DECEMBER, 1965

THE ULSTER MEDICAL JOURNAL

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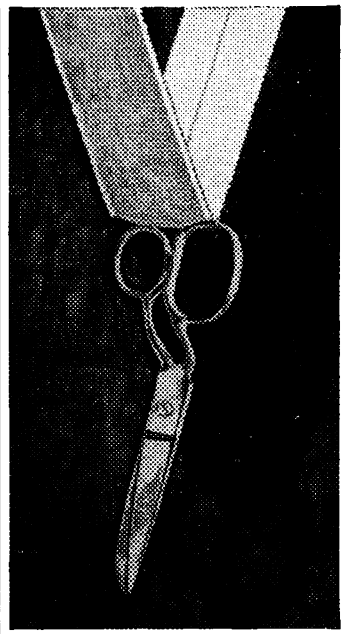

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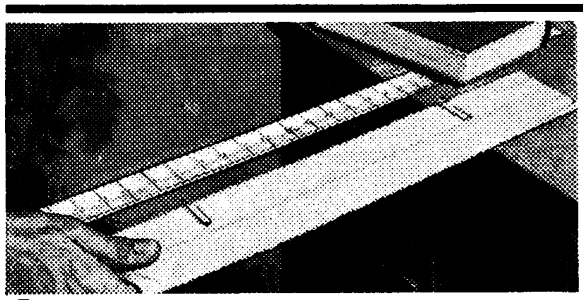

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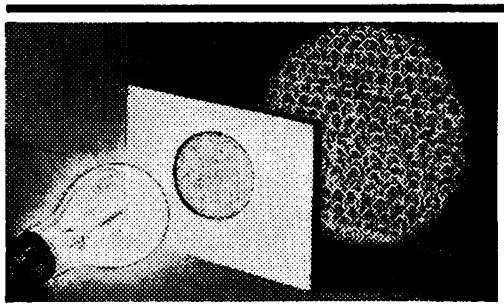

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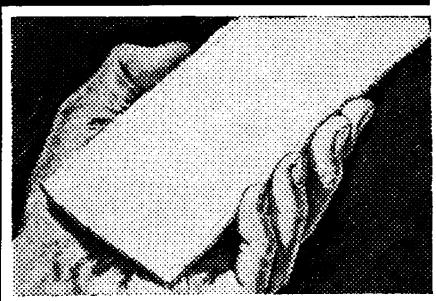

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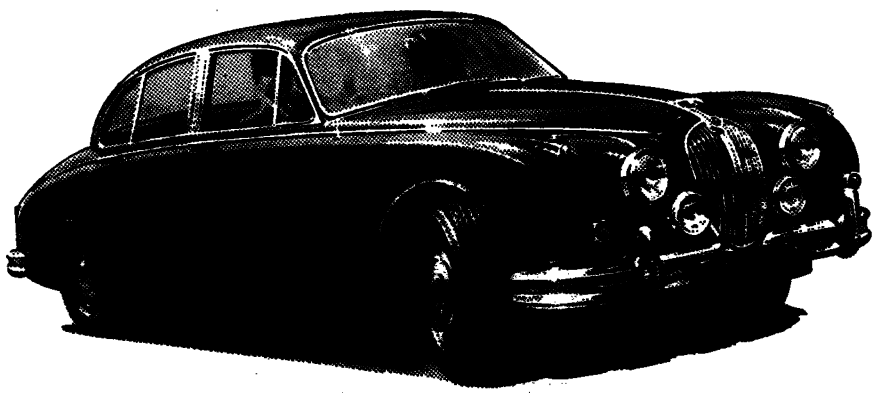

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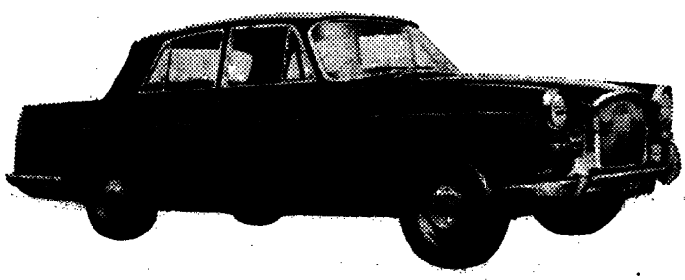

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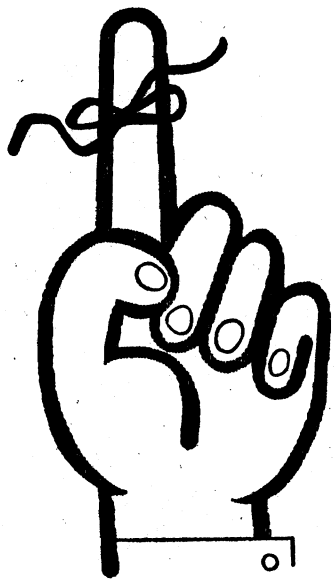

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VOL. XXXII

PUBLISHED BY
THE ULSTER MEDICAL JOURNAL
1963

CONTENTS

No. 1: June, 1963

No. 2: December, 1963

CONTENTS

Fellows and Members of the Ulster Medical Society receive the Journal Free. Subscriptions to non-members, fifteen shillings annually.

THE ULSTER MEDICAL JOURNAL

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2. Manuscripts should be typewritten with double spacing and with wide margins. They should be fully corrected, and contributors will be responsible for the payment of any sum charged for alteration in printer's proof in excess of ten shillings per sheet (16 pages).

3. References should be given as in the publications of the British Medical Association and in most other modern British journals. If contributors are uncertain of the correct abbreviation for the title of any journal, as given in the World List of Scientific Periodicals, they should give the full title.

4. Tables and illustrations should be reduced to a minimum, and should be sent detached from the typescript of the paper. Line drawings should be used whenever possible. All illustrations must be in a finished form ready for reproduction. Authors will be charged for all blocks at cost price. Half-tone blocks require to be printed on special art paper. Authors will be responsible for the cost.

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Vol. XXXII DECEMBER 1963 No. 2

THREE GENERATIONS

By J. R. WHEELER, M.B., D.O.M.S., D.L.O., F.R.C.S.

PRESIDENTIAL ADDRESS

to Ulster Medical Society, 24th October, 1963

THE last one hundred odd years have seen such changes in the world that it behoves us to pause for a moment and look back at great men, and great achievements. I can look back to forty years in the medical profession, but as my father and grandfather were also members of our great profession I thought I would try and look at life as it was since 1846 when my grandfather obtained his qualification of L.R.C.S. in Edinburgh, incidentally he was President of this Society in 1875-76.

During that early period what great names were brought before the students. Moses, the first great doctor in Egypt, laid down laws of health and made the Israelites follow a code of regulations for their cleanliness and well-being which preserved them in health for forty years wandering in the wilderness. Probably segregation of the leper, often referred to in Leviticus, was the first great feat of preventive medicine.

Hippocrates died over two thousand years ago, but his solemn oath which his students took to respect their teachers as a father, to share knowledge freely, to behave with stainless honour, and never to divulge a secret learned in the sickroom, still remains. Galen was born in A.D. 130. He gathered together all the safest teaching of those who had gone before him and added to these the results of his own observations. For a thousand years the teaching of Galen was all that Europe had to go upon in the science of curing disease. About fourteen hundred years later William Harvey appeared on the scene and it was his great mind that discovered the circulation of the blood and laid the real foundation

of physiology. John Hunter was born in Lancashire in 1728 and was a great surgeon, but will best be remembered as the comparative anatomist who first understood how different forms of life resemble one another. Edward Jenner was a pupil of Hunter's, and it was in 1798 that he made known his views on vaccination for smallpox. The idea came from overhearing a milkmaid say to her friend that she had had cowpox and so would not get smallpox. It was just over fifty years later than an Act was passed in Parliament stating that all infants within four months of birth must be vaccinated. Parliament of the day gave Jenner £30,000, and of course he received many honours which were richly deserved.

Now coming up to my grandfather's time, it was just a year after he qualified, that is to say in 1847, that Simpson, a professor of Edinburgh University, first used chloroform as an anæsthetic. Up to this time all surgical operations were performed upon conscious (or drunk) patients. Now the number of operations greatly increased, but, alas, the death rate also increased due to gross infection in the wounds. In fact, Dr. John Hall, Chief of Medical Staff of the British Army in the Crimea in 1855, issued instructions to his officers against the use of chloroform: "The smart use of the knife is a powerful stimulant, and it is much better to hear a man bawl lustily than to see him sink silently into the grave."

Dr. Paul R. Howley, M.D. of Chicago, Chief Medical Officer of U.S. Forces in Britain in the last war, pointed out that hospitals in the nineteenth century and before were set up for the primary purpose of abating a nuisance, the sick, crippled, and insane who were unable to pay for private care. The hospital was a place in which to die, not to regain health. The mortality rate was very high.

The idea of training women to the profession of nursing was due to the initiative of Florence Nightingale. Her astonishing personal success lay in the forcing of her modern methods of hospital management on the Crimean Army authorities (1854). Perhaps the first "War Correspondents" stirred up public opinion at home, so that the idea of nursing as a serious profession spread fast in civil life.

It was to Semmelweiss (1846) that we owe the beginning of our deliverance from serious epidemics of puerperal fever. He noted that the death rate from puerperal fever was low in cases treated by midwives and high when patients were examined by medical students. It was evident to Semmelweiss that infection was carried by the hands of students from bodies in the dissecting room. He gave instructions that students examining such women should wash their hands in chloride of lime solution, and as a result the death rate fell from 1 in 8 to 1 in 33. Perhaps he was the first to recognise the necessity for asepsis in dealing with patients. Like many pioneers, his ideas were bitterly opposed by some of the medical profession of his day.

On the other hand, Lord Lister, who introduced methods of antisepsis which were to produce a revolution in surgery, was acclaimed by his own profession and received many awards. Lister noted the resemblance between putrefaction in a wound and the process of fermentation as explained by Pasteur in 1862, and

he conceived the idea of destroying the organisms by use of a strong antiseptic such as carbolic acid. In 1865 his method was used for the first time in his wards at Glasgow Royal Infirmary, and his wards became the healthiest in the world. Mortality rate was reduced from 40 per cent. or 50 per cent., to 1 per cent. or 2 per cent. What a debt the world in general owes to this famous man.

Antiseptic surgery, in turn, gave way to aseptic surgery, and now the establishment of bacteriology has made most impressive changes in the medical world. My father used to like telling the story of when he was a medical student at St. Bartholomew's Hospital, how the senior surgeon came into his theatre one morning and told his class that he was going to try this new scheme of Lister's; and that was less than one hundred years ago. The main surgical operations at that time were amputations, breast tumours and strangulated hernia—the abdomen was still almost forbidden territory.

With this marked progress in medical knowledge it was deemed necessary to pass a Medical Act in 1858 in order to establish a register of medical practitioners who had a reasonable training in medicine and surgery. It was felt that in the past incalculable harm had been caused to countless individuals by the unskilled administrations of unqualified practitioners. The previous Medical Act of 1511 had stated that no one could practise medicine in London unless he had been examined and approved and put on a register by the Bishop of London or the Dean of St. Paul's. It is a long cry from this to our present very efficient court of examiners and General Medical Council.

The seventies and eighties had been a period not only of large families, but of puritanism in ethical and sexual ideas. The genuine honesty of most British merchants as men of business had been one of the causes of our great commercial prosperity.. Others were of course the advent and opening up of railways both for the carriage of goods and the travel of the general public. The advent of the railways was England's gift to the world. In 1814 George Stephenson constructed his first steam locomotive engine. The triumph of the latter opened out unexpected vistas for the carriage of all classes of goods, especially coal, and later on passenger traffic. Stage coaches and canals were doomed—this was the railway age. The first public railway for passengers was the Stockton to Darlington railway in 1825 (Rocket). During the next twenty-five years many lines were opened up in Europe and the U.S.A. Now, by all recent reports, we, in our age, are seeing the closing down of railways! At this period the British mercantile marine was substituting iron for wood and later on steel for iron. This coincided with an enormous development of English iron and steel output or of pig iron. Britain produced half the pig iron in the world, and thirty years later the output trebled. The steam engine, coke, iron, and steel are the four principle factors contributing to the acceleration of technology called the Industrial Revolution, which was now gaining its full momentum.

Each individual as a unit is subject to many influences—care when he is an infant, nutrition in adolescence, housing, education, and of course his heredity make up. In the early nineteenth century towns were small and so with the

rapid onset of the industrial age there was a packing of a large population into a limited area of land without sufficient provision for sanitation. In 1853, when cholera threatened the country, the Presbytery of Edinburgh wrote to Lord Palmerston, Home Secretary, suggesting "a national fast should be appointed on Royal authority." Palmerston's reply was that "prayers and fasting of a united but inactive people are useless"—plan and execute measures to purify those parts of towns which are inhabited by the poorer classes so that they may be freed from those causes and sources of contagion which breed pestilence. It is sad to remember that the early Church was at some periods bitterly antagonistic to the acquisition of scientific knowledge.

The various forms of epidemic were found mainly in overcrowded dwellings with poor disposal of decomposing animal and vegetable substances. A proper water supply so as to establish habits of cleanliness is essential. Legislation is required if these ideals are to be established, and then a number of Government inspectors to see that the job is properly done. In 1846-47 the Irish Potato Famine brought over three hundred thousand of panic-stricken and starving refugees to Liverpool. Lodging-houses, and even cellars, were crowded, so an epidemic of terrifying dimensions arrived in due course. All were grouped under headings of fever, typhus, and relapsing fever, plus dysentery which was simply called diarrhœa. The death rate was 135 per thousand. To deal with this Liverpool set the first example of the need for largish towns to appoint medical officers of health. A few years later the General Board of Health summed up arguments for quarantine by stating that epidemic diseases were not contagious but due to the existence of an "epidemic atmosphere."

It was about this time that Disraeli made the remark that England was divided into two nations, the rich and the poor, and this, unfortunately, had an uncomfortable amount of truth in it. Times, however, were beginning to change, and the Great Lord of Shaftesbury did much to alleviate the appalling conditions of women and child labour in mines. Britain was at last striving to remedy some of the evils attendant on the industrial revolution, and the first Factory Act was passed in 1847.

Industrialisation impels social changes, old certainties of class and status get washed away. Progress quickens when man applies his deductive powers to the material world. Over the centuries, in spite of frequent setbacks, the material condition of man has improved. Now the speed of progress has accelerated phenomenally, and shows all prospect of continuing to do so.

In the second half of the eighteenth century "self help" was a favourite motto with leading men in all classes. Science was perhaps undermining the older forms of religious history which were very intolerant. (From 1753 to 1836 no one could be legally married except by a Church of England parson—now a certificate from a registrar was sufficient.) Now the enormously increased wealth and manufacturing power of England was building up a powerful middle class. The education committee of the Privy Council was helping to build state-aided schools, private academies were giving a more scientific education in contrast to the so-called public schools which still gave a purely classical education.

During the "Age of Projects" the engineer got little help from the scientist, but during the eighteenth century, the Age of Reason, the scientist and engineer were getting together to study problems of detail. The older universities like Oxford and Cambridge contributed little, the pace being set by younger ones like Edinburgh and Glasgow. In Great Britain the state was not concerned with the education of this new master craftsman—his training was practical and his success depended on good instruction and appropriate instruments. Progress became rapid and made the great Dr. Johnston cry out, "This age is running mad after innovations, all business of the world is to be done in a new way." How right he was, the day of the small craftsman was gone. The manufacturing process was split up into a series of operations, each of which was performed by a special piece of machinery instead of being worked by hand by one craftsman who mastered all operations. These new factories demanded a large outlay of capital. Incessant local wars had impoverished central Europe and Italy. U.S.A. had their Civil War in 1861-65. England was in the fortunate position of having a flourishing overseas trade, a well-developed banking system, raw materials in the form of coal and iron ores, and an industry-minded middle class willing to take the risk of introducing new machinery and recruiting labour mainly from Scotland and Ireland. Income tax in the eighties varied from 2d. in the £ to 6d. Free trade had lifted the weight of taxation from the poor, and in spite of a falling off in agriculture there were enormous increases in shipping and overseas trade.

The latter half of the century was a great period of emigration when it was decided that Canada, Australia, New Zealand, etc., should be populated by the British. Organised efforts by emigration societies took place and Government assistance could be obtained. The Victorian era had been a long period of ever-increasing prosperity at home, and of gradual uninterrupted peaceful transition from the old to the new. In Northern Ireland there was a tremendous boom in the linen trade and many men from these parts sought their fortune in America.

Progress in the medical world was not lagging behind during this period. Pasteur, who was a chemist, not a medical man, was continuing his work on micro-organisms and vaccines. The Pasteur Institute was founded in Paris towards the end of the nineteenth century, and by his researches here some might say he laid the foundation of the science of bacteriology. He was followed by a long line of distinguished men, one of whom, Robert Koch (1843-1910), a qualified doctor, discovered the T.B. bacillus in 1882.

The next big advance in medicine perhaps came from the discovery of the X-ray by Rontgen in 1895. This diagnostic agent was first applied in cases of fractures and opaque foreign bodies. Dr. Porter told us in his opening address at the Royal Victoria Hospital last October that my father was Chairman of the Staff when they ordered their first X-ray machine. We all know the many advances that have been made in the study and science of radiology since that day.

One of the next discoveries that was to affect the medical world was the isolation of radium by M. and Mme. Curie in 1898. This was to prove of immense

value in the treatment of certain skin diseases and in the treatment of malignant growths.

It is, of course, quite impossible in a short talk of this type to mention all the great men in their day and generation, and to enumerate their various discoveries and inventions. In my own subject, however, I would just like to mention that in 1850 Helmholtz, a German ophthalmologist, introduced the first ophthalmoscope and so was the first person to view the interior of the human eye. There have been variations of this instrument since then, of course, but the original principle is the same today.

By the end of the century, after about fifty years of unremitting effort by the Public Health Authorities, improvements had been made in water supplies and general sanitation, so that the general health of the population had improved. There was a fall in infantile mortality and smallpox had been got under control. However, enteric fever still took a large toll of lives. Committees were appointed to supervise the sale of food and milk, etc. But even so, a large proportion of the labouring classes were still living on incomes below the "poverty line." In 1901 no less than 40 per cent. of the recruits examined for the armed services were rejected on medical grounds.

Sir Almoth Wright's name will always be remembered for his work on the anti-typhoid vaccine which was first used in the South African War, and then later with such good effect in the 1914-18 War. In the South African War the greater number of casualties were due to sickness in the field caused by indifferent sanitation and contamination of food and water supplies. By the use of the anti-typhoid vaccine, then in its infancy, cases of typhoid were eventually reduced in number. The experience gained at this time helped to accelerate the progress of research into these vaccines. One, or perhaps the only good thing to come out of a war is the experience gained in the treatment of disease and of injuries which can then be used to help in time of peace.

Towards the end of the nineteenth century and at the beginning of the twentieth century great strides were being made in the world of transport. The first electric tramway was opened between Portrush and the Giant's Causeway in 1883. Some of us here have seen the entrance and exit of electric trams in our city. In 1889 Dunlop, a Belfastman, invented pneumatic tyres for bicycles. This opened up a means of transport for a great many people. Motor-cars first appeared on the scene in the early 1900s. These, of course, in those days were an expensive luxury, and a journey in one was often an exciting adventure. Telephones were coming into more general use since Graham Bell introduced the first instrument which could transmit speech in 1876. This easier mode of travel and improved means of communication accelerated the transference of knowledge and ideas from one place to another, and so in many ways speeded up research. The period up to the First World War was often looked on as one of great advancement in research in the medical world. The incentive to any research is an idea, and it was fortunate that men with fruitful ideas were not lacking in the medical profession fifty odd years ago.

The bulk of the casualties in the First World War, unlike previous wars, were due to trauma rather than sickness, the amount of sickness being reduced, as I mentioned previously, by anti-typhoid vaccines and tetanus inoculations, etc. The Thomas Splint was used for the first time during this war and was responsible for saving many lives and limbs.

In this war transport in the field was almost entirely horsedrawn, there being just a few motor-cars for headquarters staff. The aeroplane was used for the first time as part of the armed defences. The experience gained during those war years greatly accelerated the improvement and construction in these planes and the advent of the second war has helped to produce the immensely powerful and efficient machines we are accustomed to today. The wings of the original aeroplanes were made of Ulster linen and I remember the first air display at Balmoral Showgrounds in 1912, when several of these little planes took part, but unfortunately one hit a flagpole and crashed. It was in 1903 that the Wright brothers produced the first petrol-driven and man-carrying aeroplane, and the first flight was a distance of 852 ft. The first trans-Atlantic flight was in 1919 when Alcock and Brown flew from America and landed in the West of Ireland. Now, of course, large air liners are flying daily to all parts of the world, and before long will probably also be flying to the moon.

Wireless as we know it today was not available during the First World War. Marconi had been experimenting with wireless telegraphy for about twenty years and was able to transmit messages by Morse Code. After the war great advances were made, and in 1927 a public wireless telephone service was established between London and New York. The first private wireless sets were the small crystal cat's whisker sets, with ear phones, and often one had to use one's imagination to hear anything on them. We all know what a tremendous part wireless transmission played during the Second World War, both as a means of communication and as a form of propaganda, and anyone who heard Sir Winston Churchill's rallying broadcasts to the nation during the darkest hours will never forget them. Now, of course, television has taken the place of the older sound wireless, and medical knowledge is even transmitted by this method, as in Your Life in their Hands, etc.! Closed circuit methods are also used for teaching purposes.

Sir Henry Dale, O.M., said in 1950: "I think that our successors are likely to recognise the first half of the twentieth century as the period in which civilisation began to feel, for good or evil, the full impact of progress in the natural sciences. In no department of knowledge and practice has this change been more conspicuous or more rapidly progressive than in the general field of medicine."

About forty years ago there may have been something in the remark of Oliver Wendell Homes when he stated in his own inimitable way, "If the whole Materia Medica (except only opium and ether) as now used could be sunk to the bottom of the sea, it would be all the better for mankind and all the worse for the fishes."

A major advance in the medical world was Banting's discovery of insulin for the treatment of diabetes. I was a house surgeon in the Royal Victoria Hospital

when some of the first cases were treated with insulin here in Belfast. I heard Banting give a lecture in Edinburgh. He told us that what first interested him in trying to find a cure for diabetes was the fact that his best friend suffered from this disease. He tried out his various preparations on his friend, who called himself "the human rabbit." The next forward step in the treatment of disease was the use of liver in the treatment of pernicious anæmia, and the sulphonamides in infections.

Perhaps, however, the most outstanding discovery of that time was the isolation of penicillin by Fleming. The time between the discovery of a drug and the placing it on the market, as it were, is often very considerable. Penicillin was considered to be of such vital importance that its production on a large scale was deemed a top priority during the Second World War. For this reason we sought the aid of our American allies in order that sufficient quantities could be produced in a limited time.

Immunisation against diphtheria was proving to be of great value. Dr. Fred Kane has given me some very interesting figures as regards the incidence of scarlet fever and diphtheria as treated in the Northern Ireland Fever Hospital, Purdysburn. In 1933 there were 2,329 cases of scarlet fever, with twelve deaths. In 1962 there were 45 cases, with no deaths. In 1933 there were 593 cases of diphtheria, with 47 deaths. In 1962 there were no cases. He points out that the changed picture in the incidence of diphtheria is entirely due to prophylaxis, while in the case of scarlet fever the improvement is due to treatment, first by sulphonamides and now by anti-biotics. Streptomycin and other anti-tuberculous drugs have dramatically hastened the decline and fall of the malady that used to be called "the captain of the men of death." The sulphonamides and anti-biotics have drastically reduced the menace of bacterial infection, and now one rarely sees a case of acute mastoiditis or ophthalmia neonatorum, or trachoma, etc.

Unfortunately on the other side of the picture, due to mechanical inventions in the workshop and on the road and in the air, the accident rate has gone up, and diseases of stress and strain due to the modern way of life, are on the increase.

With the widespread use of prophylactic vaccines and the use of these new drugs one might say that medical treatment has been put on a more scientific basis. Occasionally there will be a drug which helps millions of people but harms a few. The public will have to be prepared to accept some risk, though this risk is minimised by intelligent safeguards.

The cost of drugs today is very great, but the saving in the mortality and the morbidity rate is greater still. Great Britain, it is estimated, spends about 16s. per head of the population per annum on drugs. Holland spends 22s., U.S.A. 33s., Belgium 55s. Dr. Vincent Askey, President of the American Medical Association, called America "a land of hypochondriacs, its inhabitants crammed full of vitamins they don't need"!

Blood transfusion is such a commonplace thing today that it is hard to realise that it was only used occasionally before the last war. Prior to this time,

Sir Thomas Houston had done much valuable work on the grouping and typing of blood. Again, with all the war casualties, it was a vital necessity, and from here the whole technique of blood banks and blood donors has been brought up to its present efficient state. In the ophthalmic end we are now establishing an eye bank so as to have a supply of eyes always in readiness for corneal grafting operations.

