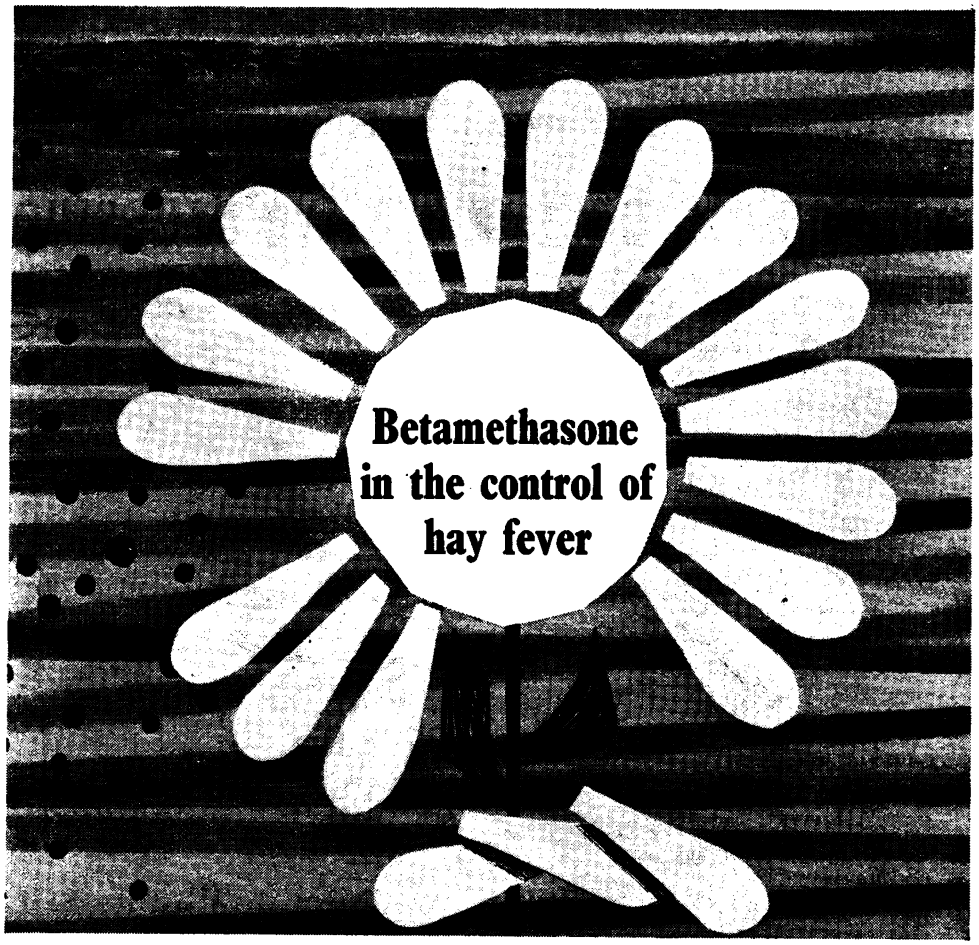
JUNE, 1963

THE ULSTER MEDICAL JOURNAL

PUBLISHED BY
THE ULSTER MEDICAL SOCIETY



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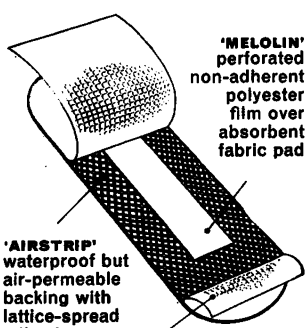

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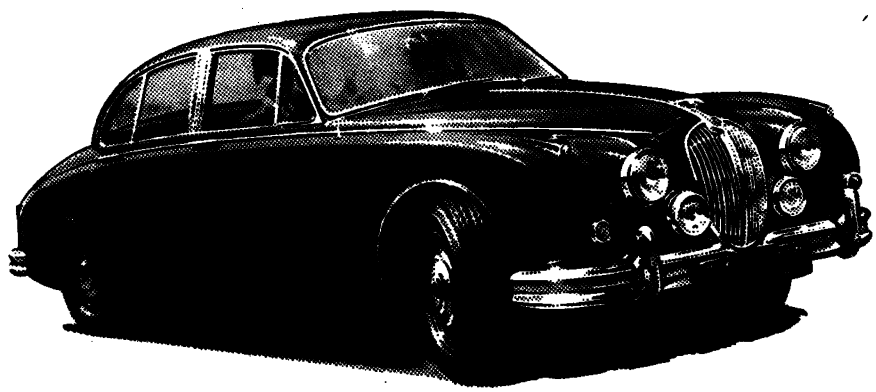

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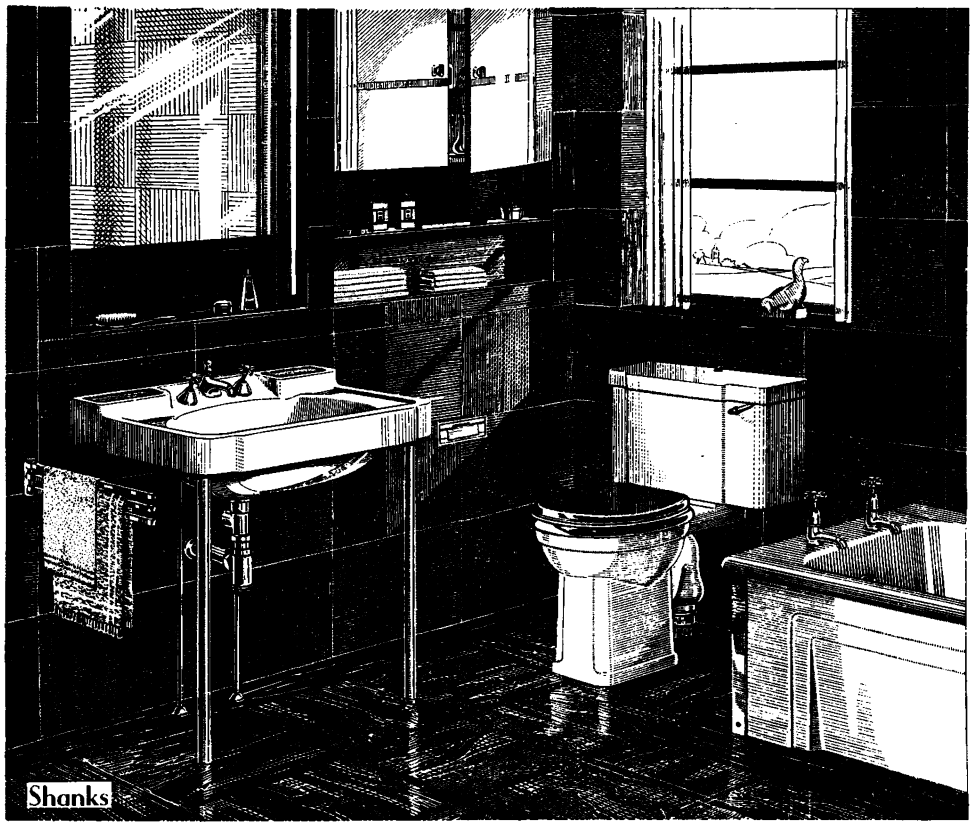

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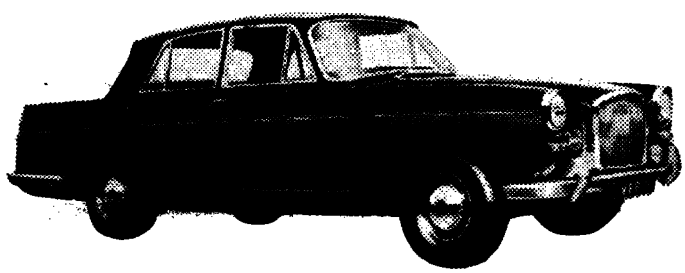

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The Ulster Medical Journal

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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We remain,

Yours faithfully,

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PUBLISHED ON BEHALF OF THE ULSTER MEDICAL SOCIETY

Vol. XXXII JUNE, 1963 No. 1

Editorial

ADEPT IN THE SCIENCES

"Good God, gentlemen, whatever will become of you!"

—ABERNETHY.

To the student entering the portals of the university, filled with the desire to be a 'doctor,' having only the faintest idea of what this means, but longing for the sense of human help and relationship which he associates with medicine, the first year presents a curious picture. Fresh from advanced levels in physics and chemistry, he suddenly feels disenchanted at having to repeat his studies in these subjects. Indeed one of the problems before the faculty is whether Queen's is to follow English medical schools in the recognition of advanced levels in chemistry, physics, and biology as equivalent to the first M.B. So far arguments have prevailed against such acceptance. The university course contains much more organic chemistry so essential for future understanding in biochemistry and clinical studies. The physics course emphasises to a greater degree than is done at school the principles of radiation. Biology—which has now replaced the former subjects of botany and zoology—is used as an introduction to physiology and mammalian anatomy. Indeed the whole course, whilst primarily a basic science one, has a certain vocational tilt which accords with the general idea of integration of medical teaching. Then, too, candidates for the medical school come from a great variety of backgrounds—some from schools with excellent teachers and laboratories, others from schools less efficiently manned and equipped, and still others from overseas. Their introduction to university entails the acquisition of new methods of learning, the development of individuality, the loss of the intimate supervision of school. For these and other reasons the university first year is by no means a waste of time.

For the modern student of medicine, much more than for his predecessors, a basic scientific training is essential. Therapeutics, instead of being empirical which it was since the beginning of time, is rapidly assuming the status of a science, and without a knowledge of physics and chemistry the student would flounder without understanding. Steroid chemistry—of no importance to medicine twenty-five years ago—is now essential for the diagnosis and treatment

of many complaints. Clinical pathology, for which a bunsen burner and a test-tube once sufficed, is now the most rapidly expanding branch of medical science and requires an ever-increasing scientific background for its proper use and evaluation.

The former subject of Hygiene or Public Health has now expanded into Social and Preventive Medicine and medical statistics has become essential.

Pathology, ever expanding, remains the basic clinical science. A new subject—biology—has been added to the curriculum.

Even greater changes are to be seen in the clinical subjects. The history-taking and the bedside examination are still fundamental, but now these represent but the beginning of the consideration of the patient. Other specialists—for there has been much fragmentation—may be called, and physical and chemical aids to diagnosis generally utilised. The doctor, however, must be able to interpret these findings from their varied sources, and perform the scientific synthesis which gives him the diagnosis in the particular case.

It is amazing how much of this is absorbed by the modern student, but the rate of accumulation of the facts of scientific medicine is so rapid that at graduation much remains to be learnt. Even if all contemporary knowledge were known at graduation the rate of advance still continues so that for the doctor who would be competent the study of medicine is a life-time duty. In view of this, the undergraduate curriculum must concentrate on the principles of its science, so that the continuing student can add intelligently to a sound platform of knowledge. There are many methods by which this can be attained, but in our own school we have all endeavoured to lead the student to the belief that, in spite of all its apparent fragmentation of the advances which sometimes come here and sometimes there, there is but one medicine and one medical problem—the sick patient.

J. H. B.

MEMOIR OF THE LATE SAMUEL SMITH THOMSON, OF BELFAST

By **ROBERT STEWART, M.D.***

SAMUEL SMITH THOMSON, whose name is so interwoven with all that is "true and honest and just and lovely and of good report" that it will not easily be forgotten in the town and neighbourhood of his adoption, was born in Coleraine in May, 1778, and died on the 30th April, 1849. The immediate cause of his death was bronchitis, to attacks of which he had been subject for a number of years, but which were always easily removed, until the last, which, notwithstanding the most prompt and energetic treatment, could not be controlled, congestion of the lungs supervening, and a fatal issue being the result on the fifth day from the period of the attack, immediately before which the deceased had been in the full enjoyment of his usual excellent health and spirits.

Doctor Thomson was of the middle stature, and of a full habit of body, but remarkably active in all his movements. He had a more than ordinarily well-developed cerebral organisation, a quick, penetrating, intelligent eye, florid complexion, and a remarkably kind and benevolent expression of countenance; of great affability and suavity of manner; in truth, the finished and polished gentleman, incapable of giving offence, and if offended most readily and easily appeased.

His conversational powers were at once varied and of the highest and most agreeable order; his tastes pure and refined; a great, indeed it might be said an enthusiastic lover of music, vocal and instrumental. He was an excellent performer on the violin, having an admirable ear, and regularly enacted his part at the concerts of the Belfast Anacreontic Society, of which he was the founder and president. The Music Hall of Belfast, a very conspicuous and ornamental building in one of the leading private streets of the town, was erected chiefly through his great and influential exertions.

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*Dr. Robert Stewart was Resident Medical Superintendent of the Belfast District Hospital for the Insane from 1835 until 1875. He presumably wrote this memoir soon after the death of Dr. S. S. Thomson in 1849. Dr. Thomson was on the staff of the Belfast General Hospital (now The Royal Victoria Hospital), and was a visiting physician at the Hospital for the Insane (which occupied the site on which the Musgrave and Clark Clinic now stands). He was also in 1806 the first President of the Belfast Medical Society (now the Ulster Medical Society), for several years Chairman of the Belfast and County Antrim Branch of the Royal Medical Benevolent Fund Society of Ireland, and a founder and performing member of the Anacreontic Society (now the Belfast Philharmonic Society). (Professor R. A. McCance, F.R.S., is a great-great-nephew of Dr. Thomson.) The memoir was apparently designed not for publication but for private circulation, and recently the Professor's brother, Mr. Henry B. McCance, lent it to Dr. Robert Marshall, and gave permission for its publication in the Journal.

His father was James Thomson, a highly respectable surgeon and eminent practitioner in Coleraine, Co. Derry, a man who was naturally gifted with a mind of great power, which was both well cultivated and well balanced. He had ten children, two sons and eight daughters, Samuel Smith being the youngest of the whole family. The eldest child, an unmarried daughter, lived to the advanced age of 88 years, having died about six months since in Belfast, retaining all her faculties perfect to the last.

The early education of Doctor Thomson was conducted by his father, and finished under the roof of a Presbyterian minister with whom he resided as a member of the family. His medical studies commenced by his being bound apprentice to his father. In due course he went to Edinburgh, attending regularly at that celebrated university until he had completed his curriculum, when he immediately went in for his examination, obtaining his degree of M.D. in 1800. Shortly after this he came to Belfast to settle as a private practitioner, where, after remaining for a few years, he went to Magherafelt, in the County of Derry; but soon leaving it, he returned to Belfast in 1805, which he never afterwards left, thus being nearly half a century actively engaged as a practising physician amongst its inhabitants.

He was greatly interested in the establishment of the Belfast Fever Hospital, now entitled the General Hospital. In 1817, when typhus fever broke out so malignantly and spread so fearfully and fatally, he was night and day in attendance on the suffering poor, not thinking at all of self or personal risks, but heroically combating with the dire pestilence which was decimating the land; and this so successfully, with such unremitting, such superhuman efforts in fact, that when the epidemic had ceased, his fellow-citizens presented him with a most complimentary address, accompanied by a splendid service of plate.

During a period of five-and-twenty years, Doctor Thomson continued one of the attending physicians of the above hospital, when, owing to his extensive private engagements arising from a rapidly increasing practice, he retired with honours not less numerous than deserved. He still, however, remained in official connexion with it as one of the consulting physicians, the duties of which he performed until his death, always taking a warm and lively interest in everything that concerned its welfare and good working, and of which the most ample proof was given by his leaving it a legacy of £100, and this too not more than a couple of hours preceding his dissolution, thus showing how vividly its prosperity was on his mind, and how clear, collected, and benevolent the intellect of this highly-gifted and distinguished man was to the very last moment of his honourable and exemplary existence.

At the first meeting of the Committee of the Hospital after his death the following resolution was passed:—

"That this Committee have heard with the deepest regret the melancholy intelligence of the death of Doctor S. S. Thomson, Consulting Physician to the Hospital, one of the earliest and most efficient promoters of this charity, to whose interests he so long and so ably devoted the best years of his professional life.

DR. SAMUEL SMITH THOMSON
1776-1849
(from the painting in The Royal Victoria Hospital)

As a slight but sincere tribute of respect for his memory, this Committee beg to express, in the most especial manner, their unfeigned sorrow at his sudden removal, and tender their cordial sympathy and condolence to his sorrowing relatives.

"(Signed) ANDREW MULHOLLAND,

Chairman."

The only other public medical institution with which Doctor Thomson was professionally connected was the Belfast District Lunatic Asylum, to which he was appointed the visiting physician in 1837, in succession to the late Doctor James MacDonnel, who retired from this office owing to the infirmities attendant upon his then very advanced age. This appointment he held until his death, and in what manner the annexed official document, as published in the local newspapers, will show sufficiently.

"At a meeting of the Governors of the Belfast District Lunatic Asylum, held on Monday, the 7th of May, 1849, the Right Reverend Bishop Denvir in the chair, it was unanimously resolved: 'That this Board, deeply lamenting the sudden removal of their late visiting physician, Doctor Samuel Smith Thomson, deem it their duty to record their cordial esteem for his most estimable character as a man, their due appreciation of his distinguished attainments as a medical pracitioner, and, above all, their grateful remembrance of his eminently judicious, humane, faithful, and efficient services during the last twelve years as the visiting medical officer of this asylum.' "

Before proceeding further with this brief memoir of Doctor Thomson, the relation in which he stood and the conduct he invariably pursued towards his professional brethren must be alluded to. And here it may be truly stated that we come to one of the brightest and purest gems in his character, for if ever there was an upright man, acting with the fullest integrity and singleness of heart and purpose, and uninfluenced by the mean and petty jealousies which unhappily are so rife amongst professional men, that man was Doctor Thomson. His family motto, significantly enough, was "Honesty is the best policy," a motto which he handed down to his relations, not merely unsullied, but rendered all the purer, and made to shine forth in still more refulgent colours by his noble manner of life, which was pre-eminently that of the "noblest work of God"—an honest man.

From a very early period in his professional life he stood forth the resolute, vigorous, and uncompromising champion of the rights and privileges, the honour and station, of his brethren. He invariably espoused the cause of the juniors in particular, having never ceased to preach that the medical labourer was worthy of his hire; and he ultimately succeeded, after many years of local battling and no small animosity and facetious opposition, in having the principle carried that the medical attendants of the General Dispensary in Belfast should be paid regular and fixed salaries. This principle is now fully recognised in Belfast, thanks to Doctor Thomson's exertions for its accomplishment. For his able and distinguished advocacy of his brethren at all times, and his exalted professional conduct

generally towards them, he was presented in 1834 with a massive and splendid gold snuff-box,* on which were engraved the names of the donors, thirty-six in number, of all branches of the profession; a gift which the lamented deceased prized, as it may be supposed, in no small degree. Having lately been referring to Doctor Cheyne's very interesting "Autobiographical Sketch," we were forcibly struck with the following extract, as very applicable in many respects to Doctor Thomson:—

"I endeavoured to become acquainted with the characters of those who moved in the highest ranks in the profession, and to discover the causes of their success; and I ascertained that although a man might acquire popularity by various means, he could not reckon upon preserving public favour unless he possessed the respect of his own profession: that if he would effectually guard his own interests, he must in the first place attend to the interests of others; hence I was led carefully to study and liberally to construe that part of medical ethics which regulates the conduct of physicians towards each other."—Essays by John Cheyne, M.D., page 8.

The high opinion held of the late Doctor Cheyne by every branch of the medical profession in Dublin is perfectly within our own recollection and observation; one and all of them, junior as well as senior, respected, nay, loved him, knowing that he was a man in whom the most implicit confidence could be placed at all times and under all circumstances. Such a man, also, was the late Doctor Thomson; the members of his profession, from the oldest to the youngest, almost venerating him for his exalted virtues and strict integrity, as shown in all his intercourse with them, to say nothing of the high estimation in which they held his professional talents and other varied and ennobling requirements. This confidence in and opinion of Doctor Thomson was never lost sight of by his brethren—sons, rather, we should say, for he had been for years past, with one consent, the father of the profession in Belfast, and as such his death was felt by the whole profession, who, without an exception, attended his unprecedently crowded funeral, walking in the procession as mourners. And in order further to prove their great love and esteem for him, and as only a fitting mark of respect for his memory and desire to perpetuate it, they, in their capacity

---

*The snuff-box was of 18 ct. gold, engraved with his crest and with the names of the donors:

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as the Medical Society, have resolved that a marble bust of their "beloved and esteemed" chief shall be placed in their library, or in the hall of the General Hospital. And further, have placed on record their deep regret for his removal from amongst them by passing the following resolution at their meeting on the 7th May, 1849:—

"That this Society begs to record its deep sorrow in the lamented decease of Doctor Samuel Smith Thomson, one of its oldest members, a gentleman at the time of his death holding the distinguished position of head of the medical body here, a place to which he was most justly entitled, not only from his sincerity, but also from his skill, worth and integrity, and kindness and urbanity to his juniors; and especially from his untiring zeal for, and the unswerving firmness with which he ever upheld the honour and interests of the profession, and that a letter signed by the Chairman and Secretary be written to his relations, expressive of these sentiments, and respectfully offering the condolence and sympathy of this Society on their melancholy bereavement."

The deceased was very liberal in his charities; his purse-strings were never closed against want or distress in any form, but freely opened to afford relief. The branch of the Medical Benevolent Fund Society established in Belfast in 1843 he supported from the first, and was unanimously elected its perpetual President.

The Belfast Branch of the Medical Benevolent Fund Society of Ireland, at a quarterly meeting held in the Library Room of the Medical Society, on Monday, 7th May, 1849—Robert Stephenson, Esq., M.D., in the chair—resolved unanimously that it is with feelings of the most unfeigned regret we have heard of the death of our late highly-esteemed and respected President, Dr. S. S. Thomson, whose unceasing and disinterested attention to the welfare of the Society since its foundation in 1843 added so justly to the lustre of his character for benevolence, and true sympathy for the wants of others, and now demands from us the expression of our greatest sorrow and concern for the heavy loss which we have sustained by his sudden removal.

No practitioner could have been more liberal in giving the benefit of his professional services gratuitously to those whose circumstances were limited; perhaps, indeed, he went to the extreme of liberality in this respect, his benevolence thus being unbounded, and meted out, too, in such a manner as to do away with all embarrassment on the part of the recipients thereof. All praise was due for this, and he received his reward by enjoying a highly lucrative practice for a number of years; in fact, latterly he was compelled to limit considerably his professional engagements, so extensive had they become, and only to attend in consultation, except in the case of patients with whom he had been since the days of their youth connected, not merely as medical adviser, but as a counsellor and friend.

