is of slight consequence because there are few points of particular interest to, or specifically directed at, the clinician, the closest exceptions perhaps being Professor Barnicot's disquisition on haptoglobins and transferrins and Dr. Allison's sections dealing with erthrocyte enzyme-deficiency traits, especially that associated with low activity of glucose-6-phosphate dehydrogenase deficiency (G 6 PDD).

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THE DIAGNOSIS AND TREATMENT OF ACUTE POISONING. By J. D. P. Graham, B.Sc., M.D., F.R.C.P.(Edin.). (Pp. viii+438. 45s.) London: Oxford University Press, 1962.

THIS book, of 438 pages, has been written principally for the general practitioner and resident hospital staff. The author's aim was to provide a practical guide to the treatment of acute poisoning and he has succeeded admirably. This is not a first-aid reference book nor a comprehensive work on toxicology; it is a textbook written in a most readable style by a practising physician about the problems arising out of the diagnosis and treatment of poisoned patients. Other matters have been consistently pruned from the general text and the balance restored by inclusion of chapters on the epidemiology of poisoning, its medico-legal aspects and attempted suicide by poisoning. Notes on the collection of specimens, simple diagnostic tests and equipment essential for hospital casualty departments and the general practitioner have been put into Appendices. As a result the text is to the point and any doctor confronted by a problem concerning a poisoned patient, should waste little time in finding the help he requires.

The author deals fully with the problems of diagnosis, stressing the need for a careful history and discussing the cardinal manifestations. He adopts the modern approach to treatment—the application of the same non-specific measures in all cases and only secondary concern with antidotes. He deals with common poisons first and at greater length; about 90 per cent. of all poisoning is due to the aspirin-barbiturate-tranquilliser drugs, carbon monoxide and alcohol and a quarter of the book is devoted to these substances. The other drugs are grouped in the conventional manner according to their principal action and although they comprise little more than a third of the volume, the conciseness of the text has allowed reference to a wide variety of substances. Notes on Preludin, Tofranil, detergents, Brasso, Harpic, and anti-freeze, for example, are to be found there, and separate chapters are devoted to agricultural poisons and radioactivity. The Index is supplemented by an Appendix which lists a large number of poisonous proprietary preparations, the amount of the active ingredients and the page on which the appropriate treatment is to be found.

The publication itself is of the usual high standard of the Oxford University Press. Its price is modest when account is taken of the information it contains. It can be unhesitatingly recommended to all who may have to deal with poisoning, and it is to be hoped that it will find its way into the casualty department or residency of every hospital. T. M.

MODERN MEDICAL TREATMENT. Edited by Henry Miller. (Pp. viii + 416. 30s.) Edinburgh and London: E. & S. Livingstone, 1962.

THE title of this book is a little misleading. It is not a comprehensive text but is a collection of essays each written by an experienced physician about his own methods of treating the commoner diseases that he meets in his own field of medicine. It is an easy book to read and a useful book for any doctor who wishes to make a quick review of the treatment being currently recommended by consultant physicians.

If there is any criticism, it is not of the book but of current medical practice. Therapy, especially drug therapy, is accepted as of value too readily. The potency of the placebo and the fallacy of post hoc ergo propter hoc arguments are seldom considered, and the new drug is too often accepted merely because it is new. There is nowhere any discussion of controlled therapeutic trials—a scientific tool which is slowly changing the face of modern medical therapy and the philosophy that underlies it. It is a pity that each essayist was not asked to include a list of useful references. If a bibliography had been added the book would have had more permanent value.

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A NEW SYSTEM OF ANATOMY. By Solly Zuckerman. (Pp. xiii + 579; figs. 540. 75s.) London: Oxford University Press.

In recent years teachers of anatomy have been under attack from various quarters and are accused of teaching too much unnecessary detail to students who are already over-crammed with facts. Anatomists are alive to the significance of this and teaching is being modified accordingly. This book is one of a number appearing in recent years with the object of simplifying the course in the dissecting room. Whether this is a good thing or not is open to question, but this book succeeds in its object. The reviewer had intended to use a small group of students to find if the book fulfilled the purpose for which it was designed, but this was unnecessary as it had been introduced as the dissecting manual for the 2nd M.B., a fact indicating that in the Belfast medical school the Professor of Anatomy is alive to the demand, if not the need, for simplification.

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As regards the contents, soundness and simplification is the theme. The illustrations are in the form of photographs of actual dissections, and, although this is not usually a satisfactory technique, in this case it has succeeded completely due to the excellent dissections and probably to the extremely skilful touching-up removing the excessive detail that usually renders a photograph useless to a student.

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MALFORMATIONS OF THE FACE. By D. Greer Walker, M.A., M.D., B.Ch., M.Dent.Sc., F.D.S.R.C.S. (Pp. xii + 202; figs. 93. 37s. 6d.) Edinburgh and London: E. & S. Livingstone, 1961.