I might here digress to mention that one of the great triumphs of the century in ophthalmology has been a method of treating simple retinal detachment where there is a retinal hole or tear. To Gonin of Lausanne (1925) goes the credit of being the first to get the idea of closing the retinal tear by means of a caustic. His original technique has, of course, been much improved, and today, by means of diathermy and scleral resection, etc., about 70 per cent. of cases have their sight restored.

The advances in general anæsthesia in the last forty years have been immense. In my day as a house surgeon in the Royal Victoria Hospital, we gave anæsthetics in all and every type of operation, often just with ether on an open mask. How the surgeons put up with this I do not know. At that time there was just one honorary consultant anæsthetist, Dr. Victor Fielden. Anyone who has had a general anæsthetic in recent years, or who has had to operate on a patient under general anæsthesia, will realise what these modern methods mean both to the patient and the surgeon.

With all this advancement in medicine and in scientific knowledge generally new schools and technical colleges and universities have had to be built, or old buildings have had to be enlarged to try to cope with the evergrowing demand for higher education.

After World War II, what with the rising cost of living and the need for hospital expansion and the rebuilding and the establishment of many new departments in hospital, it was obvious that the day of the voluntary hospital was over. In July, 1948, the Northern Ireland Hospitals Authority took over almost all the hospitals in Ulster. It has been stated that the overall cost of running a hospital has increased threefold during the past ten to twelve years. This, with the cost of building and the cost of new and expensive equipment, could only be undertaken by the State. With these advances the general health of the people is very much improved, so one hopes that the high cost of the hospital services may be offset to some degree by better workmanship and less loss of working hours through illness in the industrial world.

So we see that during the last one hundred and twenty years vast improvements have been made in the living conditions and the general health and well-being of the people. Today practically all families in this country have enough food to satisfy the high standard of nutrition as laid down by the British Medical Association.

Education has advanced to an outstanding degree, mechanisation in factories and agriculture has enormously increased output. Modes of travel have been vastly accelerated, means of communication have multiplied out of all knowledge.

With all this progress I think the advances in medicine have more than held their own.

The gift which medical scientists bequeathed to those who followed them was not so much the discoveries associated with their names, valuable as these discoveries were, as the proof of the fact that health and disease were the effects of natural causes and that these causes could be elucidated by the use of ordinary principles of scientific investigation.

In all surveys in the field of physical and medical science the story is never finished. There is no hard and fast line separating past, present, and future. We cannot overstate our debt to the past, it is interesting, but now only history. It is the present and tomorrow which have the supreme claim. There will still be new worlds to conquer, both in the region of the body and the mind.

Editorial

THE FUTURE OF MEDICAL EDUCATION

In 1886 the Medical Act demanded that everyone who qualified M.B., B.Ch. should be competent to practice medicine, surgery, and obstetrics. Most graduates went into general practice and the far reaches of the Empire were still available where the complete doctor was necessary. Laboratory aids to diagnosis scarcely existed, so bedside diagnosis and a good knowledge of materia medica constituted the graduates' armamentarium. The good family doctor met the need of his time. It was possible for the medical schools to produce him, and hospital practice was little removed from general practice. The stethoscope and the leisure to listen, the pharmacopeia were common to both. Hospital doctor and/or general practitioner could easily keep in touch with each other and the medical literature.

Advance in medical science has brought chaos to the bucolic picture. Whilst in 1886 it was possible to do what the law demanded, it is no longer so. Even if we thought we were doing so the courts of the land have decided otherwise and experience in this or that, the number of anæsthetics given, the number of deliveries achieved, the number of operations performed may constitute the sole defence to that fatality which formerly would have been written off as an Act of Providence. The community now demands from us the expertise which we profess.

Galen considered that medical training should occupy ten years. One thousand years later the School of Salernum demanded eight to twelve years. Today the curriculum is one of six years with a compulsory hospital year. Yet the factual content of the course has increased manifold, and this is but a beginning. What can the medical school do? Obviously the days of 1886 are over. No longer is it possible to produce as the end-product of the undergraduate course the complete doctor—competent in medicine, surgery, and obstetrics. There is no branch of medicine which does not require post-graduate work to achieve competence, and general practitioners who bemoan the fact that recent graduates are not fully fledged general practitioners are out of tune with their times. All branches of medicine, including general practice, represent post-graduate specialisation.

What is then the purpose of the curriculum of the future? With the rapid advance of scientific medicine the graduate will be out-dated in many of his facts in five to ten years. Where is now the fully flowering materia medica of the 1920s and 1930s? Where the supportive therapy in face of the fatal septicæmia?

Obviously the answer is to train minds to think rather than to stuff them with facts. Hence more and more the curriculum must deal with the basic sciences of medicine in an attempt to give the student a method of thought, an ability to appreciate intellectually the advances of medicine and the fundamental techniques to enable him to apply such advances. He must be imbued with the idea that medicine is a life-long study, and be trained to take advantage of such study.

Yet we are products of our ancestors. Some of the old things must remain. Proficiency in the art, sincerity in the ethic, embellishment in the culture—these must be added to adeptness in the basic sciences. Such facets of medical education are difficult to teach, and it is from the lives of their teachers rather than from their words that guidance is given. However rapid the advance the continuing theme of our profession must be sustained—to bring healing, and if not healing comfort to the sorrowing sons and daughters of man.

J. H. B.

THE STATE OF MEDICINE AT THE TIME OF THE CRUSADES

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MR. CHAIRMAN, LADIES, AND GENTLEMEN,

It is fitting that I begin by letting you know how much I value the compliment you pay me in asking me to address you on the occasion of the opening of the new session. It is a great honour to have Mr. Corkey introduce me to this distinguished audience.

To our younger colleagues here for the first time, I would like to add a few words of welcome to those of our Chairman and to say that you have chosen a good Medical School and a good time in its history. The Royal is in the forefront of medical progress, whether it be radiography, in radium therapy, in thoracic surgery, in cardiology, or in the teaching of medicine and surgery generally. Ladies and gentlemen, I wish you a successful year's work.

I must confess to a certain diffidence in appearing before you to deliver the address this morning, particularly in the light of the very high standards set by my predecessors.

The choice of subject was, in itself, one of my greatest difficulties. Osler, in his great book *Aequanimitas*, says, "There are, in truth, no specialities in medicine, since to know fully many of the important diseases a man must be familiar with their manifestations in many organs."

I felt that it was desirable to go beyond the boundaries of my own speciality, and I propose, therefore, to tell you about the contribution to medicine by the Knights of St. John of Jerusalem, and by the Saracens, the Arabs, their adversaries in the Wars of the Crusades. I therefore describe it as "The State of Medicine at the time of the Crusades."

G. K. Chesterton once pointed out that, to understand the culture and civilisation of a people, one had to look at their religious beliefs. The Emperor Julian, the apostate, in the fourth century A.D., said, "Now we see what it is that makes these Christians such powerful enemies of our gods, it is the brotherly love which they manifest toward strangers and toward the sick and the poor, the thoughtful manner in which they care for the dead, and the purity of their own lives." The connection between medicine and religion is buried deep in history. The explanation for this is quite simple. Man is both body and soul.

In its classical meaning, humanism, of which Petrarch was a chief prophet, is defined by J. A. Symonds as a 'just perception of the dignity of man as a rational, volitional, and sentient being, born upon this earth with a right to use

it and enjoy it.' It is in this spirit that the principal factor of the Renaissance of Medicine is to be found—a revival that was prepared by the later Middle Ages with those early studies on the cadaver and the beginning of clinical observation which are characteristic of humanism.

The late Lord Horder, who was the first President of the British Association of Physical Medicine, once wrote, "The treatment is the treatment of the individual by the individual, any physician who can inspire gentleness, virtue, wisdom, and endurance will help to hasten and ensure the cure. Any physician who cannot prescribe such remedies obstructs the cure and should stand aside."

In the non-Christian cultures of the past, as, of course, supremely in Christianity itself, the religious leaders and pioneers of medical practice were often synonymous.

In this connection it is of vital interest to recall the History of the Hospitallers of St. John of Jerusalem, nearly five hundred years of magnificent moral and material achievement, a slow and melancholy decline, and final extinction as a religious and military community, and then in our own day the re-creation of the Order in civilian form.

The great historian of the Order, the Abbé Vertot, began his famous work, *The Venerable Order of St. John of Jesusalem*, with these words—"The history I have taken upon me to write is that of a fraternity of hospitallers, which afterwards became a military society and at last a Sovereign Order; instituted upon the motives of charity and prompted by a zeal for a defence of the Holy Land, to take up arms against the infidels, an Order, which, amidst the noise and clashing of swords, and with a continual war upon their hands, was capable of joining the peaceable virtues of religion with the most distinguishing courage in the field. This union of the two professions so remote and distant seem to me an object worthy the regard and consideration of mankind." And now let us transfer ourselves to the Holy Land.

You will remember, ladies and gentlemen, on the partition of the Roman Empire at the end of the fourth century A.D., when Constantine the Great made Constantinople the capital of the eastern half or Byzantine half, Palestine fell within the Byzantine half. But with the rise of Islam, under the teachings of the Prophet Mohammed, the Arabs had been filled with a conquering zeal which sent their curved swords eastward to the arid banks of the Indus. Even the mountains of the Caucasus heard their fearful cry—'Fight, fight, Firdaws, Firdaws, Paradise, Paradise.' Westward they had marched along the North African coast until they spurred their horses into the Atlantic, calling upon God to witness that only the waves of the ocean prevented their further victorious advance to the glory of His name.

The essentially tolerant Muslims permitted, even encouraged, Christian pilgrimage, and pilgrims went there unarmed and stayed in hospices such as that provided by the merchants of Amalfi, the precursors of the Order of St. John from whom they took their emblem, the white eight-pointed cross.

Then, in the year 1095, occurred a great convulsion in the east. The lenient rule of the Arabs was replaced for a time by the rule of some fierce invaders

from the Steppes, beyond the Caspian Sea, the ferocious Turcomans; and the returning pilgrims to Europe complained loudly of the oppressions they suffered at the hands of the barbarians.

At home and throughout Europe a feeling of indignation rose steadily until, after appeals by the Pope in 1095, and the fiery preaching of Peter the Hermit, the forces of Christendom were urged to start a Holy War against the Infidels. Under the leadership of Godfrey de Bouillon, one of the noblest representatives of mediæval chivalry, a great religious expedition was formed—this was the first of the Great Crusades.

In the summer of 1099, after suffering many casualties and hardships in their tremendous march across the breadth of Europe and through Asia Minor, the Crusaders appeared before the walls of Jerusalem and demanded the surrender of the city. At that time the Warden of the Hospice, which also combined the function of a hospital, had as its warden a certain Gerard from Martiques in Provence, whose saintly life and untiring care for the sick and suffering earned him the title of 'The Blessed Gerard.'

After a siege lasting only six weeks, the city was captured and the grateful Crusaders, by donations and privileges, enabled Gerard to enlarge the hospital. The community of monks tending the hospital were constituted into the famous Order of St. John of Jerusalem. Peripheral hospitals were also established in many of the maritime provinces of Europe, so that the pilgrims could find shelter, food, and medical care while they waited for transport to the Holy Land.

The Crusaders had not been long in the Holy Land, however, before a problem of enormous difficulty began to confront them. There was a grievous inadequacy of fighting manpower. After the capture of Jerusalem, the greater part of the crusading army returned to Europe, leaving in the Holy Land only three hundred horses and two thousand infantry. The ravages of the climate, with malaria, dysentery, typhoid, and plague, especially on the hot swampy littoral, the constant marching and fighting under a burning sun, clothed in heavy chain armour over leather jerkins and carrying heavy weapons, the very poor military hygiene of the day, the losses in battle and low rate of wound recovery, all combined to make inroads on the fighting strength that could scarcely be replenished by drafts from Europe. In addition, for some yet unexplained reason, the mortality amongst male children was inordinately high.

As a contribution towards the solution of this problem, the second Master of the Hospital, Raymond du Puy, decided that the inherent discipline, austerity of living and organisation of the monks of the hospital could be deployed in a military role. Certain of the brethren were formed into a new class of fighting monks, and from the year 1113 onwards the Order of St. John added a military function to its original humanitarian role.

I cannot here dilate on the military exploits of the hospitallers. It must be enough to say that the Knights Templar and the Knights of the Hospital constituted the main military bulwark of the Latin kingdom of Jerusalem during its two hundred years' existence in the midst of the hostile Saracen world.

Without their unremitting valour and military skill, the kingdom would certainly not have endured more than a few years. Yet despite this cardinal military role, the Hospitallers, I would emphasise again, never forgot their ancient humanitarian role and these early statutes of the Knights Hospitaller give us an indication of the humanity and imagination which informed their medical outlook. We read, for example, that the sick were always referred to as "our lords the sick."

The commanders of hospitals were instructed to—

"Again I have commanded that wheresoever there shall be Houses for the sick, the commanders of such Houses shall tend the sick people lying there, cheerfully and gladly, and shall do their duty by them without any complaint, for which good deeds they shall have their reward in Heaven. And if, which God forbid, any of the brethren neglect to carry out this order of the Master of the Hospital, the rest of the brethren shall take care of the sick and shall report it to the Master, and he shall punish them according to the Justice of the House."

Then again—The Statutes of Fr. Jobert, Master of the Hospital, 1172-1177: ". . . The privilege of the sick to have white bread, the terms included the setting aside of two casales (a casale was a hamlet of at least one hundred houses) for the provision of white bread, with the further provision that should this quantity be insufficient, the additional amount needed should be from the Treasury. Each loaf should be 16 ounces for two poor persons." This particular statute ends with these words: ". . . and if it should happen, which God forbid, that anyone should presume rashly to conceal or contravene this pious and sacred gift, let him forever be damned with Judas, who betrayed Our Lord Jesus Christ, and let him incur the curse of Cain, and of Dathan, and Abiron, whom the earth swallowed up. Amen."

Time and again we come upon the most delightful passages, in the statutes of Roger des Moulins, Master of the Hospital, 1177-1187, for example:—

"Furthermore it is ordained with the assent of all the brethren that four experienced doctors shall be appointed for the service of the poor at the Hospital of Jerusalem, qualified to examine urine and to diagnose diseases, and to assist them by the administration of medicines.

"It is ordained how long and how broad should be the beds in which the sick lie, and that each bed should have its coverlet and two sheets of its own."

After these needs, is decreed the fourth command—"that each of the sick should have a cloak of sheepskin, cap of wool and boots for going to and coming from the latrines (ad cameras secretas).

"It is also decreed that little cradles should be made for the babies of women pilgrims born in the House, so that they may lie separate, and that the baby in its own bed may be in no danger from the restlessness of its mother."

"Let the brethren of the Hospital by night and by day cheerfully and gladly tend the sick as their lords." Moreover, it was added in Chapter General that "in every ward of the House where the sick shall lie, nine servants shall be appointed to wait upon them, who at the command of the brethren shall humbly wash the feet and heads of the sick, and cleanse their garments, and make their

beds, and prepare the food they need, and give them to drink, and be obedient in all things for the benefit of the sick."

Their charity extended in all directions—even to supporting children. The said Holy House had also been accustomed to receive and support children abandoned by their parents.

I find the following a very sympathetic gesture—"And, to a poor couple, man and woman who were desirous of entering the estate of matrimony and were without goods with which to celebrate their marriage, it has been the custom to give two bowls or the rations of two brethren."

About the same time, if I may digress for a moment, there was a great mediæval hospital movement in all the cities to combat and isolate patients suffering from leprosy, Already known to the Ancient Hebrews, Greeks, and Romans, the disease began to appear in Northern Europe in the sixth and seventh centuries A.D., and its spread in connection with crusades was appalling. It reached its zenith in the thirteenth century. Lunberger Chronik paraphrased by Heine, "Living corpses they wandered to and fro, muffled from head to foot, a hood drawn over the face, and carrying in the hand a bell, the Lazarus bell, as it was called, through which they were to give timely warning of their approach, so that everyone could get out of the way in time."

Leper hospitals for the purpose of segregation became apparent and they turned out to be a potent factor in the eventual stamping-out of the disease. The number of these Lazar houses (leprodochia or leprosoria), as they were then called, was extraordinary. There were some two hundred in England and Scotland, and two thousand in France alone.

Although in all mediæval hospitals nursing and seclusion were the rule with absolute neglect of treatment, it is clear from Virchow's thorough-going narrative the building of the leprosoria represented a great social and hygienic movement, a wave of genuine prophylaxis as well as of human charity.

Literary medicine and philosophy took refuge in the churches and cloisters, and developed almost exclusively in the monasteries.

It is natural that these men who had been driven by the sight of human miseries and fratricidal struggles to embrace the monastic rule of sacrifice and renunciation should be the first and the most zealous in treating leprosy, the plague, and in succouring the wounded.

The Hospitallers were very prominent in the great Third Crusade and especially distinguished themselves by their famous rearguard action in King Richard's magnificent victory at Arsuf in 1191. But, alas, the destruction of the Latin Field Army at the great Battle of Hattin, where the Hospitallers on the battlefield nearly all perished, ensured the fall of Jerusalem to the Muslim army, commanded by Saladin.

The Sultan Saladin was a brilliant military genius inspired by a religious ardour. He once wrote to Richard Cœur de Lion—"Jerusalem is as much to us as Mohammedans as it can be to you Christians and more. It is the place whence our Prophet made his night ascent to Heaven, and it will be the gathering place of our nation at the Great Judgment."

After Hattin, Saladin moved on to the capture of Jerusalem itself. And thus, after eighty-eight years of Christian guardianship, the Holy Sepulchre fell once more into the hands of the Mohammedans.

In this hour of supreme triumph, Saladin showed a degree of mercy rare in mediæval conquerors. After allowing the garrison to march out with military honours of war, he permitted the few serving Knights Hospitallers, who had remained, to ransom the poor townsfolk, who otherwise would have been sold into slavery and he granted the request of the Hospitallers that ten of their number should wait in the city until the sick and wounded were sufficiently healed to bear the hazard and fatigue of transit. The Hospitallers were given a respite of one year to clear up the affairs of their hospital before they left.

The contacts which the West made with the East, because of the Crusades, were considerable, and in the art and science of warfare, fortifications, metal work, architecture, chemistry, astronomy, and in many other directions the West has learned much from the East. But it was, perhaps, in the medical world that the gain was the greatest.

I am indebted to Brigadier Broadhurst, as my guide and interpreter in the otherwise closed territory of Oriental learning, for his introduction to the charming and learned Arab and Persian sages of the period. And you, ladies and gentlemen, are also indebted to him, for, with his commendable love of brevity, he ruthlessly insisted that I confine my efforts to two centuries rather than a millennium.

May I quote from Brigadier R. J. C. Broadhurst's translation—"The Travels of Ibn Jubayr from the original Arabic." This is a chronicle of a mediæval Spanish Moor's journey to the Egypt of Saladin, the holy cities of Arabia, Baghdad the city of caliphs, the Latin Kingdom of Jerusalem, and the Norman Kingdom of Sicily in the year 1183:

"Another of the things we saw, doing honour to the Sultan, was the Muristan (Hospital) in the centre of Cairo. It is a palace, goodly for its beauty and spaciousness. This benefaction he made so that he might deserve a heavenly reward and to acquire merit. He appointed as intendent a man of science with whom he placed a store of drugs and whom he empowered to use the potions and apply them in their various forms.

"In the rooms of the palace were placed beds, fully appointed for lying patients. At the disposal of the intendent are servants whose duty it is, morning and evening, to examine the conditions of the sick, and to bring them the food and the potions that befit them. Facing this establishment is another specially for women and they also have persons to attend them. A third which adjoins them, a large place, has rooms with iron windows, and it is a place of confinement for the insane. They also have persons who daily examine their condition and give them what is fitting for them. All these matters the Sultan oversees, examining and questioning, and demanding the greatest care and attention to them. In Misr there is another hospital of precisely the same model."

In the book of the Ten Treatises on the Eye, written by Hunain Ibn Is-Haq (808-877 A.D.) and translated into English by Max Meyerhof in 1928, we have the earliest extant textbook of ophthalmology. Hunain has been described as one

of the greatest scholars and noblest characters of his age. Under the caliphate of al-Mutawalkil, Hunain reached the summit of his glory as a translator and a medical practitioner. But during the same time, the mistrust of the Caliph, a very orthodox and fanatical Muslim and the envy of Hunain Christian colleagues, caused him a series of bad experiences. First the ruler proved Hunain's professional honour by a hard test. He bade him prepare a poison for one of his enemies, offering him rich reward if he would do so. Hunain refused and was imprisoned for one year. He was then brought before the Caliph and threatened with death for his disobedience. He answered, "I have skill only in what is beneficial, and have studied naught else." Asked by the Caliph, who then explained that he was only testing his physician's integrity, as to what prevented him from preparing the deadly poison, Hunain replied, "Two things: my religion and my profession. My religion decrees that we should do good even to our enemies, how much more to our friends. And my profession is instituted for the benefit of humanity and limited to relief and cure. Besides, every physician is under oath never to give anyone a deadly medicine."

The book of Hunain Ibn Is Haq on the structure of the eye, its diseases and their treatment, written in accordance with the opinions of Hippocrates and Galen on the knowledge of all that is necessary to instruct him who wishes to treat eye diseases in a reasonable manner in ten treatises. These deal with the nature of the eye and the brain and related problems together with remedies.

We must not forget that Galen's principle aim was to transform medicine into an exact science, like astronomy and mathematics. Hunain skilfully extracted all the passages from Galen's works concerning the eye and eye diseases and formed of them this systematic textbook.

Arab interest in the curative science found expression in the prophetic tradition that made science twofold: theology and medicine. The physician was at the same time metaphysician, philosopher, and sage, and the title "hakim" was indifferently applied to all these capacities.

The people of the East expected their kings to be immensely powerful, their queens incomparably beautiful, their wazirs enormously sagacious, and their physicians superhumanly discerning and resourceful.

To show the esteem in which medical men of the time were held, one court physician amassed a huge fortune of 88,800,000 dirhams, a sum equivalent, if we accept van Kremer's estimate of the dirham as equivalent to a franc, to more than three and a half million pounds sterling in thirty years. He was paid 100,000 dirhams for bleeding the Caliph twice a year and an equal sum for administering a semi-annual purgative draught.

This unbounded faith in the physician in the East is, I am told, a source of constant embarrassment to modern practitioners. Rhazi did this, they will tell him, and Avicenna did that, and are you not the heir of all the ages, greater than these, nay, even than Hippocrates and Galen? Such is the intimidating prospect which faces you young gentlemen, our Persian colleagues.

As to this superhuman discernment required of physicians, let me tell you a tale or two of Avicenna's discernment.

A relative of the ruler of a certain province lay sick of a malady which baffled all the local doctors. Avicenna, although his identity was then unknown, was invited to give his opinion and, after examining the patient, requested the collaboration of someone who knew all the districts and towns of the province, and who repeated their names while Avicenna kept his finger on the patient's pulse. At the mention of a certain town he felt a flutter in the pulse. "Now," said he, "I need someone who knows all the houses, streets, and quarters of this town." Again, when a certain street was mentioned, the same phenomenon was repeated, and once again when the names of a certain household were enumerated. The Avicenna said, "It is finished. This lad is in love with such-and-such a girl, who lives in such-and-such a house, in such-and-such a street, and the girl's face is the patient's cure." So the marriage was solemnized at a fortunate hour chosen by Avicenna, and thus the cure was completed.

I shall only cite one more anecdote, of which again Avicenna is the hero. A certain prince of the House of Buwayh was afflicted with melancholia and suffered from the delusion that he was a cow. "Every day," says the author, "he would low like a cow, causing annoyance to everyone, and crying, 'Kill me, so that a good stew may be prepared from my flesh'; until matters reached such a pass that he would eat nothing while the physicians were unable to do him any good." Finally Avicenna, who was at this time acting as prime minister, was persuaded to take the case in hand. First of all, he sent a message to the patient bidding him be of good cheer, because the butcher was coming to slaughter him, whereat, we are told, the sick man rejoiced. Some time afterwards Avicenna, holding a knife in his hand, entered the sick-room saying, "Where is this cow, that I may kill it?" The patient lowed like a cow to indicate where he was. By Avicenna's orders he was laid on the ground, bound hand and foot. Avicenna then felt him all over and said, "He is too lean, and not ready to be killed; he must be fattened." Then they offered him suitable food, of which he now partook eagerly, and gradually he gained strength, got rid of his delusion, and was completely cured. The narrator concludes, "All wise men perceive that one cannot heal by such methods of treatment save by virtue of pre-eminent intelligence, perfect science, and unerring acumen."

In the curative use of drugs some remarkable advances were made at this time by the Arabs. It was they who established the first apothecary shops, founded the earliest schools of pharmacy and produced the first pharmacopœia.

Al-Rhazi (865-925), born near Tihran, the capital of modern Persia, and was probably the greatest and most original of all the Muslim physicians and the most prolific as an author. In selecting a new site for the great hospital at Baghdad, of which he was chief physician, he is said to have hung out shreds of meat in different places, choosing the place where they showed least signs of putrefaction. His contribution to medicine consisted of 113 major works and 28 minor ones. Of his monographs, one of the best known is a treatise on smallpox and measles, the earliest of its kind and rightly considered an ornament to the medical literature of the Arabs. In it we find the first clinical account of smallpox.