Dr. Thomson never published any contributions to medical literature that we are aware of; not but that he had both material and ability to do so in the best and most attractive garb if he had pleased, for not only professionally was

Dr. Thomson thoroughly educated and experienced, but he was also an accomplished scholar, with a mind well stored with classical and general knowledge; he, however, had not the inclination, or rather his modesty prevented him, having not alone an utter aversion to appear in print, but to write anything more in ordinary than he could well avoid.

In politics Dr. Thomson was a Whig, but never appeared in public as a politician, thus evidencing that plain commonsense wisdom with which he was so largely gifted.

Having now touched, however imperfectly, on some of the chief phases in the remarkably even tenor of a lengthened existence such as Dr. Thomson's, it only remains to observe that it was in the family circle, amongst his own immediate relations and intimate friends, that he especially appeared in his true character of kindness and beneficence.

Though Dr. Thomson never married, yet from a very early period he took upon himself all the responsibilities and engagements of a parent by adopting two nephews, the sons of a deceased sister, both of whom (one being married and having a large family) continued to reside with him till death separated a tie which was made all the more precious and dear from its long and unbroken continuance of unmixed happiness.

The deceased was a truly religious man, a diligent and earnest student of his Bible, and most exemplary as a regular attendant on all the ordinances of public worship. He ever abhorred whatever tended in the most remote degree to put a slight on things sacred, and not less so did he detest hypocrisy in any shape. Living the life he did, he met death with the utmost resignation and composure. Its certain approach he plainly foresaw, having it fully impressed on his mind that he could not recover, owing to the severity of the attack which, in the Providence of God, he had been so suddenly and fatally seized. Speaking on the subject to a dear friend two days before he died, he observed, "I have been long prepared for this, and my trust is entirely on the merits of my Redeemer."

To the last moment he continued perfectly conscious and collected, and within a few hours of his dissolution he, whilst his medical friends were visiting him, recounted over the whole treatment which had been pursued, observing at the same time that but for the distress which he suffered in speaking, he felt as fully competent as at any period of his life to discuss any professional question.

But we must draw this memoir to a close, and in doing so we cannot conclude it better than by quoting the following extract from the feeling letter of the Chairman (S. Brown, Esq., R.N.) and the Secretary (A. E. Lamont, Esq., F.R.C.S.I.) of the Belfast Medical Society in officially communicating with the family of the deceased the resolution of that body on the occasion of the death of their honoured and much deplored relative:—

"In conveying to you the resolution, we feel that we but feebly express the united sentiments of the medical body here, when we say that in the demise of Dr. Thomson not only has the profession sustained an irreparable loss, but the

entire community have reason to deplore the removal of one who was an ornament to society, kind, gentle, and unassuming, charitable from innate feelings of benevolence, and generous without ostentation. Long shall the many families of which he was the respected friend and trusted counsellor—long shall the various public bodies with which he was connected, and in which he was so highly esteemed, remember Dr. Thomson."

We may here mention that this Society has received a valuable addition to their library through the liberality of Dr. Thomson's executors, as the following letter will show:—

BELFAST,
15th September, 1849.

DEAR SIR,

At the late monthly meeting of the Belfast Medical Society I was directed to acknowledge the receipt of your most liberal and valuable present of books (above 800 volumes), being the medical portion of the late Dr. Thomson's library, and to thank you most sincerely for the kind consideration and generous feeling which prompted you to put in possession of the Society so valuable and appropriate a memorial of one whom every member of it revered as a parent and valued as a friend.

Accept, therefore, dear Sir, the thanks of the Society cordially and gratefully tendered, and believe me,

Yours most faithfully,

A. E. LAMONT, F.R.C.S.I.,
Secretary.

To James Bristow, Esq., Belfast.

THE TRANSPLANTATION OF THE KIDNEY: A REVIEW OF EXPERIMENTAL AND CLINICAL ASPECTS

By **JOHN B. LOWRY, M.Ch., F.R.C.S.**
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Historical.

Since ancient times the replacement of a diseased organ of one individual with a healthy organ from another has been a surgical dream. In ancient Egypt (3500 B.C.) and ancient India (200 B.C.) the repair of noses destroyed by syphilis or mutilation was frequently attempted with pedicle skin grafts. This art spread to Arabia, Greece, and finally to Rome, where it was practised by Celsus (58 B.C.—A.D. 7) and Galen (A.D. 138—201). The art was lost during the Dark and Middle Ages and was not practised again until the fifteenth and sixteenth century. In the meantime it was still being used in India and was introduced into England in the early nineteenth century by the East India Company. During the late nineteenth century the free grafting of skin, bone, fat, and other tissues became popular and some of the early pioneers, Wolfe, Thiersch, and Reverdin, are remembered today by the type of graft which bear their names.

Homografts, that is grafts between different individuals of the same species, were slower in developing and do not appear to have been practised in ancient times. Two early paintings by Mantegna and Chirlandajo depict the Patron Saints of Surgery, St. Comos and St. Damian, transplanting a leg from one individual to another. John Hunter performed many auto- and homo-transplantation experiments and had quite a clinical practice in homotransplanting teeth (Palmer, 1935). In the seventeenth century Von Mackren repaired a cranial defect in man with bone from a dog; however, he had to remove it again because the Church considered that it was "marring God's image of man." It was not until the beginning of the twentieth century that transplantation of organs, as distinct from tissues, was first attempted. Since then many tissues and organs have been auto- and homo-transplanted with varying results and often enthusiastic claims. These historical aspects have been comprehensively reviewed by Fomon (1939), Maltz (1946), and Woodruff (1960).

Early Kidney Transplantation Experiments in Animals.

The early investigators were mainly concerned with technical problems and at first were unaware of any immunological problem with homotransplants. Ullman (1902, 1914) was the first to report the results of auto-, homo- and hetero-transplants in different animals, but his results and those of others were poor. In U.S.A. Carrel and Guthrie experimented extensively with the transplantation of many organs, including the head and limbs, and achieved better results (Carrel, 1902, 1906, 1908; Carrel and Guthrie, 1905). Their success was due to meticulous vascular suturing and several kidney autotransplants functioned

for years. With kidney homotransplants, however, results were different and few functioned for more than a few weeks. During this period there was considerable disagreement concerning the cause of failure of both types of transplant and the interpretation to be placed in the histological findings. At first many investigators did not believe that there was any fundamenal difference between the two types of transplant and that thrombosis, hæmorrhage, and infection were responsible for failure of function (Carrel, 1906; Unger, 1910). Later scepticism of this view developed (Lexer, 1914) and an inherent biochemical difference was held to be responsible. Further work on the behaviour and histology of the homotransplanted kidney established beyond doubt that homotransplants failed due to a biological response in the host and that the histological picture was specific (Williamson, 1926; Ibuka, 1926; Wu and Mann, 1934).

The Homograft Reaction.

The modern conception of the homograft reaction is based on the work of Medawar (Gibson and Medawar, 1943; Medawar, 1944, 1945). He postulated that there was no inborn or natural immunity to foreign tissue but that a homograft acted as a foreign antigen which provoked an actively acquired immunity in the host. This immune response destroyed the homograft in a fairly predictable time and fashion which varied from tissue to tissue, species to species, and slightly with the amount of tissue grafted. If the host was again grafted with tissue from the same donor, the second graft was rejected sooner and more violently because of the previously produced immunity. This did not occur if the tissue was taken from a different donor. Skin, kidney, spleen, and other tissues share the same transplantation antigens so that a recipient once grafted with one tissue is sensitized to all tissues from that donor (Dempster, 1957). This theory of an actively acquired immunity has been generally accepted, although disagreement exists concerning several specific aspects. Against full acceptance is the fact that so far transplantation antibodies have never been isolated. Extensive immunological investigations following homotransplantation have revealed several changes, but these appear to be non-specific and incidental. The antibodies may be present in very low titre or possibly completely cellbound. The whole aspect of the homograft problem has been reviewed by Medawar (1943, 1957), Merrill (1959), and Woodruff (1960).

Modern Kidney Transplantation Experiments in Animals.

Following Medawar's investigations, numerous reports concerning kidney transplantation were published, but the work of Dempster in London and Simonsen in Denmark was particularly comprehensive and stimulating (Dempster, 1953, 1957; Simonsen et al., 1953; Gammeltoft et al., 1955). From their work a clearer picture of the natural behaviour of kidney transplants emerged. It was conclusively shown that a kidney autotransplanted to the iliac vessels and its ureter implanted in the bladder was capable of indefinitely sustaining the normal life of a dog. After an initial few weeks of slightly impaired function, its function was indistinguishable from normal. Most kidney transplants begin to produce urine within a few minutes to a few hours after transplantation. However, a

small number of transplants fail to produce urine for reasons unknown, although probably technical in origin. This type of anuria and that due to arterial thrombosis are part of the technical risks involved in any transplantation operation.

At first a homotransplanted kidney functions in a similar manner to an autotransplant, but after a few days it suddenly becomes oliguric and anuric. The duration of function in animals varies from 1–21 days, with an average of about six days. When examined in situ the rejected kidney is considerably enlarged and its blood flow markedly reduced. The histological findings vary with the time of examination in relation to function and depict the various stages in the rejection process. If removed while still functioning, small interstitial peri-glomerular and perivascular foci of small mononuclear cells are found; many of these cells are immature or mature plasma cells. Later tubular narrowing and necrosis develops and an extensive infiltration of polymorphs occurs. Intimal proliferation and fibrinoid changes are found in the arterioles, but the glomeruli remain relatively intact. The interpretation of the histological picture has been a controversial point in recent years. At one time Dempster and Simonsen suggested that the plasma cells seen early in the rejection might be of renal origin and represent a reaction of the homotransplanted kidney against its new host, i.e., a 'graft v. host' reaction. More recent evidence is against the renal origin of these cells and supports the original concept that the cells infiltrate from the host. (Hume et al., 1960; Wheeler and Corson, 1960; Porter and Calne, 1960). The exact cause of functional arrest remains obscure, as normal function is compatible with cellular infiltration. Recent evidence appears to suggest that the tubules are first affected, but biochemical and enzyme investigations remain inconclusive (Williams et al., 1962). The histological picture does not resemble a typical antigen-antibody reaction, as seen in experimental nephritis in which glomerular lesions predominate.

Modification of the Homograft Reaction.

Many attempts have been made to abolish or alter the homograft reaction so that homografted tissue could survive. There are two main lines of attack—against the host or against the graft. Most efforts have aimed at destroying or altering the reticulo-endothelial system of the host, but the results in general have been disappointing. However, two methods, total body irradiation and anti-metabolite drugs, have produced interesting and promising results.

Total body irradiation lowers or abolishes the ability of an animal to form antibodies against foreign antigens provided it is administered before the antigen (Craddock and Lawrence, 1948). In sublethal doses it can produce prolonged survival of skin homograft in rodents (Dempster et al., 1950; Werder and Hardin, 1953), but has little or no effect on kidney homotransplants in dogs (Hume et al., 1960). Too low a dose has no effect and a higher dose usually kills the animal. Numerous drugs which act on the reticulo-endothelial cells have been investigated, but in many cases the effective dose is too toxic. However 6-mercaptopurine, actinomycin C, and methotrexate are more selective and have given promising results. 6-mercaptopurine is an antimetabolite drug which interferes with cellular

and purine metabolism and is capable of preventing antibody production when given simultaneously with the antigen (Schwartz and Dameshek, 1960). It has prolonged the survival of kidney homotransplants in dogs for many months and abolished the homograft reaction (Calne, 1961; Zukoski et al., 1961; Pierce and Varco, 1962). It has to be given continuously and unfortunately its effect is variable and unpredictable. A combination of 6-mercaptopurine and actinomycin C seems to be even more effective (Calne and Murray, 1961). At present this line of approach is being vigorously pursued and numerous new synthetic drugs are being investigated.

Attempts to modify the graft before or after homotransplantation have mainly been unrewarding. The use of fœtal or neonatal tissue has reduced the incidence of complications with marrow homotransplantation (Porter, 1957), but neonatal kidneys behave in the usual manner (Dealy et al., 1960). Homotransplantation of endocrine glands appear to be more successful especially if there is an endocrine deficiency, but a lowered antigenicity may also be involved.

Tolerance.

The usual pattern of rejection may not occur in certain circumstances and homografts may be partially or completely tolerated. This tolerance may be natural or acquired.

Natural Tolerance.

A. Identical twins:—Grafts between identical twins behave like autografts and are permanently accepted. In clinical practice skin grafts and kidney transplants have been performed successfully (McIndoe and Franceschetti, 1950; Murray et al., 1958).

B. Non-identical twins and blood relations:—The closer the genetic relationship the longer will a graft survive. In non-identical twins, especially in the rare event of erythrocyte chimærism, this tolerance may be almost complete (Woodruff and Lennox, 1959; Peer et al., 1960).

C. Pregnancy, Hodgkin's disease, agammaglobinæmia, advanced cancer:—A variable degree of tolerance exists, but the reason is unknown.

D. Chronic uræmia:—This appears to act by depressing the immune response and skin homografts in man have survived for many months (Couch et al., 1957). Some authors consider that chronic uræmia may be partially responsible for the prolonged survival that has occurred in some kidney homotransplants in man.

Acquired Tolerance.

Tolerance can be produced in fœtal or early neonatal life in animals by injection of cellular extracts from another animal. In later life these animals will tolerate a skin homograft from the donor of the injected cells (Billingham et al., 1953, 1955). In the human the period of development at which such tolerance could be produced is probably quite early in fœtal life and the method does not appear to be a practical proposition for clinical use.

Following lethal total body irradiation a certain number of animals can be saved from the effects of reticulo-endothelial destruction by the homotransplantation of marrow, liver, and spleen cells (Lorenz et al., 1951; Porter,

1957). These cells survive and repopulate the depleted reticulo-endothelial system of the host (Ford et al., 1957). As long as this state of chimærism persists the host will tolerate a skin graft from the donor of the injected cells (Zaalberg et al., 1957). While irradiation chimærism has been fairly easily produced in small animals, little or no success has been achieved in higher animals and man (Ferrebee et al., 1958; Thomas et al., 1959; Porter and Couch, 1959; Hume et al., 1960). In one dog a state of irradiation chimærism was produced and a kidney homotransplant from the same donor functioned for forty-nine days without evidence of rejection (Mannick et al., 1959). This isolated result led to similar attempts in man, but the marrow homotransplantation failed. The injection of foreign cells into fœtal, neonatal or adult animals or into humans is not without risk, as immunological warfare may develop and result in death of recipient rather than of the injected cells (Mathe, 1960).

Kidney Homotransplants in Man.

Over the years more than a hundred kidney homotransplants have been performed in man in spite of the universal failure of such transplants in animals. Many were performed as a last hope, with little expectation of success, but several interesting facts emerged in the process. However, kidney transplants between identical twins have been successful and are now a universally accepted procedure. These various transplants can be best considered under three headings: (a) unmodified hosts; (b) identical twins; (c) modified hosts.

Kidney Homotransplants in Unmodified Hosts.

In these instances no deliberate attempts were made to alter the response of the host to the grafted kidney. Apart from a few performed for acute uræmia, the majority have been performed for chronic irreversible renal failure due to glomerulo-nephritis, pyelonephritis, and other renal diseases. The source of the donor kidney has been extremely variable—cadavers, executed criminals, operation deaths, nephrectomy of hydrocephalic drainage operations and living donors. The site of transplantation has also varied—brachial, femoral, splenic, renal, and iliac vessels. In 1902 Ullman attempted to treat a uræmic patient by transplanting a pig's kidney to the brachial vessels, but without success (Ullman, 1902, 1914). Similar attempts by Jaboulay and Papin (1906) and Unger (1910) with heterologous kidneys also failed. In 1932 the first kidney homotransplant between humans was performed in Russia by Voronoy (1936). A cadaveric kidney was transplanted to the femoral vessels and functioned for almost two days. Several unsuccessful attempts were then reported from America (Landsteiner and Hufnagel, 1945; Lawler et al., 1951; Murray and Holden, 1954). In 1951 several homotransplants were reported from France, using kidneys from executed criminals. Function in these transplants was much better, but all became anuric by twenty-one days (Kuss et al., 1951; Servelle et al., 1951; Dubost et al., 1951). Later an interesting mother-to-son homotransplant functioned perfectly for three weeks and then suddenly became anuric (Michon et al., 1953). The clinical behaviour and histological picture of this transplant was similar to that previously

noted experimentally. In 1955 Hume and his colleagues reported the results of a series of nine kidney homotransplants. Four of these transplants functioned well and reversed the uræmic state for 37—140 days. The most successful homotransplant functioned for five and a half months, and this case seems to be the longest survival ever reported. One of the homotransplants in this series developed glomerulo-nephritis, which was considered to be due to a similar condition in the recipient's own diseased kidneys. In 1957 the first kidney homotransplant was reported from the British Isles, but this kidney, obtained from a cadaver, failed to secrete urine (Jockes et al., 1957). From Russia, Gristman and his colleagues (1959) have described unsuccessful attempts, using preserved cadaveric kidneys, and suggested that preservation in itself might alter the antigenicity of the transplant. Several other homotransplants have been performed in various parts of the world but none functioned for any appreciable time (Krieg et al., 1960; Inoue et al., 1957).

At this stage the future of kidney homotransplantation appeared very dismal. However, the homograft reaction in man seemed less intense and less rapid so that homotransplants functioned longer than in animals. It was also apparent that the ideal donor was a living person, as cadaveric kidneys frequently never functioned because of arterial spasm and prolonged ischæmia and it was also difficult to time the supply with the demand. Canine kidneys, preserved for twenty-four hours by a combination of hypothermia and perfusion, may regain their function when transplanted (Lapchinsky, 1960), but similar storage of human kidneys does not appear to be successful. It has recently been suggested by Demikhov (1962) that kidneys might be kept variable in cadavers by the artificial re-establishment of the body respiration and circulation soon after death.

Kidney Transplants in Identical Twins.

The first successful transplant was reported from Boston in 1956, and this was followed in 1958 by a review of seven transplants (Merrill et al., 1956; Murray et al., 1958). By 1961 Murray stated that thirteen transplants had been successfully performed in Boston and further successful cases have now been reported from Scotland (Woodruff et al., 1961), Canada (Dossetor et al., 1960), and U.S.A. (Ginn et al., 1960; Cohn et al., 1961; Dunphy, 1961; Menville et al., 1961). A successful transplantation depends on proof of identity and a satisfactory surgical procedure. Identity is assessed by clinical features, blood groups, finger prints, type of placenta at birth, and occasionally by exchange skin grafts. Because of the possibility of sensitizing the prospective recipient in the event of the twins being non-identical, usually only the donor is skin grafted. Naturally the donor must be willing and the risks have to be fully explained. The risk of the identical disease developing in the healthy donor have been shown to be similar to the general population, but any disease affecting a solitary kidney is more serious than with two kidneys. The medico-legal and ethical aspects have to be fully considered, as the donor does not benefit in any way from the operation. The donor must be healthy and have two normal kidneys and a normal urinary tract. An arteriogram of the renal vessels is advisable, as the majority of vascular

anomalies are definite contra-indications to operation. The operation is indicated if the patient is in the terminal stages of uræmia due to irreversible renal damage. Ideally the operation should be performed while the patient is still in a reasonable condition rather than in extremis; however, rapidly changing clinical events often leave one with very little choice in the matter of timing. Hæmodialysis is frequently required pre-operatively to get the patient into optimal condition. Most of the complications of chronic uræmia are cured by a successful transplant, but a combination of circumstances may arise in which difficulties and complications might be too serious to justify such a sacrifice by the donor. While there is no definite age limit, the older the patients the higher are the chances of atheromatous lesions in both donor and recipient causing thrombosis at the anastomosis.

The two operations are performed simultaneously in adjoining theatres. The left kidney of the donor is fully mobilized and the ureter divided at the pelvic brim. At the same time the right iliac vessels of the recipient are mobilized extraperitoneally and prepared for anastomosis. The renal vessels of the donor kidney are ligated and divided and the kidney immediately transferred to the right iliac fossa of the recipient where the renal artery is anastomosed end-to-end with the internal iliac artery and the renal vein end-to-side with the external iliac vein. Arterial disease in the recipient or vascular anomalies in the donor may dictate a slightly different technique. The transfer of the kidney usually takes 30-60 minutes. The ureter is implanted into the bladder and the transplant partially decapsulated to allow for swelling. In most cases urine starts to flow before the end of the operation and a copious diuresis may occur over the next forty-eight hours.

There is an immediate and dramatic improvement in the state of the patient and within a few days all manifestations of the uræmic state start to disappear. The raised blood pressure soon falls and may reach normal levels in about fourteen days. However, the blood pressure may not return completely to normal or remain stable until the diseased kidneys of the recipient are removed. Other indications for removal of the recipient's diseased kidneys are underlying glomerulo-nephritis and infection. A bilateral nephrectomy is usually performed about 1-2 months later. The majority of the patients have been able to live a full and normal life afterwards and one patient has had a successful pregnancy.

Kidney Homotransplants in Modified Hosts.

(i) Total Body Irradiation.

As previously stated, lethal total body irradiation so alters the immune response of the animal host that homotransplanted reticulo-endothelial cells survive and this state of chimærism tolerates skin grafts and possibly kidney transplants from the same donor. Attempts were then made to produce a similar state of tolerance in patients with chronic uræmia. In several patients bone marrow homotransplantation was attempted following lethal total body irradiation but without success (Murray et al., 1960). In one patient a kidney was also transplanted and functioned well for four weeks, but the patient died from marrow failure. In

spite of these failures, further attempts were made with a lower but sublethal dose of total body irradiation and without attempted marrow transplantation. The first homotransplantation by this procedure was performed in Boston between non-identical twins and the patient is still alive and well (Merrill et al., 1960). The very close genetic relationship confuses the situation, but a state of tolerance appears to have been produced by the sublethal dose of irradiation. Further attempts in Boston were unsuccessful, but successful homotransplantation by this procedure have been reported from other centres.

From Paris, Hamburger and his colleagues (1962) have recently reported a series of six patients in which three homotransplantations were successful. Two of these were alive and well 2-3 years after operation. Also from Paris, Kuss and his colleagues (1961) have reported two successful homotransplants out of four attempts. At Hammersmith Hospital, London, a similar line of approach has been used in several patients and one patient was alive and well twenty-one months after operation (Shachman, 1962). In some centres local irradiation has also been applied to the transplanted kidney in the recipient during the post-operative period in the belief that it may alter a reaction in the transplanted kidney itself, but the rationale and effectiveness of this remains to be evaluated (Kuss et al., 1961; Dempster, 1962).