This is essentially a descriptive and anatomical study of the more complex malformations affecting the face. It is little concerned with conditions calling for surgical correction, such as hare lip. Terminology of these conditions, frequently dependent on some one physical sign, has now often become meaningless. Aetiological factors, including embryology, genetics, comparative morphology and atavism and moulding strains, are considered in the search for unification in classification and description. There are some valuable descriptions and observations pointing to useful groupings for further study. The frequent digressions and discussions on the related aspects do not all appear equally authoritative, and make this a difficult and inconclusive, and at times a frustrating book. J. E. M.

CEREBRAL PALSY IN CHILDHOOD AND ADOLESCENCE. By J. L. Henderson, M.D., F.R.C.P.E. (Pp. viii + 403. 35s.) Edinburgh and London: E. & S. Livingstone, 1961.

The literature on cerebral palsy is most confusing and, with few exceptions, of very little value. No fewer than six new classifications have appeared in the last decade. Our American colleagues have frequently led us astray with loose terminology, uncontrolled observations and by including patients which few of us would accept as having cerebral palsy.

The above criticisms do not apply to Professor Henderson and his colleagues who have provided us with a most excellent survey of cerebral palsy in the East of Scotland. Only a few will wish to criticise their definitions, classification, etc. Their figures for incidence, degree of physical and mental handicap, employability, etc., will be of considerable value to educationalists and others who have to make provision for the handicapped.

The summaries at the end of each chapter will appeal to many. There are, however, many valuable clinical observations not previously recorded which are not included in the summaries.

The treatment of cerebral palsy has never been carefully assessed and there are a few who think that physiotherapy, intensive or otherwise, may not be necessary. Our Scottish colleagues are of the opinion that more intensive physiotherapy and better home management may prevent minor deformities. It would appear that careful assessment of treatment is overdue. W. I. F.

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This is essentially a descriptive and anatomical study of the more complex malformations affecting the face. It is little concerned with conditions calling for surgical correction, such as hare lip. Terminology of these conditions, frequently dependent on some one physical sign, has now often become meaningless. Aetiological factors, including embryology, genetics, comparative morphology and atavism and moulding strains, are considered in the search for unification in classification and description. There are some valuable descriptions and observations pointing to useful groupings for further study. The frequent digressions and discussions on the related aspects do not all appear equally authoritative, and make this a difficult and inconclusive, and at times a frustrating book. J. E. M.

CEREBRAL PALSY IN CHILDHOOD AND ADOLESCENCE. By J. L. Henderson, M.D., F.R.C.P.E. (Pp. viii + 403. 35s.) Edinburgh and London: E. & S. Livingstone, 1961.

The literature on cerebral palsy is most confusing and, with few exceptions, of very little value. No fewer than six new classifications have appeared in the last decade. Our American colleagues have frequently led us astray with loose terminology, uncontrolled observations and by including patients which few of us would accept as having cerebral palsy.

The above criticisms do not apply to Professor Henderson and his colleagues who have provided us with a most excellent survey of cerebral palsy in the East of Scotland. Only a few will wish to criticise their definitions, classification, etc. Their figures for incidence, degree of physical and mental handicap, employability, etc., will be of considerable value to educationalists and others who have to make provision for the handicapped.

The summaries at the end of each chapter will appeal to many. There are, however, many valuable clinical observations not previously recorded which are not included in the summaries.

The treatment of cerebral palsy has never been carefully assessed and there are a few who think that physiotherapy, intensive or otherwise, may not be necessary. Our Scottish colleagues are of the opinion that more intensive physiotherapy and better home management may prevent minor deformities. It would appear that careful assessment of treatment is overdue. W. I. F.

A NEW SYSTEM OF ANATOMY. By Solly Zuckerman. (Pp. xiii + 579; figs. 540. 75s.) London: Oxford University Press.

In recent years teachers of anatomy have been under attack from various quarters and are accused of teaching too much unnecessary detail to students who are already over-crammed with facts. Anatomists are alive to the significance of this and teaching is being modified accordingly. This book is one of a number appearing in recent years with the object of simplifying the course in the dissecting room. Whether this is a good thing or not is open to question, but this book succeeds in its object. The reviewer had intended to use a small group of students to find if the book fulfilled the purpose for which it was designed, but this was unnecessary as it had been introduced as the dissecting manual for the 2nd M.B., a fact indicating that in the Belfast medical school the Professor of Anatomy is alive to the demand, if not the need, for simplification.

The students like the book. It is rather bulky for a dissecting manual, but is extremely well bound and has waterproof covers and very good quality paper and printing and has been found very usable. This confirms the results of the similar severe tests that had already been performed in the Birmingham medical school.

As regards the contents, soundness and simplification is the theme. The illustrations are in the form of photographs of actual dissections, and, although this is not usually a satisfactory technique, in this case it has succeeded completely due to the excellent dissections and probably to the extremely skilful touching-up removing the excessive detail that usually renders a photograph useless to a student.

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