The most illustrious name in Arabic medical annals, after Al-Rhazi, is that of Ibn Sina (known to the West as Avicenna). He organised physicians to travel to different areas, carrying drugs and administering relief to ailing people; other physicians visited gaols daily. Such facts show an intelligent interest in public hygiene unknown to the rest of the world at that time. In his efforts to raise the scientific standards of the medical profession and in his efficient administration of the Baghdad hospital lay Avicenna's chief title to fame. This hospital, the first in Islam, was erected at the beginning of the ninth century. Shortly afterwards thirty-four hospitals were built throughout the Muslim world. Travelling clinics made their appearance in the eleventh century. Muslim hospitals had special wards for women and each had its own dispensary. Some were equipped with medical libraries and offered courses in medicine.

Avicenna's Qanun, a vast Arabic medical encyclopedia, which represented the final codification of Greco-Arabic medical thought, was published in Rome in 1593 and Cairo in 1877. It had previously been translated in Latin in the twelfth century. In the last thirty years of the fifteen century it passed through fifteen Latin editions and one Hebrew. In recent years a partial translation into English was made. The book distinguishes mediastinitis from pleurisy and recognises the contagious nature of phthisis and the scientific diagnosis of ankylostomiasis and attributes it to an intestinal worm. Its materia medica considers some 760 drugs. From the twelfth to the seventeenth centuries the work served as the chief guide to medical science in the West and is still in occasional use in the Muslim East. In the words of Dr. Osler, in *The Evolution of Modern Medicine*, 'it has remained a medical bible for a longer period than any other work.'

It is now generally understood in certain specialised circles of competent historians of medicine that the early patterns of hospitalisation and hygiene in Europe received their energising impetus from Arab medical science. Guy de Chambrai (d. 1368), the surgeon of Montpellier, adopted the scorned operations of Arab physicians for rupture and cataract. Lanfranchi of Milan, who established himself in France (1295), introduced advanced methods in ligature of blood vessels and suture of wounds.

Less traceable, though no less real, is the link of the early European universities with the Arab diffusion centres. From the twelfth century onwards universities in Europe were established in numbers. The new learning crystallised in them. Such were Bologne, Padua, Montpellier, and Paris. As in Byzantine Alexandria, and Baghdad of the Caliphs, education revolved around the reading of the ancient authors, at last accessible in Latin. Experimental science was hardly known as yet, and botany, zoology, physics, and alchemy, as well as astronomy, mathematics, and medicine took their cue from their Arab masters. The science of chemistry owes its very inception to the tireless industry of the Arabs. They described scientifically the two principal operations of calcination and reduction: they improved on the method for evaporation, sublimation, melting, and crystallisation. They knew how to prepare crude sulphuric and nitric acids and to mix them to produce aqua regia, in which gold and silver would be dissolved.

The final expulsion of the Crusaders from the Holy Land by the Saracens at the end of the thirteenth century brought to a close the more direct contact between the East and the West. But the close association of nearly two hundred years had endowed the Western settlers in Palestine with much of the science and wisdom of the contemporary Muslim world. Hence it was that the immense suffering and loss of life and seeming uselessness of the Western attempt to seize Jerusalem from its Eastern inhabitants was compensated by an immense gain in knowledge, only a portion of which I have been able, within the compass of a short address, to indicate to you.

Today the Medical School is happy and proud to number amongst its students young men and women from the Arab and Middle Eastern world. And so it has come to pass that, after the passage of close upon a thousand years, we resume the dialogue between the East and the West—that dialogue wherein we learnt so much and which we gratefully acknowledge. Is that not a splendid thing, and if we who follow the healing art do not lead the way in international co-operation and the advancement of knowledge, who will?

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THE TREATMENT OF MALIGNANT DISEASE BY REGIONAL CHEMOTHERAPY

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THE treatment of cancer by the local application of chemical substances has been practised since the time of Hippocrates. Moore, writing in the *British Medical Journal* of 1866, commented on the failure of occasional applications of caustic pastes in the treatment of cancer and suggested the necessity for a long continued stream of the medicinal agent flowing through the tumour.

Modern chemotherapy of solid tumours began about 1940 when nitrogen mustard was first used in the treatment of the reticuloses. Klopp and his colleagues (1950) first described a method of localised chemotherapy for tumours in an area with an accessible arterial blood supply. Intermittent injections of nitrogen mustard given through a small polythene catheter in the appropriate artery produced regressions of tumour growth which had not been obtained by systemic chemotherapy. The amount of chemotherapeutic agent given by intra-arterial injection was limited, because of the general toxic effects produced after the drug had passed through the tumour circulation.

The ideal agent for this form of treatment would be a substance with a very short effective life in the body after injection so that the drug was completely inactivated by the time it had passed through the tumour circulation. This type of substance has not been produced but research continues along these lines. Two methods have been developed which aim at increasing the local or regional cytotoxic effects and at the same time reducing the general toxic actions of the drugs. The first consists of vascular isolation of the region to be treated with maintenance of the circulation of the isolated area by a pump oxygenator during treatment. The second consists of injecting large doses of the drug intra-arterially and at the same time giving an antagonist to the cytotoxic agent by systemic injection. The highest concentration of the drug occurs in the treated area and severe toxicity is avoided.

The majority of chemotherapeutic agents which have been used fall into two main groups, the alkylating agents and the antimetabolites. All these substances produce their biological effects by interfering with nucleic acid synthesis. The alkylating agents act by direct chemical reaction with the complex nucleic acid molecules and so destroy their normal function. Antimetabolites, on the other hand, interfere with the synthesis of nucleic acids by competing with normal metabolites for enzymes required in nucleic acid production. Alkylating agents act rapidly and most of them exert their maximum effect within minutes of coming into contact with body tissues. These drugs are suitable for single injections or short periods of isolated perfusion.

The antimetabolites act slowly and it is necessary to have the antimetabolite in contact with body tissues for many days before the maximal effect is obtained. These drugs are usually given continuously for days so that the sequentially dividing cells will be exposed to the antimetabolite. Another miscellaneous group consists of plant extracts and antibodies. Limited clinical success has been reported with these substances.

The principal cancer chemotherapeutic agents which are clinically useful in the treatment of solid tumours are listed in Table 1.

TABLE 1.

EXAMPLES OF SOME OF THE DRUGS CURRENTLY IN USE FOR CANCER CHEMOTHERAPY.

ALKYLATING AGENTS:			
NITROGEN MUSTARDS	TRIETHYLENEAMINES	ANTIMETABOLITES	ANTIBIOTICS
Leukeran ...	T.E.M. (Triethylenemelamine) ...	6 Mercaptopurine ...	Actinomycin D
Melphalan (Phenylalanine Mustard) ...	Thiotepa ...	5 Fluorouracil ...	—
Cyclophosphomide (Endoxan) ...	— ...	Amethopterin (Methotrexate) ...	—
Degranol (Mannomustine) ...	— ...	— ...	—
Myleran ...	— ...	— ...	—

REGIONAL PERFUSION.

Creech and colleagues (1958) first published the results of the treatment of localised malignant disease by regional arterial perfusion. Since then regional perfusion has been applied in a variety of ways by many investigators and some of the results have been encouraging.

Extracorporeal perfusion implies the continuous artificial circulation of cytotoxic drugs through an isolated area. When the area can be easily isolated as in a limb the dose of the drug is limited only by the tolerance of the tissues. Where isolation is difficult a varying amount of the drug leaks into the general circulation and the maximum dose of drug is limited by this spill over into the rest of the body.

The drug that has produced the most dramatic regressions of tumours after regional perfusion is melphalan (phenylalanine mustard). This drug is a combination of an alkylating agent with phenylalanine. It is thought that melanin-forming cells have an affinity for phenylalanine and this explains the selective toxicity in melanoma.

Melphalan has been used exclusively in the present studies. Three of the factors which influence the effectiveness of drug perfusion are temperature, flow rate, and oxygen tension. The apparatus is designed so that each can be controlled. The utilization of the drug is related to the temperature of the infusate. A heat exchange unit is connected between the arterial pump and the patient, and the infusate delivered at 40°C.

The venous return from the isolated area is pumped through an oxygenating column and pure oxygen is added. The blood then passes through a defoaming sponge before reaching the arterial inflow pump. High flow rates of 100-120 ml. per minute are maintained in order to achieve a uniform distribution of blood in the peripheral tissues and the pressure in the isolated circuit is maintained below the systemic blood pressure in order to limit the leakage into the general circulation.

The pump system is primed with 1 litre of heparinized blood and the main vessels cannulated. A tourniquet is tightened to isolate the part and the pumps switched on. The first injection of cytotoxic agent is given as soon as the venous return is adequate. Intermittent doses are injected during perfusion, and the total amount given depends on the leakage into the general circulation. This is small in femoral perfusion but higher in forequarter or pelvic perfusion. An estimate of the leak into the rest of the body is obtained by injecting some of the patient's red blood cells labelled with radioactive chromium 51 into the isolated part at the beginning of the perfusion. Samples are taken from a systemic vein at fifteen-minute intervals during perfusion and the percentage leakage calculated.

Clinical Experience.

Isolated regional perfusion has been applied to the limbs and girdles in five patients. The technique has been used by other workers to perfuse the head and neck, liver and lung, but the enormous leakage in these areas reduces the value of the method.

Regional chemotherapy has not been used for new cases of peripheral malignant disease, but has been reserved for cases of locally advanced or recurrent disease. It has been the aim to use perfusion as an adjuvant to further surgical treatment where possible. Regional perfusion has been attempted in six patients and was successfully completed in five. One patient had advanced atheroma and previous dissection in the groin made arterial cannulation difficult and dangerous, and the procedure was abandoned. Two patients had prophylactic perfusion after radical surgery. Four patients had recurrent malignant melanomata and one had a recurring pleomorphic sarcoma. The histories of the individual patients are as follows:

Case 1. This patient, a man aged 29, attended the Department of Dermatology in August, 1961, with a pigmented mole in the interscapular region, which had been present for nine months. A wide excision was carried out and a split skin graft applied. The pathological report was that of malignant melanoma, and the extent of the resection appeared adequate. The patient was re-admitted in May, 1962, with a hard mass in the right supraclavicular fossa. This was the only evidence of spread. Forequarter perfusion was carried out immediately after

dissection and removal of the affected neck glands which contained malignant melanoma. The catheters were threaded into the brachial artery and vein and the subclavian vessels were occluded in the neck. The perfusion was of 100 mg. of melphalan. The post-operative course was uneventful for the first week and then the white cell count fell to less than 1,000 within ten days and remained low for four days. During this period of marrow depression the wound became infected and a staphlococcal septicæmia ensued. The organism was resistant to most antibiotics and the patient died within a few days from septicæmia.

Case 2. This patient, a lady aged 75, had a malignant melanoma locally excised from the sole of the right foot, in August, 1962. She was seen a few months later and was found to have enlarged groin glands and local recurrence of tumour. Isolated regional perfusion lasting one hour was carried out with 80 mg. melphalan and at the same time excision of the groin glands was performed. These glands contained excessive melanin but no malignant cells. The lesion in the foot regressed in the first week after treatment. The white cell count fell to 1,200 per cu. mm. by the twelfth day, but soon rose again. The groin wound failed to heal and became infected. A brisk reactionary hæmorrhage occurred from the femoral artery thirty days after perfusion and femoral ligation was necessary. The right leg required to be amputated a few days later and the patient died from bronchopneumonia two months after perfusion.

Case 3. This patient, a man aged 78, had a painful tumour excised from the sole of the right foot in January, 1963. This was a malignant melanoma and a local recurrence rapidly developed. He was treated in March, 1963, by a block dissection of inguinal glands and isolated regional perfusion of the right leg. 80 mg. of melphalan was given during perfusion which lasted one hour. The local recurrence on the foot was not touched and rapidly regressed after perfusion. The white cell count fell to 1,500 per cu. mm. within twelve days and soon rose again to normal limits. The wound healed satisfactorily and convalescence was uneventful. The patient refused to have a further biopsy and excision at the site of the local recurrence and the regression has persisted. Without excision of the site of recurrence it is difficult to know the effectiveness of treatment in this patient.

Case 4. This patient, a woman aged 34, had an ulcerated mole excised from the outer aspect of the right leg in February, 1961. This was found histologically to be a malignant melanoma. Recurrence occurred at the site of excision within six months and a further wide local excision and skin graft was performed. Three weeks later a radical block dissection of the groin glands was performed, and the glands were found to be free of tumour. However, a further local recurrence was noted one month later. This was a small black nodule at the edge of the previous skin graft.

The right leg was perfused with 75 mg. of melphalan for a period of 1 hour 20 minutes. The white cell count subsequently fell to 2,000 per cu. mm. and erythema developed in the perfused limb. The recurrent nodule did not regress immediately and it was excised two weeks later and found to be an epidermoid cyst containing organised blood clot. The patient has remained free of recurrence for two years after excision and perfusion. Regional perfusion in this patient turned out to have been prophylactic and really should have been done at the time of regional gland dissection.

Case 5. This patient, a man aged 72, had a large lump removed from the right gluteal region in 1948. This recurred and was again locally excised in February, 1961, July, 1961, and June, 1962. The histological picture was that of a pleomorphic sarcoma. A further wide excision of gluteal muscle and scar tissue was carried out, and the hind quarter was perfused with 80 mg. of melphalan in July, 1962. The catheters were threaded into the common iliac vessels which were occluded at their origins during perfusion. The limbs were protected by femoral cuffs which were inflated during perfusion. The patient had an uneventful convalescence and has remained free of recurrence for over one year.

Serious complications occurred in two patients. Severe bone marrow depression occurred in one man due to an excessive leak and in the other patient local healing was impaired. Tumour response was observed in two patients. The result in the two patients treated prophylactically is difficult to assses at this stage, but both are free of tumour at one and two years respectively.

Krementz (1962) reported their experience with 350 perfusions and claimed that twelve out of forty-five patients with malignant melanoma remained under control after two years. Irvine and Noon (1960) have also reported dramatic regressions of malignant melanomata.

Continuous Intra-Arterial Infusion.

This term is applied to the administration of drugs by an intra-arterial drip. The drug which is not fixed or inactivated by the tissue in the infused area returns to the rest of the body by the venous drainage of the part. The folic acid antagonist methotrexate has been used in this form of treatment. Methotrexate interferes with the conversion of folic acid to folinic acid which is in turn necessary for nucleic acid synthesis.

It is possible to combat any methotrexate which enters the circulation by giving folinic acid systemically, and because of this very large doses of the antimetabolite can be given into the tumour-bearing area. Maximum concentration of the drug occurs in the infused area and the excess which recirculates causes little damage because of the circulating folinic acid. Cells vary in their sensitivity to antimetabolites depending upon the phase of mitosis. A high concentration of drug must be maintained in the tumour-bearing area for a prolonged period, so that all the cells will pass through a sensitive phase when the drug is present.

This treatment is simpler to carry out than regional perfusion and has been more widely used. Head and neck cancer and advanced pelvic tumours have been suitable for this form of therapy.

Malignant disease of the head and neck often remains localised and produces severe pain and disability by local tissue infiltration. Some of the arterial branches of the external carotid artery are easily entered and it is in the treatment of this form of malignant disease that the most encouraging results have been obtained. Sullivan (1962) found that 50 per cent. of patients with advanced head and neck cancer obtained relief of symptoms, and partial regression of growth after infusion therapy. Westbury (1962) and Espiner (1962) have had similar experiences. The

reports of these workers contain a few cases of relatively early disease in which total regression of tumour occurred after infusion and in some cases this has been maintained for more than one year. These observations of total regression in a few patients raises the question of the use of infusion for the treatment of the early rather than the advanced case.

Clinical Experience.

Twenty-four patients with epidermoid carcinoma of the head and neck have been treated in the surgical Professorial Unit, Royal Victoria Hospital. The disease was unilateral and confined to the distribution of the external carotid artery in every case. The superficial temporal artery was cannulated in sixteen patients. The superior thyroid artery was used five times, the facial artery once, and the external carotid in the remaining two patients. There were no complications from the minor surgical procedure of cannulation which was always carried out under general anæsthesia.

It is important that the catheter tip lies in such a position that the infusate reaches the desired area. A slow injection of 1 - 2 cc. of 5 per cent. fluorescein solution is given and the area examined under ultraviolet light. The fluorescence persists in the capillary bed of the irrigated area for about thirty minutes. When the catheter is in the external carotid supply, fluorescence occurs in the skin of the face, neck, scalp, and the mucosa of the mouth and tongue. If the infusate is reaching the internal carotid supply fluorescence occurs in the eye, eyelids, and forehead. The position of the catheter is adjusted until fluorescence is observed in the required area. Methotrexate (50 mg.) is dissolved in 500 ml. of physiological saline and placed in a plastic bag containing heparin. The plastic pack is inserted into the pouch of the Fenwal pressure infusor, which consists of an air-filled cuff, surrounding the polythene bag. The pressure in the cuff is kept above the patient's arterial pressure and the drip rate adjusted so that the contents of the plastic pack are infused slowly over twenty-four hours. The drip rate and the pressure in the infusion cuff are checked each fifteen minutes during treatment by the duty nurse. This method of arterial infusion has proved very satisfactory, and is easier to manage than infusion by the gravity feed or an arterial pump described by others (Sullivan, 1962; Espiner, 1962). The danger of air embolism is eliminated. The patient can move freely about the ward during treatment since the apparatus is very light and can be easily fixed to the buttonhole of a dressing-gown.

A full blood count is checked daily and the dose of 50 mg. of methotrexate per day continued until the white cell count falls below 2,000 per cu. mm. or toxic signs appear. The usual early toxic signs consist of painful mouth ulcers. Folinic acid (citrovorum factor) is given daily by intramuscular injection (6 mg. four-hourly). The average duration of infusion in the present series was 5 - 6 days, by which time 250 - 300 mg. of methotrexate had passed through the growth. The catheter was withdrawn at the end of the treatment and light pressure applied for five minutes. Bleeding from the infusion site did not occur after withdrawal of the catheter.

The results of the treatment are shown in Table 2. Total regression was defined as the complete disappearance of all visible tumour, but without histological confirmation. This occurred in two patients and has persisted for three and six months respectively. The treatment was considered to have been worthwhile in the patients who had partial reduction of tumour size and relief of symptoms. Pain relief was observed by the second day of infusion and analgesic requirements were reduced. The remissions did not last longer than 5 - 6 weeks in most instances which is rather disappointing. The incidence of tumour response and pain relief was greatest in the patients who did not have prior treatment with radiotherapy. Espiner, Vowles, and Walker (1962) record a similar observation.

TABLE 2.

CASES OF CARCINOMA OF THE HEAD AND NECK TREATED WITH METHOTREXATE AND THOSE SHOWING REGRESSION AND/OR SUBJECTIVE IMPROVEMENT.

LESION	NO. TREATED	PARTIAL REGRESSION	TOTAL REGRESSION	SUBJECTIVE IMPROVEMENT
Carcinoma:				
Tongue	2	–	–	–
Buccal Mucosa	7	3	1	5
Neck Glands	7	4	–	3
Skin of Face	2	1	1	2
Sinuses	2	1	–	1
Malignant Tumours of Salivary Glands	4	–	–	1
TOTAL	24	9	2	12

The incidence of complications in a palliative procedure is important when assessing the value of the treatment. Complications occurred in eight patients. (A reduction in white cell count alone was not counted as a complication.) Very marked ulceration of the buccal mucosa with œdema occurred in two patients. One patient developed a complete hemiplegia during treatment and died. Two others had transient signs of contralateral hemiplegia which cleared up in 5 - 6 days. The hemiplegia is presumably due to thrombi forming around the catheter in the external carotid artery and breaking off into the internal carotid circulation. One patient developed a severe bronchopneumonia during treatment and died. Severe mental depression was associated with infusion in a further four patients. Six patients developed a generalised macular skin rash after 4 - 5 days. This was severe enough to cause the treatment to be discontinued in each case. The majority of complications occurred in patients who had had previous radiotherapy.

The case histories of the two patients who had a total regression of growth are as follows:—

Case 6. This patient was a lady aged 57 who was first seen in May, 1962, complaining of a large solid tumour over the right parotid region. The growth was widely excised and was found to be a squamous carcinoma. A skin flap was taken from the forehead to cover the defect, and the bare area on the forehead was then covered with split skin grafts. The growth recurred six months later and she was re-admitted with a large recurrent solid tumour at the site of the previous excision, with no evidence of glandular spread.

A catheter was inserted in the superficial temporal artery and 375 mg. of methotrexate infused during eight days. The bulk of the tumour became necrotic within 2 - 3 days and there was a rapid reduction in size. The white cell count fell to 1,500 per cu. mm. after eight days. The drug was stopped for four days to allow the white cell count to recover and further 200 mg. of methotrexate was given. The white cell count fell sharply again and the treatment was stopped. There was complete regression of the growth after four weeks and there has been no local recurrence after three months.

Case 7. This was a man aged 74 who complained of a painful ulcer in the roof of the mouth for four months. This was an ulcerating squamous carcinoma, one inch in diameter, in the right side of the hard palate. A catheter was placed in the superficial temporal artery and fluorescence was noted in the margins of the ulcer. The infusion was continued for one week and a total dose of 350 mg. of methotrexate was given. The patient was free of pain within a few days of starting treatment, and the ulcer was half its original size at the end of one week. Regression continued and after three weeks a course of radiotherapy was commenced, because the patient had had no previous conventional therapy. The regression continued and the ulcer healed. The patient has remained well and is free of any recurrence nine months later.

Discussion.

There is no doubt that regional perfusion and infusion offers a degree of control over locally advanced malignant disease, particularly the malignant melanoma. However, no patient appears to have been cured of advanced disease by these methods.

There would appear to be reasonable grounds for believing that these new methods may improve the prognosis in many patients when combined with current conventional forms of treatment. The existing evidence suggests that if arterial infusion is being considered then it should be given before and not after radiotherapy or surgical excision.

There are many fields of future advancement in this subject. For example, there is no way of knowing whether a tumour will respond to any particular drug. Some tumours respond dramatically while their exact histological counterpart in another patient shows no response. Techniques require to be developed whereby cancer cells obtained at biopsy can be grown in tissue culture and the sensitivity to various chemotherapeutic agents assessed before any treatment is given.

The results of combining drugs with different cytotoxic actions appears to be another fruitful field of investigation and the inter-relationships between the combination of surgical radiotherapeutic and chemotherapeutic methods requires detailed study. It is also possible that a new type of specialist may emerge in the next decade—the chemotherapist-oncologist who will advise on the application of the advancing knowledge in the treatment of individual cases. It is to be hoped that developments in this field will help to unite rather than separate the specialist treatment of the cancer patient. The surgeon, radiotherapist, and chemotherapist should all combine their interest and experience so that the individual cancer patient will have the best possible chance of cure or control of his disease.

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PRESENT-DAY CONCEPTS OF TYMPANOPLASTY

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TYMPANOPLASTY was the subject of an earlier contribution to this Journal (Smyth, 1962). Since then there has been considerable controversy amongst E.N.T. surgeons about the operation, its value and techniques. The present article deals with personal observations made while visiting the major E.N.T. centres of the U.S.A. during 1962 and 1963, and is aimed at bringing the reader up to date, or as up to date as possible, with a subject which does not stand still for long.

E.N.T. surgeons can be classified as those who believe that tympanoplasty is a good operation or at least one with a future, and those who will not have it at any price. These latter, complaining that the hearing results are almost always bad, prefer to stick to the old modified radical type of operation with all its post-operative problems. Somewhere between these two groups are those who are prepared to utilise modern techniques only to repair a simple perforation, and then only in a long, dry, uncomplicated ear. The presence of cholesteatoma or ossicular defects are to them contraindications to this type of surgery.

Those who believe in the benefits of tympanoplasty can be again divided into the "old school" and the "new school."

(a) The "old school," which includes Wullstein, the originator of the operation, Portmann, Bocca, Shambaugh, Schuknecht, and Guilford, to mention only its better-known advocates, adheres strictly to the ideas originally proposed by Zoellner (1951) and Wullstein (1952). These embodied the use of post-aural full thickness or Theirsch grafts for drum reconstruction, and for lining the cavity, and five possible types of tympanic reconstruction which depended upon the degree of middle-ear disease. They rightly insisted on complete eradication of all irreversible pathology, good Eustachian function, and an adequate cochlear reserve. An ingenious system of burr holes around the annulus was devised to permit inspection and removal of diseased material from the aditus, antrum, and sinus tympani. However, in spite of this, removal of the bridge and posterior meatal wall was often necessary to completely remove dangerous disease, and the resulting cavity, in spite of the newly available antibiotics, was just as difficult to get healed as it had always been in the past. (British authorities state 40 per cent. cavities are either perpetually and intermittently moist—Beales, 1959.)