The indications for homotransplantation by these methods are similar to those for identical twins. Other factors, however, make the decision very difficult because total body irradiation introduces additional hazards, and these, combined with the poor chance of success, may not always justify the procedure. In chronic uræmia, infection is dangerous and, when associated with marrow depression following total body irradiation, may well be lethal. In fact the presence of resistant organisms such as staph. pyogenes and pyocyaneous is considered by many to be a contra-indication to operation.

The choice of a suitable donor is difficult in spite of the fact that many friends and relatives volunteer. Ideally the donor should be a close blood relation with identical major and minor blood groups (Hamburger et al., 1962; Dempster, 1962). While certain minor blood group differences are often ignored, differences in the major groups are considered a contra-indication to operation. Hamburger and his colleagues (1962) have studied leucocytic antigens in donors and recipients and found that in all their successful homotransplants there were no leucocytic antigens present in the donor which were not also present in the recipient. This aspect will require further study, as it may be of value in donor selection.

The usual procedure is to give the total body irradiation (150—450 r) in one or two sessions depending on the available facilities and source of irradiation. The operation is usually performed the day after the last dose of irradiation. The patient has to be barrier nursed in a sterile room with special ventilation and ultraviolet light (Woodruff et al., 1962). Daily cultures are taken from the room and the patient and a close watch is kept on the hæmatological picture. The white cell count usually begins to fall at the beginning of the second week and the fall is often sudden and profound. The most dangerous aspect is the fall

in the platelets and this may lead to massive internal hæmorrhage. This fall should be anticipated and prophylactically treated by cortisone and fresh platelet transfusions (Dempster, 1962). If the transplant has been initially successful the patient is usually out of immediate danger in four weeks.

Several interesting and often inexplicable results have emerged from the reported series of kidney homotransplants by this method. In several instances the transplanted kidney has ceased functioning within a few hours to a few days. Technical causes are possible, but in most cases there has been no evidence of this. Yet neither clinically nor histologically has the pattern been that of a typical homograft reaction. It has been suggested that this early failure may be due to pre-existing antibodies (Hamburger et al., 1962), but differences in blood groups or even sensitization by previous blood transfusions may be responsible (Dempster, 1962). This early rejection phenomenon has been noted in most series and remains an unexplained hazard, possibly similar to some of the anurias found experimentally in animals. In other transplants a period of oliguria has developed after several weeks of good function. In some instances this has meant rejection of the transplant, but in others recovery has occurred, possibly aided by the effects of local irradiation (Kuss et al., 1961). In one patient this period of impaired function developed after several months and was reversed by removal of the diseased kidneys of the recipient (Dempster, 1962). Again this phenomenon remains unexplained, but seems in some way to be related to the homograft reaction. Biopsies taken from successful homotransplants have revealed the presence of interstitial cellular infiltration, œdema, and fibrosis (Hamburger et al., 1962). This has not been noted in identical twin transplants and appears to be an abortive or suppressed homograft reaction. Also in these long-term successes there has been a tendency for the blood pressure to rise again for unknown reasons. The rationale of successful transplantation is obscure, but an uneasy state of tolerance seems to have been produced. The future of these patients is unpredictable and the state of tolerance may swing in any direction.

(ii) Cytotoxic Drugs.

An alternate method of modifying the reaction of the host is the continuous administration of cytotoxic drugs such as 6-mercaptopurine and its derivatives ('Imuran'), actinomycin – C and methotrexate. These drugs have been given alone or combined either with pre-operative total body irradiation or local irradiation of the spleen and site of transplantation. Over ten patients have been treated with drugs alone, but only one patient has lived for a significant length of time. This patient was treated with 'Imuran' and actinomycin – C and was still alive nine months later; this homotransplant is even more remarkable, as the kidney was obtained from a cadaver (Murray et al., 1962). Four patients have been treated in Paris by a combination of sublethal total body irradiation and 6-mercaptopurine, and three of them were still alive 6-12 months later. In Edinburgh five patients have been treated with low dosage pre-operative local irradiation of the spleen and graft site followed by continuous 'Imuran' therapy;

four homotransplants were reported to functioning satisfactorily 1-4½ months after operation (Woodruff, 1963).

At the present stage it is difficult to evaluate the various methods of modifying the immune response of the recipient. The potentialities of drug therapy would appear to be greater, especially if a more selective and specific drug can be found.

Out of the present active research into the possibilities of kidney homotransplantation, a clearer picture may soon emerge. If a breakthrough occurs, the question of an adequate supply of suitable donor kidneys will have to be faced and this will require extensive research into better methods of preservation. Certainly the demand for kidneys will be very high, as renal diseases account for many deaths. The present partial breakthrough is in many ways empirical, but the problem may well be solved by this means long before the fundamental reasons are fully understood.

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ALCOHOLISM AS A PUBLIC HEALTH PROBLEM IN NORTHERN IRELAND

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ALCOHOLISM is becoming once again a matter of general concern. For too long the treatment and care of alcoholic patients has lagged behind the general advances in medicine. The answer to alcoholism is complex and differs in every country requiring the combined efforts of sociologists, politicians, health authorities, as well as doctors to solve it. The material discussed in the present paper is an admission of our lack of knowledge as to how much alcoholism affects the health of the community in Northern Ireland. Facts are few and conclusions largely supposition. Perhaps, however, the presentation of these may stimulate interest in an important and as yet little investigated field of medicine in Northern Ireland.

METHODS OF ASSESSMENT OF THE INCIDENCE OF CHRONIC ALCOHOLISM.

Estimation of the incidence of chronic alcoholism is extremely important as only then can adequate facilities for treatment be made available and, if necessary, changes in legislation undertaken to remedy the situation. Unfortunately this estimate has been extremely difficult to arrive at by direct means, so the indirect estimation formula of E. M. Jellinek was adopted by the World Health Organisation (W.H.O.) in 1951 to determine the incidence in different nations. Almost all the information to date on different countries has, therefore, been based on this formula, but since doubts have now been expressed as to its reliability many of these figures may not be true. Nevertheless, they can be of use in comparing the incidence of chronic alcoholism between one country and another, although they probably overestimate the situation. Jellinek (1959) suggested direct field studies should be undertaken instead of using his formula, and now that more definite concepts of what chronic alcoholism is these should give comparable results. To be reliable direct surveys require an enormous amount of personal work by the investigators, as enquiry into alcoholism tends to be discouraged not only by patients but by their practitioners.

RESULTS OF DIRECT SURVEYS IN NORTHERN IRELAND.

An initial survey in the Downpatrick area suggested a rate of 214 per 100,000 adults (Grant and Boyd, 1961). Following this an attempt was made to sample the remainder of rural Northern Ireland (Grant and Boyd, 1962), and as the crude alcoholism rates per 1,000 population were 1.4 and 1.04 both these samples were combined for estimation purposes. An alcoholism rate of 191 per 100,000 adults from these combined samples was suggested for rural Northern Ireland, although one must frankly admit the enquiries would not satisfy the rigid demands of the statisticians. Many difficulties already discussed were encountered, but the information received was felt to be reasonably reliable and gave a consistent

pattern. It can be compared with Parr's (1957) direct result of 110 alcoholics per 100,000 adults in the United Kingdom. With further information kindly given by Dr. Parr it was possible to cover 7.5 per cent. of all practices in Northern Ireland. The Northern Ireland Survey confirmed the marked male sex preponderance of alcoholism in this country of approximately 10 : 1, which is much higher than the English ratio of 2.2 : 1. It further hinted at different drinking habits between England and Northern Ireland, whiskey being outstandingly the alcoholic's drink of choice in Ireland. The average alcoholic in Northern Ireland appeared to be a man of 52-53 years of age, who had started on the downward path between 28 and 32 years of age. The large discrepancy between results obtained by direct methods and the indirect rate of 1,000 per 100,000 adults calculated by W.H.O. (1951) for the United Kingdom makes comparisons impossible between these methods. While it is admitted indirect rates may be unreliable and therefore no claim is made for strict accuracy of the direct rate of 190 per 100,000 adults in Northern Ireland, personal experiences, whilst undertaking this survey, would suggest it was a reasonable figure on which to base treatment facilities. The indirect method would certainly give a grossly unrealistic overestimate. The direct alcoholism rate, if correct, would give a total of 1,640 alcoholics requiring treatment in this country, a total which could probably be multiplied at least fivefold if the indirect method was correct.

Treatment.

The problem of adequate therapy under the National Health Service is now becoming increasingly recognised and the Ministry of Health (1962) has issued a memorandum to all hospital boards in England and Wales recognising the present haphazard arrangements. Admissions of alcholics to psychiatric hospitals increased there from 775 in 1953 to 2,044 in 1959 and were scattered over one hundred institutions. The memorandum stressed that this was unsatisfactory and recommended each board should set up a specialised unit of 8-16 beds with outpatient facilities and co-operation with Alcoholics Anonymous. The Joint Committee of the British Medical Association and Magistrates Association (1961) had reached similar conclusions and thought that "the application of modern methods of treatment should result in the recovery of a substantial proportion of cases." Perhaps as an even more important issue this Committee noted the present legislation and the difficulty of ensuring the proper treatment of patients on a voluntary basis. They compared this with the legal procedures in Ontario, Denmark, and Norway, where real attempts are made to deal with alcoholics and ensure cure.

Increases in requirements for treatment seem to be taking place and have been noted elsewhere. In Vienna, where there is official intervention and compulsory treatment, the proportion of alcoholics to total psychiatric admissions in 1947 was 10 per cent. men and 1.2 per cent. women, while in 1953 these percentages had risen to 56 per cent. and 8.5 per cent. respectively (Rotter, 1955). Apart from its purely psychiatric aspect alcoholism produced as a by-product problems in general hospitals. In Australia Mackay (1959) quotes figures to show that in the

State of Victoria alcoholism was the direct cause of admission to public hospitals in 7.7 per cent. of instances, of illness in 14 per cent., and contributing to illness in 5 per cent.

The Treatment Position in Northern Ireland.

In an enquiry into this subject (Grant and Knox, 1962) only figures from mental hospitals were investigated. In 1958 the six institutions in Northern Ireland treated 250 alcoholics, that is 5.4 per cent. of their total admissions, a low percentage compared to those quoted above. If one accepts the approximate estimate of 1,640 for the country this means they were only treating 15 per cent. of the alcoholic population. If this estimate was low the position was even worse, and an estimate based on the Jellinek formula might even drop the treatment rate to 3 per cent. or less. However, for reasons already mentioned, this formula has been severely questioned and tends to give too high a figure. Apart from the inadequacy of numbers treated the results of treatment were not good, as shown by the fact that 46 per cent. of the alcoholics treated were return cases whose previous therapy had failed. The proportions between the sexes were 6.7 : 1 in favour of males in the 224 cases whose details were available, a proportion apparently less than in the general population where the ratio is 10 : 1. No conclusions can be drawn from this, but the question arises as to whether this was due to insufficient male beds or merely to the fact females tend to seek treatment sooner. The first answer would also help to explain the low general admission rate in that suitable accommodation was not available.

Discussion.

From the material presented it would seem that facilities at present in Northern Ireland for the reception and treatment of alcoholics were similar to those in England and Wales in that they were inadequate. Steps, however, have been taken by the Northern Ireland Hospitals Authority (N.I.H.A.) to remedy the position, although it is debatable whether these are adequate to meet the situation suggested above.

A special sub-committee has been formed to deal with alcoholism, which has made nine recommendations (N.I.H.A., 1962). These are briefly set out below and further information as to the deliberations of this body is unfortunately not known.

(1) A pilot scheme should be set up.
(2) The unit should be set up in a general hospital.
(3) The unit should have approximately twelve beds.
(4) Outpatient facilities should be provided.
(5) Treatment should be confined to acute cases.
(6) Accommodation should be mainly for male patients.
(7) Consideration should be given to some of these beds being designated pay beds.
(8) The unit should be in charge of a psychiatrist with particular interests in alcoholism.
(9) The unit should be established as soon as possible.

It would appear obvious that the Authority have received expert advice and the sub-committee have followed closely the pattern suggested for England and Wales (Ministry of Health, 1962). It seems doubtful, however, that a total of twelve beds is more than a token in dealing with the problem and this figure could be multiplied tenfold. Criticism, however, is limited by lack of information of the deliberations of the sub-committee who may well be aware of the fact. It would seem from the experience of countries making a definite attack on the problem that centralisation of care of all alcoholics is essential. There are two aspects in treatment—short-term care which might be inadequately dealt with, as suggested by the Northern Ireland Hospitals Authority, and long-term cases. There is no doubt that acute episodes often present as primarily medical emergencies requiring the facilities of a general hospital, and close liaison is necessary between the psychiatrist and a physician. It is also probable that males will predominate over females in a ratio of perhaps 10 : 1. Some unease might be felt as to what is going to happen to patients requiring protracted care, and it does not appear that the present system of distributing them throughout the mental hospitals of Northern Ireland will solve the problem. Consideration might be given to centralising long-term care as well as acute cases. The Norwegian system of sanatoria and then "half-way houses," where the patient has a sheltered life but is fit for work and is expected to contribute towards his keep, seems to have much to recommend it. Some justification for the expense involved in setting up such a scheme can, in fact, be taken from the fact that present methods are costly in beds and uneconomical. The sub-committee have wisely suggested pay beds and indeed lack of these has severely prejudiced treatment of alcoholic patients. Nursing homes, which were available, have had to close since the inception of the National Health Service and the State has not provided proper alternative facilities perhaps from a reluctance to accept an alcoholic as an ill person and not just a social outcast. It is salutary for these people to contribute to their treatment and a personal view is that they should do so whenever hardship is not involved. Money which would otherwise be spent on alcohol can be used by the patient to recover his self-respect. There seems no adequate reason, apart from political expediency, why the community should have to pay the full cost of alcoholic patients.

It may be considered that present legislation is adequate to deal with alcoholics and if patients will not submit voluntarily they will never be cured. If adequate accommodation is available, however, serious consideration should be given to compulsory treatment for up to a year followed by probation. Certification as an alcoholic might be undertaken by a special board on the Norwegian System to whom all the facts would be presented. This would remove from the practitioners concerned an unpleasant difficult task and strong pressure could be made on the patient to submit to voluntary treatment before certification. To compete successfully with the situation requires political decision as well as medical care.

To conclude, therefore, while a start is being made in dealing with alcoholism, much remains to be done, and it should be remembered we seem to have gone backwards in this respect since the inception of the National Health Service—the Windsor observation wards have closed, the Claremont Street Clinic has ceased, and private nursing homes have closed. Although valuable help has been received from the new department of psychiatry of Queen's University, it is not reasonable to expect this to replace accommodation for alcoholics no longer available. While therefore the authorities have made a welcome beginning in dealing with alcoholism, a great deal more seems necessary, and it is hoped that, apart from initiating a small unit, the whole problem will be reviewed. The opportunity is presented for an energetic and imaginative step forward in public health.

Thanks are expressed to the Northern Ireland Hospitals Authority for a grant towards the expenses of this work.

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REVIEW

HANDBOOK OF TREATMENT OF ACUTE POISONING. By E. H. Bensley, M.B.E., B.A., M.D., F.R.C.P.(C.), F.A.C.P., and G. E. Joron, B.A., M.D., C.M., F.A.C.P. Third Edition. (Pp. xii + 227. 15s.) Edinburgh and London: E. & S. Livingstone, 1963.

This book, which was first published in 1953, comes from the departments of Toxicology and Pharmacology at McGill University, in which the authors are lecturers.

It is of pocket size and only two hundred odd pages, so it is by no means a complete reference book but a readily available source of guidance in the treatment of acute poisoning in emergency.

The information is clearly set out, in many cases in tabulated form. The first forty pages are devoted to basic principles and general methods while the remainder is devoted to specific treatments for particular poisons.

This is a useful book to have handy in a Casualty Department, but would hardly serve as a student's textbook or a standard reference book on Toxicology. W. H. E.

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INTRAHEPATIC OBSTRUCTIVE JAUNDICE

By **W. S. HANNA, F.R.C.S.Ed.**

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OBSTRUCTIVE jaundice is amenable to surgical treatment when the obstruction is extrahepatic. In recent years it has been recognised that the obstruction may be intrahepatic and the complete picture of obstructive jaundice may be seen without obstruction of the main bile ducts. It is important to differentiate between intrahepatic and extrahepatic cholestasis in order to avoid unnecessary surgical interference. In differential diagnosis liver function tests are valuable. Liver biopsy, which can be conveniently done with a Menghini liver biopsy needle, may be diagnostic.

In view of the diagnostic difficulty a report of a case of intrahepatic cholestasis might be of interest. The significance of liver function tests and the multiple ætiology of intrahepatic cholestasis are discussed.

CASE REPORT.

The patient was a woman aged 71 years. She was admitted to hospital on 29th March, 1962. She gave a history of painless jaundice of six weeks' duration, and she had troublesome pruritus. She had noticed the urine to be dark and the stools pale. There was no history of recent drug administration. Apart from severe icterus, clinical examination was not remarkable. The liver was not enlarged, and the gall bladder not palpable. The urine contained bile salts and bile pigment. Urobilinogen was not detected.

Liver function tests:—

Bilirubin		
Total	25.6	mgm.%
Direct	16.9	mgm.%
Alkaline Phosphatase	4	units
Transaminase (SGOT)	20	units
Cholesterol	215	mgm.%
Plasma Proteins		
Albumin	3.7	G. per 100 ml.
Alpha 1 Globulin	.20	G.
Alpha 2 Globulin	.50	G.
Beta Globulin	.60	G.
Gamma Globulin	.90	G.

LIVER BIOPSY. "It cannot be appreciated that there is any distortion of the lobular architecture. There is a very considerable inspissation of bile pigment within the intralobular bile canaliculi and this appears to be most marked in relation to the more central portions of the lobule. There is just a little variation in an occasional liver cell nucleus and in the one or two tiny portal triads is

a slight increased cellularity. Bile ducts cannot be detected. Subacute hepatitis with intralobular inspissation of bile."

Laparotomy was advised to exclude extrahepatic obstruction. There was no evidence of obstruction of the common bile duct. The liver and gall bladder appeared normal. She made a complete clinical and biochemical recovery during the two months subsequent to operation.

Liver Function Tests.

A persistent bilirubinæmia of 1.5 mg. per cent. or higher must be present before noticeable discoloration takes place. Bilirubin is a derivative of the iron-free porphyrin fraction of hæmoglobin and is formed in the reticulo-endothelial system where breakdown of erythrocytes takes place; approximately 300 mg. of bilirubin is formed daily. When liberated into the blood stream from the sites of formation, bilirubin gives an indirect van den Bergh with diazotized sulphanilic acid. It is insoluble in water and is not excreted by the kidney. Indirect-reacting bilirubin is readily taken up by hepatic cells via the sinusoids which receive blood from both the portal vein and the hepatic artery. Bilirubin is conjugated with glucoronic acid in the microsomes of the liver cells as a result of enzyme action of glucoronyl transferase. Conjugated bilirubin is water-soluble and gives a direct van den Bergh reaction.

In the intestine bilirubin undergoes reduction by bacterial action. The main product is urobilinogen which is partially re-oxidised to urobilin. Small amounts of urobilin and urobilinogen are re-absorbed from the intestine and most of this is re-excreted by the liver after re-oxidation to bilirubin. The very small amount of absorbed urobilinogen not re-excreted by the normal liver passes into the systemic blood stream and is excreted in the urine. This amount does not give the usual qualitative test for urobilinogen.

Hyperbilirubinæmia can be produced in three ways:—

(1) By obstruction to the outflow of bile; the pigment in the plasma is chiefly conjugated bilirubin.

(2) By excessive production of bilirubin—as in hæmolytic jaundice; the pigment in the plasma is chiefly free bilirubin. The normal liver has a great capacity to conjugate bilirubin, the amount excreted increasing in proportion to the square of the concentration in the plasma.

(3) By inability of damaged liver cells to transmit even the normal amounts of bilirubin as in the clinical "toxic" and "infective" types of jaundice. Hepatogenous jaundice is usually associated with some degree of obstruction to the bile flow and both free and conjugated bilirubin appear in the plasma.

The van den Bergh measures the concentration of bilirubin in the plasma. Normally the concentration is between 0.1 and 0.8 mg. per 100 ml. of serum. The van den Bergh is of doubtful value in differential diagnosis of jaundice, but it is useful as a quantitative measure and is valuable in assessing progress of the case.

Bilirubinuria occurs when serum conjugated bilirubin exceeds 2 mg. per 100 ml. Urobilinogen occurs in the urine in conditions associated with excessive pro-

duction and excretion of bilirubin. One of the most difficult functions of the hepatic cells is the re-oxidation of urobilinogen to bilirubin. One of the earliest signs of hepatic cellular damage is excessive excretion of urobilinogen in the urine. Urobilinogen may be detected in the urine in cases of infective hepatitis before the development of overt jaundice.

Serum alkaline phosphatase levels usually parallel the obstructive factor of jaundice. The King and Armstrong method measures the liberation of phenol from phenyl phosphate with fifteen minutes' incubation at 37° C. and with the pH adjusted to 10.0. A plasma alkaline phosphatase greater than 35 K.A. units per 100 ml. strongly suggests obstructive jaundice; a figure below 25 units per 100 ml. suggests hepatogenous jaundice. A clear differentiation is not always possible because many cases give intermediate values.

The cholesterol of the plasma is usually increased above the normal of 240 mg. per 100 ml. in cases of obstructive jaundice.

Many tests not based directly on the production and excretion of bile constituents are of value in differential diagnosis of jaundice. In hepatogenous jaundice tests based on the metabolic functions show a greater abnormality than those based on excretory functions. In obstructive jaundice the excretory functions are more impaired.

Electrophoretic estimation of the plasma proteins is one of the most valuable of the metabolic liver function tests. The liver is an important organ in the synthesis of plasma proteins. Inflammatory and degenerative lesions of the liver are manifested by changes in the plasma proteins, viz., a decrease in the albumin and an increase in the gamma globulin. Failure of synthesis accounts for the hypoalbuminæmia. The cause of the increased gamma globulin is obscure. In obstructive jaundice there may be a rise in the beta globulin which reflects the raised plasma cholesterol.