In these cases the postero-superior segment of the annulus was necessarily lost and in the subsequent tympanic reconstruction a narrow middle ear niche was unavoidable. So long as the mucosa in the sinus tympani and on the promontory were healthy this narrowness did not matter, and the hearing results were often as excellent as those produced by the same mechanisms in nature (i.e., columella or round window baffle). However, too often the extent and virulence of the disease which necessitated the wide removel of bone had also damaged much

of the middle-ear mucosa. Post-operatively adhesions would form only too readily across the mere 2 mm. space between the raw inner wall of the middle ear and the raw graft on the drum remnant. The result was immobilisation of the windows just as effective as by an otosclerotic process. Adhesions then accounted for many failures to gain improvement in hearing. The many methods improvised to overcome this problem include gelfoam pledgets soaked in antibiotics and hydrocortisone, nylon threads and polythene tubes removed via the Eustachian tube 6-12 weeks post-operatively, paraffin moulds removed at a second operation in two months, lining the space with nasal sinus mucosa, buccal mucosa, conjunctiva, and by a tube of vein, inflation by catheters and autoinflation at variable periods post-operatively. All were designed to create an air-containing pocket in communication with the Eustachian tube to protect the round wndow. The results by most of these techniques were disappointing in the long run, although gelfoam has always been useful to support the graft. It has now been largely replaced as a method of choice for graft support by blood clot.

Finally, the long-term results of Wullstein's operations have been marred by troubles with the graft both in the middle ear and the cavity. Some weeks or months post-operatively a weeping dermatitis may appear in the grafted skin. This looks like the granulations of chronic otitis media, but has been shown in some cases where histological section has been done to be superficial to the intact basal layer of epithelium (Austin, 1963b). In some personal cases I have found this appearance to be indicative of underlying pathology, for removal of the skin has revealed a pocket of sterile mucoid fluid in communication with a track of deep cells apparently not grossly unhealthy at the original operation. Frequently extra-aural skin grafted into the cavity or on to the drum collects large amounts of waxy sebaceous material on its surface necessitating frequent cleansing to avoid damage to the graft. A highly frustrating and only too frequent complication of extra-aural skin grafting is the occurrence of cholesteatomatous cysts in the graft itself. This occurrence may mar a good hearing result after as much as 2-3 years. These cysts are said to arise from the cut ends of glandular ducts and hair follicles, an arguable possibility in Thiersch grafts, but since it occurs also in full thickness grafts, it may be that some are in fact retention cysts of blocked sebaceous glands. It is undeniable that in some cases the source of trouble must be in fragments of squamous epithelium overlooked by the surgeon at the original operation, and the much greater frequency of these 'cysts' in the reconstructed middle ear than in the mastoid bowl is suggestive evidence for this. Even in experienced hands a small finger of skin growing from the edge of a perforation on the deep surface of the drum may be missed (Guilford, 1962). When one considers recent evidence of squamous metaplasia of the tympanic mucosa in secretory otitis (Bendek, 1963), detected only by microscopic examination, one wonders how often it may also occur in chronic middle-ear disease. There surely must be a stage in its development when naked-eye recognition is impossible and from which progression to a full-blown cholesteatoma is inevitable.

(b) The "new school," largely American and younger, is led by William House and Austin, who have pioneered physiologic developments of the original

German ideas. Their operations—the "combined approach technique" (House, 1962) and "vein graft tympanoplasty" (Austin, 1961, 1963a; Austin and Smyth, 1963)—were developed independently and without knowledge of each other's thinking during 1961. (During the following year a similar process of logical development was occurring in Belfast—Smyth, 1962b.)

It should be made clear the treatment of the mastoid segment in these methods is the same as that described but not persisted in by Tumarkin in 1938. The reconstructive methods employed owe much to Shea for his vein graft (Shea, 1960) and malleus-stapes strut ideas (Shea, 1961; Shea and Smyth, 1963), and to Wullstein (1952) and McGuckin (1949), to name only a few who earlier had recognised the occasional occurrence of columellar hearing in natural healing of chronic otitis media. In making recognition to the sources of knowledge in this field very great tribute must be paid to Julius Lempert (1938), who established middle-ear technology, but who sadly now is most often thought of in connection with an outdated and unfairly condemned operation—fenestration of the lateral semi-circular canal.

The basic philosophy of the "new school" is twofold. First, that there should be no open post-operative cavity, and secondly, that the anatomical relationship of drum to meatus and middle ear should be as close to normal as possible. Achievement of these precepts has several excellent consequences. Firstly, once healing has occurred the patient need no longer attend for toilet or periodic observation. Experience has shown (Austin, 1963) that in the small numbers of ears in which recurrence of disease has occurred it has done so, not as predicted by some, in a dramatic and dangerous way, such as with intracranial complications, but has presented as either a loss of hearing gain or recurrence of otorrhœa, both frequently associated in time with an upper respiratory infection. Fungal (Smyth, 1961, 1962c) and bacterial infections of the bowl are no longer the causes of crowded clinic waiting-rooms, and bathing and hairwashing can be indulged in normally. Again, since the normal communication between the mastoid area and the Eustachian tube remains intact, mucoid discharge from abnormal cells in the petrous pyramid can freely escape. It is my personal feeling that therein lies one of the great advantages of the method. Where there has been chronic infection of the mastoid, and after removal of the *gross* disease process, one often sees air cells whose only abnormality is that their lining is thicker than normal and secretes mucus. When these cells extend deeply in association with the labyrinth, their exenteration even in the best hands might endanger the canals unjustifiably. Yet if left they will continue to secrete minimally for often many months, and in a radical operation this secretion would keep an open cavity moist. By Austin's and House's methods this scanty mucoid discharge is disposed of into the naso-pharynx without ill effect.

Finally, by retention of the tympanic annulus the drum's position is kept as far from the promontory as possible, and in normal relationship to the direction of the sound waves travelling towards it down the meatus. Although I have no proof of it, it seems reasonable to presume that distortion of hearing due to

dissipation and reflection of sound energy around the walls of an open cavity may also be avoided advantageously.

In view of the recent articles on this technique (House, 1963; Austin and Smyth, 1963) it would be superfluous to deal with the steps of the operation in any detail. I was fortunate enough to see Bill House operate in Los Angeles and see his excellent results. While in Memphis I observed David Austin operate on many hundreds of patients and was involved in their post-operative care and follow-up. Having compiled the statistics on over one thousand of Austin's patients, I am more than satisfied with the practicality and success of the method. However, there is one practical point worth remembering which hinges on the basic differences between the American patient and those in the British National Health Service. Nearly always the American private patient reaches the operating room with much less extensive pathology than his British counterpart. This means that the surgical technique is often more difficult in our cases and the excellent American results will always be hard to emulate.

As far as general technique is concerned, a few remarks on variations may be worth while. The term "combined-approach" used by House (1962) is very apt, as the old mastoid route and the newer permeatal route are used together. The first part of the operation is concerned with eliminating "irreversible pathology" (a term sacred to otologists). This is begun through the meatus and if the disease cannot all be eradicated by this route, the mastoid antrum is opened through the cortex with power-driven burrs. (The coup d'etat was given to the mallet and gouge techniques of old Vienna by the research of Schuknecht (1961), who showed that hammering on the temporal bone caused cochlear trauma in cats. This hardly unexpected news has apparently not yet crossed the Atlantic!) The decision to go into the antrum is made when cholesteatoma is seen or is suspected to pass into aditus or attic, when these areas can be seen to be full of thick granulations or when pus can be aspirated from the aditus. This decision may be easier after partial inspection of these areas through burr holes placed in the outer walls of the attic and aditus. When it is decided to open the antrum, the choice between post-aural incision and endaural incision is a matter of choice. The arguments in favour of the endaural are that it may be combined with an endomeatal incision for middle-ear work should this be required, and that since the periosteum is elevated off the mastoid cortex in one piece there is less chance of a post-aural depression in subsequent years—in fact new bone may grow from the periosteum into the antrostomy. (These depressions can collect dirt and be troublesome if spectacles are worn.) On the other hand, when bone-removal extends to the mastoid tip or drainage is desirable in the immediate post-operative phase, it may be inefficient via the lower end of an endaural wound which lies several millimetres superior to the depths of the bony cavity. In these cases drainage through a post-aural stab wound is preferable. After opening the antrum the diseased tissue is then followed to its limits and removed. The bone forming the posterior root of the zygoma and outer walls of aditus and attic can be successively removed to reach granulations or squamous

epithelium. (This now amounts to an extended simple mastoid operation.) During this stage care is taken to preserve the outermost shell of the osseous superior and posterior meatal walls. Even one millimetre thickness of bone deep to the periosteum will be sufficient to support the meatal skin and maintain the normal contour of the ear canal. House (1962) has made an important observation regarding the sinus tympani which is worth acting on at this stage of the operation. It is that a track of cells often passes posteriorly from the upper part of the sinus, lateral to the pyramid and the facial nerve. (Occasionally a similar track passes medial to the facial nerve.) This lateral track called the "facial sinus" can be opened from behind (using a diamond burr for safety) by taking down a small area of bone just infero-lateral to the short process of the incus. This is the deepest area of the annulus, and once it is removed the incudostapedial joint, stapes, posterior part of the sinus tympani and the facial sinus are now open for removal of any irreversible pathology which may be present. This step is of paramount importance in cases of postero-superior perforation. Wullstein has designed a burr hole for this same purpose, but since it is made via the meatus I have always felt the facial nerve might be endangered. With House's method, the fossa incudis, an excellent landmark for the facial nerve, is clearly seen from the start. When cholesterol granuloma is found it frequently fills all the cells; most surgeons feel that it should be ruthlessly eradicated (Austin is the one exception to this opinion and he will often leave thick granular mucosa in many areas without apparent ill effect). When cells extend deeply into the petrous pyramid discretion may now be the better part of valour as dissection around the posterior and superior semi-circular canals is difficult enough even in a bone whose anatomy has not already been distorted by infection and its consequent osteogenesis. To risk opening one of the canals is to risk a dead ear and maybe a dead patient!

The methods of tympanic reconstruction are numerous but some few are rapidly becoming more popular than others:

(a) The drum. House (1961) and Plester and Nysten (1959) use meatal skin, dissecting out a large 'L'-shaped piece from the drum remnant and osseous meatus. The 'vascular strip' is left in situ. This is the posterosuperior skin in which some constant branches of the posterior auricular artery travel towards the drum. This is a laborious and tricky piece of dissection and is done early on in the operation. Shea made drum repair a going concern when he devised the vein repair method in 1960, and Austin (1963) has proved its value since (90 per cent. success). There are others who find vein difficult to work with and complain that it is not always possible to get a piece large enough for a total perforation. In answer to this it can be said that two pieces overlapped will do the job well. Schiff (1962) has shown that homogenous vein from a 'bank' works well and when large veins such as the internal jugular are available obviously the size of the perforation does not matter. Tabb (1963) prefers temporalis fascia and this is easily obtained if an endaural incision is used in the exposure of the mastoid cortex. Other substances used in the States are fat, muscle, pericardium (from a 'bank') and peritoneum.

(b) Conducting mechanism. The methods of repair are numerous and depend upon the pathological defect in the ossicular chain. This is most commonly encountered in the long process of the incus. Many ingenious but not over-practical methods have been devised to deal with this, amongst them repositioning the incus or the malleus (Hall and Rytzner, 1961), wiring the incus or malleus to the stapes (Harrison, 1960), grafting skin direct on to the incus and the head of the stapes to bridge the gap (Beales, 1961), connecting the incus and the stapes head with polythene tubing, or with a small piece of cortex bone, Wullstein's type III operation including Guilford's modification (hole in graft to grip stapes head) (Guilford, 1962), placing a strut between the neck of the malleus and the footplate of the stapes after crurectomy (Shea, 1961; Austin and Smyth, 1963), polythene columella on footplate after crurectomy supported by wire to the neck of the malleus (Smyth, 1963a). Good results have been obtained with a teflon strut between the neck of the malleus and the footplate of the stapes (Austin, 1963a; Smyth, 1963b). The type III operation of Wullstein is often difficult to complete satisfactorily because the annulus, to which the drum must be attached to fulfil the aims of the operation, overlies and often projects beyond the stapes head. It is impossible for the drum to make contact with the stapes in such a case.

When the malleus is lacking and there is a mobile footplate, then a columella type mechanism is sought by placing a teflon "sunflower" columella between the footplate and the drum (Austin, 1963). Teflon is preferred to polythene, being less likely to slough through the drum. In this situation the above remarks about the annulus in the type III operation also apply. If the disease has not already done so, then the annular rim must be taken back to allow room for the columella. A useful trick in this type of reconstruction is to make a small hole in the vein immediately over the columella. Some of the spokes of the columella are then threaded through this hole and a small piece of endomeatal skin placed as a covering patch over the visible spokes and the hole in the vein. This helps to keep the columella steady until fibrous tissue forms around its lateral end. In the past many bad hearing results have been due to early tilting of the columella. This type of reconstruction is much preferable to the Wullstein type IV operation which depended alone upon phase difference between round and oval windows. It is believed that direct energy conduction to one window is always much more efficient than phase difference.

Results obtained by Austin in 317 ears. These were operated upon before the incorporation of the teflon strut which is expected to improve the hearing gains in type II operations.

Type I (Typical—ossicular chain intact, dry central perforation). Total number 117, 89 per cent. socially adequate hearing.

Type II (Typical—long process incus absent, drum perforation. Cholesteatoma or tympanosclerosis (64 per cent.). Total number 215, 71 per cent. socially adequate hearing.

Type III (Typical—almost total perforation, destruction ossicular chain. Cholesteatoma 30 per cent.). Total number 45, 54 per cent. socially adequate hearing.

In some American centres cavity obliterating operations after mastoid surgery are popular. These operations consist of filling the cavity with fat, cartilage, and bone of animals and of the patient, fibrous tissue or muscle. Plastic has not been used yet as far as I know, but "Silastic," a new material from U.S.A., will certainly be soon used by someone. Probably the most commonly practised of these operations is muscleplasty, where a pedicled flap of temporalis muscle is swung down into the cavity. In this the muscle, being now non-functional, is replaced by fibrous tissue and consequently it is impossible to "obliterate" a cavity permanently in this way. However, even after shrinkage of the "filler," the cavity will be much smaller than otherwise and has the great asset of now having a much more vascular (and thus infection-resistant) lining. The removal of disease, both reversible and irreversible, is of even greater importance here than in the "combined-approach" operation. A thick mass of fibrous tissue might well mask an underlying collection of stagnant (and thus infection-prone) mucus or of squamous epithelium until intracranial invasion was well advanced.

Recently published results (Rambo, 1960; Thorburn, 1962; Palva, 1963) show clearly that this operation is best used to obtain a dry ear, rather than a hearing one. I think the basic reason for the frequent poor hearing result is the lack of annular support for the posterosuperior quadrant of the drum. Unsupported, it tends to fall inwards early on, and later is actively drawn inwards by fibrous contraction where the muscle lies on the medial wall of the aditus. The edge of drum in relation to the head of stapes must always be hard to keep finite and fixed in this operation, whereas in the "combined-approach" this is done by the bony annulus. However, there is no doubt that when a dry ear is the chief consideration muscleplasty can usually be relied upon to give satisfaction.

Finally, what should be the indications for tympanoplastic operations at their present state of development? The essentials are adequate Eustachian and cochlear function to justify what can be predictably done with the middle-ear mechanism. In bilateral otitis the aim should be to get at least one ear with satisfactory hearing. In unilateral otitis, with good hearing in the other ear, the patient will usually be most satisfied by a dry, safe ear from the operation. In such a case the hearing result is of secondary importance to abolition of pain and discharge.

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THE LIFE AND WORK OF ROBERT CAMPBELL

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"*'Let us now praise famous men'—*
Men of little showing—
For their work continueth,
And their work continueth,
Broad and deep continueth,
Greater than their knowing!"

(KIPLING).

IN addressing the students at the opening of the 1902 session at the Belfast Royal Hospital, then in its final year at Frederick Street, Robert Campbell, who had been appointed Honorary Assistant Surgeon two years earlier, suggested that it might have been more appropriate for one of the senior members of the staff to have undertaken this duty and remarked, "If that address had taken a retrospective form and dealt with the origin and progress of this institution, and the lives of the many well-known men whose workshop it has been, a record of great interest and some permanent value might have been produced. And it is to be hoped that the present crisis in the history of this hospital will not be allowed to pass without some such record being made, for in the case of institutions or of individuals there is nothing better worth preserving than the memory of an honourable past." It is in an attempt to aid the preservation of the memory of one individual's "honourable past" that this outline of the life of Robert Campbell and the foundation of the Robert Campbell Memorial Fund has been compiled.

Robert Campbell was a true Ulster Scot, or in his own words, an "unscotched Scotsman," born on 1st August, 1866, in the Old Manse, Carnanee, near Templepatrick, of a family whose history in Co. Antrim dates from plantation times in the seventeenth century, when one Hew Campbell, "a gentleman of the house of Ducket Hall" in Ayrshire, Scotland, settled at Oldstone, near Antrim. Robert Campbell was the second son of Reverend Robert Campbell, Minister of the Old Presbyterian Congregation of Templepatrick, Co. Antrim, and his wife, Elizabeth Simpson. Baptized on 8th November, 1866, by Reverend J. Porter of Ballee, he had a long and honourable manse tradition behind him. His ancestor, Hew Campbell*, was certainly an intimate friend and probably a relation by

*Hew Campbell, according to the tradition of the locality, married either a daughter or a niece, probably the latter, of Reverend Josias Welch. In his will Josias Welch left a legacy to Hew Campbell "as a testimony of my love to him," all the rest of his property going to his wife and children.

marriage of the first Presbyterian minister in Templepatrick, Reverend Josias Welch (1622-1634), grandson of the great Scottish reformer John Knox and known locally as "the cock of the conscience" from his preaching abilities. Further, Robert Campbell's great-uncle and his father, both also named Robert Campbell, held between them the ministry at the Old Presbyterian Meeting House, Templepatrick, from 1796 to 1894, a period of ninety-eight years. The first Reverend Robert Campbell, minister from 1796 until 1855, played a part in the anxious and stormy period of church history between 1821 and 1829. In the conflict in the General Synod between the parties led by Reverend Henry Cooke (Orthodoxy) and Reverend Henry Montgomery (New Light) he took a firm stand on the side of religious liberty "holding the Scriptures of the Old and New Testament to be the only infallible rule of faith and duty, and refusing to subscribe as articles of belief mere human tests and confessions."* As a result, he was one of the five ministers who, having with their congregations seceded from the General Synod of Ulster, constituted on 14th November, 1829, the Remonstrant Presbytery of Templepatrick which, on 25th May, 1830, joined with two other presbyteries (seventeen ministers in all) to form the Remonstrant Synod of Ulster. There can be little doubt but that this background of belief in civil and religious liberty was of profound importance in the upbringing and mental development of the future surgeon.

In the third Robert Campbell Memorial Oration, Sir John Campbell, his elder brother, gave the following account of Robert's boyhood—"At Roughfort National School, where Robert Campbell received his early schooling, his companions were the children of small farmers and of agricultural labourers. From them he got a knowledge of the lives of the poorer people, and a sympathy with their difficulties and trials, which stood to him in his after life. The mistress of the school, a Miss Gourlay, was an excellent teacher and a stern disciplinarian. She enforced her rule by means of the cane, in the use of which she was not trammelled by the objections of modern parents to it. . . . Under the teaching of his father he learned to be thorough, to take pains, and, above all, to remember that character and conduct were the most important things in human life. In his early days was laid the foundation on which he built up his life." This was his brother's view; these, however, were not the only influences. He had a great affection for, and must at times have leaned heavily upon, his elder brother, the future Sir John Campbell, Surgeon to the Samaritan Hospital and Member for Queen's University, Belfast, in the first Northern Ireland Parliament, a man of vast intellect, industry, and strength of character, to whose precept and example he must have owed much. Much also he must have owed to his elder sister, Eliza Wilson, who, at an early age, took the place of his mother, while also in the intellectual background was his younger sister, Isabel, who later graduated B.A. in modern languages at the Royal University of Ireland.

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*Part of the inscription on the grave stone of Reverend Robert Campbell, senior, erected by his congregation.

His early life and education must have involved much physical hardship and, in addition, two tragic happenings marred this early phase. Firstly, at an early age, he contracted scarlet fever, a disease of much greater severity then than now, which resulted in an albuminuria, and this may well have sown the seeds of his subsequent Bright's disease and death from uræmia. Secondly, four days after Christmas in 1875, when he was 9 years old, his mother died suddenly from puerperal eclampsia. A third sister of his, Margaret, died in childhood.

Robert Campbell showed early promise as a scholar and reached the top form at Roughfort National School when only 11 years of age. He subsequently entered the Royal Belfast Academical Institution and studied in the English School under John Carlisle, M.A., father of the future Lady Pirrie, and in the Classical School under Robert Steen, Ph.D. Each department at "Inst" until 1897 was a separate school with co-equal headmasters. He entered the Arts Faculty of Queen's College, Belfast, in 1884 with an entrance scholarship. His first interests were English Literature and the Ancient Classics, and his studies in the latter must have been assisted by his father, who had then retired from active duty in the ministry, but gave instruction in Ecclesiastical Greek and New Testament Introduction to divinity students. His love of literature remained all his life and was illustrated by Professor J. Dixon Boyd in the following way—"My father-in-law, who knew him well, used to tell of sitting beside him in a tram. Robert Campbell suddenly emerged from a small volume in which he was immersed to exclaim: 'There's the best definition of life I have met!' The book was Measure for Measure; the line indicated was 'This sensible warm motion'—from Claudio's moving speech in the first scene of the third act. He was a successful and busy surgeon who read Shakespeare in a tram-car, and read him with critical and sensitive attention."

As an undergraduate, Robert Campbell gained first-, second-, and third-year scholarships in Arts (Literary Division) and graduated B.A. in 1887 with second-class honours in Ancient Classics at the Royal University of Ireland. His inclination then is said to have been to read for the Bar, but he yielded to other counsels and entered the medical faculty. In 1890 he was awarded a third-year medical scholarship and in 1891 a fourth-year medical scholarship (Anatomy and Physiology) and the Coulter Exhibition at the Belfast Royal Hospital. He graduated M.B., B.Ch., B.A.O. in 1892 at the Royal University of Ireland with second-class honours. In this final examination he was placed first in his year and awarded an exhibition.

In retrospect it seems surprising that a Presbyterian minister at that time should have been able to afford a university education for three of his family, and at times the slender resources of the minister, even though supplemented by scholarships, must have been severely strained. A commutation of the regium donum, following Gladstone's Irish Church Act of 1869, was probably a source of aid.

In the session 1891-92 Robert Campbell was Treasurer of the Belfast Students' Medical Association, A. B. Mitchell being President. He has left an interesting

account of the amenities available before the present Students' Union was built. "The student of the present day with his dining-room, reading-room, smoke-room and billiard-room must find it difficult even to imagine the provision made for the creature comforts of the seeker after knowledge in those days. A dark and dismal room with a counter across one end and devoid of seating accommodation represented the present Students' Union, while stale tarts and buns and milk, which, I am sure fell far short of the standard which Dr. Henry O'Neill demands, took the place of the sumptuous fare with which you are now daily provided." Dr. O'Neill was, of course, the famous "Health, Belfast."

After qualification Robert Campbell was Demonstrator of Anatomy (1892-93) under Professor Peter Redfern.* Professor Redfern was an outstanding teacher and was generally regarded as having laid the foundations of the advancing Belfast School of Surgery. Sir William Whitla, in 1909, when analysing his character, maintained that his most important secret was that "In him the quality of thoroughness developed into a master passion. Every department of his anatomical work was dominated by it; with him, as regarding the teaching of anatomy and physiology 'there existed not a trifle.'" In this quality of thoroughness Robert Campbell proved an apt pupil; he always acknowledged his indebtedness to him and spoke affectionately of him as one "who inspired all who had the privilege of being his pupils, no less by the keenness of his intellect and his earnestness of purpose, than by his deep interest in the welfare of his former students."

In 1893 Professor Redfern retired and Robert's brother John's application for the vacant anatomical chair was unsuccessful, Johnson Symington of Edinburgh being appointed. Robert Campbell then took up for a year an appointment as house surgeon in St. Thomas's Hospital, London, a hospital on whose staff his fellow-townsman, Sir William MacCormac, a famous Queen's College graduate, was then surgeon. He later became resident physician to Chester Infirmary until 1896, and he himself regarded his clinical experience there as being of great help in his future career. He further qualified M.R.C.S. and L.R.C.P. London in 1893 and became F.R.C.S. England in 1896, the year in which Sir William MacCormac was for the first time elected as President of the Royal College of Surgeons of England.

In 1897 Robert Campbell returned to Belfast and in 1898 was appointed Honorary Surgeon at the Belfast Hospital for Sick Children, then in Queen Street. His work at this hospital was always a great source of pleasure to him; he became devoted to children and was beloved by them in turn, and he spent more and more time in working there. Professor Fullerton has described how "On his out-patient day, the waiting-room of the hospital was crowded to its

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*Queen's University is unable to trace definitely when he was demonstrator, and some memorial orators have suggested 1897. On that date Professor Symington was in office, and a manuscript in my possession, written by Robert Campbell, states specifically he was demonstrator to Professor Redfern.

utmost limits, and time and time again I have known him work from nine in the morning until late in the afternoon, examining, treating, and operating on these children."