Changes in the plasma proteins are the basis of the flocculation tests. The behaviour of a colloidal solution of several proteins towards precipitating agents depends upon the relative concentrations of the different proteins. The cephalin cholesterol and thymol turbidity reflect changes in the plasma proteins. The flocculation tests are normal in obstructive jaundice and are usually positive in hepatogenous jaundice.

Estimation of certain enzymes are of value in differential diagnosis. Serum transaminases can be assayed by their activity in transferring an amino group from glutamic acid to oxalacetic acid (SGOT) and from glutamic acid to pyruvic acid (SGPT). The transaminases are elevated in hepatogenous jaundice with parenchymal injury. Lactic dehydrogenase, which catalyses the oxidation of lactic acid to pyruvic acid, is also increased in cases of jaundice with hepatocellular damage.

Liver function tests must be interpreted in relationship to the clinical findings. An accurate diagnosis can be established in approximately 90 per cent. of cases. Liver biopsy may be diagnostic in doubtful cases. It is important that the clinician should appreciate the difficulty which confronts the pathologist in his interpre-

tation of the hepatic changes in sections of liver biopsy. The main difficulty arises in the distinction between intrahepatic and extrahepatic cholestasis. In extrahepatic cholestasis there may be multiplication of bile ductules in the portal zones which show a predominantly polymorph infiltration reflecting the cholangitis. In intrahepatic cholestasis there is inspissation of bile pigment within the intralobular bile canaliculi and the bile ductules are flattened and inconspicuous. In intrahepatic cholestasis due to drugs the portal zones may show an eosinophilic infiltration.

A block of the bile duct may be shown by the technique of percutaneous transhepatic cholangiography. In patients with extrahepatic cholestasis a bile duct may be punctured. The procedure carries a risk of biliary peritonitis and is not recommended.

Intrahepatic Cholestasis.

The mechanism of jaundice in intrahepatic cholestasis is doubtful. Electron microscopy has shown distortion of the microvilli lining the bile canaliculi. An additional factor may be a disturbance of intracellular bilirubin transport from the hepatic cell into the bile canaliculus. As a consequence, bile accumulates in the intralobular bile canaliculi. Obstruction of the bile ductules by infiltrates in the portal zones is unlikely to be a factor.

One important cause of intrahepatic cholestasis is the hepatotoxicity of drugs. Certain drugs, including choloroform, carbon tetrachloride, tetrachlorethylene, ethyl chloride, benzene derivatives, certain metallic poisons, iproniazid and other hydrazine monoamine-oxidase inhibitors, isonicotinic acid, and pyrazinamide are direct hepato-cellular poisons which produce centrizonal liver necrosis. This state is reflected by high serum transaminase levels and abnormal plasma protein pattern. Hepatic damage is often associated with acute renal tubular necrosis.

In contrast to this severe hepatocellular jaundice due to drugs is the more benign intrahepatic drug cholestasis which is manifested by painless, afebrile, obstructive jaundice. The liver is not enlarged and not tender. Liver biopsy may be equivocal and such cases may come to laparotomy which reveals the main bile ducts to be patent.

There are two types of cholestatic drug jaundice. The first type is caused by a hypersensitivity reaction and may follow administration of chlorpromazine ("largactil") and other phenothiazine derivatives such as promazine ("sparine") and trifluperazine ("stelazine"), para-aminosalicyclic acid, thiouracil, chlorpropamide ("diabinese"), and nitrofurantoin ("furadantin"). Cholestatic jaundice develops in about 1 per cent. of patients taking chlorpromazine. Jaundice may follow a single dose or one day's treatment. The initial manifestations may be leucopenia, eosinophilia, drug fever, and drug rash. Recovery usually takes place within one to four weeks after the drug has been discontinued. Occasionally jaundice is much more prolonged and the clinical picture in such cases simulates primary biliary cirrhosis. The serum cholesterol and alkaline phosphatase levels are high from the outset.

The second type of acute intrahepatic drug cholestasis may complicate treatment with methyltestosterone and other related steroids, including nore-

thandrolone ("nilevar") and methandienone ("dianobol"). This type is not due to hypersensitivity but is a straightforward consequence of dosage and duration of administration. The clinical picture of steroidal jaundice resembles that seen in chlorpromazine jaundice. Liver biopsy reveals inspissation of bile in the canaliculi but there is no portal-zone cellular reaction as occurs with chlorpromazine jaundice.

Another cause of intrahepatic obstructive jaundice is virus hepatitis. Jaundice persists for several months and recovery is complete. This is in contrast to subacute hepatitis and cirrhosis which may complicate an attack of virus hepatitis and is conditioned by methionine deficiency. The atypical hepatitis with intrahepatic cholestasis is the variety which has been called cholangiolitic hepatitis. According to Dubin the ætiological agent is a variant of the virus of infective hepatitis. In cholangiolitic hepatitis there is no biochemical evidence of hepatocellular damage. The serum transaminase and the plasma protein pattern are normal; the serum alkaline phosphatase is usually slightly raised. The patient, in whom intrahepatic cholestasis is due to cholangiolitic hepatitis, sometimes shows a dramatic response to corticosteroid therapy. Prednisolone, 40 mg. daily for four days, may cause a fall in the serum bilirubin level. The action of cortiscosteroid in alleviating the jaundice is obscure.

A rare type of intrahepatic cholestasis occurs during pregnancy.

Primary biliary cirrhosis is another type of intrahepatic cholestasis of obscure mechanism. The onset is insidious and liver biopsy shows marked infiltration in the portal zones.

Summary.

The difficulty in diagnosis of intrahepatic obstructive jaundice may lead to unnecessary surgical intervention because an incorrect diagnosis of extrahepatic obtruction is made.

It is essential to elicit any history of recent drug administration.

Fever, rigors, and leucocytosis indicate extrahepatic obstruction and reflect secondary infection in the dilated ducts.

Liver biopsy may be diagnostic but it is sometimes difficult to distinguish between intrahepatic and extrahepatic cholestasis.

Response to a trial of corticosteroid therapy would indicate intrahepatic obstruction.

In doubtful cases serial liver function tests should be performed at weekly intervals during a period of three to four weeks' observation.

Some patients may require laparotomy to establish a definitive diagnosis.

We are indebted to Dr. J. E. Morison for his report on the liver biopsy and to Dr. R. A. Neely for help and co-operation with the biochemical investigations.

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NEUROLOGICAL COMPLICATIONS OF GLANDULAR FEVER

I: CASE REPORT

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NEUROLOGICAL complications of glandular fever are uncommon. The rapid development of a complete bilateral external ophthalmoplegia in a 6-year-old girl presented a diagnostic problem which was only solved by the appearance of the more usual clinical features of the illness and her complete spontaneous recovery.

CASE REPORT.

Doreen P., who was born on 8th May, 1952, came from a healthy family and her development had been normal. She had had measles at the age of 3 and had been immunised against diphtheria, pertussis, and poliomyelitis, and she had been vaccinated.

Shortly after supper on the 10th November, 1958, she complained of feeling unwell and vomited. She slept well that night, but during the next day she was sick nearly every hour and she felt hot and looked unwell. She was reluctant to stand because of pain in the legs, but she had no headache.

At midday on 12th November, a divergent squint was noticed and she complained of double vision. At 5 p.m. her right upper eyelid began to droop and she was admitted to Purdysburn Fever Hospital, where she was found to be apyrexial, well orientated, and co-operative. There was extreme neck rigidity, bilateral ptosis, and external ocular paresis.

She was transferred to the Neurosurgical Unit of The Royal Victoria Hospital, Belfast, on the following day. On admission, she was a slight girl, pale and apyrexial, mentally very alert, crying but denying headache. She exhibited mild neck rigidity and a positive Kernig's sign. In the nervous system, vision was 6/6 in each eye, the fields were full on confrontation and the fundi were normal. There was a complete bilateral ptosis; on lifting the eyelids, the eyes were seen to be slightly divergent. Except for a few millimetres of abduction on attempted lateral gaze, she had a total external ophthalmoplegia in each eye, and this became complete by 16th November. The left pupil was a little larger than the right, but both reacted briskly to light. The remainder of the nervous system was normal. The fauces were normal, but a few cervical and axillary lymph nodes were palpable, and the tip of the spleen was felt two finger-breadths below the costal margin on deep inspiration. There was no rash, no conjuctival injection, and the cardiovascular and respiratory system were normal. The intravenous injection of edrophonium chloride (Tensilon) 5 mgm. had no effect on the ocular paralysis. The results of the laboratory investigations are shown in the table.

During the next few days her general condition did not alter. She remained apyrexial and alert. There was no vomiting or headache, but she did complain of a little pain behind the right eye.

INVESTIGATIONS.

Blood Picture (12-11-58):

E.S.R.	3.5 mm.
Hæmoglobin	13.4 gm./100 ml.
Red blood cells	4,360,000/cu.mm.
White blood cells	10,500/cu.mm.
Mature neutrophils	3,265/cu.mm. (31%).
Band neutrophils	630/cu.mm. (6%).
Small lymphocytes	1,260/cu.mm. (12%).
Large lymphocytes	2,310/cu.mm. (22%).
Monocytes	210/cu.mm. (2%).
Smeared cells	2,835/cu.mm. (27%).

Serology (12-11-58):

Influenza A/B	<1 : 8.
A.P.C.	<1 : 8.
Mumps	1 : 128.
L.C.M.	<1 : 8.
R.S.S.E.	<1 : 8.
Paul Bunnell	Saline test—1 : 448. Absorbed by guinea-pig kidney—1 : 224. Absorbed by ox red cells—1 : 14.

Biochemical Findings (12-11-58):

Blood sugar	76 mg./100 ml.
S.G.O. transaminase	62 units.
S.G.P. transaminase	60 units.

Lumbar C.S.F. (12-11-58):

Clear fluid.

Protein	26 mg./100 ml.
Lymphocytes	4/cu.mm.
Sugar	57 mg./100 ml.

(14-11-58):

Skull X-ray	No abnormality seen.
Chest X-ray	No abnormality seen.
E.E.G.	Normal.

Ventricular C.S.F. (18-11-58):

Cloudy fluid.

Protein	15 mg./100 ml.
W.B.C.	<1/cu.mm.
R.B.C.	2,140/cu.mm.

On the 17th November, ventriculography was performed. The brain was somewhat tense, but air outlined normal ventricles, and Myodil passed through the aqueduct of Sylvius to outline a normal fourth ventricle.

Over the next few days, the neurological signs slowly resolved. By 22nd November, the ptosis had almost gone. On gaze to the right abduction of the

right eye was accompanied by coarse horizontal nystagmus; and on gaze to the left there was incomplete abduction of the left eye, but there was no recovery of adduction, elevation, depression or convergence. On 30th November there was no ptosis and all external ocular movements were full except for elevation of the right eye. On attempted upward gaze the left eye turned upwards and the right one became partially abducted. On lateral gaze horizontal nystagmus was present in the abducting eye with little or no nystagmus of the adducting eye. By 3rd December, the twenty-fourth day of her illness, all ocular movements were full.

She has been followed up at intervals since then, and was quite well and developing normally when last seen on 5th May, 1960.

Discussion.

In many ways glandular fever resembles a virus infection, but as yet no causal virus has been identified and the ætiology remains unknown. The accompanying neurological symptoms may be due to invasion of the nervous system by an unidentified virus, or to an allergic encephalomyelitis similar to that following measles, rubella, chicken pox, and scarlet fever (Miller, Stanton, and Gibbons, 1956).

The site of the lesion in this patient can be inferred from the clinical picture. In the absence of other cranial or peripheral nerve signs it is extremely unlikely that it was a manifestation of an acute polyneuritis. Damage to the supranuclear pathways in the region of the posterior commisure may cause a bilateral ophthalmoplegia, but this is often accompanied by retraction of the upper lids (Collier, 1927). If such a lesion extended so far posteriorly as to involve the descending sympathetic fibres ptosis would occur, but it is hard to conceive that a lesion of this extent would not cause signs elsewhere. Further evidence against a purely supranuclear lesion was provided during recovery by the disparate movements of the globes on attempted upward gaze.

On the other hand the development during recovery of a monocular nystagmus on lateral gaze suggests a lesion of the medial longitudinal bundle. It can be concluded that the site of the disease was the ocular motor group of nuclei and their mutual connexions. The sparing of the pupillary reaction is dependent on the anatomical isolation of the relevant nuclei at the cephalad pole of the ocular motor group. The sixth nerve nucleus need not be involved, as the oculomotor and trochlear nuclei lie in close relation to each other and to the supranuclear fibres descending to the abducens nucleus (Spiller, 1919). By restricting the lesion in this way the sparing of the trigeminal and facial nerves can more easily be understood.

The report by Dolgolpol and Husson (1949) on the microscopic findings in a fatal case of glandular fever offers support for this conclusion. Their patient was a 19-year-old girl who, on the third day of the disease, developed diplopia and an areflexic paralysis of all limbs. The eye movements are not described in detail. She died in respiratory failure on the tenth day. Microscopical examination of the brain stem showed well-marked degenerative changes which were confined to

the nuclei of the third and fourth cranial nerves and the inferior reticular nucleus.

A rapidly developing bilateral and complete external ophthalmoplegia is a rare clinical picture and has not previously been reported in glandular fever. It may occur in myasthenia gravis (Sniderman, 1940) and the exclusion of this disease by the intravenous injection of edrophonium chloride (Tensilon) is of first importance. In association with proptosis, bilateral ophthalmoplegia may develop rapidly in exophthalmic ophthalmoplegia, and in thrombosis or arteriovenous aneurysm of the cavernous sinus (Cairns, 1938). Pituitary apoplexy (Walsh, 1949), neoplastic infiltration of the meninges (Fischer-Williams, Bosanquet, and Daniel, 1955) and syphilitic meningitis might also involve the nerves in their extramedullary course, but the ophthalmoplegia is usually incomplete, and is accompanied by pupillary changes and involvement of other cranial nerves.

Within the brain stem the toxæmia of diphtheria, tetanus, and botulism are well-documented causes of ophthalmoplegia. Sporadic cases of acute encephalitis lethargica still occur (Espir and Spalding, 1956) and more or less complete bilateral external ophthalmoplegia may be found in acute poliomyelitis (Wright, 1949), acute disseminated encephalomyelitis (Miller et al., 1956), epidemic myalgic encephalitis (Medical Staff of the Royal Free Hospital, 1957), and in rhombencephalitis (Bickerstaff, 1957). Intrinsic neoplasms, or vascular disease of the brain stem would be unlikely to pick out the ocular motor nerves so completely and exclusively as in this patient. Wernicke's encephalopathy is characterized by associated vomiting, mental change, and the circumstantial evidence of thiamin deficiency in the patient's background.

From the clinical point of view this case history reveals another cause of bilateral external ophthalmoplegia. The diagnosis of glandular fever depended on the demonstration of the enlarged spleen and lymph nodes and was confirmed by finding the atypical white cells in the blood and the positive Paul-Bunnell test.

Summary.

The case of a young girl with a complete and bilateral external ophthalmoplegia due to glandular fever is described. The anatomical site of the lesion is discussed from the clinical evidence, and the differential diagnosis is reviewed.

It gives me great pleasure to record my thanks to Dr. F. F. Kane and Mr. C. A. Gledhill for permission to report this case.

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NEUROLOGICAL COMPLICATIONS OF GLANDULAR FEVER

II: REVIEW OF THE LITERATURE

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WHILE examining the literature on glandular fever in connexion with the previous paper, the remarkable variety of the neurological complications became apparent. In this review attention is directed only to those case reports in which it could reasonably be assumed that the parenchyma of the nervous system had been involved during the course of glandular fever. Cases of benign lymphocytic meningitis complicating glandular fever have not been included unless there were associated neurological signs.

In seventy-eight reports in the English language the clinical history was sufficiently complete to form an independent assessment of the diagnosis. The reported neurological complications can be put into four clinical groups—polyneuritis, mononeuritis, encephalomyelitis, and those cases in which the optic nerves were affected, although some cases overlap more than one group. The paucity of pathological material leaves this purely clinical assessment open to doubt, but what such a classification lacks in accuracy is made up by its descriptive value in illustrating the very varied neurological complications which may be found.

POLYNEURITIS.

The twenty-three members of this group were identified by a widespread, symmetrical, flaccid paralysis with reduced or absent tendon reflexes. The chief clinical features are presented in Table 1.

Paræsthesiæ or muscular weakness occurred on the first or second day of the disease in four patients; in one patient the onset of the nervous symptoms was delayed until the thirty-eighth day, but in the remainder the first evidence of polyneuritis appeared between three and twenty days after the onset of malaise or symptoms of upper respiratory tract infection. In five cases the patient made a temporary recovery from the initial illness before the nervous system was affected on the tenth, eighteenth, eighteenth, nineteenth, and thirty-eighth day. Enlarged lymph nodes or a palpable spleen accompanied the neurological signs in all except a child of four years (14) who showed neither of these signs throughout the illness.

Peripheral sensory loss was reported in twelve patients, trigeminal anæsthesia in one. Six patients had a partial external ocular palsy, five had weakness of the jaw, and thirteen had facial paralysis.

The gag reflex was depressed in five patients, three of whom had respiratory failure. Dysphagia occurred in nine patients, all of whom had respiratory

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weakness. Paralysis of the respiratory muscles occurred in thirteen patients and of the seven who recovered five needed mechanical aid. Clouding of consciousness occurred in one and convulsions in another two of these patients, and could be attributed to cerebral anoxia. Bladder disturbance was reported in two patients.

The illness ended fatally in seven patients. Death was due to respiratory paralysis and occurred on the tenth to twenty-third day of the disease and within four to eight days after the onset of neurological symptoms. Complete

TABLE 1.

POLYNEURITIS.

Ref. No.	Sex.	Age.	Day of Onset.	Resp. Paraly-sis.	C.S.F. Cells: Lymphs.	C.S.F. Cells: Poly.	C.S.F. Protein.	Outcome.
5	M	18	10	+	4		50	Recovery 5 months.
10	F	17	18		0		68	Recovery 4 months.
14	F	4	1	+	N.S.		70	Recovery 4 months.
19	M	58	7		0		200	Recovery 3 months.
22	M	18	1		3		900	Recovery 5 months.
23	M	10	7		9	0	400	Recovery 3 months.
25	M	18	3	+	7		112	Recovery 2 months.
33	M	32	11	+	14	19	63	Death 17th day.
34	M	6	7		2		+	Recovery 6 months.
44	F	33	20		4		75	Recovery 2 months.
45 i	M	21	11	+	36	0	81	Death 18th day.
45 ii	M	22	18	+	8		74	Death 23rd day.
46 vi	M	7	3	+	1		60	Death 10th day.
48 i	M	24	38		0		88	Symptomatic recovery.
48 ii	M	16	7	+	0		280	Partial recovery 3 months.
48 iii	M	50	1	+	N.S.		101	Partial recovery 2 months.
51	M	19	12	+	23	3	+	Death 14th day.
53 i	M	22	13	+	91	6	81	Death 19th day.
53 ii	M	21	19	+	8		74	Death 23rd day.
54 ii	F	28	6		2	0	65	Recovery 1 year.
57	M	18	7		N		80	Recovery 4 months.
63 ii	M	36	7		1		48	Partial recovery 5 months.
69	M	21	2	+	2		190	Recovery 5 months.

symptomatic recovery was attained in a matter of months in eleven patients, two patients had residual weakness of the extremities and three were not followed up.

Either the heterophile agglutination test was positive or atypical lymphocytes were found in the blood on admission in all cases except two (45 ii, 53 ii) in which the diagnosis was made at autopsy.

As a rule, the illness was not distinguishable from acute infective polyneuritis of unknown ætiology. Haymaker and Kernohan (27) found that two out of fifty fatal cases of polyneuritis followed glandular fever, and increased awareness on the part of clinicians may well reveal a higher incidence.

Mononeuritis.

There were three reports of serratus anterior palsy during the course of glandular fever (16, 52, 55) and the paralysis was permanent in one case. Rugg-Gunn (54) described a fifth cervical radiculitis which started one week after the onset of fever and recovered in three months.

Optic Nerve Involvement.

Three patients (32, 47, 68) were reported to have papillœdema during the course of encephalitis and they are described in that group.

In five patients (1, 6, 7, 31, 65) papillœdema was the dominant sign. In three the disc œdema was accompanied by a central scotoma suggesting an optic neuritis rather than papillœdema due to raised intracranial pressure. In the other two reports the visual fields were not described, but the association of pain, photophobia, and conjunctival injection with normal cerebro-spinal fluid (C.S.F.) pressure also makes optic neuritis probable.

The optic neuritis developed on the first, third, seventh, eighth, and ninth days of the disease and recovery was complete in the three patients who were followed up. The disc œdema was bilateral in four. Apart from an equivocal Babinski sign in one case, no other neurological signs were found. Lymphadenopathy or splenomegaly was found in all, but in two cases the glands and spleen only became palpable two and five days after optic neuritis had appeared. The spinal fluid was examined in three patients, in two the cells and protein were slightly increased.

Shechter, Lipsius, and Rasansky (59) report a boy of 6 years who developed retrobulbar neuritis in the right eye four weeks after the onset of glandular fever. The condition had subsided in a month and vision was normal one year later. This is an isolated instance of retrobulbar neuritis and its relationship to the fever may have been coincidental.

Encephalomyelitis.

Forty-five patients formed a heterogenous group in which the central nervous system rather than the peripheral nerves had borne the brunt of the disease. The label encephalomyelitis had often been applied in the case reports to indicate broadly a disturbance of central nervous function which was associated with glandular fever. It is here used as a purely clinical concept implying no specific pathology, and while there may be semantic objections to this clinical use of a pathological term, it is a valuable descriptive diagnosis for which there is no entirely satisfactory alternative.

A table of the incidence of the various symptoms and signs in this group of patients would give no idea of the very varied clinical pictures which have been reported. A quantitative analysis has therefore been abandoned in favour of a more descriptive approach (Table 2). A primary subdivision can be made into those patients in whom focal neurological signs were unobtrusive and the illness was characterized by epileptic fits or by alteration of consciousness, and those in whom the physical signs suggested that one region of the neuraxis had been more heavily affected to the partial or complete exclusion of other regions.

Thirteen patients had *seizures without gross neurological signs* of a localizing nature. They were preceded by a short period of confusion in five instances (3, 4, 20, 24, 68) and by drowsiness in two (58, 62), but in the remaining six an epileptic fit was the first sign of neurological disease. The fits were generalized in all patients but, in addition, focal seizures occurred in four, and extensor spasms with opisthotonus in two. Post-ictal confusion lasted for more than a few hours in all cases. No unequivocal focal signs were observed in four patients, post-ictal plantar reflexes were extensor bilaterally in six and unilaterally in three patients. Bilateral trigeminal anæsthesia and a left lower facial weakness were reported in one patient, and disc œdema in one.

Seven patients presented with *confusion, stupor or coma without epilepsy*. There were no focal neurological signs in three. Unilateral extensor plantar reflexes were obtained in two, bilateral partial ptosis was observed in one, and vertical nystagmus in one. In all cases recovery was complete within two months.

Eight patients presented a picture of diffuse encephalomyelitis with *quadriplegia* or *paraplegia*. The mortality was high in this group, three dying in respiratory failure, and complete recovery was observed in only two.

A *cauda equina* lesion was described by Piel, Thelander, and Shaw (47) in association with optic neuritis and diplopia.

The *cranial nerves* were exclusively or predominantly affected in six patients, including the case report in the first part of this paper (17). Vaughan, Regan, and Terplan (67) reported a patient with a left lateral rectus palsy after emergency splenectomy for rupture of the spleen during the course of glandular fever. Slade's patient (63i) developed bilateral ocular, jaw, facial, and palatal weakness, ageusia and dissociated trigeminal anæsthesia. Later he exhibited involuntary smacking movements of the lips, cogwheel rigidity of the arms and athetosis. Residual cranial nerve signs were present seven months later. Montadon, Rauch, and Reytan (41i) reported bulbar symptoms with a left extensor plantar reflex, and Silversides and Richardson (62iii) reported bilateral jaw and facial weakness with complete recovery. A temporary bilateral facial weakness was described by Canter and Schillhammer (8).

Inco-ordination was a prominent feature in three patients and suggested that the *cerebellum* or its connexions were chiefly affected. Frenkel, Shiver, Berg, and Caris (21) reported nystagmus, slurred speech, dysdiadochokinesia and ataxic gait in association with muscular twitching and mental confusion. Landes, Reich, and Perlow's patient (35) developed slurred speech and cerebellar ataxia of his limbs with complete recovery in three days. Hoyne's patient (28) developed an ataxic gait which persisted for several months before recovery.

In three patients *vertigo* related to the position of the head was the dominant symptom. Kalmansohn, Conte, and Cavalieri (30) described a patient whose illness began with severe nausea and vertigo and he became comatose on the seventh day. Four days later he regained consciousness, but continued to have nystagmus and postural vertigo for two weeks. Crowther's case (11) was similar. Dizziness related to posture appeared on the eleventh day. Three weeks later

TABLE 2.

ENCEPHALITIS.

REF. No.	SEX.	AGE.	DAY OF ONSET.	C.S.F. CELLS: Lymphs.	Poly.	PROTEIN.	E.E.G.	OUTCOME.
SEIZURES *without gross focal neurological signs:*								
3	M	21	15	3		102		Death 20th day.
4	M	19	4	108	12	156	+	Recovery 1 month.
12	F	16	16	18		N.S.		Recovery 1 month.
20	M	21	11	25	0	474	+	Recovery 1 month.
24	M	18	4	13		116		Partial recovery 1 month.
29	M	17	2	33	0	120		Recovery 1 month.
36	M	19	14	100	15	82	+	Recovery 1 month.
42	M	24	8	80	10	175		Recovery 1 month.
58	F	14	15	74	6	150		Recovery 1 month.
61	M	9	14	25	5	51		Recovery 1 month.
62 i	M	17	3	16		raised		Recovery 1 month.
64	M	22	?	5		120	+	Recovery 1 month.
68	M	8	13	21		256	+	Partial recovery 2 months.
CLOUDING OF CONSCIOUSNESS *without gross focal neurological signs:*								
2	F	19	?	N	N	N	+	Recovery 1 month.
15	M	19	1	30	4	52		Recovery 2 months.
32 i	M	3	6	78	117	45	+	Recovery 1 month.
37 vi	M	29	3	24	2	N.S.		Recovery 1 month.
49	M	25	8	0	0	42		Recovery 1 month.
50	F	22	7	0	50	272	+	Recovery 1 month.
56	M	18	2	44	14	80		Recovery 1 month.
DIFFUSE ENCEPHALOMYELITIS *with spinal cord involvement:*								
13	F	19	3		50	N		Death on 10th day.
16 iii	M	18	11	124	52	82		Partial recovery 2 months.
16 v	F	16	5	132	33	97		Death on 27th day.
32 iii	M	9	7		92	300		Partial recovery 6 months.
43 i	F	41	7	65	8	180		Death in 5th month.
43 ii	F	27	21		4	68		Partial recovery 6 months.
47	M	21	3	163	70	100		Recovery 1 month.
62 ii	M	24	17		23	N.S.	+	Recovery 2 months.
70	M	21	14		4	68		Recovery 3 months.
CRANIAL NERVES *predominantly affected:*								
8	M	24	14	N.S.	N.S.	N.S.		Recovery 1 month.
17	F	6	3	4	0	26		Recovery 1 month.
41 i	M	6	8	176	0	raised		Partial recovery 2 months.
62 iii	M	24	14	N	N	N	N	Recovery 1 month.
63 i	M	31	12	4		91	+	Partial recovery 7 months
67	M	38	6	8		116		Recovery 1 month.

TABLE 2—*continued*

CEREBELLAR SIGNS:												
21	...	M	...	19	...	12	...	47	0	...	131	... Recovery 2 months.
28	...	M	...	20	...	?	..	4	2	...	79	... Recovery 5 months.
35	...	M	...	21	..	3	...	9	0	...	170	... Recovery 1 month.
VERTIGO:												
11	...	M	...	20	...	11	...	<1	...		15	... Recovery 2 months.
30	...	M	...	49	...	1	...	5	...		90	... Recovery.
38	..	F	...	19	...	1	...	<1	...		25	... Recovery 1 month.
HEMIPLEGIA:												
18	...	M	...	19	...	5	...	230	18	..	340	... Recovery 2 months.
26	...	F	...	17	...	?	...	N.S.	...		42	... Unknown.
39	...	F	...	15	..	7	..	18	...		150	.. Recovery 1 month.
46V	...	M	...	11	...	12	...	5	8	...	74	... Partial recovery 6 months.

N = Normal. N.S. = Not stated. + = Abnormal.

he became drowsy, developed nystagmus, and was stuperose on the next day. Recovery was rapid. Librach (38) describes a patient with postural vertigo and no signs apart from unequal pupils with a sluggish reaction to light. Recovery was complete.

Four patients abruptly developed a *hemiplegia*. McNeel (39) described a girl of 15 who developed a flaccid left hemiplegia following a convulsion. She remained unconscious for three days and then made a rapid recovery. Field's patient (18) developed a hemiplegia after the first fit and became tetraplegic after a second fit six days later. He was comatose and very ill for eight days and then made a complete recovery. Pew's patient (46) was observed to have a right hemiparesis after status epilepticus. He was unconscious for ten weeks and was left with severe brain damage. Green (26) reported a girl who suddenly developed a right hemiplegia and aphasia. The outcome is not revealed. It can only be surmised whether these cases had vascular lesions, such as an internal carotid artery occlusion, or an encephalitis which affected chiefly one hemisphere.

In all the patients with encephalomyelitis neurological complications appeared within the first seventeen days. Neck stiffness was reported in seventeen patients and a positive Kernig's sign in one other patient. Clinical evidence of glandular fever in the form of enlarged lymph nodes or a palpable spleen was found on admission to hospital in thirty-two cases. In five cases these signs were definitely not observed on admission, but developed after an appreciable interval (four, six, eleven, thirteen, and twenty-two days) (47, 36, 29, 4, 35). In seven cases neither splenomegaly or lymphadenopathy were reported. In one case the patient was admitted with a ruptured spleen and the neurological signs appeared on the following day (67). Only four deaths were reported and in only seven patients was recovery incomplete.

Either the Paul-Bunnell reaction or the blood picture was characteristic of glandular fever during the illness, but there is one instance of the Paul-Bunnell test being negative at the onset of neurological complications and reaching a titre of 1 : 896 five days later (24).

A direct hetrophile agglutination test on the C.S.F. was negative in six patients, but two positive results were obtained (20, 36) when the modified technique devised by Silberstein, Bernstein, and Stern (60) was used.

The electroencephalogram (E.E.G.) was reported in eleven cases. It was normal in one instance; in the remainder generalized slow waves were present without focal features.

Morbid Anatomy.

Four of the cases classified as polyneuritis came to autopsy. Pew (46vi) reported the brain as essentially normal on microscopy, and Reske-Nielsen and Mogensen (51) found congestion and perivascular œdema in the brain, and did not report on the peripheral nerves. Ricker and colleagues (53) found an extensive cellular infiltration of the nerve roots and peripheral nerves with small round cells and eosinophils, and early degenerative changes in the cerebral cortex, anterior grey columns, and Purkinje cells.

Three of the cases classified as encephalomyelitis were examined post-mortem and Dolgolpol and Husson's (13) findings have been discussed in the first part of this paper. Bergin (3) found cellular degeneration in the cortex, brain stem, and cord with some perivascular hæmorrhages, but no cellular infiltrate. Erwin, Weber, and Manning (16v) also found severe degeneration in all parts of the brain with infiltration by polymorphs and histiocytes.

Incidence.

From these case reports no estimate of the incidence of neurological complications can be made, but the total of seventy-eight cases over thirty years suggests that they are infrequently recognized. The incidence in reported series varies. Out of 239 patients, Raftery and colleagues (48) found three patients with neurological complications and Rugg-Gunn (54) also found three in a series of 412 patients. On the other hand, Milne (40) found no neurological signs in 141 cases and Contratto (9) found none in 196 cases. The incidence of overt involvement of the parenchyma of the nervous system appears to be under 1 per cent., but this figure may be too low either because minor signs are overlooked, or because the neurological signs so dominate the clinical picture that the underlying glandular fever is not appreciated.

Conclusion.

The overall age distribution of the cases reflect that of glandular fever, and the preponderance of males is to some extent due to the number of cases amongst service personnel who are more at risk from institutional epidemics.

The mortality appears particularly high amongst the polyneuritis group, but as all the deaths were from respiratory failure it is probable that present-day

treatment would reduce this figure considerably. In the encephalomyelitis group a rapid and complete recovery was usual except amongst those with diffuse involvement of brain and spinal cord, and although the outlook is probably better with modern treatment, the incidence of sequelæ was higher.

This survey emphasizes the remarkable variety of neurological complications which may occur. Many of them are familiar syndromes such as polyneuritis, brachial neuropathy, serratus anterior palsy, optic neuritis. The types of encephalitis, whether presenting with clouding of consciousness and seizures, or with evidence of focal neurological involvement, do not differ from those met with after other infectious illnesses such as measles, varicella, scarlet fever, and mumps. One is led to the conclusion that the conditions are due to a pathological reaction which is the common end-point of different disease processes, and that glandular fever encephalitis does not differ substantially from other types of post-infectious encephalomyelitis.

Attention has already been drawn to the small number of reported cases. Glandular fever can, at times, be a mild disease with the most diffident clinical features that may well pass unnoticed in the face of an obvious neurological disturbance. A deliberate search for abnormal cells in the blood and the use of the Paul-Bunnell test in all cases of acute neurological illness may reveal more cases in which glandular fever is responsible. It should be noted, however, that the Paul-Bunnell test is often negative in children under 10 years old who have otherwise typical glandular fever (66).

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OPERATIONAL RESEARCH AND GERIATRIC SERVICES IN BELFAST

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"PRECISE determination of the optimal allocation of resources within the health service, and between the health service and other wants of society, may be impossible. But to think in terms of optimal allocation, instead of 'meeting needs,' will produce better decisions."

This is a quotation from a critical review (Feldstein, 1963) of the recent Nuffield study of operational research in the health services (Davies et al., 1962). The authors of the Nuffield report emphasize that demand is not the same as need, and they define different types of 'need,' and methods of its assessment and measurement as a basis for the development of health services. Feldstein believes that it is wrong to approach health service decisions as though the problem were to meet specific community 'needs'; they may be fallacious guides because opinions on them change with medical knowledge, and with social ideology, and they may only reflect medical fashion. (In any event, it is too much to hope that enough resources could be made available to meet all needs that might be considered essential.) Instead, Feldstein suggests that the health service facilities to be provided, how to provide them, and how much to provide, should be decided from a search amongst alternatives, adopting the course that will ensure *optimal* use, choosing the preventive, diagnostic, curative, and rehabilitation services to be offered from statistically derived estimates of probable benefits and costs.

These studies must appeal to anyone concerned with the medical care of old people. It has been well said that old age will provide the hospital service with its principal challenge in the next twenty years, but there are many who feel that the impact of an ageing population on the health services in general, and on hospitals in particular, does not claim the attention it seems to merit from those who direct policy. Conflict of opinion on whether to relate health service provision to 'demand,' 'need' or 'optimal use' may be part of the explanation for this apparent neglect. Where old people are concerned the general practitioner probably thinks in terms of demand, the medical and nursing staff of hospitals in terms of need, and the administrator in terms of optimal use of the resources he has to offer within and outside the hospital. If the total resources provided are adequate, the family doctor and hospital staff may come to terms, with or without some friction, and may reach an amicable settlement for better or for worse on behalf of the patient; if, however, resources are inadequate, it is quite impossible to resolve the difficulties for patient, family doctor, or hospital. This is an over-simplification, but it may point to the source of some difficulties experienced in Belfast hospitals.

Statistical records of the results of treatment of old people in hospital have

been compiled regularly since the first moves were made fifteen years ago to introduce modern geriatric medical care in the Belfast City Hospital. Analysis of these annual records shows remarkable constancy, suggesting that accurate predictions of the hospital needs of old people, or of the optimal use of resources available to them, could be made. These records also lend support to two beliefs; first, that there are not enough hospital beds in Belfast for the old people and chronic invalids who need them, and secondly that, as most of the beds that are reserved for this use are concentrated in one hospital, a disproportionate load of chronic sick nursing is imposed on its nurses. The demand from general practice is not being met satisfactorily; the needs of the hospitals exceed their resources and are growing; and optimal use cannot be made of the resources whilst long-stay invalids are mixed with the new admissions to general wards which were not designed or equipped to segregate and nurse them properly, or encroach on the small proportion of geriatric beds reserved for rehabilitation.

Census returns show that the population aged 60 and over in the Belfast County Borough increased from 46,438 in 1936 to 55,639 in 1951 and 63,803 in 1961, i.e., there are 17,000 more elderly people in the city than there were pre-war. Half of this increase has occurred since the Health Service was introduced. This trend has been accompanied by a corresponding increase in old people needing temporary or permanent hospital care. Since 1948 admissions aged 60 and over have gone up from 18 per cent. to 30 per cent. in the general wards of the Royal Victoria Hospital, and from 30 per cent. to 40 per cent. in the general wards of the Belfast City Hospital. Over this period the number of hospital beds apportioned to old people and chronic invalids in Belfast has gradually diminished. At first the decline was compensated, partly by geriatric rehabilitation (which has reduced the unnecessary chronic incapacity that once arose from neglect of sick old people), and partly by more tolerant acceptance of long-stay patients in general hospital wards, and of infirm old people in local authority homes. But the time is long past when this adjustment can offset the need for more beds. In 1948 there were at least 550 beds for 'the chronic sick' reserved in the convalescent, Windsor, and cancer wards of the Belfast City Hospital. There are now less than 400 geriatric and long-stay beds shared between the Belfast City, Northern Ireland Fever, and Musgrave Park Hospitals.

The effect of this growing demand on diminished accommodation is well known to those familiar with the administration or application of medical services in Belfast. In the winter months the wards of the hospitals are reduced to chaos in efforts to counterbalance the shortage of beds. Sick people, only recently admitted or in early post-operative recovery, have to be ferried about from one corner to another, at all hours of the day and night, to make room for new arrivals; infirm old people, chronic invalids, and patients in terminal illness must often be discharged without proper preparation, because there is no alternative accommodation for them, even in the geriatric department. In March this year 230 of the 275 geriatric beds were occupied by long-stay invalids. Only two-thirds of the beds staffed and equipped for rehabilitation were being put to this use. At the same time it was estimated that there were more than fifty elderly long-stay

patients in the general wards of the Belfast City Hospital. This hospital risks losing all it has gained since 1948 in status and responsibility as a leading general hospital, and of sliding back to its former passive role as an institution for the chronic sick.

Estimates of bed requirements are notoriously unreliable, and a cynical view of them is encouraged by assessments, from both sides of the Atlantic, which have shown that the appropriate number of beds necessary for a given speciality, at any given time, is the number already available (Forsythe and Logan, 1962). However, some yardstick is necessary, and a ratio of 1.2 beds per 1,000 population (or 300 beds for 250,000 people) was once popular in Great Britain as the essential hospital provision necessary for old people and the chronic sick, welfare accommodation being considered separately. It is now recognised that hospital and welfare hostel accommodation for old people are too closely dependent on each other to be dissociated in this way, and in Great Britain they are usually combined in a ratio of total beds for a given area. Sheldon (1961) considers that *not less than* three total beds per 1,000 population is a realistic figure for present needs, with the following reservations:

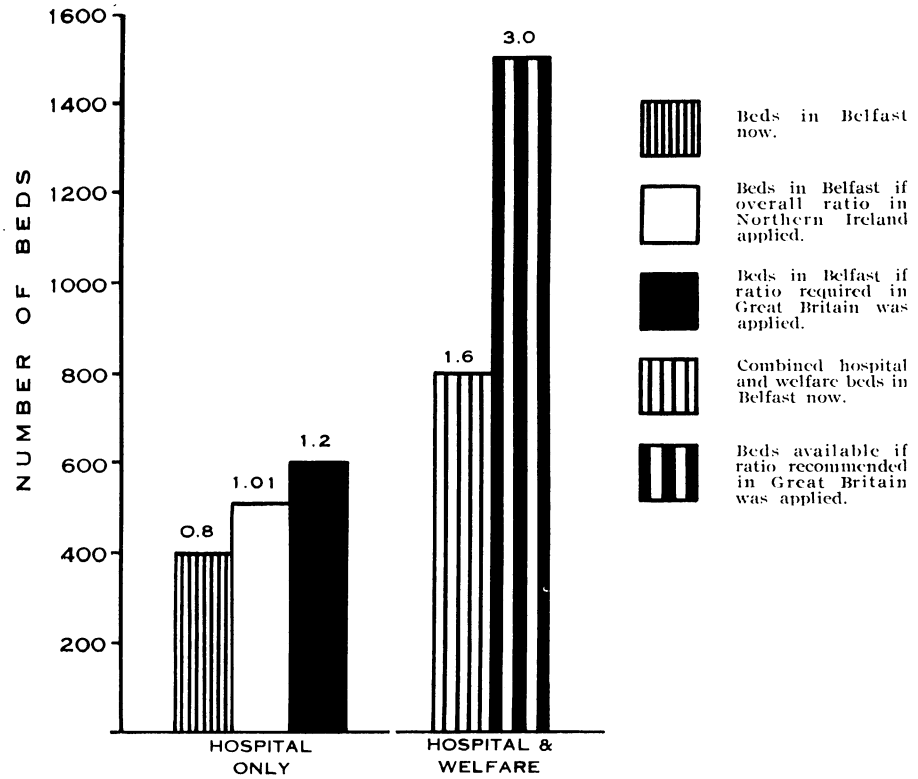
1. It must vary to some extent with the size of different areas;
2. It may not make enough allowance for psychiatric breakdown in old age;
3. It makes no allowance for seasonal variations, with the heavy demands experienced in the winter months, and
4. It presupposes the existence of an active geriatric unit.

Allowing for minor differences in different areas, this total allocation would be shared about equally between hospital and welfare authorities, but Anderson (1962) believes that it may be necessary before long to increase the ratio of hospital beds alone to 2.0 per 1,000 population.

The future of old people in Northern Ireland hospitals was considered two years ago by the Hospitals Authority in a memorandum on development of hospital and specialist services. It was acknowledged that at mid-1960 the ratio of beds per 1,000 population reserved for old people and long-stay patients was 1.01. This ratio, however, represented the beds available in all hospitals in Northern Ireland, and was greater than the ratio in Belfast where it was, and still is, 0.8 (about 400 beds for half a million population). It is no consolation to patients who cannot be admitted for the care they need in Belfast (or to their relatives) to know that there may be empty beds in hospitals many miles from their homes. The disparity between ratios in Belfast and estimates for other areas in Great Britain are illustrated in the diagram.

In the memorandum it was hoped that a ratio of 1.25 hospital beds for old people per 1,000 population would be reached by 1970, and it was observed that:

> "The increased provision for old people and long-stay patients is likely to be required. There will be more old people. It is hoped to care for many of them outside the mental health units and some other factors may tend to increase the demand on 'general' hospitals. On the other hand, the Welfare Authorities should be better equipped by 1970 to deal with the frail ambulant and some feeble old people who need institutional care but not continuous hospital treatment."



STATUTORY ACCOMMODATION FOR OLD PEOPLE IN BELFAST COMPARED WITH OTHER AREAS

Figures are ratios of beds per 1,000 population (see text)

This comfortable assurance is not in keeping with the sense of urgency felt amongst those immediately concerned with present anxieties and frustrations in the Belfast hospitals. The discrepancy between Belfast and other areas in the Province does not seem to be appreciated and there is nothing to indicate that it will be corrected. There is no indication that extra provision will be made to meet the effects of the changes in policy towards psychiatric disturbances in old age. These effects are already being felt in general hospitals which are not prepared or equipped to cater for them, or to deal with the evils of misplacement of the elderly in hospital (Kidd, 1962). In January this year 31 patients with advanced senile or arteriosclerotic dementia were being nursed in the geriatric wards of the Belfast City Hospital, and they were only a proportion of the total number of such patients in this hospital. They could have been sent as formal admissions to a mental health unit, but it is already so hard pressed that this course is only adopted in exceptional circumstances.

Progress in the development of Welfare Services will help to offset some of the effects of population trends and policy changes, but cannot make good the

present deficiencies, and the Welfare Authorities too have their problems. The Welfare Authority has had to rehouse in new hostels large numbers of old people from the derelict workhouse buildings and, by accepting responsibility for increasing numbers of physically and mentally infirm old people in these hostels and by supporting others with domestic help in their own homes, they have helped greatly to relieve pressure on the hospitals. However, there are less than 400 welfare hostel beds available to old people in Belfast, so that even when the elderly residents subsidised by the local authority in voluntary homes are included, the ratio of total beds for old people in Belfast is no better than 1.6 per 1,000, half of that considered necessary elsewhere.