From 1899 to 1900 he was Surgical Registrar at the Belfast Royal Hospital, and, in 1900 he was appointed Honorary Assistant Surgeon to the same hospital, later, in 1912, when John Walton Browne retired, becoming Honorary Surgeon to the then Royal Victoria Hospital. He also acted as a Clinical Lecturer in Surgery to Queen's University and during the 1914-1918 war acted as Surgeon to the U.V.F. Military Hospital which was set up in the Exhibition Hall in the University's grounds. He joined the Ulster Medical Society in 1897, acted as Honorary Secretary to it from 1900 to 1903 inclusive, was Vice-President in the session 1911-12 and President in the session 1916-17. He was a member of the British Medical Association and was elected President of the Ulster Branch in the 1918-19 session. He was also a fellow of the Royal Society of Medicine.

During his working life Robert Campbell first lived with his brother at 21 Great Victoria Street, later moving to 63 Great Victoria Street, finally in 1909 moving to 22 College Gardens, where he resided during the rest of his life. He married Miss Amy Isobella MacTaggart, daughter of William MacTaggart of Eltham, his bride being the matron of his beloved Queen Street Children's Hospital. There was no issue of the marriage.

Robert Campbell's contribution to the advancement of surgery was due probably not so much to the originality of his views as to his gift of clarity of logical thought which enabled him to recognise the best of the ideas available and then put them into practice. He was first and foremost a clinician, rather than a mere surgical carpenter; he condemned in his 1902 address the needless multiplication of operative procedures under various names, and made a strong plea for a more energetic study of surgery in its scientific aspects. In describing and condemning repeated mutilating operations for recurrence of tuberculous disease he remarked, "If things continue at their present rate I foresee the time when as much of that patient shall be resting quietly beneath the sod as shall be above ground striving to fulfil the duties of a citizen." He wrote very little and published less, although he often orally demonstrated cases at medical meetings. This is much to be regretted as he had a clear simple style, accompanied by a logical presentation of his facts, which renders reading of his manuscripts, beautifully penned in his own hand, a pleasant experience. Apart from his surgical papers, considered later, he undertook the surgical section of a Textbook of Treatment (alphabetically arranged) to be published by Sidney Appleton, London, the other sections on obstetrics and gynæcology and medicine being in the hands of his brother John and William Calwell respectively. Regrettably, he never finished his manuscript, and only John Campbell's volume on Obstetrics and Gynæcology was subsequently published (1908) in book form.

Robert Campbell was one of the first in Ulster to adopt in its entirety the system of aseptic surgery. The use of rubber gloves had been introduced by Halstead about 1890 in Johns Hopkins Hospital, and their use became a regular

part of the technique at that hospital by 1896. At that time, too, they were being used for some operations by John Campbell at the Samaritan Hospital. Robert Campbell was also an early user, and he was, in addition, the first in Ulster to advocate the use of face masks covering the mouth and nose. Credit for the introduction of these is usually given to Mikulicz (Breslau) and Berger (Paris) in 1897, but they were not generally in use until as late as 1906. Robert Campbell's description of his reasons for adopting face masks illustrates his clear thinking and his odd turn of phrase, which so captivated his colleagues, and is worth recording. In describing his technique in operations for hernia in infants and children (1903) he remarked, "In the majority of the operations I have worn thin rubber gloves and I frequently, especially when demonstrating the operation to students, wear over the head a square piece of sterilized gauze split into two tails at either side, the anterior two being tied behind the neck and the posterior two being brought forward over the mouth. This latter precaution I adopted after seeing operators and their assistants now and again during an operation in which they were much interested, shed showers of dandruff into the wound, and also from the observation that some people cannot speak to you without spitting into your face."

His first published work was a short presentation of a case of club hand, illustrated by a skiagraph, to the Ulster Medical Society on 7th April, 1898. He was an early advocate of operation in all cases of perforated typhoid ulcer, whether in the active or the convalescent stage of the disease, and on 12th December, 1898, he was the first in Ulster to close such a perforation. It is interesting to recall that the first perforation of a gastric ulcer to be closed by laparotomy in Ulster was by his brother John on 21st July, 1897, the patient, a woman of 35, surviving.

In 1906, before the Ulster Medical Society, he read a paper on acid intoxication following general anæsthesia. He described three cases of delayed chloroform poisoning in children and strongly insisted on the greater safety of ether as compared with chloroform in operations. In 1909 he read a well-composed and interesting paper on the surgical treatment of exophthalmic goitre, some of his partial thyroidectomies being done under local anæsthesia, and in 1915 one on fractures of the head of the radius. He maintained "in all but the mildest forms of fracture excision of the whole head of the radius is the best treatment." He argued that the usual cause of the condition was a fall on the outer side of the elbow and not on the palm of the hand.

Robert Campbell's most important contributions were, however, in the fields of the operative treatment of hernia in infants and children, and the ætiological types of acute appendicitis. In the former subject, by careful and laborious work, he succeeded in perfecting the operation for hernia in the young, and making it a recognised and successful method of treatment in spite of much opposition. In so doing, he not only gained personal fame, but brought great credit to the Belfast Medical School. In an unpublished, undated manuscript in the writer's possession, he outlines the history of the operation for the radical

cure of inguinal hernia in infants and young children, and the story can best be told by reproducing part of this in his own words:—

"1898. Joined staff of Children's Hospital. Teaching then=no operation unless hernia uncontrollable after 8 or 9 years.

"1899. Discussion at Portsmouth (B.M.A. meeting) introduced by John Langton on treatment of hernia in children under 5 years. Langton, Edmund Owen, and Corner against operation under 5. Eve not so positive. Self from personal experience of 20 cases in favour of operation.

"1901. Self-read paper at Ulster Medical Society on 40 operations. No age limit insisted on owing to success in strangulated cases as young as 21 days.*

"1901 (later). Paper by Stiles in *B.M.J.* on 100 cases. Age advised 2 years. 3 deaths. This=1st large series of cases published by British surgeon.

"1903. Self-read paper at Ulster Medical Society, afterwards published in *Lancet*, of 114 cases. Age limit done away with. No deaths. First published paper advocating early operation, and first long series without a death."

He continues chronologically with published series and later the entry reads:—

"1906 (April). Self-read paper at Children's Society in London on 305 cases, 10 per cent. under 2 months, and 34 per cent. under 6 months. Age for operation =when child is brought for treatment, yet in 1912 at meeting of Royal Society of Medicine member boasts of operation in child of 3 months."

The manuscript concludes with a short analysis of 1,500 cases of inguinal hernia, 28.6 per cent. being under three months and 43.2 per cent. under six months. Three cases were under seven days old at operation, two between seven and fourteen days, eight between fourteen and twenty-one days, and sixty between twenty-one and twenty-eight days. There was one death in the series from delayed chloroform poisoning. Professor Sinclair, in the first Campbell Memorial Oration, stated, "Those engaged in large family practice can but estimate the amount of human suffering and misery obviated by the early adoption of the operative plan in young children, as compared with the consequences of the oft-times careless and inefficient trussing carried out by mothers and nurses for several years."

Some time before 1909 Robert Campbell began to perform these operations in the out-patients' department of the Queen Street Children's Hospital. This at first gave rise to criticism by the governors of the hospital, but all objections were overcome in the end, and a well-equipped out-patient theatre was provided. This procedure received support from a paper by J. H. Nicholl of Glasgow, read at the B.M.A. meeting in Belfast in 1909, which recommended that a much larger share of operative work at a children's hospital should be done in the out-patients' department. Robert Campbell, at the same meeting, supported this policy completely in the case of those children who could be easily carried by the mother. This work was later taken up by Professor Fullerton.

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*I have so far been unable to trace this paper in the Transactions of the Ulster Medical Society, in Robert Campbell's manuscripts or elsewhere.

About 1910 Robert Campbell first distinguished clinically between acute appendicitis and acute appendicular obstruction, i.e., between an acute inflammation of the wall of the appendix and an acute obstruction of its lumen resulting in a closed loop intestinal obstruction. Credit for this distinction is usually given to D. P. D. Wilkie who, without knowledge of Robert Campbell's work, published his own conclusions in the "British Medical Journal" in 1914. In view of this, the following lines are quoted from a paper by Robert Campbell read before the Ulster Medical Society on 12th December, 1912, and published in the Society's Transactions. The paper begins, "About two years ago, at one of our meetings, I expressed the opinion that there were two acute affections of the appendix, viz.—obstruction and genuine appendicitis—which differed in their pathology, their symptoms, and their tendency to a fatal termination. Subsequent experience has convinced me of the accuracy of the view which I then held; although in the various text books and monographs at my disposal, and in the numerous articles and debates on the subject of appendicitis I have been unable to find any support for my contention described." Having outlined very fully and clearly the symptomatology of the two conditions, he wrote, "From what I have said you will gather that I regard these cases of obstruction as infinitely more dangerous to life than the average case of appendicitis. The mild onset of the condition, the feeling of well-being on the part of the patient when gangrene has already taken place, and a catastrophe is to be expected, are calculated to deceive any medical man whose attention has not been forcibly directed to its insidiousness and its great dangers." This subject was again discussed, along with other forms of intestinal obstruction and divers other subjects, in his presidential address to the Ulster Medical Society in 1916 under the title, "Some Surgical Problems." Today, fifty years later, it would perhaps be fair to say that although some cases of appendicular disease are not so sharply defined as in the original description, this conception is still useful and may lead to prompt operation in the insidious case.

Robert Campbell was not a spectacular operator. He laid great stress on accurate and detailed anatomical knowledge, and, although he was not slow, he never made speed for its own sake one of his ideals; rather he would methodically, step by step, complete the stages of a complicated operation often in silence and with very little assistance. The thoroughness of his aseptic technique was such that wound sepsis was very uncommon in his wards, e.g., in his series of three hundred and five inguinal hernia operations, reported in 1906, there were only two cases of suppuration. He was credited with great powers as a diagnostician. These powers, however, appear to have been based on careful study of all the factors bearing on the case rather than to any intuitive flair. It was his logical and orderly mind, combined with the thoroughness which was always one of his characteristics, that made his diagnoses always sound and worthy of unusual respect.

As a teacher Robert Campbell was held in the very highest regard by his house surgeons, pupils, and others. This is perhaps strange, as he was a man of

few words with long periods of silence. Purce, one of his house surgeons, quoted the hospital alphabet as saying:—

"R is for Robert, whom you know, boys and girls,
Does not believe in the casting of pearls."

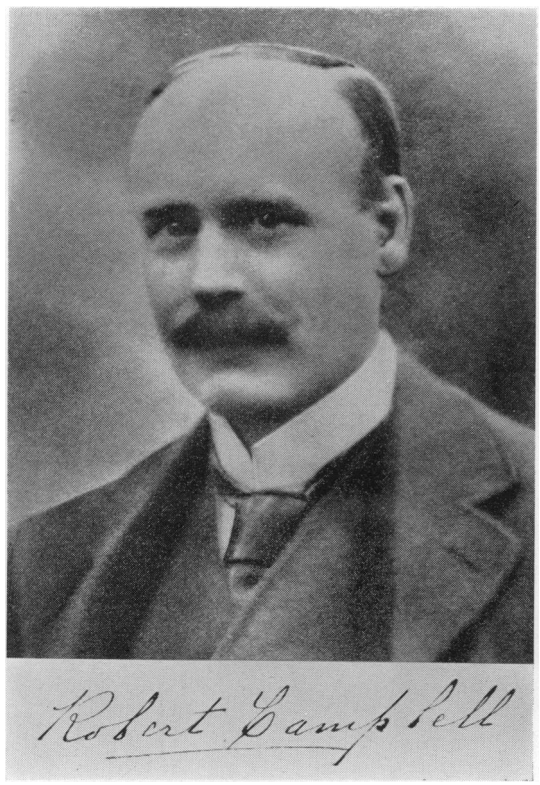
He went on, however, "I learned more from his silence and his precepts of action than I could have learned from one much more voluble, for it was intriguing to find out, from many sources, why he did certain things, and arrived at certain diagnoses." He seems, however, to have had that gift, so often found in a really good teacher, of imparting his knowledge in such a way and by a quality in expression and imagery that it can be recalled years later without any loss of clarity. One example only will be quoted. In discussing the diagnosis of carcinoma Robert Campbell remarked, "Syphilis is so often found skulking about in the garb of an entirely different ailment that I think it must rank among the criminal classes of disease. Sometimes it presents itself as innocent little acne. Another time it poses as aristocratic eczema of gouty origin. Again it may simulate the appearance of poor and weak but respectable tuberculosis. Now and again it puts on the garb of that terrible fellow whose very name makes all human flesh quiver and quake."

In an unpublished manuscript of an address to the Belfast Students' Medical Association in 1906, entitled, "The Student and His Teachers," Robert Campbell, in elaborating certain themes, affords some clues regarding the nature of his teaching:—

(1) The basis of clinical work should rest on a sound knowledge of anatomy and physiology.

(2) In examination of the patient he stressed "the great importance of looking at things" and maintained that "too often the student seems to be possessed with an uncontrollable itching to lay hands on the patient" and "without casting more than a hasty glance at the affected part commences to finger it in an aimless way with one hand, keeping the other meanwhile in his trouser pocket." He held that "in searching for the signs of injury or disease we mainly depend on our sight, our hearing and our touch, and I should like to impress strongly on you that the most accurate observations and the most lasting impressions are those conveyed to our mind by our sense of sight—'Sounds that address the ear are lost and die in one short hour, while things that strike the eye live long upon the mind'."

(3) Students should always "verify for themselves the statements made by their teachers of the signs present in a given case." Brigadier Sinton, in his oration years later, said "he taught one not to accept what at first sight appeared to be an obvious and simple diagnosis, without first fully weighing the pros and cons of other possibilities. I think it was he who first laid the foundations in my mind for the acceptance of that great principle in research work, 'never take authority when you can get fact, and never guess what you can know.' He taught one to be critical, and more especially of one's own work."

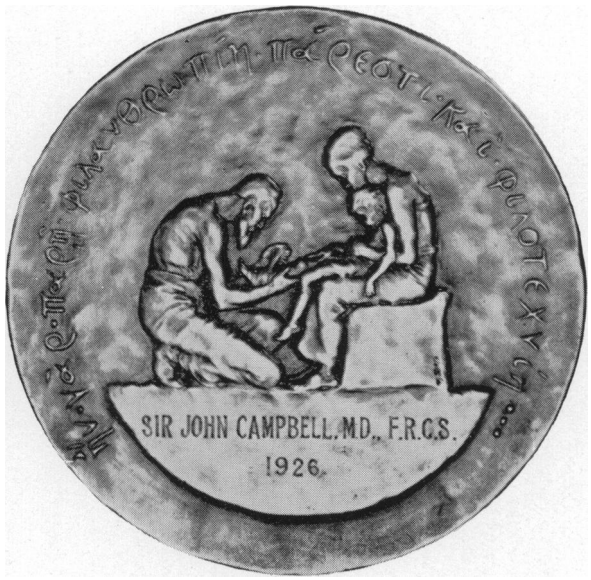


ROBERT CAMPBELL, B.A., M.B., F.R.C.S.
1866-1920

PLATE I

ROBERT CAMPBELL MEMORIAL MEDAL
(obverse)

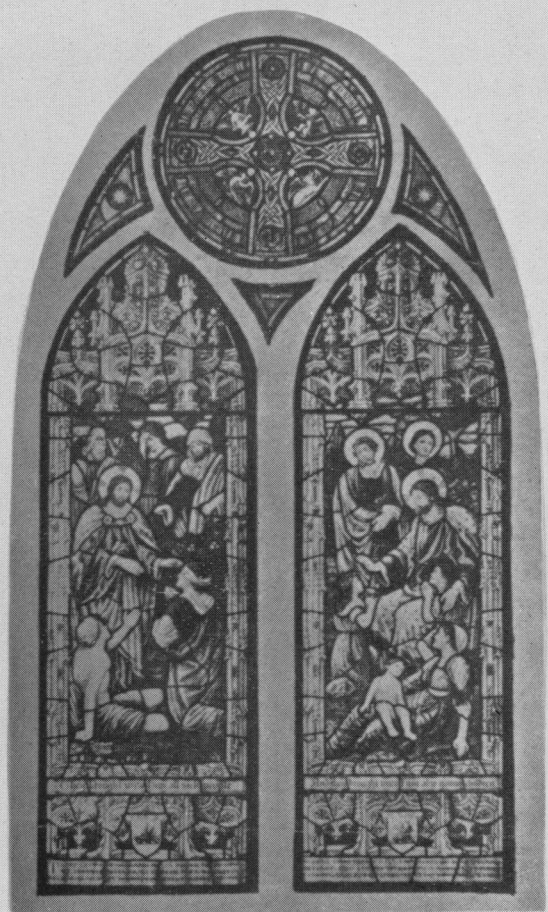
PLATE II



ROBERT CAMPBELL MEMORIAL MEDAL
(reverse)

PLATE III

The Old Presbyterian Church, Templepatrick.



DEDICATION OF WINDOW

In Memory of

ROBERT CAMPBELL, F.R.C.S. (Eng.)

25th June, 1922,

FOUR O'CLOCK P.M.

ROBERT CAMPBELL MEMORIAL WINDOW

PLATE IV

(4) As a corollary regarding students in hospital Robert Campbell added: "The main object of their attendance at hospital is not that they may listen to the views expressed by other people, but rather that they should train their organs of special sense in the detection of disease by constant practice."

(5) He held that the asking of questions was of great importance (a) of the teacher to clarify obscure points and (b) of the patient especially with the view of gaining experience in talking to sick people.

(6) His remarks on set lectures are worth quoting:—"Courses of lectures are relics of the days when printing was in its infancy and treatises on medical subjects were few and far between. Nowadays books are published yearly in every subject in the medical curriculum, most of which contain in readable form the greater part of the material professors and lecturers grind out in mechanical fashion session after session. I do not suggest that lectures should be entirely abandoned. I would merely propose they should be limited in scope—that they should not deal with matters contained in every text book—but rather that they should be confined to the discussion of subjects about which some recent information, not yet embodied in the hand books, could be given, and to the elucidation of difficult points which could be more clearly expressed by oral teaching." He believed that this plan would reduce the number of lectures by four-fifths, and that the time saved could be spent in clinical instruction in hospital. "There is one subject, however, on which a course of lectures should be given. I mean the subject of medical ethics."

In the same paper, with a mixture of idealism and earthly wisdom he suggested there were three requisites for a successful career in medicine:—

(1) A sound knowledge of professional work.

(2) A sound personal character as shown by conduct and manner. Regarding this he quoted Professor Redfern's dictum, "Any man who possessed a diploma in medicine was certain to gain a fair measure of success in his profession provided he was *sober* and *kind* to his patients."

(3) Pushfulness, i.e., the spirit of self-advertisement. In this connection he quoted W. S. Gilbert's lines:—

> "If you wish in this world to advance
> You must all your merits enhance,
> Stir and stump it, and blow your own trumpet
> Or you haven't the ghost of a chance."

Robert Campbell had, undoubtedly, the first two of these requisites in abundance, but the last was completely foreign to his nature—he hated all pomp, boastfulness, and show, and detested all sham and humbug. Perhaps the furthest he would have gone in this direction would have been to emulate the Scottish divinity student who is said to have prayed to be given a good conceit of himself.

What can be said of Robert Campbell's personality? The image that he presented was that of a tall, austere figure, with a somewhat stern demeanour,

walking slowly and deliberately down the main corridor at the Royal Victoria Hospital. He was usually a man of few words with at times an almost stoic philosophy to life's ups and downs. Behind this somewhat forbidding façade, however, there was a very kind disposition with a great capacity for making enduring friendships. As Robert Marshall puts it, "Although he had a reputation of being silent he was never morose, and at night when there was time for talk his conversation was delightfully seasoned with the attic salt." A number of friends used to gather at 22 College Gardens on a Sunday evening—Tom Houston, James Moore, William Calwell, John Rankin, Johnny Morrow, and Andy Fullerton, among others, and from the younger men, T. S. Holmes. There, as Fullerton put it, "he held court, surrounded by an atmosphere of goodwill and tobacco smoke. On these occasions the strong silent man unbent, and rallied or chaffed one or other of his coterie of friends who had the privilege of being present at these delightful gatherings. All sorts of subjects were discussed, from socialism to the higher criticism, and the greatest harmony prevailed." It may, perhaps, be added that at times these gatherings had a still lighter side, as when J. S. Morrow recited his parody of Kipling, "Just a poor old country doctor, surgeon and midwife too!" or when Andy Fullerton, the future President of the Royal College of Surgeons of Ireland, stood on his head and drank a glass of water in that position to demonstrate that liquids did not always flow downhill.

In the writer's student days many stories of Robert Campbell were still circulating in the Royal corridor—a few true, many apocryphal and some unprintable, but all with a certain plausibility in that one could imagine that they might have happened. One only will be recalled, in Robert Campbell's own words, which he recounted in the following manner when proposing the President's health at an Ulster Medical Society dinner:—"Why I have been selected to perform the pleasing duty with which I have been entrusted is more or less a mystery to me. The only valid reason which I can adduce is that I have earned among my professional brethren (whether rightly or wrongly it is not for me to say) the reputation of being a man of very few words, and that, therefore, I would not have the power to detain you long from the enjoyment of the intellectual views or the highly spiced stories of your friends. Indeed it seems that I possess the gift of aseptic silence in such a high degree that on one occasion I visited the Royal Victoria Hospital in the early hours of the morning, performed two urgent abdominal operations, and left the building having uttered only one monosyllabic if malodorous word. I make this statement on the unimpeachable authority of our secretary; and what purer source of truth need one seek than in the turbulent gushes of words and ideas which flow from the lips and brain of John Rankin." This is an example of what Professor Sinclair referred to as "that quaint humour and inoffensive satire which we enjoyed so much, and which were so peculiarly his own."

Robert Campbell had little interest in politics, although he signed Ulster's Solemn League and Covenant in 1912. As an Ulster Scot he had a great love for his native land and he concluded his address to the Belfast Medical Students'

Association in the following way, "Why should we not develop a proper pride in being Ulstermen? Why should we not take a lesson from other nations and go forth into the world proclaiming that Ulster is the best of all possible lands to be born in and that Ulstermen are the salt of the earth? Let us endeavour to foster a patriotic spirit. Let us unite to help one another. Let our watchword in every clime be 'Forward, Ulster!'" He had little time and no inclination for sport or games and, apart from his love of literature, his main interest was in his chosen work, especially among the children.

Robert Campbell was a friend to many and his sincerity, personal integrity, and clarity of mind proved of benefit to many of his colleagues when in difficulties, either professional or personal. As Professor Sinclair said, "What a support he was in anxious and difficult situations so that if he did not speak (for he was a man of few words and well chosen) his influence was sustaining; and in many respects an inspiration to those whose inexperience or timidity demanded a strong arm on which to lean." A most touching tribute came from Sir Thomas Houston when he remarked, "I have to acknowledge with gratitude how his logical mind made straight many of the difficulties of my early professional life. He had the faculty, which few men have, of brushing aside all that is irrelevant and non-essential and coming with logical precision to the heart of the matter discussed. He was a kind and generous friend and when he died I felt something had gone out of my life that could never be regained."

Robert Campbell had suffered from Bright's disease for some years when, in March, 1920, he became seriously ill with a uræmic condition. He rallied, however, and was able to resume work, but this improvement was short-lived. He died at his home, 22 College Gardens, from uræmia, in the early hours of the morning of 6th September, 1920, and the writer can still recall how his faithful Irish terrier, Jack, began to howl at his passing. He was only 54 years of age. There was a strange aftermath to his death when, nine days later, his friend, Sir John Byers, on some members of whose family Robert Campbell had operated, attended a meeting of the Board of Management of the Royal Victoria Hospital. Obviously deeply touched, he moved the vote of condolence to his friend's relatives, and was then driven home by car. On arrival at his home in Lower Crescent he was found to have sustained a right hemiplegia with loss of speech, from which he died shortly afterwards. Robert Campbell was interred in the old burial ground at Templepatrick, the ground where the old church of the Knights of St. John of Jerusalem once stood, and where his ancestors lie at rest. A stained-glass window (Plate IV) was erected to his memory by his widow in the old meeting-house where his father and great-uncle once preached the Gospel. This was dedicated at a special service on 25th June, 1922, by Reverend Alfred Turner.

Shortly after his death a fund was established by his medical friends and colleagues to commemorate the pioneer work Robert Campbell had done for surgery in Ulster. The future Sir Thomas Houston, who was President of the Ulster Medical Society at the time, and a close friend of Robert Campbell, played

a leading part in this. By the 8th November, 1920, a sum of £456. 12s. 0d. had been subscribed (it eventually reached a total of £874. 7s. 0d. two months later), and a meeting of the subscribers was held in the Whitla Medical Institute to determine what form the memorial should take. After some discussion it was decided that it should be something of "recurring practical utility rather than to seek to enshrine his well-known personality in some form of pictorial or plastic art." The meeting agreed that the fund should be called the Robert Campbell Memorial Fund, and the memorial should take the form of a prize, to be called the Robert Campbell Memorial Prize "to be awarded periodically for distinguished work in any branch of medical science to that member of the profession in Ulster or to that graduate of Queen's University, Belfast, whom, at the time of the selection the committee should consider most deserving of the honour." It was also decided that the recipient of the prize should have the duty of delivering an oration to the profession, to be called the Robert Campbell Memorial Oration. This was the first memorial oration of this type to be founded in Ulster.