The core of the problem of long-stay hospital care is not where it should be given, but who is to give it. Wards can be converted or built, but if their sole use is to house large concentrates of incontinent chronic invalids it is difficult, and at times impossible, to recruit appropriate staff and maintain the standards of skilled nursing required in such wards.

The alternative is to disperse long-stay patients in small groups amongst the wards where the nurses are, i.e., in the general hospitals. In suitably designed and equipped annexes 20 per cent. of each general ward complement could be reserved for long-stay patients without compromising the work of the ward, and with benefit to the training and experience of the nurses. Yet, from the plans of a vast programme of new hospital building in Northern Ireland, it seems to be impossible to obtain an uncontrovertible statement, or clear evidence, of the number of beds to be allocated to long-stay patients; if there are to be any, where they will be sited; or whether ward space for them will be designed, equipped, or staffed to conform with modern standards. Long-stay care is an uncomfortable topic, tiresome and unprofitable compared with the more attractive aspect of recovery after successful treatment, and it seems to meet with apathy and evasion at all levels, professional as well as administrative, because nobody really wants to be bothered with it. Each winter is approached with the same gloomy sense of frustration and the same ineffectual makeshifts, and at times the fate of sick old people is discussed almost as if they were interlopers in wards that only welcome robust young folk with 'interesting' diseases, and then only for a limited number of weeks.

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FAMILY PLANNING: A SURVEY OF CLINIC PATIENTS

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Historical Background.

In the early centuries, when little was known about the true causes of disease, the population was limited by the very high infant mortality and by the short expectation of life, but according to Wingfield-Stratford (1942), "It was undoubtedly a fact that during the first forty years or so of the nineteenth century the people of this country bred children with such unprecedented rapidity as to swallow up the increase of the national dividend." Malthus, a philanthropic clergyman, came to the conclusion that every increase in wealth tended to be nullified by an increase in population and aroused much public controversy by his "Essay on the Principles of Population" (1798). He advocated late marriage as a means of controlling family size.

In 1800 world population figures were static, but people in England were becoming more and more aware of the burden and hardships of very large families and of the necessity for some form of birth control. Leaflets and tracts were secretly distributed during the early nineteenth century, giving instructions in coitus interruptus or in the use of a medicated sponge, as a means of family limitation, and in 1871 the Malthusian League was formed to encourage birth control. Unfortunately any effort made in the nineteenth century to encourage decent standards, to alleviate the worst effects of grinding poverty, or to improve the existing social order "was sure to start some expansively whiskered gentleman, primed with economics and respectability, to cast it out" (Wingfield-Stratford, 1942).

It was not until 1921 that the first birth control clinic was opened in London by Dr. Marie Stopes who, by her books and her Society for Constructive Birth Control, finally awakened public interest. Over three hundred other clinics have since been established in Great Britain.

In 1934 Dr. Marie Stopes came to Belfast, lectured to the Ulster Medical Society and to the Alpha Club, and addressed a public meeting. She advanced a loan for a house and equipment at The Mount, Belfast, to start a birth-control clinic. It was organised by a Ladies' Committee and a doctor, and employed a full-time trained midwife who was there five days a week. The nurse fitted the patients with contraceptives and a doctor came voluntarily once a week to see any difficult cases. However, there was little response, and very few patients were referred to the clinic. During the war the number of women attending rose gradually to about twelve new patients each week, mainly because of the number of wives of servicemen living in or near Belfast. Immediately after the war there was a steady decline in numbers, and the clinic only survived for a short period.

The birth-control clinic in the Royal Maternity Hospital was started about 1940 and medical cases referred by doctors are seen there on alternate Monday

afternoons. These patients are mainly referred from other hospital departments, and are women for whom a further pregnancy is considered inadvisable. They are fitted free of charge by a doctor employed by the Hospitals Authority.

In 1951 the "Women's Welfare Clinic" opened on one morning and one evening of each week in the extern department of Malone Place Hospital. This clinic was run voluntarily by women doctors and secretarial staff, who were helped by some of the nurses in the hospital, and as the number of patients increased more voluntary workers joined the staff. The clinic moved to the Belfast City Hospital when the building alterations at Malone Place Hospital began in 1959. The name "Women's Welfare Clinic" is a misnomer, and it is said that some doctors still think of it as a convenient source of orange juice and dried milk, but in recent years it seems to have become better known and is now entered as a family planning clinic in the list of clinics published by the Northern Ireland Hospitals Authority.

Another family planning clinic has recently been opened in Belfast. A general practitioner in the Newtownards Road area has generously lent her surgery on Tuesday afternoons to one of the clinic doctors. Patients seen here are charged a small fee when they first attend to cover expenses, but the doctor and secretarial staff work voluntarily. Patients from the Belfast City Hospital who find this clinic more convenient are transferred.

An Outline of Clinic Procedure.

The work of the family planning clinic in the Belfast City Hospital has been increasing every year and in 1960 of the 2,121 women who came to the clinic, 719 were new patients. Two clinics are held each week, one in the morning and one in the evening.

New patients make appointments by letter or by telephone, but there is now a waiting list of nearly three months (November, 1962), although about twenty appointments are made for each week. Patients are referred to the clinic mainly by friends or relatives, or by general practitioners, but a few are referred through other medical or social services (hospital departments, midwives, health and welfare visitors, marriage guidance councils or other family planning clinics in Great Britain).

Almost all the patients are given an occlusive diaphragm cap to be used with a chemical spermicide, but occasionally other forms of contraceptive have to be prescribed for those about to be married or for multiparous women with prolapse or other abnormality.

Clinic procedure here differs from that in most English family planning clinics where patients are initially given a practice cap and are asked to return for a further check before being prescribed their own cap and spermicide. Our patients are not asked to make two visits before getting supplies, but instead they are given more time than in most other clinics to understand and practise the fitting of a cap when they first attend, and this has advantages for women who come from long distances outside Belfast where no other clinics exist.

Further supplies can be obtained from the clinic when required, but every patient who is fitted with a cap is asked to return annually for a medical examination, and post-natal patients are refitted in four to five months, when involution is complete. Patients do not need an appointment for a return visit as re-examination and instruction do not take long, and they are encouraged to return at any time during clinic hours should they need further help or advice. In most English clinics patients are expected to return for a refit at six-monthly intervals. No figures have previously been produced here to compare results with those from other family planning clinics.

As the family planning clinic in the Belfast City Hospital is a recognised Hospitals Authority Clinic, no charge is made for consultation, and the patients only pay the cost of the supplies prescribed, usually about 12s. for a new patient.

The doctors and clerical staff work voluntarily, two nurses are paid recognised rates per hour and a secretary is now employed part-time. Any patient who is thought to be in poor circumstances is given supplies free of charge, while donations are accepted from those who can afford them.

Selection of Patients for the Survey.

No analysis of clinic records has ever been attempted, although the staff have often wondered if our methods were satisfactory, and if our results were worthwhile compared with those of other clinics in Great Britain. It was decided, therefore, to review a group of patients, to compare their social and marital status, and to find out how they were referred initially to the clinic. We particularly wanted to know why some patients, who only attended the clinic once, failed to return.

We chose patients referred to the clinic fairly recently, because those from earlier years might have been difficult to trace. Even this presented difficulties, because the clinic was moved from Malone Place to the Belfast City Hospital in 1959, and working conditions did not return to normal until the end of March, 1960, when better equipment was obtained and two nurses joined the staff again. All the new patients who first attended during the following three months, April, May, and June, were therefore chosen for the analysis. As attendances during the summer months were abnormal and the clinic was not open in August, those months were omitted, the new patients first seen in October, November, and December being added.

All those patients who came to the clinic for the first time during these six months in 1960, and who had not previously had birth-control instruction at any other clinic, were included. We believe this group to be representative of clinic patients seen under normal working conditions.

There were 412 new patients seen at the clinic in the survey period. Two hundred and thirty-one of these (56.1 per cent.) came from Belfast, and the remaining 181 patients came from outside the city, some from as far afield as Kilkeel, Banbridge, Ballymena, Castlerock, or even Londonderry. Only the 231 patients who lived in Belfast were included in the study because of the difficulties of visiting patients living outside the city. Some information was available from

the medical records, but the rest was obtained by a questionnaire or, where this failed, by a visit.

CLASSIFICATION OF PATIENTS IN THE SERIES INTO SELECTED GROUPS.

Ninety-four of the 231 patients (40.7 per cent.) came back to the clinic at least once after their initial visit, and these patients were presumed to be satisfied with this form of family planning and were called the *attenders*. One woman in this group became pregnant while using a cap, but this failure did not discourage her and she subsequently returned to the clinic.

The remaining 137 patients (59.3 per cent.) did not come back to the clinic for supplies or for their annual medical check, but seven of them were known to be leaving Northern Ireland soon after their initial visit. Seven other patients could not be fitted with caps owing to abnormalities such as cystocœle and rectocœle, or general loss of muscle tone; they were given other contraceptives and were not asked to return.

This left 123 patients who should have returned to the clinic—the group that interested us most. A letter enclosing a simple questionnaire was sent in 1962 to all these patients. Sixteen letters were returned undelivered, and 53 people (43.1 per cent.) replied. The homes of 54 patients, all those who failed to reply, were visited, and 12 more women were found to have left the area. The other visits were successful, and the patients seemed glad to see us and to discuss their problems. There were six patients who had not returned because of illness, and one woman had reached the menopause; as they did not require contraceptives, these seven patients were not included in any further study.

There remained 88 patients still living in Belfast who should and could have returned to the clinic, but failed to do so. These are classified in Table 1 and they have been divided into two groups—the *non-attenders* (patients who had temporarily stopped using contraception, and those who continued to use the recommended method but had not come back to the clinic), and the *defaulters* (patients who did not return because they were dissatisfied with this form of family planning).

Non-attenders (37 patients).

Fourteen patients had recently had a "planned" baby or were pregnant and two others were hoping to conceive. Twenty-one patients claimed to be using the method prescribed, many of them buying their own supplies or asking a friend to collect them from the clinic. Some did not realise that it was necessary to return annually for a medical check, in spite of the fact that each patient is given a card showing the date when she is due to return.

Defaulters (51 patients).

(a) *Pregnancies.* Seven patients became pregnant because they did not always use their caps, or because they had no spermicide and had failed to get more supplies. These were "accidental" pregnancies, not attributable to any technical failure of the recommended method of contraception. Two women were probably already pregnant when they came to the clinic. They were both fitted approximately three weeks after their last menstrual periods and were delivered between

38 and 39 weeks later. There were three "unplanned" pregnancies (3.4 per cent. of the 88 patients). These pregnancies occurred despite claims by the patients to have used the cap correctly. There was also one woman already mentioned in the "attender" group, who had an unplanned pregnancy. Hence there were four pregnancies owing to technical failure of the method in the group of 182 patients (2.2 per cent.). This compares favourably with results reported from other family planning clinics.

(b) *Disapproval.* Seventeen patients "disapproved" of this means of family planning. Six of them felt it was not a safe method of contraception, seven others found it inconvenient and unpleasant to use, and four said that they could not manage the cap properly.

TABLE 1.

REASONS GIVEN BY 88 PATIENTS WHO DID NOT RETURN TO THE CLINIC.

REASONS GIVEN FOR NOT RETURNING.	No.	PER CENT.
Non-attenders (37)—		
Pregnancy (14) or hoping to conceive (2)	16	18.2
Still using cap	21	23.9
Defaulters (51)—		
Pregnancy:		
"Accidental"	7	7.9
"Before fitting"	2	2.3
"Unplanned"	3	3.4
"Disapproval"	17	19.3
Discomfort	6	6.8
Difficult to attend	5	5.7
No valid reason	11	12.5
TOTAL	88	100.0

"Accidental" pregnancy = Not using method recommended.
"Unplanned" pregnancy = Using method recommended.

(c) *Discomfort.* Six patients complained that the cap caused discomfort. A patient should not normally feel a cap of the correct size which is properly fitted. Common causes of discomfort are constipation, incorrect size of cap, or a cap which is inserted in one of the fornices and causes pressure on the cervix. The discomfort found by these patients could probably have been relieved, had they returned to the clinic for further examination and instruction.

(d) *Difficult to attend.* Five patients found it too difficult to attend the clinic and two of these said they could not afford supplies. Perhaps these women should not have been asked to pay, but it is not always easy to estimate when a patient

needs financial help. It is hard to believe that a patient in poor circumstances would rather risk a further pregnancy than pay about £1 per annum for birth control. It seems more likely that these women viewed this method of contraception with scepticism and felt that money was wasted, or else had some deep sense of disapproval.

(e) *No valid reason.* There were eleven women who gave no real reason for not returning to the clinic, or just "couldn't be bothered" as one patient expressed it.

Six of the defaulters who were dissatisfied and gave up this method of family planning subsequently became pregnant. The defaulters as a group obviously included the patients so aptly described by Mary Stocks as "people with bewildered minds, clumsy fingers, shyness, fears, and fantasies."

Further study was limited to the 182 patients comprised by the attenders (94), the non-attenders (37), and the defaulters (51).

CLASSIFICATION OF THE PATIENTS ACCORDING TO HUSBAND'S OCCUPATION.

The husbands' occupations were classified from the entries on the medical cards when the patients registered, and from the standards of occupational skill defined by the Registrar General for England and Wales in "Classification of Occupations 1960," which gave five social classes:—

I. Professional, etc., occupations;
e.g., legal, medical, the arts.

II. Intermediate occupations;
e.g., schoolteacher, technical assistant.

III. Skilled occupations;
e.g., joiner, electrician, bus and lorry driver, machinist, plater, riveter.

IV. Partly skilled occupations;
e.g., bus conductor, postman.

V. Unskilled occupations;
e.g., labourer, docker.

As the series comprised a small number of patients, those in Classes I and II were combined. Unemployed persons were classified as VI, and were combined with social classes IV and V. Sometimes the description of the husband's work was vague and occasionally was not entered, but the figures in Table 2 give a general picture of the class of patient coming to the clinic.

Most of the patients' husbands (65.4 per cent.) belonged to Class III; these were the men who had raised themselves by a training from the unskilled status of labourers; 8.5 per cent. came from Classes I and II, and 26.1 per cent. came from Classes IV, V, and VI. The patients from the lower occupational classes seemed to have least success with this method of contraception. Only one patient from Classes I and II failed to continue the prescribed family planning, but 13 (30.2 per cent.) of the patients from the lower occupational classes, including four patients whose husbands were unemployed, gave up the method. Probably too few patients in these classes come to the clinic, and it is unfortunate that so many of those who do must be classed as defaulters.

TABLE 2.

COMPARISON OF DEFAULTERS WITH ALL PATIENTS IN THE STUDY GROUP ACCORDING TO OCCUPATIONAL CLASS OF HUSBAND.

CLASS OF OCCUPATION OF HUSBAND.	ALL PATIENTS.		DEFAULTERS.	
	No.	Per cent.	No.	Per cent. of all Patients in same class.
I and II	14	8.5	1	7.1
III	108	65.4	32	29.6
IV, V, and VI	43	26.1	13	30.2
Total	165	100.0	46	27.9
Services and Unclassified	17	—	5	—
TOTAL	182	—	51	28.0

All patients = attenders, non-attenders, and defaulters.

HOW DIFFERENT CLASSES OF PATIENT WERE REFERRED TO THE CLINIC.

Half of the patients (49.4 per cent.) were referred to the clinic by friends or relatives, and the remainder were referred by general practitioners (34.9 per cent.) or by other medical or social services (15.7 per cent.).

The general practitioners referred a high proportion of the patients from the lower social classes (28.1 per cent.), and of the few patients who came from Classes I and II the highest proportion was referred by other medical or social services (13.0 per cent.).

TABLE 3.

HOW DIFFERENT CLASSES OF PATIENT WERE REFERRED TO THE CLINIC.

CLASS OF OCCUPATION. OF HUSBAND.	BY WHOM PATIENT WAS REFERRED.					
	GENERAL PRACTITIONER.		OTHER MEDICAL OR SOCIAL SERVICES.		FRIEND OR RELATIVE.	
	No.	Per cent.	No.	Per cent.	No.	Per cent.
I and II	3	5.2	3	13.0	8	9.9
III	38	66.7	14	60.9	54	66.6
IV, V, and VI	16	28.1	6	26.1	19	23.5
Total	57	100.0	23	100.0	81	100.0
Services and not classified	5	—	5	—	7	—
TOTAL	62	34.9	28	15.7	88	49.4

There was no record of how four patients were referred to the clinic.

Age and Marital Status.

The ages of patients ranged from 18 to 46 years. There were twelve patients under 21 years of age and only one of them did not intend to return to the clinic; almost one-third (32.1 per cent.) of the fifty-three patients who were over 30 years of age gave up the recommended method of birth control.

Few pre-marital patients (4.9 per cent.) were seen at the clinic, but most women came within five years of marriage (43.1 per cent.), a further 32.1 per cent. came within ten years of marriage, but 6.6 per cent. had been married for more than fifteen years when they first came to the clinic. The remainder (13.3 per cent.) came within fifteen years of marriage. The Papers of the Royal Commission on Population (1949) showed that among those practising birth

TABLE 4.

Comparison of Defaulters with all Patients in the Study Group according to Family Size and to Husband's Occupation.

Number of Children	Class of Occupation. I and II		III	
	All Patients	Defaulters	All Patients	Defaulters
0	6 (42.9%)	0 (0.0%)	17 (15.7%)	5 (4.6%)
1	4 (28.6%)	1 (7.1%)	20 (18.5%)	4 (3.7%)
2	2 (14.3%)	0 (0.0%)	35 (32.4%)	9 (8.3%)
3	1 (7.1%)	0 (0.0%)	19 (17.6%)	9 (8.3%)
4+	1 (7.1%)	0 (0.0%)	17 (15.8%)	5 (4.7%)
Total	14 (100.0%)	1 (7.1%)	108 (100.0%)	32 (29.6%)

Number of Children	Class of Occupation. IV, V, and VI		Not Known	Total
	All Patients	Defaulters	Total		
0	3 (7.0%)	1 (2.3%)	26	3	29 (15.9%)
1	9 (20.9%)	2 (4.7%)	33	3	36 (19.8%)
2	6 (14.0%)	1 (2.3%)	43	2	45 (24.7%)
3	13 (30.2%)	3 (6.9%)	33	7	40 (22.0%)
4+	12 (27.9%)	6 (14.0%)	30	2	32 (17.6%)
Total	43 (100.0%)	13 (30.2%)	165	17	182 (100.0%)

All patients = attenders, non-attenders, and defaulters.

Percentages are expressed on the number of patients in each social group.

Seventeen patients whose husbands were in the services, or who were not classified, are not included in the table of Social Classes.

control who were married between 1930 and 1934, 89 per cent. adopted control in the first five years of marriage; rather less than half of this proportion were using appliance methods.

Apart from the group who were married between 11 and 15 years, the proportion of clinic patients who gave up the recommended method rose according to the number of years they were married before they first attended the clinic.

CLASSIFICATION OF FAMILY SIZE ACCORDING TO HUSBAND'S OCCUPATION.

This is detailed in Table 4. Most patients had either two or three children when first seen; only twenty-nine women had no family. Seventeen patients had an average size of family of 5.6, and three of these had seven children. The 182 patients in the group had a total of 402 children, and the mean size of family was 2.2. In a survey of married women in general hospitals in England, the mean size of family of patients married between 1925 and 1934 was shown to range from 2.2 for those women with no unwanted children to 3.8 for those with unwanted children (Papers of the Royal Commission on Population, 1949).

A large proportion of the patients with four or more children belonged to the lower classes of occupation, and there appeared to be a greater tendency for the mothers with large families from Classes IV, V, and VI to give up this method of contraception than for the patients either in the higher social classes or with small families.

CONTRACEPTIVE PRACTICE AND FAMILY SIZE BEFORE REGISTRATION.

No reference to previous contraception is demanded on the clinic record cards, and inquiry about contraceptive practice was limited, therefore, to the patients interviewed in their homes, and to those who reattended since the survey began.

There were seventy-three patients, excluding those who had been married for less than six months, and fifty-four (74.0 per cent.) of them had used birth control before attending the clinic (Table 5). A survey of married women in

TABLE 5.

CONTRACEPTIVE PRACTICE AND FAMILY SIZE BEFORE REGISTRATION.

PREVIOUS CONTRACEPTION.	NUMBER OF CHILDREN. 0 or 1.	2	3	4+	TOTAL
Coitus Interruptus only	2 (10.0%)	6 (27.3%)	4 (26.7%)	3 (18.8%)	15 (20.6%)
Sheath only	5 (25.0%)	6 (27.3%)	3 (20.0%)	1 (6.2%)	15 (20.6%)
Chemicals only	0 (0.0%)	2 (9.1%)	2 (13.3%)	0 (0.0%)	4 (5.4%)
"Various"	5 (25.0%)	3 (13.6%)	4 (26.7%)	8 (50.0%)	20 (27.4%)
None	8 (40.0%)	5 (22.7%)	2 (13.3%)	4 (25.0%)	19 (26.0%)
TOTAL	20(100.0%)	22 (100.0%)	15 (100.0%)	16 (100.0%)	73 (100.0%)

Various = More than one method of contraception used.

general hospitals in England (Papers of the Royal Commission on Population, 1949) showed that 66 per cent. of the women married between 1935 and 1939 used some form of birth control, but only 37 per cent. used appliance methods (appliance methods include sheaths and chemical spermicides, as well as the cap).

In this group 27.4 per cent. of the patients had used more than one method of contraception, 20.6 per cent. had used only coitus interruptus, and a further 20.6 per cent. had used sheaths. Four patients had used chemical spermicides. There were sixty-seven patients with children, and 42 (62.7 per cent.) of them had at least one undesired pregnancy (41.8 per cent. had more than one) in an average of five and a half years of marriage. Half of the patients with at least four children had tried various methods of contraception, but 40.0 per cent. of those with no family or only one child, most of whom had been married for a short time, had not used any birth control.

Pregnancies since Registration.