It appears from the above that the original intention was to confine the prize to Ulstermen and Queen's men, but its scope was later broadened, and when the Trust Deed was drawn up the appropriate phrase read, "The prize shall be awarded by the committee at such time or times as it shall think fit, and shall on the occasion of its being so awarded be of such amount as the committee shall decide to some of the following persons, namely, to a medical man residing in Ulster, or a graduate of Queen's University of Belfast, or some other distinguished medical practitioner or surgeon who in the opinion of the committee shall have performed distinguished work in some department of medical or surgical science." The object of the Trust was stated to be "to perpetuate the memory of the said Robert Campbell and to advance the cause of medical and surgical science."

At the subscribers' meeting on 8th November, 1920, the following constitution for the executive committee was agreed on:—

"The Professors of Surgery, Medicine, Midwifery, Gynæcology, Ophthalmology (altered in the Trust Deed to Lecturer), Pathology, Anatomy, and Physiology in Queen's University, Belfast.

"The Presidents of the Ulster Branch of the British Medical Association and of the Ulster Medical Society.

"The Chairman of Staff at the following hospitals:—

Royal Victoria, Mater Infirmorum, Queen Street, and the Ulster. Dr. John Campbell and Dr. J. Walton Browne (during their lifetime). Dr. James Colville was appointed Treasurer and Dr. Thomas Houston Secretary."

The executive committee was given power to appoint five trustees, two of whom must be general practitioners. The trustees with the executive committee were to award the prize from time to time. The original trustees appointed were James Colville, Thomas Houston, William Burns, James Moore, and John Smith Morrow. After the death of Dr. Burns and Dr. Colville two new trustees were

appointed at a meeting held on 12th June, 1936—W. S. Campbell and R. W. M. Strain. The latter was appointed Treasurer on 15th January, 1937, and the former Secretary on 11th January, 1950, to succeed Sir Thomas Houston. Dr. Moore, Dr. Morrow, and Sir Thomas Houston have been replaced as trustees by W. Dickey, W. G. Frackelton, and Professor C. H. G. Macafee.

The original executive committee decided that the orator should receive, in addition to his honorarium, a memorial medal. The design of the medal, which is executed in bronze, was entrusted to the Ulster sculptress, Miss Rosamond Praeger. The obverse (Plate II) shows Robert Campbell's head, his name and the dates 1866 and 1920. Although Miss Praeger had never met Robert Campbell, the head, designed from a photograph, is regarded as being a very good likeness. The reverse of the medal (Plate III) shows a group, of Miss Praeger's own composition, illustrating a very appropriate subject—a surgeon attending to an injured child seated on its mother's lap—and it also bears an inscription in Greek taken from the Precepts, one of the Hippocratic writings, generally now regarded as being of later date than Hippocrates but the work of one of his school. A translation of this is "Where there is the love of man, there is also love of the art," i.e., the art of medicine.* This inscription or motto was suggested as a suitable one by Sir Richard Livingstone, who was at the time Vice-Chancellor of Queen's University. Two large wall plaques, illustrating the design on the obverse and the reverse of the medal, were presented to the Ulster Medical Society by Sir Thomas Houston, representing the executive committee of the Robert Campbell Memorial Fund, at the close of the third memorial oration on 10th February, 1927.

The first oration was given on 16th February, 1922, by Professor Thomas Sinclair, Professor of Surgery at Queen's University, who had been teacher, colleague and friend of Robert Campbell, and the three following orators included his brother and two of his closest friends. Since then a variety of orations on different subjects has been given by some who were ex-house surgeons or pupils of Robert Campbell and others who had never met him. While a very high standard has always been maintained, perhaps the two most memorable orations were that of Sir Alexander Fleming on penicillin, attended by the Duchess of Abercorn representing the Governor, and a huge audience which overflowed throughout the Whitla Medical Institute, and that of Sir William MacArthur, whose oration on the Irish famine of 1846 was delivered to a packed Great Hall of Queen's University, without the aid of a single note and without a single sign of hesitancy.

This completes an attempt to outline Robert Campbell's life and work, and to indicate, as far as possible from his own writings and those of his contem-

*The passage in the Precepts is concerned with fees and has been translated as "I urge you not to be too grasping, but to consider carefully your patient's means. Sometimes give your services for nothing . . . and if there be an opportunity of serving one who is a stranger in financial straits give full assistance to all such. For where there is the love of man, there is also love of the art."

poraries, what manner of man he was. A question remains—what quality or qualities of his led to the rapid subscription of nearly £900 by some one hundred and ten of his friends and colleagues, and to the novel form that the memorial took? All the aspects of his personality and work, previously mentioned, may have made some contribution, but the *fons et origo* may well have been an echo of the character of the first Reverend Robert Campbell, who, for freedom of thought, defied the General Synod and the wrath of Reverend Henry Cooke, and was known throughout the countryside in his lifetime as "honest Bob"—an echo reflected in the honesty of thought, clear vision, and integrity of moral purpose of his descendant and namesake, the pioneer of aseptic surgery at Queen Street and the Royal Victoria Hospitals. Perhaps the epitaph, composed over one hundred years ago by the Templepatrick congregation for his great-uncle, would not be so very much out of place in describing Robert Campbell's own life—"Unassuming in manners, unswerving in integrity, unostentatious in piety, and unblemished in moral character, he enjoyed in a remarkable degree the esteem and confidence of the entire community."

"For I loved the man, and do honour his memory,
on this side idolatry, as much as any" (Jonson).

My thanks are due to Mr. Robin, Photographic Department, Belfast City Hospital, for his help with the illustrations.

APPENDIX

ROBERT CAMPBELL MEMORIAL ORATIONS

Number/Date	*Subject*	*Orator*
1—16- 2-22	The Surgery of the Blood	Professor Thomas Sinclair C.B., M.D., F.R.C.S.
2—20-11-24	Addison's Anæmia	Thomas Houston O.B.E., B.A., M.D.
3—10- 2-27	The Renaissance of Surgery in Belfast	Sir John Campbell M.A., M.D., F.R.C.S., L.L.D., M.P.
4— 8-11-29	Progress in Urology	Professor Andrew Fullerton C.B., C.M.G., M.CH., F.R.C.S.I., HON. F.A.C.S.
5—19- 1-33	The Problem of the Streptococcus	John S. Campbell M.D.
6—18-11-37	Streptococcal Infections and Sulphanilamide	Leonard Colebrook M.B., B.S.LOND.
7—23- 3-39	Modern Surgical Anæsthesia	Ivan W. Magill M.B., D.A.
8—13-11-42	The Clinical Aspects of Deficiency Diseases	Professor V. P. Sydenstricker M.D., F.A.C.P., D.P.H.
9— 4- 3-43	The Problem of Diphtheria in the Light of Modern Knowledge	Professor R. A. Q. O'Meara M.D., D.SC., F.R.C.P.I., F.T.C.D.
10—23- 3-44	The Surgery of Pulmonary Tuberculosis	G. B. R. Purce M.C., M.CH., F.R.C.S.ED.
11— 2-11-44	Penicillin	Sir Alexander Fleming F.R.C.S., F.R.C.P., F.R.S.
12—28- 3-46	Malaria in War	Brigadier J. A. Sinton V.C., O.B.E., F.R.S., M.D., D.SC., D.P.H.
13—18- 3-48	The Contribution of Pathology to our Knowledge of the Internal Environment	Professor J. Henry Biggart M.D., D.SC.
14— 5- 4-51	A Medical Survey of the Irish Famine of 1846	Lt.-Gen. Sir William MacArthur K.C.B., D.S.O., O.B.E., M.D., D.SC., F.R.C.P., F.R.C.P.I.
15—26- 2-53	The Clinical Value of Radioactive Isotopes	E. E. Pochin M.D., F.R.C.P.
16—24- 3-55	Pædiatric Surgery in Retrospect and Prospect	T. Twistington Higgins O.B.E., F.R.C.S.
17—28- 2-57	Methods and Consequences of Lowering the Blood Pressure	Professor W. D. M. Paton D.M., F.R.S.
18—12- 3-59	Some Aspects of the Relationship between Mother and Child	Professor J. Dixon Boyd M.A., M.SC., M.D.
19— 9- 3-61	Surgical Treatment of Deafness	Terence Cawthorn F.R.C.S.

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SOME OBSERVATIONS ON ALCOHOL CONSUMPTION AND ITS RESULTS IN NORTHERN IRELAND

By ALAN P. GRANT, M.D., F.R.C.P.I., M.R.C.P.(Lond.)
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PRELIMINARY studies of the incidence (Grant and Boyd, 1961-1962) and results of treatment (Grant and Knox, 1962) of alcoholism have revealed an unsatisfactory state of affairs in Northern Ireland. Interest and co-operation were, on the whole, poor, and it was hoped a more general enquiry into the facts of consumption of alcohol in Northern Ireland and the amount of acute alcoholism might help to confirm the impressions previously reached. The results of this enquiry are presented below and an attempt is made to relate them to similar known facts in other countries. That the figures shown are perhaps scanty and inadequate must again be attributed to lack of facilities and help. It is obvious that a large-scale investigation is needed and in a small country such as Northern Ireland with a relatively static population this could more easily be done than elsewhere, if the authorities considered it necessary.

In presenting these figures it should be stressed that they are not an attempt to confuse the issue by attacking alcohol rather than alcoholism, but should be considered only as indirect evidence on the state of the latter. Much harm has been done in the past to the task of treating alcoholics by making this mistake. This has also been emphasised by Griffith Edwards (1962) in his review of the situation in the U.S.A.

RATES OF APPARENT CONSUMPTION OF ALCOHOLIC DRINKS.

As Popham (1955) has pointed out, reservations should be made in evaluating such statistics and especially in relating them to the incidence of chronic alcoholism. It is impossible to take into account the increases or decreases of the quantity held in stock or reserve. Visitors also contribute to the total amount consumed. In a rough way, however, figures of this type are of value in illustrating the drinking habits of different populations and may give some indications of the amount of alcoholism which can be expected in them. Comparisons may be made between countries with alcoholism rates and those where these are not yet available. Lastly and perhaps the most important use of such figures is that, if the rate of alcohol consumption is obviously altering, an increase or decrease in the alcoholism rate may be predicted.

In Table 1 various countries where the gross alcoholism rate has been calculated have been arranged in a descending scale. All these rates have been obtained using the Jellinek formula and their accuracy has been questioned; nevertheless, they probably fairly represent a scale of alcoholism between various countries. The total alcohol consumption as absolute alcohol and the percentages different types contribute to this total are compared with the estimated rates, these figures

being extracted from tables of Popham and Schmidt (1958) and WHO (1951). It can be seen that spirit consumption is a better indicator than the total alcoholic consumption of expected alcoholism. This is especially well illustrated in the case of Italy, where the total consumption is very high, but as 93 per cent. is drunk as wine and only 5 per cent. as spirits the alcoholism rate is extremely low.

TABLE 1.

Comparison of Alcoholism Rates and Consumption in Various Countries.

	Alcoholism Rate per 100,000 Adults		Annual Rate of Consumption in Gallons per Adult of Absolute Alcohol			Percentage Contribution		
	Popham and Schmidt, 1958	W.H.O. 1951	Total	As Spirits (Absolute Spirit) Rate		Beer	Wine	Spirits
France	- 5200	2850	... 2.8	.532	...	8	73	19
U.S.A.	- 4360	3952	... 1.64	.650	...	49	11	40
Sweden	- —	2580	... 1.19	.797	...	24	9	67
Switzerland	- 2100	2385	... 1.60	.336	...	28	51	21
Denmark	- —	1950	... 1.14	.137	...	77	11	12
Canada	- 1890	—	... 1.51	.653	...	64	6	30
Norway	- —	1560	... 0.66	.317	...	44	8	48
Finland	- —	1430	... 0.75	.550	...	13	14	73
Australia	- —	1340	... 1.89	.133	...	75	18	7
U.K.	- —	1100	... 1.25	.165	...	82	4	14
Italy	- —	500	... 2.75	.137	...	2	93	5

Compiled out of Tables 2-4 and 4-9; Popham, R. E., and Schmidt, W. (1958), and W.H.O. Tech. Rep. Ser. No. 42 and Table 1, Annex 1 (1951).

In Ireland figures for the consumption of spirits in Northern Ireland and Eire for the years 1950 to 1954 have been obtained from H.M. Customs and Excise (1961) for Northern Ireland and from Perceval (1956) for Eire. These have been related to the potential drinking population of adults over 19 years of age and are compared in Table 2. It would seem that almost twice as much spirits were drunk in Eire, 0.54 gallons per adult annually, compared to Northern Ireland's 0.28 gallons. Unfortunately, figures for the total consumption of alcohol, including beer and wines, could or would not be presented by the authorities.

Perceval (1956) was able to show that in Eire the approximate annual consumption consisted of: —

32,000,000 gallons of stout and beer
500,000 gallons of wine
1,000,000 gallons of cider
1,000,000 gallons of spirit.

Rough calculation shows each adult in the Republic would require to take 18.6 gallons of alcoholic drinks each year to reach this total, a fact confirming it is a reasonably heavy drinking community.

TABLE 2.

CONSUMPTION OF SPIRITS IN IRELAND.

	TOTAL YEARLY CONSUMPTION IN GALLONS		
	N. Ireland		Eire
1950 - - -	260,310	...	1,167,965
1951 - - -	217,566	...	1,286,060
1952 - - -	224,649	...	1,027,947
1953 - - -	231,073	...	1,013,425
1954 - - -	247,552	...	1,072,697
Average - - -	238,000	...	1,113,000
Total Population - -	1,400,000	...	2,960,000
Gallons per head - -	0.17	...	0.38
Adult Population - -	840,000	...	1,860,000
Gallons per head (adult) -	0.28	...	0.54
Absolute Spirit Rate - -	.112	...	.217

Population figures for Northern Ireland based on an estimate for 1958 (Registrar-General for Northern Ireland), figures for Eire based on 1951 Census.

To compare what figures are available for both North and South of Ireland with elsewhere limits one to estimations on spirits. Furthermore, as stated above, the consumption of spirits is perhaps a better indicator of the expected amount of alcoholism in a country than the total consumption. It seemed that *an annual rate of consumption in gallons per adult of absolute alcohol taken as spirits or absolute spirit rate* might be useful. This has been calculated for each of the countries in Table 1 and is shown in column 4. Some discrepancies again are seen to occur between this and the alcoholism rate, but, on the whole, these are not so gross as with the total rate of alcohol consumption. It should be remembered that indirect alcoholism rates are far from perfect even in their gross

degrees of magnitude. The absolute spirit rate allows comparison between Ireland and other countries, and it is calculated in Table 2, assuming most spirit drunk is 70° proof and 174° proof is absolute alcohol. Relating .112 gallons per adult in Northern Ireland and .217 for Eire with Table 1 might allow one some predictions. Northern Ireland might be expected to have a very low alcoholism rate, even lower than the United Kingdom, while Eire would lie somewhere in the middle of the series. A more accurate placing of the two countries would not, however, be possible.

The annual consumption of spirits in Northern Ireland is rising and in Table 3 the consumption of spirits from 1955 to 1959 is presented (H.M. Customs and Excise, 1961). It can be seen that an increase has taken place from 251,056 to 315,429 gallons per year; this is possibly a hint of an increased number of alcoholics.

TABLE 3.

RECENT TREND IN CONSUMPTION OF SPIRITS IN NORTHERN IRELAND.
H.M. CUSTOMS AND EXCISE (1961).

	GALLONS
1955 - - -	251,056
1956 - - -	258,727
1957 - - -	271,975
1958 - - -	283,230
1959 - - -	315,429

RATES OF CONVICTION FOR DRUNKENNESS.

These figures, which are for acute alcoholic intoxication, are often considered by indiscriminate or biased persons to be the most important indication of alcoholism. It will be remembered, however, that an attempt is being made to limit the definition and to consider and treat chronic alcoholism as a disease. Obviously rates of drunkenness are of some value, as they will probably increase in parallel with the amount of spirits drunk, but they are probably the most unreliable of the indicators of an expected incidence of chronic alcoholism. They consist of only a fraction of total cases of drunkenness, and although in Northern Ireland an arrest usually leads to a conviction this may not apply elsewhere. They depend greatly on the manner in which intoxication occurs and even more so on the prevailing attitude of the law and local social and religious pressures. Often an increase in convictions for drunkenness could as easily be due to the police as to a true increase in the number of drunks, and especially so while

propaganda for road safety is now in the news. Differences between various countries must be accepted with these reservations, but may be of some use in comparison when supported by consumption figures.

TABLE 4.

PROSECUTIONS AND CONVICTIONS FOR DRUNKENNESS—NORTHERN IRELAND.

	Prosecutions		Total Found Guilty
	Male	Female	
1958 - -	1020	137	... 1151
1959 - -	1125	133	... 1238
1960 - -	1343	138	... 1468

Rates for Northern Ireland during the years 1958 to 1960, by courtesy of the Inspector-General R.U.C. (1961) are shown in Table 4. They show a slight increase over these years and when taken in conjunction with increased annual spirit consumption may be significant of a change in social and drinking habits. Applying an average of 1,300 convictions for drunkenness each year in Northern Ireland, this gives a rate of 15.5 per 10,000 adults which is the same as in England and Wales for 1952 (H.M. Stationery Office, 1952). Offences for drunkenness have, however, increased in England and Wales from 47,717 in 1950 to 68,109 in 1960 (*Lancet*, 1961), so that the rate in Northern Ireland is probably lower than the present rate over the Irish Sea.

Perceval (1955) showed tables for the years 1948-1952, where the average numbers of persons convicted for drunkenness in Eire can be calculated out as 21.7 per 10,000. Taken in conjunction with spirit consumption this might suggest the authorities in the Republic were not as strict as here, for one would have expected an approximate rate of 41.8 per 10,000 adults. It also tends to suggest an expected higher alcoholism rate and confirms the higher spirit consumption. As far as sex is concerned, figures both north and south show a large predominance of males, approximately 9:1, a predominance shown also in suggested alcoholism and treatment rates for Northern Ireland (Grant and Boyd, 1961 and 1962; Grant and Knox, 1962).

SUMMARY AND CONCLUSIONS.

Some statistics for consumption of alcohol in Northern Ireland and convictions for drunkenness are presented. They are compared with figures for other countries and especially those available for Eire. An attempt has been made to compare the consumption of spirits with the indirect calculated alcoholism rate in various countries and to suggest that this is a more reliable indicator of chronic alcoholism than the total alcohol consumption. It is stressed that an attack on

alcohol is probably not the best way to attack alcoholism. The following conclusions are reached:—

(1) Spirit consumption in Northern Ireland of 0.28 gallons per adult annually is about half that in Eire.

(2) Spirits are being increasingly drunk in the last few years and the annual amount in Northern Ireland which is consumed has risen from 251,000 gallons in 1955 to 315,000 gallons in 1959.

(3) Rates of convictions for drunkenness are probably lower than England and are three-quarters of the Eire rates.

(4) Calculation of an absolute spirit rate or annual rate or consumption in gallons per adult of absolute alcohol as spirits is presented as a method of comparing intake in Ireland with other countries.

ACKNOWLEDGMENT.

Acknowledgment to the Northern Ireland Hospitals Authority for a grant towards secretarial expenses.

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1962 ANNUAL REPORT
VIRUS REFERENCE LABORATORY*

Department of Microbiology, Queen's University, Belfast

During 1962 the following have contributed to the work of the Virus Reference Laboratory:

J. H. CONNOLLY, M.D., J. R. L. FORSYTH, M.B.,
MARGARET HAIRE, M.B., J. EVANS, A.I.M.L.T.,
and BARBARA WHITE.

THIS is the sixth report of the Virus Reference Laboratory and, as in previous reports, only the more interesting and rewarding aspects of the work will be presented.

POLIOMYELITIS.

Laboratory Diagnosis.

During 1962 there were thirty-one cases of paralytic poliomyelitis in Northern Ireland, including one death, giving an attack rate of 2.2 per 100,000 of the population. Type 1 poliovirus was isolated from all cases. In addition, there were three patients with limb paralysis in whom the C.S.F. findings were suggestive of polyneuritis; poliovirus was not isolated from these patients and they had no rise in poliovirus neutralizing antibody during their illnesses. A case of facial palsy in which a diagnosis of poliomyelitis was considered possible was found to be due to geniculate herpes.

Type 1 poliovirus was also isolated from six cases of aseptic meningitis.

The age and sex of the patients with poliomyelitis were as follows:

	AGE IN YEARS							
	0-1	1-3	3-5	5-7	7-9	9-11	20+	TOTAL
Paralytic	2	11	7	2*	4	1	4	31
Aseptic meningitis	–	1	–	2	–	3	–	6

*Includes one death.

Two of the patients with paralytic poliomyelitis were children less than a year old, one a 7-month-old boy and the other a 6-month-old girl. Two-thirds of the paralysed patients were children under 5 years old. Four of the patients had facial palsy; three were boys aged 1, 3, and 8 years, and one a girl aged 3 years. The only patient who died was an unimmunized 5-year-old girl suffering from extensive paralysis.

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

The vaccination history of the thirty-one paralysed patients was as follows:

	Inactivated Virus Vaccine (Salk)					Live Virus Vaccine (Oral)		
No. of Doses	0	1	2	3	4	1	2	3
No. of Patients	24	2	2	1	0	2	0	0

Twenty-four of the thirty-one paralysed patients had had no immunization and four had been inadequately immunized. (No patient had received both types of vaccine.) Four of the patients with aseptic meningitis had not been immunized, one had received one dose and the other four doses of Salk vaccine.

The time of year during which the cases occurred was as follows:

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Paralytic	3	7	7	6	4	2	1	1	–	–	–	–
Aseptic meningitis	–	1	–	2	1	–	1	1	–	–	–	–

The majority of the paralytic cases occurred during the first four months of the year. In Northern Ireland there has been a tendency for poliomyelitis to be more prevalent in the colder months during non-epidemic years.

The distribution of the cases geographically was as follows:

	Aseptic Meningitis Cases	Paralytic Cases	Paralytic Attack Rate/100,000
Belfast Co. Borough	1	5	1.2
Londonderry Co. Borough	2	6	11.2
Co. Antrim	1	8	2.9
Co. Down	1	1	0.4
Co. Armagh	0	4	3.4
Co. Londonderry	1	7	6.3
Co. Tyrone	0	0	0
Co. Fermanagh	0	0	0
Northern Ireland	6	31	2.2

Contacts of Cases.

One hundred and one close contacts of twenty-two paralytic cases were investigated before the use of oral vaccine became widespread. Sixty-four contacts were excreting type 1 poliovirus, any one of whom could have developed paralytic poliomyelitis. Forty-one of these excreters had not been immunized and a further twenty-two inadequately immunized.

Poliomyelitis Vaccine Surveillance.

Oral poliomyelitis vaccine was first used in April, 1962, for routine immunization in Northern Ireland and relatively little Salk vaccine has since been used. A more detailed type of surveillance was introduced to cover the use of oral vaccine. Fæcal specimens and paired sera were obtained from all patients with poliomyelitis or suspected poliomyelitis in the Province. A surveillance form was completed with the help of the Medical Officer of Health and the physicians in charge of the case. The patient's home was visited and the clinical history and C.S.F. findings in hospital noted. Associated cases (i.e., those patients who had been fed oral vaccine within thirty days of the onset of paralysis or who had been in contact with vaccinated persons up to sixty days previously) were investigated in more detail. Sera from these patients were tested for neutralizing antibody, and marker tests were done on the polioviruses isolated.

In one child the onset of paralysis occurred fourteen days after immunization with Salk vaccine. The vaccine had been given in the left upper arm and paralysis occurred in the right leg. Furthermore, the patient was one of three cases occurring in the same area. It was therefore most unlikely that the paralysis was caused or provoked by the inoculation. There were, however, two cases in which "provocation" seemed possible. Two brothers with tuberculosis who were receiving injections of streptomycin into their lower limbs developed lower limb paralysis.

Two patients had been fed oral vaccine prior to becoming paralysed. In one patient the interval between vaccination and paralysis was ten days and in the other it was seven days. Another paralysed patient was in close family contact with two people who were fed oral vaccine sixteen days previously. An additional patient in whom the diagnosis of poliomyelitis remained uncertain was fed oral vaccine twenty-eight days before becoming paralysed. However, epidemiological studies, together with laboratory tests on the viruses isolated, did not implicate oral vaccine as the cause.

Studies continued on the use of a quadruple vaccine to protect against poliomyelitis, diphtheria, tetanus, and pertussis.

Aseptic Meningitis.