Pregnancies in patients who had not returned to the clinic have already been discussed (see p. 52)—14 planned, 7 accidental, 3 unplanned, and 6 which occurred after the patients had given up the recommended method of birth control (the two patients who were probably already pregnant when they registered are not included). In addition to these, 13 of the attender group became pregnant within two years of their first visit—8 had planned to have babies, 4 had accidental pregnancies because they did not always use the cap and spermicide, and one, already referred to, had an unplanned pregnancy. Thus there were 43 pregnancies in the group of 182 patients (23.6 per cent.), occurring within two years of first registration, and 22 of these were planned. Only four of the remaining 21 patients had unplanned pregnancies attributable to technical failure of the cap (2.2 per cent. of the whole group); the others, representing 9.3 per cent. of the whole group, were either not using the full method recommended (6.0 per cent.) or were dissatisfied and had given it up (3.3 per cent.).

Discussion.

In the ten years since this family planning clinic was opened the demand for contraceptive advice has increased steadily and in 1960 2,121 women attended, one-third of them for the first time. In the survey period 56.1 per cent. of the new patients were from Belfast; most of those from outside the city came to the morning clinic (66.3 per cent.), and it is obvious that many women could not manage to make the long journeys to and from Belfast in the evening. As there is now a waiting list of three months for new patients, we feel that, in spite of the difficulty of recruiting more voluntary staff, the clinic should be opened more often, and other clinics should be started in the Province to fulfil the growing demand. Few patients seek advice for medical reasons as most of these are referred to the birth-control clinic in The Royal Maternity Hospital, but patients who wish to space their children or who do not want a larger family, sometimes for economic reasons, should be given the opportunity to obtain advice on family planning.

Of 231 patients living in Belfast, 18.2 per cent. stopped coming to the clinic because of illness, the menopause, or because they had moved from this area; 3.0 per cent. could not be fitted with caps and were given other contraceptives. Of the remaining 182 patients who could and should have returned to the clinic, 72.0 per cent. were satisfied apparently with this method of family planning, and 28.0 per cent. did not intend to continue (defaulters).

It is understandable why patients who had an unwanted pregnancy did not come back to the clinic, but the group of defaulters gave very varied reasons for not returning. A large proportion found the cap unpleasant, inconvenient, uncomfortable or too difficult to manage and a few were doubful of its value. Some patients had no real reason for discontinuing, but these women did not give us the impression of being less intelligent, more feckless, or from noticeably poorer homes than any of the others visited.

In the study of the percentage distribution of defaulters according to social class of husband, age, years of marriage, and family size, failure to continue seemed to occur most readily amongst the oldest patients and amongst those who had been married for over fifteen years. A high proportion of defaulters was observed in patients with large families from the lower social classes, which is unfortunate as they are the very people who most need help. We feel that extra time might usefully be given by the clinic staff to these mothers from poorer homes and, therefore, probably of poorer educational level, to ensure that they fully understand and are confident in the use of a cap; some of them might be encouraged to return a few weeks after their initial visit for further instruction and advice. We believe that too few patients from the lower social classes are referred to the clinic, and that many who are might be more successful if they came earlier in marriage, before being overburdened with too many children too closely spaced.

Some of the group of 182 patients planned a pregnancy within two years of registration (12.1 per cent.), but accidental pregnancies caused by human fallibility occurred in 6.0 per cent. and a small proportion (2.2 per cent.) had unplanned pregnancies despite their claims to have used the cap correctly. These results compare favourably with those of our analysis of contraceptive practice and family size before registration, in which 62.7 per cent. of the group of 73 patients had at least one undesired pregnancy, although most of them were using some form of birth control.

The "pill" has not so far been used in this clinic and we know that much has still to be done to make birth control simpler and surer, but results from this survey show that most patients who know of the clinic's existence are glad of its help and often travel long distances to obtain advice which they feel is important to the health and stability of their family life. In a population of approximately one and a half million, one-third of whom live in the Belfast area, there must be many more women who would welcome instruction in family planning.

SUMMARY.

A brief history of the development of family planning, and a description of the existing clinics in Belfast is given. A survey of a group of new patients first seen in 1960 was carried out to find how many women were still attending in 1962 and why some failed to return.

We wish to thank Dr. O. M. Anderson and all the clinic staff for their encouragement and co-operation. We are grateful to Professor J. Pemberton for his advice and comments and to the staff of the Department of Social and Preventive Medicine who duplicated the letters and questionnaires.

We are most grateful to Mrs. Vera Stewart for the time and trouble she has taken in preparing the manuscript of this report.

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REVIEW

DISEASE IN INFANCY AND CHILDHOOD. By Richard W. B. Ellis, O.B.E., M.A., M.D., F.R.C.P. Fourth Edition. (Pp. vii + 717; figs. 301. 60s.) Edinburgh and London: E. & S. Livingstone, 1963.

THIS edition follows quickly on the Third which was published in 1960, there having been translations into Spanish and Greek in the meantime. This is a most valuable and comprehensive textbook on disease in infancy and childhood. The illustrations are numerous and meet the demands of the text; they are of good quality and many are in colour. The chapter on congenital malformations is excellent and impressive. The author has justifiably retained adequate chapters on diseases which are becoming rare in this country such as rickets, congenital syphilis and tuberculosis. One presumes this is to appeal to those who practise in countries where these diseases persist; and for the same reason diseases not seen at home, such as kwashiorkor are excellently dealt with. This volume can be recommended without reservation to the post-graduate student and those who wish to bring their knowledge of paediatrics up to date whether for the purpose of examinations or because of their interest in diseases in infants and children. The author and publishers are to be congratulated.

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F. M. B. A.

THE EARLY HISTORY OF THE SAMARITAN HOSPITAL

(1872-1892)

By **WILLIAM S. CAMPBELL, B.Sc., M.B., F.R.C.S., F.R.C.O.G.**

Gynæcologist, Samaritan Hospital, Belfast

Obstetric Surgeon, Belfast City Hospital

PRESIDENTIAL ADDRESS

to the Ulster Obstetrical and Gynæcological Society, 1st November, 1962

THE origin of the Samaritan Hospital dates from May, 1872, when Dr. William K. McMordie opened a free dispensary at No. 1 College Street for the treatment of diseases of women and children. The dispensary was soon found to meet a public want, and many patients availed themselves of the facilities and gratuitous advice provided. Many others, however, from poverty, were unable to afford the medicines and medical appliances recommended and this proved an obstacle to the full success of the undertaking. A meeting of a number of philanthropic individuals interested in the project was held to consider the problem. The meeting was a private one and no minutes of it were recorded, but a newspaper report at a later date states, "After a full investigation of the circumstances, it was the unanimous feeling that there was not only a pressing necessity for the supplying of medicines, but also for increased accommodation. One gentleman present volunteered to rent a house and one sufficiently commodious for present requirements was accordingly taken by him in Carlisle Street." There is no record as to who this gentleman was, but the probability is that it was David Cunningham.

The house rented was No. 74 Carlisle Street, off Carlisle Circus, and it was opened on 26th May, 1873, under the name of the Samaritan Hospital for Women and Children, taking over the work of the dispensary in College Street. In addition to Dr. McMordie, Dr. Angus Porter was appointed a Visiting Physician and Professor Cuming was appointed as Consulting Physician. Out-patients were to be seen daily from 10-11 o'clock by the Visiting Physicians. The Reverend James Young and David Cunningham, Esq., signed the opening announcement (see over). The hospital was established at a period when the old lines of the physician and the surgeon were being departed from, and when specialization was making its first efforts towards progress. The Samaritan Hospital was one of a number of special hospitals founded about that time. The others were the Belfast Hospital for Diseases of the Skin (1865), Belfast Ophthalmic Hospital (1867), Benn Ulster Eye, Ear and Throat Hospital (1871), the Hospital for Children and Women (1872), and the Belfast Hospital for Sick Children (1873).

Dr. William Kirkpatrick McMordie, a son of the manse, was born in 1844 at Seaforde, Co. Down, where his father was a Presbyterian clergyman.* He had

three brothers, two of whom later became well known in Belfast, and who were closely associated with the Samaritan Hospital. Dr. McMordie studied medicine at Queen's College, Belfast, and graduated M.D. in 1868 at the old Queen's University in Ireland. When he started his studies the ordinary medical session

SAMARITAN HOSPITAL

FOR

WOMEN AND CHILDREN,

74, CARLISLE STREET, BELFAST.

THIS HOSPITAL will be OPENED for the RECEPTION of PATIENTS, on MONDAY, 26th inst. Out-Patients will be seen DAILY, from TEN till ELEVEN o'clock a.m., by the VISITING PHYSICIANS.

CONSULTING PHYSICIAN:

DR. CUMING.

VISITING PHYSICIANS:

DR. W. K. M'MORDIE—DR. ANGUS PORTER

The Dispensary for Women and Children, in COLLEGE STREET, is now CLOSED, this Hospital being an extension of that Institution.

(Signed by order)

JAMES YOUNG.
DAVID CUNNINGHAM.

Belfast, 24th May, 1873.

was for a period of six months, extending from October to April, with a few days' break at Christmas and Easter. In 1866, however, a summer session from May until late July was introduced to relieve the pressure on the winter session. The medical course was divided into two periods of two years, each with its own quota of lectures, practical and clinical work, the degree awarded being M.D. Two examinations, one after each part of the course, had to be passed, the examinations being mainly written, but viva voce and practical examinations could be added at the examiners' discretion. Visitation by members of the General Medical Council, following its establishment in 1858, took place in 1866, 1868

*John Andrew McMordie, a licentiate of the Down Presbytery, was, in 1839, ordained the second minister of the Seaforde Presbyterian Church, which had seceded from the Clough Presbyterian Church in 1825. He married Miss Kirkpatrick of Cumran, near Seaforde, early in his ministry, which lasted till his retirement in 1877. He died in 1879 at an inherited farm at Annacloy, where he spent the latter years of his life.

(when McMordie qualified), and 1869, and they commended the care, efficiency, and fairness with which the examinations were conducted.

Dr. William McMordie was, perhaps, not so academically brilliant as his brothers. He was, however, a junior scholar (Fourth-Year Medicine in Therapeutics and Pathology) in the session 1867-68. He studied medicine under Professor Cuming, who was one of the first trustees of the Samaritan Hospital and Consultant Physician to it; surgery under Professor Alexander Gordon and midwifery under Professor Burden, who retired at the end of 1867 and was replaced by Professor R. F. Dill, who, in 1890, became Consultant Physician to the Samaritan Hospital.

Dr. McMordie appears to have been a high-spirited student, giving glimpses of a pioneering outlook and great courage in a cause in which he believed. In 1865 he was rusticated for a time by the Council of Queen's College, Belfast, having been found guilty of throwing stones through the glass door of the Vice-President's house. McMordie did not, however, take this sentence lying down. Appeals from decisions of the President and Council lay to a board of distinguished visitors, which was supposed to meet triennially to review the general working of the college. Their proceedings were largely formal, and decisions of the Council were nearly always upheld. Extraordinary visitations were, however, contemplated in special cases in the statutes, and McMordie applied for such an extraordinary visitation, this being the only occasion in the history of Queen's College, Belfast, that such a request was made! It was refused on the grounds that no evidence had been submitted.

After qualifying, Dr. McMordie was in general practice in Portadown for some years until, deciding to devote himself to gynæcology, he studied at the London Hospitals, including the London Samaritan Hospital, before founding the Samaritan Hospital in 1872. In 1877 he was appointed an examiner in midwifery and in diseases of women at the old Queen's University in Ireland, and in 1882 he was awarded the degree of M.Ch. (Honoris Causa). He was also a fellow of the Royal Academy of Medicine in Ireland, a fellow of the Obstetrical Society of London (founded in 1858), and a fellow of the British Gynæcological Society (founded in 1885 by Lawson Tait). These two latter united in 1907 to form the joint section of Obstetrics and Gynæcology in the Royal Society of Medicine.

His brothers, Hans and Robert James McMordie, also attended Queen's College, Belfast. Hans McMordie graduated B.A. with second-class honours in Logic, Metaphysics, and Political Economy in 1867, proceeding to M.A. in 1868 with third-class honours in the same subjects. He had scholarships in his first three years in Arts and was President of the Literific in the so-called "heroic age" (the sixties) in the session 1868-69. He practised as a barrister-at-law, was appointed to the Senate of Queen's University in 1878 and was awarded the LL.D. (Honoris Causa) in 1882. He was one of the original trustees of the Samaritan Hospital and served on the General and Executive Committees. On his early death a fund (£500) was subscribed by his friends and admirers, originally designed to found a scholarship, but finally given to the building fund for the Students' Union, on condition that a room should bear his name—the McMordie Hall.

Robert James McMordie graduated B.A. with second-class honours in Experimental Science in 1870 and M.A. in 1882, i.e., three of the brothers obtained degrees in 1882 at the then Queen's University in Ireland, which later that year was replaced by the new Royal University. He had first-, second-, and third-year scholarships in Arts (Science Division) at Queen's College, was President of the Literific in 1871-72, and practised as a solicitor in Belfast. He was Lord Mayor of Belfast from 1910-1914 inclusive. He was for many years one of the Honorary Secretaries of the Samaritan Hospital, and later became a trustee, besides serving on the General and Executive Committees. His wife was a member of the first Parliament of Northern Ireland.*

A public meeting of those interested in the founding of the Samaritan Hospital was held in 74 Carlisle Street on 28th July, 1873, with Alderman Robert Boag in the chair. Mr. David Cunningham outlined the history of the project up to then, stressing the need for such a special hospital which was the first of its kind in Ulster. A General Committee of Management was appointed, and, at a meeting of this three days later (31st July, 1873) an Executive Committee was formed. At this meeting David Cunningham announced that Edward Benn, Esq., of Glenravel, proposed to erect, at his sole cost, a suitable building for the Samaritan Hospital†. The first two sites suggested were one on the property of the Belfast Charitable Society and the other on the Crumlin Road, the property of J. B. Houston, Esq., the latter of which was regarded as more suitable. Later, however, on 21st October, 1873, David Cunningham suggested two other sites, one situated between Camden Street and Fitzwilliam Street, and one on the new Lisburn Road between the Presbyterian Church and Royal Terrace, and the latter was finally chosen. It is noteworthy that when Edward Benn became interested in the charity he had been a sick man for some time, and indeed had not visited Belfast for six years.

Edward Benn, a great philanthropist, and brother of the better known George Benn, the historian of Belfast, lived for many years on his estate, Glenravel, on the Antrim moors. He built Glenravel House and, over many years, developed the surrounding district, reclaiming and cultivating land on a considerable scale and making new roads to facilitate communications in the district. He also was the first to exploit commercially the iron ore present in this area of County Antrim, and this undertaking led to the building of the narrow gauge railway from Ballymena to Parkmore, reputed, at one thousand feet, to have been the highest railway station in Ireland.

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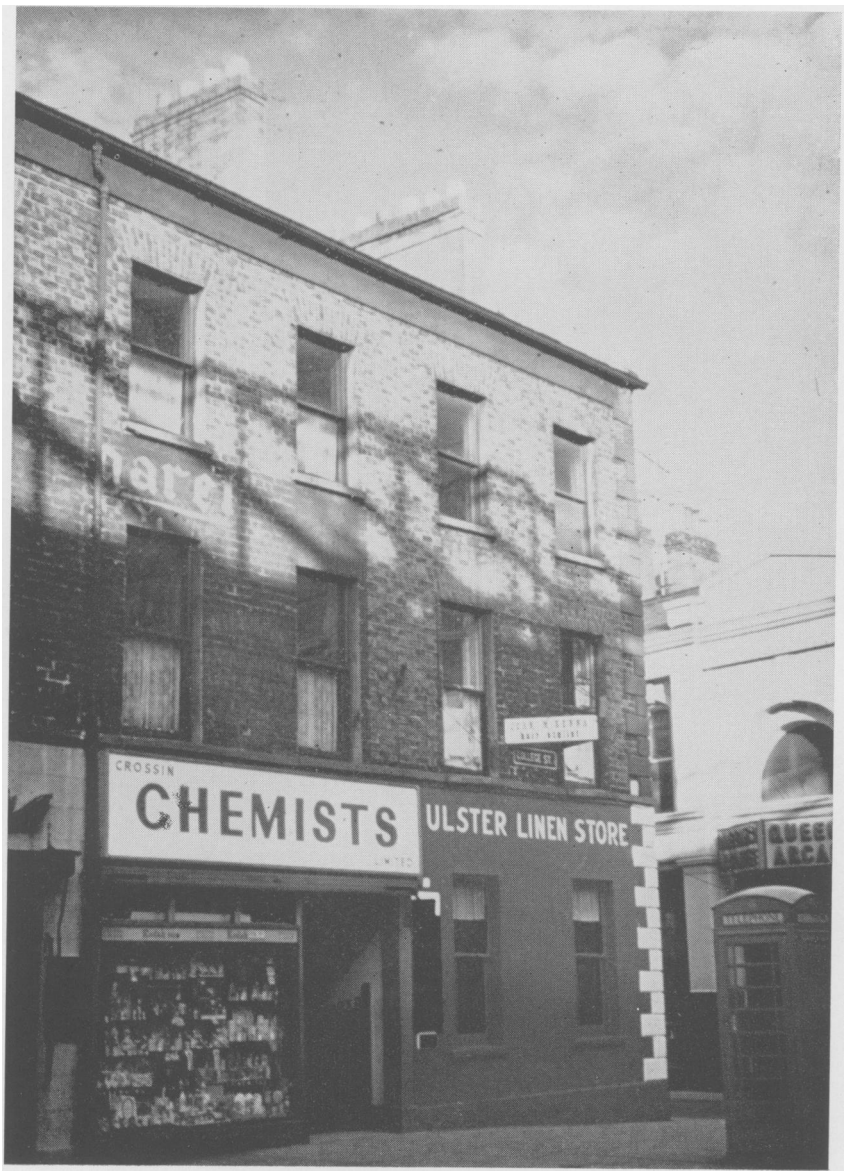
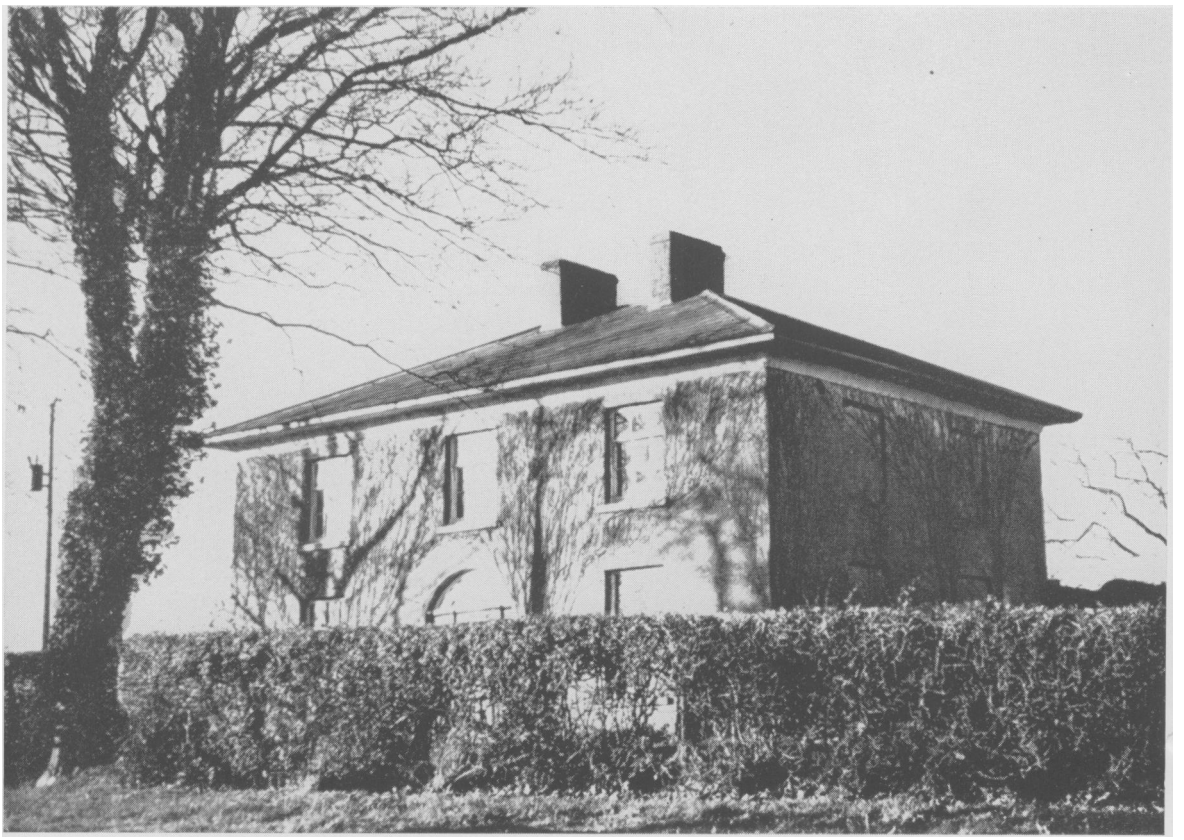
*The third brother, David, qualified B.E. in 1868 at Queen's University and became an engineer (public works) in India.