The viruses responsible for the cases of aseptic meningitis during 1962 which were diagnosed in the laboratory were as follows:

Virus	No. of Cases
Polio type 1	6
Coxsackie A_9	1
Coxsackie B_4	2
Coxsackie B_5	1
ECHO type 3	2
ECHO type 14	5
Mumps	18
Herpes simplex	3
Group B arbor	3
Untyped	6

In addition three further cases were known to have been associated with varicella, two with rubella, and one after smallpox vaccination, although virus studies were not carried out. There remained twenty-eight patients with aseptic meningitis from whom virus was not isolated, and in twenty of them from whom paired sera were obtained, an antibody rise to poliomyelitis, Cocksackie B, mumps, lymphocytic-choriomeningitis, herpes simplex, and louping ill viruses or meningococci could not be demonstrated.

Once again mumps virus was the commonest known cause of aseptic meningitis in Northern Ireland during 1962. The majority of cases which occurred at the beginning of the year were in male children under 10 years old. The enterovirus group which included poliovirus type 1, Coxsackie A_9, Coxsackie B_4 and B_5, ECHO 3 and 14 were the next most common cause. Nineteen sixty-two was the first year that serological tests were carried out for herpes simplex virus infection in cases of aseptic meningitis. There were three such patients, none of whom had any external evidence of herpetic infection. There were also three patients who had a rise in antibody to group B arbor virus. It has not yet been determined whether their infection was caused by louping ill virus or possibly some closely related virus of the same group.

Coxsackie Virus Infections.

In addition to the three cases of aseptic meningitis, Coxsackie B viruses were implicated in five cases of Bornholm disease, three cases of pericarditis, and one of pneumonia.

Coxsackie A virus infection was diagnosed in a case of aseptic meningitis and in a case of "hand, foot, and mouth" disease.

Respiratory Viruses.

Influenza Viruses.

Work continued on the W.H.O. Influenza Spotting Scheme. There was little influenza during 1962 and only six influenza type B and two influenza type C infections were diagnosed. A trial of different types of influenza vaccine was started at the end of the year.

Respiratory Syncytial Virus.

An investigation of an outbreak of bronchitis and pneumonia in infants and very young children during January and December of 1962 detected twelve patients infected with respiratory syncytial virus. This is the first time that this infection, which is an important cause of severe respiratory infection in young children (Chanock et al., 1961) has been recognized in Northern Ireland.

Adenoviruses.

Adenovirus was isolated from two patients with pharyngitis, two with bronchopneumonia, and a baby with convulsions and hepatosplenomegaly. Adenovirus was also isolated from the appendix and mesenteric gland of a baby with intussusception.

Serological evidence of adenovirus infection was obtained in an adult with pharyngitis and conjunctivitis and in a child with tonsillitis, convulsions, and coma. Two children with mesenteric adenitis and appendicitis and a further two children with mesenteric adenitis only had serological evidence of infection with adenoviruses.

Vaccinia Virus.

Vaccinia virus was isolated from an 8-week-old boy with generalized vaccinia which developed after smallpox vaccination.

Reference.

Chanock, R. M., Kim, H. W., Vargosko, A. J., Deleva, A., Johnson, K. M., Cumming, C., and Parrott, R. H. (1961). *J. Amer. med. Assoc.*, **176**, 647.

REPORT ON THE MYCOLOGICAL DIAGNOSTIC SERVICE QUEEN'S UNIVERSITY, BELFAST, 1962

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

In the fourth year since its inception in 1959 the Mycological Laboratory of the Department of Microbiology, Queen's University of Belfast, continued to provide a diagnostic service for the isolation and/or identification of fungi associated with human sources. During 1962 mycological examinations were made on 1,322 specimens from 1,000 patients from thirty hospitals, clinics or laboratories, dermatological or general practices in Northern Ireland. The presence of pathogenic fungi was confirmed by microscopy or culture of material from 362 patients (36.2 per cent.). As in previous years, most specimens originated from dermatological clinics and practices, but a substantial number (10 per cent.) were derived from elsewhere.

TABLE 1.

RINGWORM FUNGI ISOLATED DURING 1962.

	No. Isolated
Trichophyton verrucosum	108
T. mentagrophytes	29
Microsporum canis	21
T. tonsurans var. sulfureum	19
Epidermophyton floccosum	18
T. rubrum	17
Positive by microscopy alone	69
T. interdigitale	6
Unidentified	3
M. gypseum	1
T. schœnleinii	1
TOTAL	292

RINGWORM.

Ringworm fungi (Table 1) accounted for almost 80 per cent. of the pathogens isolated during 1962.

When compared with previous years, two major trends are evident, viz.:

(1) An increase in the number of animal (zoophilic) species isolated, and

(2) A continued reduction in the numbers of isolates of *Trichophyton tonsurans var. sulfureum.*

More than half of all infections confirmed by mycological investigation were attributable to "cattle ringworm" (*T. verrucosum*) and it is this species alone which is responsible for the overall increase in incidence of "animal" ringworm infections.

Since there was no increase in the number of specimens from patients believed to be infected with cattle ringworm, it is possible that this represents a true increase. No quantitative estimate of its true incidence in Northern Ireland can be attempted, but in view of the widespread familiarity with the ætiology of this condition it is likely that those patients referred to dermatological clinics represent only a fraction of the annual total: consequently it may be no exaggeration to suggest that within the Province the number of infections may be measured in hundreds.

As in 1961, there were comparatively few implications (21) of cats and dogs as sources of ringworm (*Microsporum canis*). One dog in a Belfast district infected at least six children in the neighbourhood before it was located and the lesion successfully eradicated.

The second trend noted, viz., the reduction in numbers of tinea capitis confirmed, is partially obscured by the overall increase in infections caused by *T. verrucosum* which includes sixteen scalp infections. Nevertheless, only seven scalp infections with *T. tonsurans var. sulfureum* were confirmed during 1962, the lowest figure obtained to date for this species. Infections with this organism apparently now occur only as isolated cases, without any predominant age group or clinical presentation.

One isolate of unusual interest and the first case seen for many years in Northern Ireland confirmed the presence of favus (*T. schœnleinii*) in a 15-year-old girl whose scalp infection had been acquired seven years previously. Within this girl's family there apparently had been an unbroken history of infection for over forty years, an association that was finally ended by a successful course of griseofulvin therapy.

Other Pathogenic Fungi.

Candida albicans was identified on fifty-one occasions from skin (8), nails (8), groin (7), sputum (5), feet (4), throat (3), tongue (3), hand (2), mouth (2), scalp (2), pus (2), fæces (2), vulva (1), ear (1), breast (1). As with cattle ringworm, this is unlikely to bear any relationship to the actual number of infections.

Fifteen infections of middle ear and mastoid cavities were attributed to *Aspergillus niger* (5), *A. terreus* (5), *A. flavus* (3), and *A. fumigatus* (2).

Aspergillosis (caused by *A. nidulans*) in a 6-year-old boy was investigated, a unique feature being destructive lesions of vertebræ and ribs.

Malassezia furfur, the cause of pityriasis versicolor was recorded on seven occasions, whilst other pathogens included *Actinomyces israelii* (1), *Nocardia minutissima* (1), and *Scopulariopsis brevicaulis* (1).

A STUDY OF APPENDICECTOMIES IN BELFAST IN 1958

By WILLIAM F. M. WALLACE, B.Sc., M.B., R. A. LOANE, B.Sc., M.B. and J. T. QUINN, B.Sc., M.B.

From the Department of Social and Preventive Medicine, Queen's University, Belfast

Object.

The object of the investigation was to find out the morbidity rate, as opposed to the mortality rate, of appendicitis in a known population—in this case that of the City of Belfast, whose population in 1958 was estimated as 436,200; and also to examine the distribution of appendicitis by age, sex, month of the year, and day of the week.

Method.

Information was obtained from a study of the charts of all patients living within the city boundary who had undergone appendicectomies in Belfast hospitals in 1958—excluding appendicectomies performed incidentally to some other operation.

The sources of the cases were all Belfast hospitals at which appendicectomies are normally carried out, with the exception of private wings. Cases were distributed among the Belfast hospitals as follows:—

Royal Victoria Hospital	376
Belfast City Hospital	161
Mater Infirmorum Hospital	46
Musgrave Park Hospital	34
Ulster Hospital for Women and Children	65
Royal Belfast Hospital for Sick Children	183
	865

In the case of private patients, full information was not available and these cases had to be omitted from the investigation. Clearly this was likely to exclude more patients from the higher income groups than from the lower. Although an accurate estimate of this loss was not possible, it was estimated, by analysing theatre operation registers in the private clinics, that the total figure was about 100.

Classification.

The cases were divided into seven groups, based on the diagnosis made from the operation note, supplemented, in some cases, by a pathological report.

Group 1. Acute appendicitis without peritonitis or rupture.
Group 2. Acute appendicitis with peritonitis, rupture or abscess formation.
Group 3. Appendicitis unqualified.
Group 4. Chronic appendicitis, including interval appendicectomy.
Group 5. Miscellaneous diseases of the appendix, e.g., mucocœle, fæcalith, threadworms.
Group 6. Non-specific mesenteric adenitis.
Group 7. Normal appendix.

TABLE 1.

APPENDICECTOMIES, BELFAST HOSPITALS, 1958, BY AGE, SEX, AND TYPE OF CASE.

AGE	SEX	DIAGNOSIS 1	2	3	4	5	6	7	TOTAL
0–	M	6	7	1	2	–	1	–	17
	F	2	10	–	–	–	4	–	16
5–	M	39	15	–	7	2	14	1	78
	F	24	11	–	10	2	10	2	59
10–	M	63	17	4	15	4	10	5	118
	F	55	6	1	17	4	14	2	99
15–	M	38	24	–	14	–	–	1	77
	F	51	17	5	9	2	5	4	93
20–	M	21	10	–	1	2	–	3	37
	F	26	13	–	9	2	1	6	57
25–	M	14	5	–	2	2	–	1	24
	F	10	6	–	6	1	1	3	27
30–	M	18	7	–	4	1	–	–	30
	F	15	3	2	6	1	1	2	30
40–	M	15	7	–	2	1	–	–	25
	F	10	6	–	2	2	1	1	22
50–	M	8	4	–	2	–	–	–	14
	F	7	8	–	1	–	–	1	17
60–	M	2	4	–	–	–	–	1	7
	F	2	3	–	–	–	–	–	5
70+	M	–	2	–	–	–	–	–	2
	F	6	5	–	–	–	–	–	11
TOTAL	M	224	102	5	49	12	25	12	429
	F	208	88	8	60	14	37	21	436
GRAND TOTAL		432	190	13	109	26	62	33	865

RESULTS.

Among the 865 cases investigated there were three deaths. Table 1 shows all cases classified by age, sex, and diagnostic group. In Table 2 and Figs. 1 and 2 the number of cases per 100,000 of the population is shown for each sex and age group. Figures are shown (i) for all cases together and (ii) for diagnostic groups 1 and 2 together. Groups 1 and 2, the cases of definite acute appendicitis, accounted for 72 per cent. of the total, and further studies were limited to these cases. It was assumed that the great majority of cases of acute appendicitis are admitted to hospital and that therefore an estimate of the rate in the population could be derived from hospital admission figures.

TABLE 2.

INCIDENCE OF ALL TYPES AND ACUTE CASES PER 100,000 POPULATION.

AGE	SEX	POPULATION	ALL CASES Number	ALL CASES Rate/ 100,000	ACUTE APPENDICITIS (Groups 1 and 2) Number	ACUTE APPENDICITIS (Groups 1 and 2) Rate/ 100,000
0–	M	19,652	17	87	13	66
	F	18,797	16	85	12	64
5–	M	17,455	78	387	54	309
	F	16,494	59	358	35	212
10–	M	18,330	118	644	80	436
	F	17,723	99	559	61	344
15–	M	17,938	77	430	62	346
	F	18,825	93	495	68	361
20–	M	26,741	61	228	50	187
	F	27,911	84	301	55	197
30–	M	23,724	30	126	25	105
	F	26,160	30	115	18	69
40–	M	23,905	25	109	22	92
	F	27,509	22	80	16	58
50–	M	23,278	14	60	12	52
	F	27,767	17	61	15	54
60–	M	16,029	7	44	6	37
	F	22,181	5	31	5	31
70+	M	9,233	2	22	2	22
	F	16,360	11	67	11	67
TOTAL	M	196,285	429	218	326	166
	F	219,727	436	199	296	135

(Population Figures from 1961 Census)

Fig. 3 analyses the cases with respect to length of history, Table 3 with respect to calendar month of admission, and Table 4 with respect to day of the week of admission.

DISCUSSION.

Age: Tables 1 and 2 and Figs. 1 and 2 show that the highest morbidity rates occurred between the ages of 5 and 30, with maximum incidence between ages 10 and 20, but that the condition was not exceptionally rare at any age.

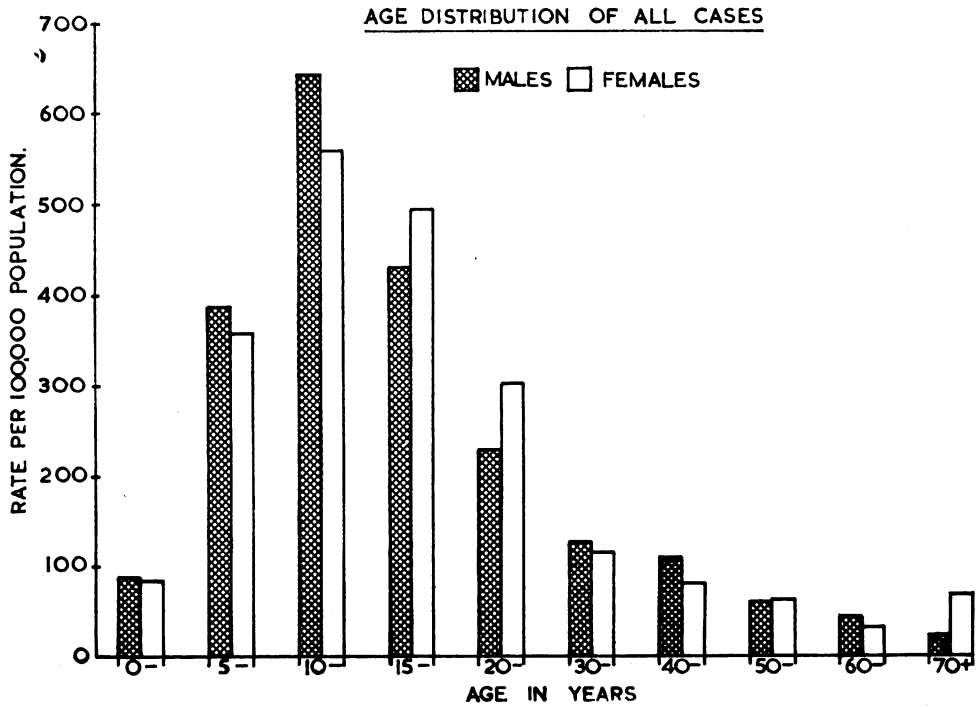
AGE DISTRIBUTION OF ALL CASES
MALES
FEMALES
RATE PER 100,000 POPULATION.
700
600
500
400
300
200
100
0
0-
5-
10-
15-
20-
30-
40-
50-
60-
70+
AGE IN YEARS

Fig. 1

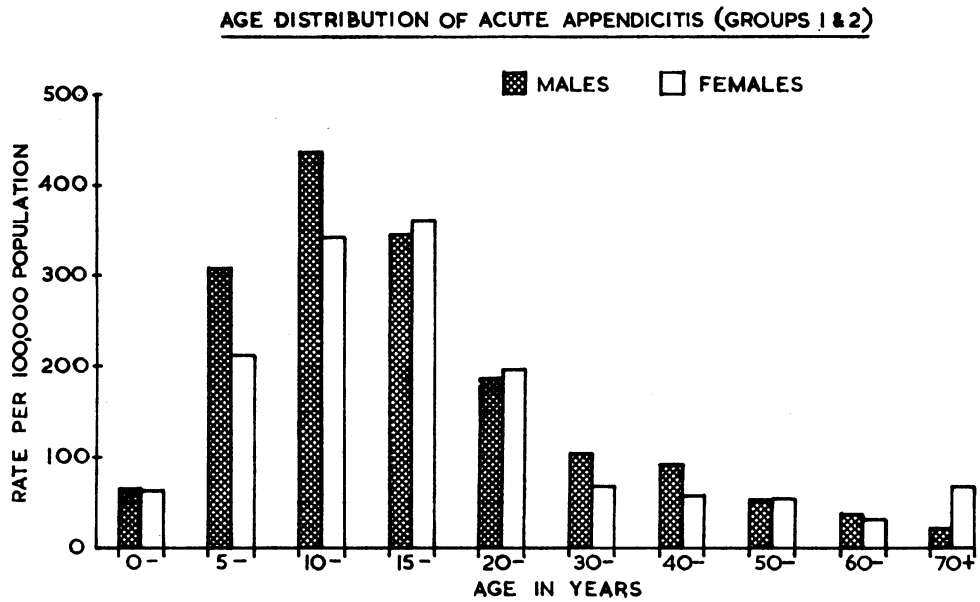
AGE DISTRIBUTION OF ACUTE APPENDICITIS (GROUPS 1 & 2)
MALES
FEMALES
RATE PER 100,000 POPULATION
500
400
300
200
100
0
0-
5-
10-
15-
20-
30-
40-
50-
60-
70+
AGE IN YEARS

Fig. 2

From Fig. 3 it can be seen that there was a fairly constant 'length of history pattern' for ages 5 to 44. Those under 5 or over 45, however, tended to have a longer history of symptoms before admission. This suggests a more atypical and insidious onset in these age groups and it is thus not surprising that the proportion of more advanced cases (diagnosis 2 as compared with diagnosis 1) was graded in these groups.

In fact, of the three patients who died one was aged 69 and one 70—the third was aged 40.

Similar findings have been reported in other investigations. Boyce (1954) showed that the clinical presentation of the disease in the over 50 age group is often atypical. It has been suggested (Carp and Arminio, 1952) that the pathology of appendicitis is different in the aged.

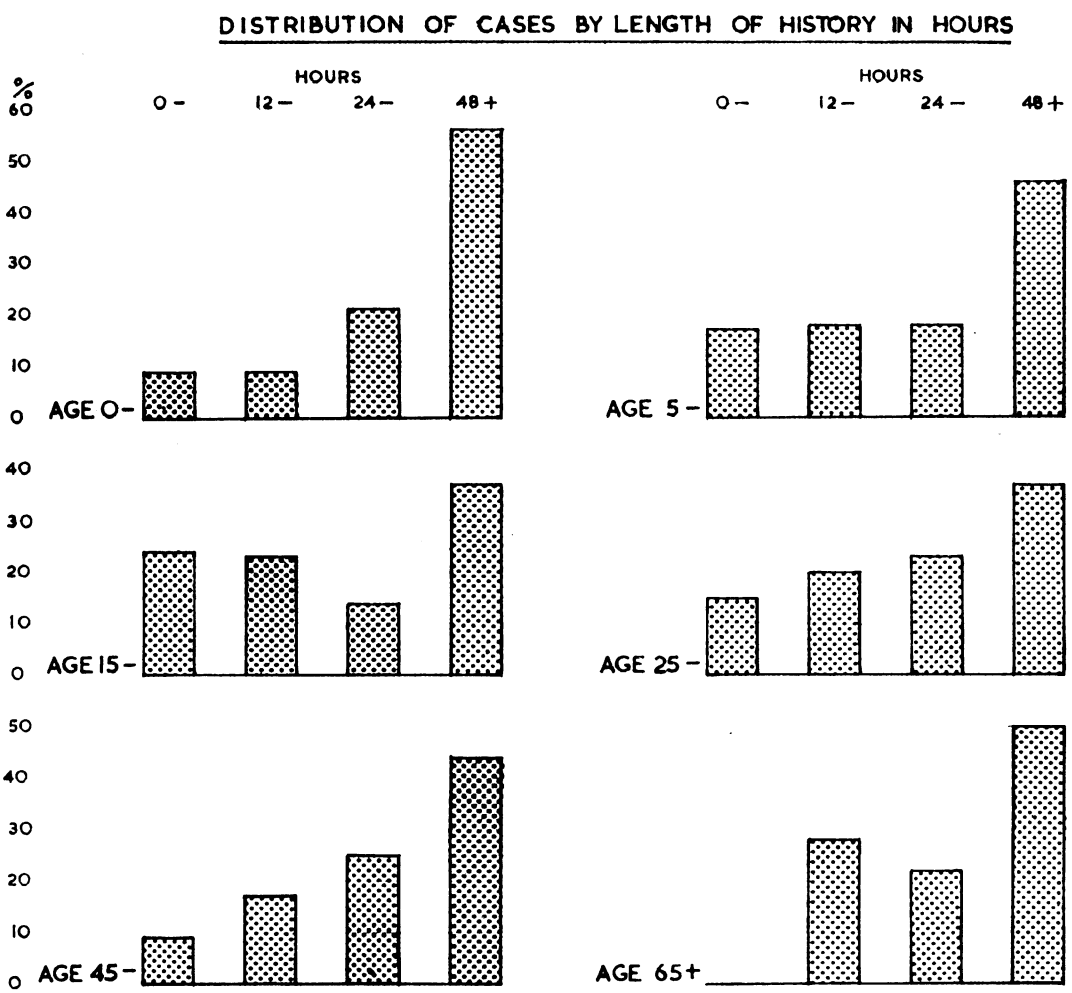

Fig. 3

Sex. The incidence of acute appendicitis for all ages together was higher in males than in females (ratio 1.1 : 1.0). This trend has been found by most investigators. However, as seen from Table 1 and Figs. 1 and 2, there was a marked excess of females with diagnosis 3-7 (cases other than definite acute appendicitis) between the ages of 15 and 30 (females 54, males 26). This would suggest that females in this age group are more likely than males to undergo appendicectomy for conditions other than acute appendicitis. In fact the sex ratio for cases of definite appendicitis (diagnostic groups 1 and 2) at these ages was approximately unity (females 123, males 112). These findings are similar to those of Lee (1961), who discusses their significance and suggests that the excess appendicectomy rate in young women may be due to cases where the diagnosis was in fact gynæcological.

TABLE 3.

DISTRIBUTION OF CASES BY MONTH.

MONTH OF ADMISSION	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY
Cases of Diagnosis - 1+2	64	56	51	55	45	48	48
% - -	10	9	8	9	7	8	8

MONTH OF ADMISSION	AUG.	SEPT.	OCT.	NOV.	DEC.	NOT KNOWN	TOTAL
Cases of Diagnosis - 1+2	44	43	67	52	44	5	622
% - -	7	7	11	8	7	1	100

Social Class. The incidence of acute appendicitis was determined for the inner and for the outer zones of the city. These zones were defined for another study connected with air pollution. The inner zone consists for the most part of a densely populated area of nineteenth-century terrace houses. The outer zone contains the better residential areas. Population figures for these zones were made available by the Registrar-General of Northern Ireland from the 1961 census.

Comparison of these two zones may thus give information on variations related to social class.

Previous studies (Registrar-General, 1954; Lee, 1957) showed higher mortality and morbidity rates in the higher social classes. The influence of a fashionable element was suggested by the report of Stewart, Webb, and Hewitt (1955) that the incidence of an appendicectomy scar in army recruits for the Second World War was greater in the higher social classes but that this difference occurred only in recruits born prior to the First World War.

In our study a higher rate of acute appendicitis (167/100,000) was found in the inner zone than in the outer (130/100,000).

If it is assumed that the proportion of cases of acute appendicitis was the same in the one hundred 'missing' cases as in the other cases investigated (72 per cent.) and if all of these seventy-two cases were from the outer zone, then the rates for the two zones were almost identical (167 and 166/100,000).

If these assumptions are correct, then it would appear that social factors did not play an important part in the ætiology of acute appendicitis in the population studied.

Season. Table 3 shows the incidence by month of admission. There did not appear to be any seasonal incidence.

Day of Week. Table 4 shows a striking variation in incidence with the day of the week of admission, with a low incidence on Sunday and a high incidence on Monday. This trend is shown for all age groups and for both sexes and is

TABLE 4.

DISTRIBUTION OF CASES BY DAY OF WEEK.

DAY OF WEEK	TOTAL CASES (Diagnosis 1+2)		χ^2
Sunday	54	...	13.22
Monday	122	...	13.01
Tuesday	88	...	0.0002
Wednesday	97	...	0.89
Thursday	88	...	0.0002
Friday	88	...	0.0002
Saturday	80	...	0.75
Not known	—	...	—

Total χ^2 - - - 27.87
Degrees of Freedom - 6
$P < 0.001$

statistically highly significant ($P < 0.001$). This difference could be produced by either a true variation of appendicitis incidence with the day of the week, or by factors unconnected with the disease itself. Further analysis of the cases suggests that the variation was due to delayed admission of cases occurring on Sunday.

To examine this question further the cases were analysed with respect to day of admission and length of history for diagnoses 1 and 2 separately. Table 5 shows that, of the uncomplicated cases, a relatively high proportion of Monday admissions had a history of more than twenty-four hours—suggesting that the excess cases would normally have been admitted a day earlier.

The same holds for the complicated cases to a more marked extent. In addition, the percentage of complicated cases was higher on Monday, 35 per cent. than on any other day of the week (mean percentage of complicated cases on days other than Monday, 29 per cent.).

TABLE 5.

DISTRIBUTION OF UNCOMPLICATED CASES (GROUP 1) AND COMPLICATED CASES (GROUP 2) BY LENGTH OF HISTORY AND DAY OF ADMISSION.

DIAGNOSIS	Length of History (Hours)	DAY OF ADMISSION. Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
1 -	0-	18	31	27	36	37	31	31
	24-	18	45	35	29	24	31	26
2 -	0-	6	9	8	10	10	6	7
	24-	10	34	16	19	15	18	15

The conclusion to be drawn from the above facts is that a good many cases which should have been admitted on Sunday were not seen at hospital until Monday. It appears that in some of these cases complications had arisen in the interval.

Since most cases of appendicitis seen by general practitioners are sent to hospital the same day, the explanation would seem to lie in a reluctance on the part of patients or their relatives to disturb their general practitioner on a Sunday.

Calculations on the figures presented suggest that the above explanation accounts numerically for the differences observed between appendicitis admissions on Sunday and on Monday.

Two practical points emerged from the study. Firstly it seemed that adolescent girls and young women ran a greater risk than males of the same age of having appendicectomies performed for conditions other than appendicitis (probably gynæcological). Secondly, there was more probability of delay in admission to hospital for those cases in which the symptoms began on Sunday, compared with other days of the week. This resulted in a higher proportion of complicated cases among the Monday admissions.

SUMMARY.

A survey of appendicitis morbidity was carried out for the City of Belfast in the year 1958. Results were analysed with respect to age, sex, area of residence, month of the year and day of the week of admission.

There appeared to be a greater risk of delay in the diagnosis in children under 5 years and in adults over 45, especially in those over 65.

Girls and young women appeared to run a greater risk than males of the same age of having appendicectomies performed for conditions other than appendicitis.

No influence of social class factors was detected.

There was no evidence of a seasonal incidence.

There was an exceptionally high admission rate on Mondays, corresponding to a diminished admission rate on Sundays. This was thought to be due to an

increased risk of delay in admission to hospital of cases where symptoms began on Sunday and resulted in a higher proportion of complicated cases among the Monday admissions.

We wish to thank Professor Pemberton, Dr. K. W. Newell, and the staff of the Department of Social and Preventive Medicine for advice in connection with this study, the medical records officers of the hospitals concerned who helped in the collection of records, Mrs. Jean McCabe for transferring the selected data on to punch cards and tabulating it, Miss E. Thornbury for preparing the figures and Miss J. Broderick for the typing.

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REVIEW

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The most interesting section of the report, "Some Aspects of Medical Research" (pp. 27-89), contains eleven scientific articles and is published separately as "Current Medical Research" at a price of 5s. 6d. In this there are two articles, *The Genetic Code* and *Chemical Mutagens*, dealing with genetic inheritance. The first describes how cells copy themselves and the second notes new techniques for studying agents, especially chemical agents, causing mutations. This emphasizes that agents operating in lower organisms may not operate in higher forms. Viruses in tumours, cancer in the tropics, river blindness, the demyelinating diseases, recent work on the endocrine glands and their interrelationship with the central nervous system, and mental retardation and chemical abnormalities are discussed. The metabolism of plasma proteins and the synthesis of sterols in the body are reviewed. There is a fascinating, but brief, section on biological engineering which includes miniaturized instruments and prostheses for artificial limbs and heart valves. All these articles stimulate thought on the newer horizons of medicine.

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AN OPERATIVE SERIES OF LUMBAR INTERVERTEBRAL DISCS

By J. H. LOWRY, F.R.C.S.

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Summary of a paper read at the Irish Orthopædic Club Meeting at Londonderry, May, 1961

THIS is a review of one hundred cases taken from approximately five hundred cases operated upon in Musgrave Park Hospital during the past twelve years.

These cases have been selected because of positive findings of disc prolapse demonstrated at operation. The time from operation varies from twelve years to one year, the average length of follow-up being seven years and the majority of cases being at least five years since operation.

In looking at these figures it should be appreciated that considerable filtering of diagnosed cases occur before coming to surgery. Firstly, the general practitioners realize that complete bed rest is often sufficient and a patient arriving at hospital has already had this and perhaps other adjuncts such as plaster of paris casts. It is difficult to estimate, but probably only one-third of the cases with prolapsed discs entering hospital eventually require surgical treatment.

RELATION OF TRAUMA.

Sixty-three of the patients gave a history of trauma such as falling or lifting a heavy weight. Those without any history fall into the group of repeated minor strains or a forgotten injury or simply the pathology which is invariably present may alone be sufficient to allow bulging.

AGE AND SEX INCIDENCE.

The average age was 34 years, majority of cases being in the third decade. The youngest was 19 and the oldest 53 years. There were seventy-five males and twenty-five females. Commonly given figures are two males to one female.

GRADING OF RESULTS.

(i) EXCELLENT—In which there is complete relief of symptoms. The patient is back to his original occupation and can indulge in activities such as golf. No support is worn. *47 patients.*

(ii) GOOD —Patient confesses to occasional weakness and aching in the back, but otherwise is as Grade (i). *44 patients.*

(iii) FAIR —Initial relief of symptoms, but there has been recurrence of pain such as to necessitate the wearing of a support. *9 patients.*

(iv) POOR —No relief. *0 patients.*

LENGTH OF HISTORY.

The average duration of symptoms in Grade (i) and (ii) was one year. This figure was brought up by one or two being of some years' duration and the majority did not exceed six months. In Grade (iii) the average duration of symptoms was five years.

PRE-OPERATIVE TREATMENT.

The average length of this was two months, including bed rest, pelvic traction, immobilization in a plaster jacket, exercises and manipulation.

MYELOGRAPHY.

Eight cases had myelograms in addition to routine radiology. The results were all positive. Occasionally in lumbo-sacral prolapse a false negative can occur.

CORRELATION OF CLINICAL FINDINGS AND SITE OF PROLAPSE.

SITE OF PROLAPSE		NUMBER OF CASES		ABSENT ANKLE JERK
L4/5	...	31	...	4
L5/S1	...	69	...	55

In theory L4/5 prolapse should cause diminution of sensation on the outer side of the calf and foot with diminution of the power of the extensor hallucis longus. L5/S1 prolapse should cause diminution of sensation on the back of the calf and sole of the foot with an absent ankle jerk.

OPERATIVE FINDINGS.

Twenty-eight cases had exploration of one space only following the finding of a positive prolapse. The remaining cases had routine exploration of the two spaces. (See discussion.)

INDICATIONS FOR OPERATION.

(1) Persistence of sciatica with limitation of straight leg raising. *94 cases.*

(2) Severe low back pain without sciatica. *5 cases.*

(3) Evidence of cauda equina involvement. *1 case.*

Post-Operative Complications.

There was no mortality in these cases and indeed there were no deaths associated with the five hundred cases. Shock was seen in four cases and was defined as the necessity for post-operative transfusion. There were no pulmonary or deep venous complications in this series.

Discussion.

In assessing the high success rate it is recalled that these cases all showed definite prolapse at operation and such results would be expected. The assessment of these results is based on subjective findings, as disc operations are a surgery of pain. The better results follow the shorter histories. The site of prolapse pre-operatively is difficult to determine and in this series the ankle jerk would seem to be the most reliable indication. Some writers have stated that a positive prolapse occurs at two levels in 10 per cent. of cases. This was not substantiated here, although it is noted that two of the cases later requiring re-exploration for recurrence of sciatica had only one space explored at the original operation.

Limitation of straight leg raising is the principle reason for operative interference, but there would appear to be a small number of cases of severe low back pain associated with, and curable by, removal of a herniated lumbar disc. The discovery of this small group from the masses of cases of low back pain remains an outstanding problem. Its elicitation is difficult, and I would suggest that it can be found from careful history taking, myelography, and the vaguest of all from clinical experience.

I should like to thank Mr. R. I. Wilson for his considerable help in the preparation of this paper and the other surgeons in this group for permission to review their cases.

REVIEWS

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The authors have dealt with the concept of accident proneness in a well-designed piece of academic research in which they have conformed to a rigorous scientific and statistical discipline. The term "accident prone" has been in common use since the middle twenties, suggesting that certain persons in a group in identical circumstances are always more likely to sustain an accident than others, and has been suspect for some time but until now has not been seriously challenged.

This study describes the results of investigations into the road accidents incurred over a four-year period by bus and trolley-bus drivers employed by the Ulster Transport Authority and the Belfast Transport Authority which between them comprise the entire public road transport system in Northern Ireland. A clinical assessment of selected drivers who appeared in groups having the most unfortunate accident experience in two periods of time and control groups was also carried out. The main conclusion arrived at is that the validity of the concept of accident proneness is more than doubtful. The influence of age and experience of drivers as important factors in accident causation is demonstrated. Finally, recommendations are made of an alternative hypothesis to accident proneness and for further research into these complex matters which might be profitable.

This is a most readable and valuable contribution to the literature and it will be of interest to the increasing number of doctors involved in industrial medicine. The statistics are elaborate and indeed a separate section is devoted to statistical techniques which are beyond the scope of ordinary readers. The review of relevant literature is extensive and there is an excellent bibliography.

The final sentence in the book very adequately epitomises our present knowledge: "Tendency to accident is a hazard of living." C. K.

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In all the text has been increased by seventy-four pages but the thickness of this edition is less than formerly due to a thinner paper and binding. Those familiar with previous editions will miss the rounded corners which made for easier handling. M. W. J. B.

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He compares the relative merits of renal function tests by an arbitrary score based on "obtainability" of desired information, degree of difficulty of performance of the test, risk involved, age of patient, etc. The choice of tests must always be related to the needs of the individual patient and the facilities available, and such a comparison cannot be valid. It is not necessary to make a case for radioactive renograms based on such a comparison, and these tables add nothing to the usefulness of the book.

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THIS compact, well produced little book deals methodically with the majority of those dermatoses which have a genetic background. The authors have had the advantage of many years' observation of patients at the Pennhurst State School in Pennsylvania, "where there are hundreds of patients with various congenital abnormalities."

There is an introduction by Professor James E. Wright who deals with the general aspects of genetics in a simple and straightforward manner. There then follows fourteen chapters in which the various skin disturbances, such as pigmentation, keratinisation, hair, etc., as seen in the so-called genodermatoses, are dealt with in a simple manner. A few references, not perhaps always very well chosen, are appended for each disease. The accounts are clearly written and easily understood, but tend at times to be somewhat abbreviated although, perhaps, the authors have not intended that the book should be used for any research or investigative study. It is certainly very helpful to find simple and clear accounts of many of the very rare inherited abnormalities of the skin contained in one small book, and no doubt those preparing lectures for both undergraduate and postgraduate students will find this book invaluable. The authors wisely, however, have not attempted to provide a thesis on the subject which would compare with the old and now out-of-date, but well loved, textbook by Cockayne. They have also wisely reduced the section on psoriasis to one short paragraph.

The photographs are all in black and white and contain ninety-nine figures but, in fact, many of these figures include as many as six different photographs. All these photographs are excellent.

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The way in which the subject is treated follows the classical style. However, this does not mean that the material is not up to date—on the contrary the authors have surveyed very recent developments in every field they describe. Whilst emphasising a scientific approach to the study of psychology, they have not forgotten the contributions of psychoanalysis and allied schools. What has not been emphasised sufficiently, in the reviewer's opinion, is the psychophysiology of the emotions. It is in this field that students look for a bridge that will link their somatic studies with what is for them the new dimensions of psychology.

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Dr. Agate begins with a review of population trends, the physical, mental and biochemical changes of normal senescence, the infirmities inevitably arising from impairment of the special senses consequent upon physiological ageing, and the significance of social factors in relation to geriatric medicine. Having delineated this background, necessary to a proper understanding of the effects of illness in old age, and the importance of preventive medical care, the special factors that influence the course of illness and disability arising from it are considered. Successive chapters then deal with diseases affecting the different systems, in the orderly sequence of standard medical textbooks, but avoiding repetition of the details common to them in favour of emphasis on the "special hazards of being old and ill together," and on the points in diagnosis and treatment of common disorders, and the combinations of circumstance, that have caused geriatrics to emerge as a discipline complementary to general medicine. Other special sections deal with the problems of surgery in old people, the approach to retirement and some of the administrative and logistic problems to be faced by hospital and domiciliary services.

This book is written by an author who combines wisdom, insight and a deep understanding of his subject with a wide experience and knowledge of general medicine. His views are expressed in elegant, lucid and most readable English. The print is clear, and the book is attractively bound and illustrated. Essentials are not skimped, yet the size of the book has been kept to admirable proportions avoiding unnecessary or repetitive detail, and it has been produced at a cost that represents very good value for money. It would be wrong to suppose that this is a highly specialised monograph appealing only to the geriatric physician. It is a reference book of every aspect of geriatric medical care, presenting in clear and balanced style a subject which is usually passed over in the standard medical textbooks, although old people claim so much more medical attention at home and in hospital every year. This book can be confidently recommended to any doctor engaged in clinical practice, other than the pædiatrician and the obstetrician, and to every medical student.

I should like to hope that any book of mine would deal as well with its subject, and read as well, as this. G. F. A.

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PSYCHOLOGICAL MEDICINE: AN INTRODUCTION TO PSYCHIATRY. By Desmond Curran, C.B.E., M.B., F.R.C.P., D.P.M., and Maurice Partridge, D.M., M.R.C.P., D.P.M. Fifth Edition. (Pp. viii + 427; figs. 20. 30s.) Edinburgh and London: E. & S. Livingstone, 1963.

THIS book was first published twenty years ago and, with subsequent editions, it has become established as one of the standard introductions to psychiatry. By its very nature, psychiatry is a field still characterized by many uncertainties, yet the authors have been successful in presenting basic principles in a succinct and balanced manner. The introductory chapter is particularly valuable in that it outlines the difficulties which the undergraduate is likely to experience when he comes to the systematic study of psychiatry and is required to broaden his concept of illness in order to include its psychological as well as its organic aspects. The various psychiatric disturbances are described in a detailed, but lucid manner and both students and doctors will find much of clinical value in this book. The differentiation of depression into "psychotic" or "reactive" types and involutional melancholia will be at variance with teaching in some centres. Again, not all clinicians will accept the author's arguments regarding the necessity or validity of classifying mental illness into two major groupings, namely psychoses and neuroses. Nevertheless, this book can be recommended enthusiastically to the student for use in conjunction with his lecture notes which will indicate any differences of emphasis within his own medical school. The student who wishes to read more extensively than his few prescribed psychiatric textbooks is in danger, without guidance, of accepting much unreliable material and thereby equating all schools of thought as being of equal significance. The bibliography of "a small selection of textbooks useful to the student" which has been incorporated is, therefore, most useful in this respect. S. J. K.

CARDOGRAPHIC TECHNIQUE. By A. Schott, M.D. (Heidelberg), M.R.C.S. Second Edition. (Pp. 140; illustrated. 25s.) London: William Heinemann Medical Books, 1963.

THIS is a most useful little book. Although the authors intend it for cardiological technicians, all physicians who employ electronic instruments for recording physiological data will find in it lucid descriptions of basic physics. The galvanometer, valve amplifiers, transistors, cathode ray tubes and sound recording apparatus are fully described. Most important, the end of each chapter has an ample bibliography of basic physics. The reader will find many useful tips about electrocardiographic technique. A serious study of this book will undoubtedly increase the confidence of anyone who employs the range of electronic cardiological instruments. Every department of cardiology should have a copy. It is highly recommended.

E. F.

OUTLINE OF HUMAN REPRODUCTION. By Ian MacGillivray, M.D., F.R.C.O.G. (Pp. 100; figs. 11. 10s.) Edinburgh and London: E. & S. Livingstone, 1963.

IN his preface the author claims that this book is intended to acquaint the beginner, either student nurse, pupil midwife or medical student, with the whole subject of human reproduction in broad outline without considering in detail the clinical management of patients.

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The subject of therapeutic termination of pregnancy is altogether unsuited for discussion in such a limited text. In the opinion of this reviewer the author, in spite of his recognised eminence and authority in his speciality, has set himself a task impossible of fulfilment without misleading the novice in various ways. H. L. H. G.

PSYCHOLOGICAL MEDICINE: AN INTRODUCTION TO PSYCHIATRY. By Desmond Curran, C.B.E., M.B., F.R.C.P., D.P.M., and Maurice Partridge, D.M., M.R.C.P., D.P.M. Fifth Edition. (Pp. viii + 427; figs. 20. 30s.) Edinburgh and London: E. & S. Livingstone, 1963.

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GUIDE TO PSYCHIATRY. By Myre Sim. (Pp. ix + 868. 55s.) Edinburgh and London: E. & S. Livingstone, 1963.

GUIDE books like small scale maps are often of limited value to the enquiring traveller. Their tendency to eulogise may encourage many to go on but, if the traveller is disappointed, he may feel that the territory is not worth re-visiting. There are exceptions to this where the reliable guide book stimulates the reader to further exploration.

Dr. Myre Sim's "Guide to Psychiatry" is such an exception. He has presented a wealth of factual and up-to-date information that will satisfy many and stimulate others to begin further exploration in depth. Indeed, he encourages this in his preface, and provides a forty-seven page bibliography for the purpose. This is not, of course, a textbook of psychiatry, and so the author's views are generally not too obtrusive, but there are exceptions. The frequent introduction of an historical note helps to put the material into perspective so that what is really new can be readily discerned. Psychosomatic medicine is dealt with more fully than in most comprehensive books, and in that chapter, as elsewhere, theories of causation put forward by various authors are summarised with reference to source material. Psycho-analytic interpretation of symptomatology takes precedence over alternative explanations.

Traditional psychology is dealt with in eighteen pages, and psychopathology in sixty-five. The chapter on social psychiatry will provide a very useful summary for examination candidates, but in this as in other chapters, the author's exhortation to refer to the literature should be noted. In the chapter on psycho-pharmacology and drug therapy, the metric system of dosage is used, and the preparations are referred to by their chemical descriptions and not by their trade names.

The English and Scottish Mental Health Acts are briefly summarised, but there is no reference to the Mental Health Act (Northern Ireland), 1961.

In the reviewer's opinion Dr. Sim's book is more suitable for postgraduates than undergraduates. The general physician will find in it useful compendium and guide to that part of medicine which is becoming more widely recognised as an integral part of his work.

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THE DEVELOPMENT OF THE INFANT AND YOUNG CHILD, NORMAL AND ABNORMAL. By R. S. Illingworth, M.D., F.R.C.P., D.P.H., D.C.H. (Pp. viii + 318. 30s.) Edinburgh and London: E. & S. Livingstone, 1963.

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THE appearance of this book is an important event. There has not been for many years a standard British textbook of gastroenterology, and recent attempts to supply one have not been so successful as one could have wished. The authoritative and massive three-volume work of Bockus is the stand-by of every gastroenterologist; but is not for the student, and perhaps not routine reading even for the M.D. candidate. There is little doubt that, for want of a convenient manual, the teaching and understanding of alimentary diseases has not reached the standard attained in, for instance, cardiology, or neurology. Deficiency is most marked in the knowledge of the natural history of the alimentary diseases, and in treatment; so that the upper abdomen is the centre of more irrationality and obscurantism than any other system or organ.

The book in your reviewer's opinion remedies the lack of a suitable textbook. It is a highly intelligent and discerning survey of gastroenterology in 1963. A satisfactory account of the clinical syndromes is given. The chapter on malabsorption is particularly good. Treatment is discussed realistically and in practical detail and these sections are truly helpful. Surgery is given its due place. The usefulness and limitations of special investigations are described and details of methods given in an appendix. The radiographs and diagrams are very good. The index is good. The print is agreeable. Gastroenterologists will be pleased that so much worthless digestive and abdominal folklore is openly condemned. What may most impress a reader unfamiliar with the new gastroenterology is the integration of medicine, surgery, radiology, clinical pathology and biochemistry in a majestic and beautiful discipline. The book is worthy of the subject.

Per contra it is a pity that gastric and duodenal ulcer are considered together under the heading of peptic ulcer. Where these subjects are not separated, the reader has to read analytically if he is not to be confused. It is a pity, too, that in the just revolt against the uselessly restrictive diets of the past, the author should seem to abandon the formal prescription of food. There is only a single diet programme in the book—the gluten-free. The gastroenterologist's concern with food is mainly with obtaining optimum nutrition and with using maximum food to neutralise gastric acid, not with penitential or propitiatory deprivations. Precise advice about food need not imply restriction. General directions will not avail with most hospital patients—especially when the "lady next door" is only too ready to step into the place of the physician and the dietitian. Typhoid fever is not described, nor are worm infestations, though cholera rightly is. Five hundred milligrams of mepacrine t.i.d. for five days, for giardiasis, seems a very large dose for a child, but it may be that the doses of mepacrine hitherto used have been too small. Certainly in the case of a therapeutic test of a diagnosis, it is essential that the dose should be adequate and perhaps current dosage of mepacrine in giardiasis should be reviewed. J. S. L.

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It is interesting to note the long and friendly association with the Royal College of Physicians of London which has continued for three hundred years. This friendship is reflected in the coat of arms granted by King Charles II in 1667, and issued at his command by the Ulster King-of-Arms. It resembles that of the London College in that it shows "in chief a hand celestial descending out of a cloud feeling the pulse of a hand terrestrial." In the London coat the lower compartment shows a pomegranate and fleur-de-lis, but the Irish one shows a harp, crowned. For some reason the terrestrial hand is now omitted from the device, except, apparently, when used by the President himself.

Professor Widdess has made but slight reference to the historical background of Ireland during this long period. There is a passing reference to the defeat of King James II which led to the College being named the King and Queen's College of Physicians of Ireland. This clumsy label was discarded in 1890, and the College was granted its present prefix of "Royal," to which it still adheres, although Southern Ireland is now a republic outside the British Commonwealth.

It is with particular pleasure that I recommend this valuable and entertaining book. It is published by E. & S. Livingstone, of London and Edinburgh, and its format and ten illustrations are finely produced. R. M.

PRACTICAL BIOCHEMISTRY. By H. Zwarenstein and V. E. Vander Schyff. Seventh Edition. (Pp. x + 106. 15s.) Edinburgh and London: E. & S. Livingstone Ltd., 1963.

THIS small book embodies the course in biochemistry given to medical students in the University of Cape Town. As such it must be considered as supplementing an organised series of lectures and it can be said at once that in this framework it succeeds admirably. It is astonishingly comprehensive in the range of principles covered and while necessarily abbreviated the instructions given for experimental procedures are clear and complete.

Of interest is the approach to the biochemistry of physiologically important enzymes where the enzymes are extracted from the relevant animal tissue and used for a study of their properties.

It is disappointing to see the old term "change in reaction" used to refer to an alteration in pH in a book with an essentially modern approach, but this, and the inherent defects of compression, are the only points in which the book can be said to be vulnerable. D.W.N.

THE OVARY. Edited by Hugh G. Grady, M.D., and David E. Smith, M.D. (Pp. 896; figs. 193. 108s.) International Academy of Pathology Monograph. London: Baillière, Tindall & Cox, 1963.

THIS monograph by fourteen authors gives a very good summary of our present knowledge of the ovary. The contributions cover its embryology, its structure in infancy and childhood, the pathogenesis of sexual anomalies, the histology and histochemistry of the adult ovary, ovarian hormones, ovulation, androgenic and estrogenic lesions and non-functioning neoplasms. In each section an expert has been called to examine the present position of our knowledge. Each contains a useful bibliography. It is obvious that there are still serious deficiencies in our biochemical knowledge of the steroid hormones, and interesting to read that the beneficial effects of wedge resection in the Stein-Leventhal lesion are still inexplicable. The sections on ovarian tumours are particularly valuable to gynaecologists and pathologists. All workers in these fields should have this book readily available.

The illustrations are good and the publishers are to be commended. J. H. B.

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This is a readable general text on applied embryology and should interest the student and practitioner by emphasising the growing importance of embryology, especially in pædiatric surgery and medicine. J. E. M.

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THE publication of a book from our own Medical School is an occasion which should arouse pleasure from its graduates and pupils and, at the outset, let me say that this book does not let us down. The purpose of the book is to provide for surgeons and would-be surgeons some clear direction through the somewhat new and complicated field of endocrinology. In this I think the authors have done well and one will find a clear explanation of the known physiological basis of the diseases and, equally important, a truthful statement of ignorance where theory or supposition has still to be indulged. The clinical descriptions of the diseases are clear and, for us, interesting, because they are illustrated by local experience.

The combination of physician and surgeon is a happy thing for the patient's benefit and this book highlights several examples of such co-operation. I am sure that many will admit with me a sense of difficulty in investigating and afterwards interpreting the results in these cases; and here the book provides a good index to direct one to the information quickly, and lists of references to special articles are provided at the end of each of the chapters for those who require more detailed information. Perhaps some criticism could be aimed at the sketchy instructions to anæsthetists, but the aim is not to teach operative surgery or anæsthetics but to give an indication of the current Belfast practice.

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