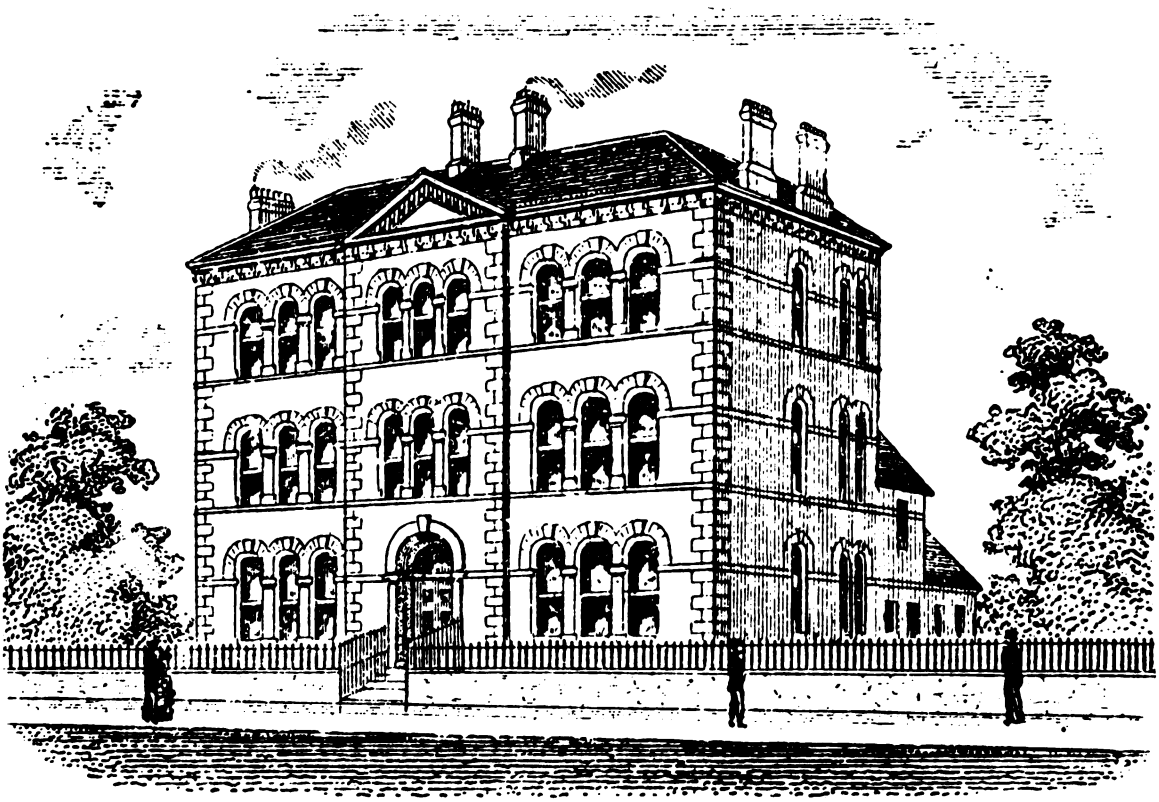
†Apparently shortly after the Charity was transferred to Carlisle Street, Edward Benn—through James Andrews, Solicitor, and Dr. W. A. McKeown—intimated to Dr. McMordie that he would provide more extensive accommodation. He requested that some friend of the Charity should be appointed to give the matter business attention and David Cunningham was appointed to undertake this.



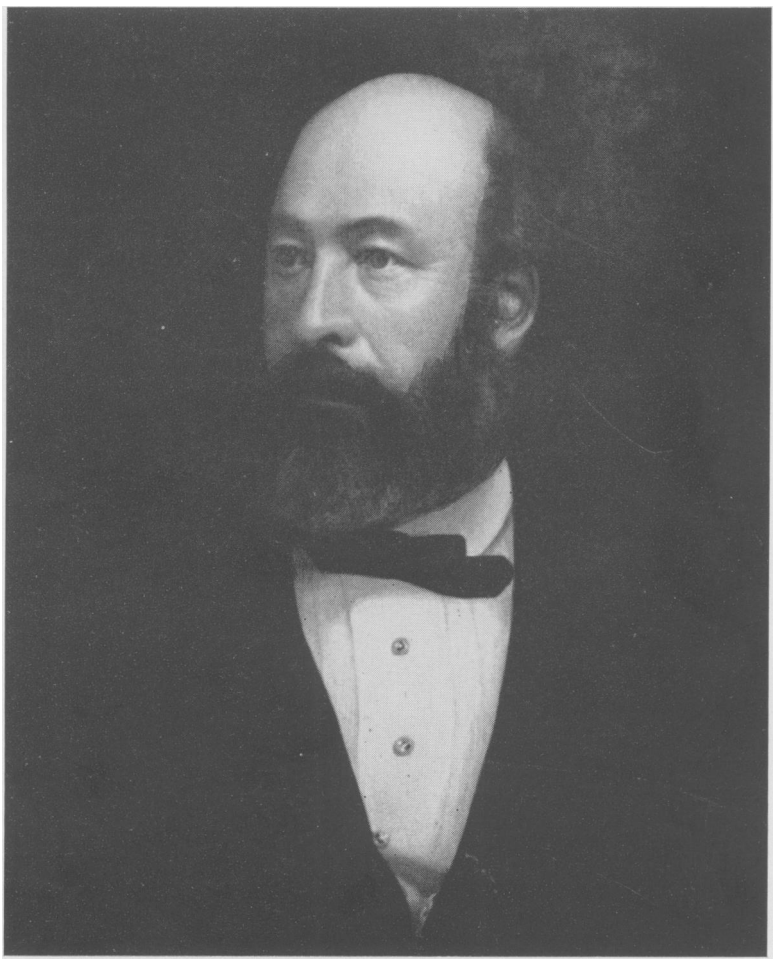
1 COLLEGE STREET TODAY



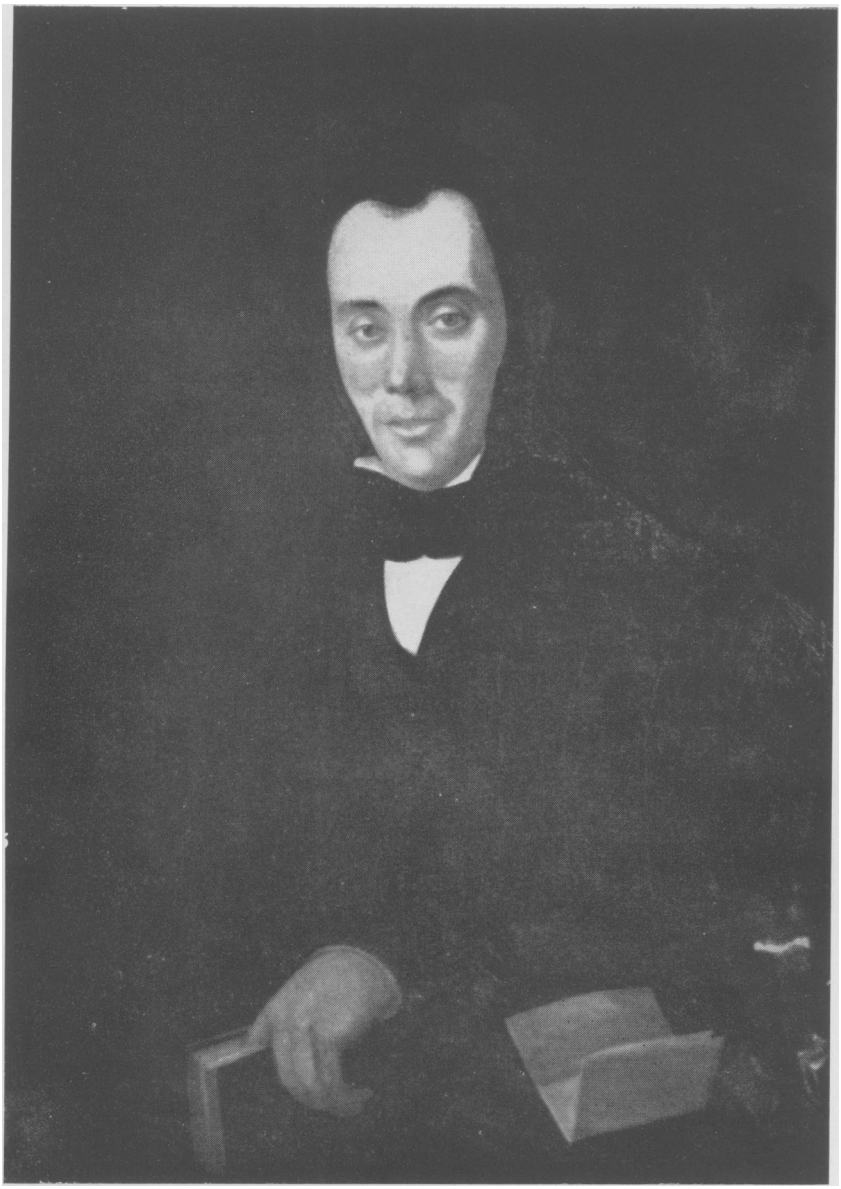
DR. McMORDIE'S BIRTHPLACE



SAMARITAN HOSPITAL IN DR. McMORDIE'S TIME

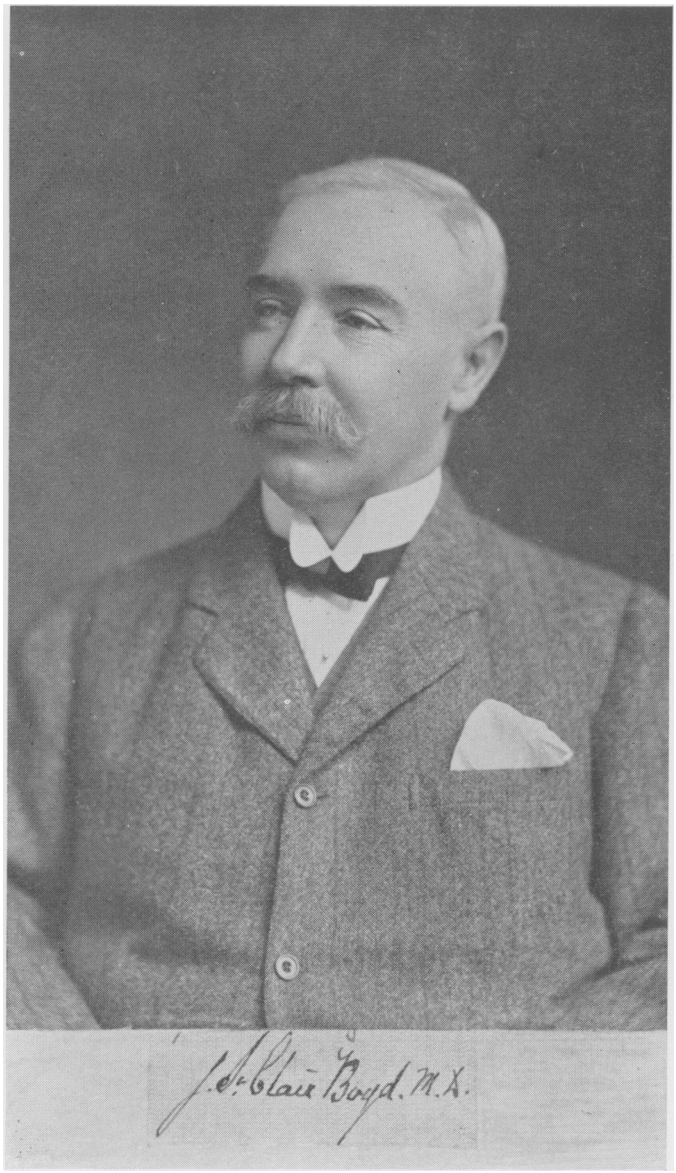


DAVID CUNNINGHAM



EDWARD BENN

JOHN CAMPBELL



JOHN ST. CLAIR BOYD

D. J. McKINNEY

Belfast, in 1870, had a population of about 174,000 people, i.e., about one-third the present population, and it was a thriving and prosperous town. The General Hospital had 176 beds for adults and about this time, as already stated, six new special hospitals were founded, three of which owed their development to Edward Benn. The Belfast Hospital for Diseases of the Skin was founded in 1865 by Dr. H. S. Purdon in Academy Street and moved in 1875 to a building built by Edward Benn in Glenravel Street. The Benn Ulster Eye, Ear, and Throat Hospital, founded by Dr. McKeown in 1871 in Great Patrick Street, was rebuilt in 1874 in Clifton Street at Benn's expense. The third of the Benn hospitals was the Samaritan and, in addition to these hospitals, Edward Benn also added two wings to the Charitable Society building.

A trust deed was approved on 31st March, 1874, appointing Dr. Cuming, Alderman Boag, Rev. James Young, Hans McMordie, and Andrew Morton as lessees and trustees of the hospital. It was proposed that Edward Benn should lay the foundation stone and it was thought desirable that this should take place during the visit of the British Association to Belfast in August. Benn's illness and death, at the age of 76, on 3rd August, 1874, prevented this, and it was not until 18th August, 1874, that the foundation stone was laid by his brother-in-law, Professor John F. Hodges, Professor of Agriculture at Queen's College, Belfast, from 1849-1899, although for the last thirty-six years until his death the chair was only nominally in existence, having ceased to function in 1863. He was also, however, a Lecturer in Medical Jurisprudence, having graduated M.D. at Glasgow.

The architect appointed was Mr. Hastings and the builders Messrs. Dixon & Co. Early difficulties arose with the Town Council Improvements Committee, the Council wishing to acquire a four-foot strip of ground for the purpose of widening the footway on the Lisburn Road. The Samaritan Hospital Committee considered that no reasonable terms had been offered and proceeded to build a wall and railings to delineate their property. They suggested that, on being granted the four-foot strip sought, the Council should flag enirely the footpath on the Lisburn Road, and also make a footpath along Fountainville Avenue as far as the hospital property extended. A prolonged wrangle followed. The Council eventually paved Fountainville Avenue footway, but they sent the bill to the Samaritan Hospital and it was not until 1885 that the dispute was finally settled by a compromise agreement "with the Town Council for the cancelling of their account of £79. 18s. 8d. for the paving and flagging of Fountainville Avenue, as assessed on the Samaritan Hospital and for freeing the hospital from any future liability for flagging the pathway in front of the building and ground on the Lisburn Road in consideration of the Committee's agreeing to set back the railing in front four feet and at their expense."

The Lisburn Road had been in existence since 1819, when it was constructed along the base of the Malone ridge. The farm on the Malone ridge nearest to the town was called Fountainville, and part of the house survived until 1956 on the corner of Fountainville Avenue, where Aldersgate House now stands. At the middle of the nineteenth century terraces of houses developed along University

Road, then called Malone Road, forming a nucleus of large houses similar to those built near the Linen Hall. These were Fountainville Terrace, Prospect Terrace, Botanic View, and others as well as on the opposite side Upper Crescent (then Corry's Crescent), Mount Charles, University Street and Square. Royal Terrace was also completed about this time and Claremont Street, Camden Street, and Fitzwilliam Street began to take shape. The University Road Methodist Church was built in 1865, and hence the layout of the area since the erection of the Samaritan Hospital has not greatly changed. The hospital, however, was originally in a fairly open area, since the ground leased for its erection was sufficiently extensive to allow for future developments.

The hospital was completed in May, 1875, and formally declared open to receive patients on 29th June of that year by William Ewart, the keys of the building being handed over by Professor Hodges to Reverend James Young representing the trustees.

A marble plaque in the porch of the hospital reads:—

THIS HOSPITAL WAS ERECTED
A.D. 1874
AT THE SOLE EXPENSE OF
EDWARD BENN, ESQ.
OF BELFAST AND OF GLENRAVEL
IN THE COUNTY OF ANTRIM
IT COST £3,450
THIS MEMORIAL IS HERE PLACED TO COMMEMORATE
THE NAME OF THE FOUNDER BY HIS BROTHER
GEORGE BENN

Edward Benn appears to have been a man of broad-minded ideas well in advance of most men of his time. He believed that hospitals should be available for all classes of people and should combine the principle of free and paying. Therefore he advocated in the Samaritan Hospital the provision of wards to be supported by subscriptions and to be used by the poor, and also smaller wards for the use of paying patients. In the early days of the hospital the terms of admission for paying patients varied from 7s. to 12s. per week, according to the accommodation desired or required. There was also a free ward for those unable to pay. All the Benn Hospitals were conducted on this principle of practical support by the working classes, and Edward Benn thought it was preferable to see the hospitals supported by the pence of the thousands than by the pounds of the few. Dr. McMordie, in a letter to the *Lancet* in 1888, pointed out that this pay principle was not used as a means of exacting payment, and made the following points:—

(1) The patient or friends are asked to contribute to the funds according to their means, the scale of charges being a sliding one.

(2) If the patient or relatives cannot pay anything the clergyman of the district may make a collection among a few people who know the circumstances of the case.

(3) Trade societies or other organisations pay for their members.

(4) The master or mistress may pay for a good and faithful servant's stay in hospital.

This principle of partial payment was carried out in the hospital from its foundation. Another principle which was always held was that patients were admitted from all parts of the country; in other words, from the beginning it was a provincial rather than a city charity. A further important point is that from the first the hospital was non-sectarian.

Benn also appears to have been ahead of his time in recognising the need for hospitals dealing solely with the then slowly developing specialties, and all his hospitals were of this nature. This view was by no means universally held, and a letter from George Benn after Edward's death states:—"Some reflections have been made both in the public print and by individuals that so many institutions recently established by him and others in the town for many purposes act adversely to the interests of the General Hospital. I really cannot say what truth, if any, there may be in this opinion. My brother's idea was contrary. He imagined that a number of hospitals of this description would so far relieve the General Hospital of most of its burden." One of these reflections was that of Rev. William Johnston, Moderator of the General Assembly, who was reported as having said at a meeting of subscribers and friends of the General Hospital "while he admitted that special hospitals for special diseases might in some cases be good he believed that in some cases they were an evil." The Samaritan Hospital Committee countered with a resolution in their minutes of 20th January, 1874, "that the vagueness of Mr. Johnston's remarks reflects unjustly on some institutions, and tends to create prejudice against all while he neither points definitely to any one institution nor substantiates his statement by facts." It is interesting that this very question is still debated, e.g., Somerville Hastings writes in the *British Medical Journal* in 1962 on the subject "Are Special Hospitals Doomed?" and the Northern Ireland Hospitals Authority appears to take the view, in so far as it is possible to ascertain its views, that these small hospitals should be gradually liquidated. It is instructive to note that although the term "gynæcology" was first used in 1847, and it gradually became a subject apart from surgery following Marion Sims' pioneer operations on patients suffering from vesico-vaginal fistulæ, it was not until 1870, after Listerian principles had been accepted and anæsthesia had become safer, that abdominal gynæcology began to develop. The Samaritan Hospital, under Dr. McMordie, was thus in the van of progress, and it was not until 1882 that the Belfast Royal Hospital decided to establish special departments for gynæcology and for diseases of the eye and ear, and this appears to have been done largely to meet the teaching requirements of the new Royal University.

The general management of the hospital was vested in a General Committee, appointed at the annual meeting of subscribers, which in turn elected an Executive

Committee, and in 1878 a document of Rules or Bye-laws of the Samaritan Hospital was drawn up to enunciate the purpose of the Hospital and standardize its administrative procedure. These rules were apparently not ratified until 1885*. A Ladies' Committee was also constituted in 1878, one of whose members was Miss Harriet Benn, but it was disbanded in 1882, and it was not until 1899 that it was resurrected by Miss Florence Henderson at the suggestion of James Craig, who later became Lord Craigavon.

The finances of those early days make strange reading today. Edward Benn erected the hospital at a cost of £3,450 and the Committee spent £1,500 in furnishing it and supplying surgical instruments and appliances. A further £400 was paid to fine down the ground rent from £60 per annum to £42. 4s. 5d. and £100 for the erection of railings and walls to complete the enclosure of the grounds. A complete functioning hospital had been created for £5,450. A substantial debt was incurred to Mr. David Cunningham of over £600 which was later reduced to £550, the interest on which, £27. 10s. 0d., he returned to the hospital as a subscription until 1882. The debt was finally repaid in 1893 after his death, although it had apparently been his intention, by a proposed codicil to his will which was never executed, to present the money to the hospital†.

Other early supporters were George Benn and Miss Charters among others, but it was not until 1881 that an endowment fund was started by a donation of £50 by John Campbell, Esq., of Lennoxvale, followed in 1882 by £1,000 from George Benn on his death. The balance sheet of 1882 shows subscriptions amounting to £117. 8s. 0d. from 155 subscribers, including various business firms, and £333. 17s. 4d. received from the paying patients. Four free beds were maintained by four individuals for £50. 10s. 0d. Interest on investments was £2 and the total receipts £503. 15s. 4d., against a total expenditure of £430. 9s. 7d.

Some of the early ways, apart from subscriptions, of raising money are of interest. In 1875, following the opening of the hospital, "some pictures were obtained for the purpose of raising funds for the benefit of the hospital by means of a drawing on the Art Union principle." This forerunner of hospital sweepstakes raised £164. 8s. 6d. The pictures were displayed in the window of the Donegall Place furniture firm of N. A. Campbell, who was a great-uncle of mine. Incidentally, he supplied the first blinds to the hospital at a charge of £13. 1s. 7d., being the first of the Campbell name to be associated with the Samaritan (1875). Further, a picture, the "City of Derry," by T. H. Connop, was shipped free of charge by the "State Line" to America, where Mr. Thomas Barbour offered to put it up for auction in the belief that "some patriotic Irishman would buy it for a good round sum." Another venture, organised by David Cunningham, Esq.,

*Up to and including 1878 the hospital was called the Samaritan Hospital for Women and Children. The words "and Children" were then dropped from the title until 1890 when, on a proposal by Dr. McMordie, they were again added. In 1892, however, they were again deleted and not subsequently replaced.

†A portrait of David Cunningham by T. Jones of Dublin was presented to him on 27th December, 1876, by a special committee in recognition of his active part in arranging the lease of the hospital, in obtaining subscriptions and donations and in furnishing the building.

was the readings given by Henry Irving on 16th August, 1878. This raised the sum of £163. 13s. 6d., and the future Sir Henry was presented with an address on parchment and subsequently made a Life Member of the Hospital, this honour being awarded to a subscriber of £50 or more in one lump sum. Collections at church services were another means of raising money, and it is recorded that Reverend William Napier raised a congregational collection of £6. 5s. 0d. in 1878 and Reverend Robert Montgomery in 1879, by a special sermon, the sum of £4 from some hundred worshippers.

Dr. W. K. McMordie was in medical charge of the hospital from its inception until 1892, when he was forced by ill health to resign. Dr. Angus Porter, who was at Carlisle Street, resigned on 19th August, 1874, as he was about to settle near London. A severe attack of fever had apparently greatly interfered with his duties at Carlisle Street. He was not replaced.

Dr. McMordie appears to have been an extremely hardworking and energetic man, devoting a large amount of his time gratuitously to the Samaritan Hospital, both on the clinical and the administrative side. Reading the old minutes and annual reports, his personality, revealed early perhaps by the incident of his university days, seems to spring to life. His industry and energy are shown by the figures of attendances of patients, both at Carlisle Street and the Lisburn Road, and in one of his annual reports he makes the point that all patients were seen and treated by him personally. His medical reports reveal a certain reticence, e.g., in 1886 he remarks that "owing to the peculiar and special nature of the operations it is undesirable to give a detailed statement such as is generally included in the surgical reports of other hospitals." He had previously, however, in 1879, stated that "cases for which the hospital was intended embrace all diseases and displacements of the womb and diseases of the breasts and other organs peculiar to women." He added a rider that "all diseases resulting from immorality are carefully excluded." He remarked in 1883 "he had not much faith in mere reports of the effecting of cures. The test to be applied was paying to the institution for treament received."

In a rare burst of confidence in the 1886 report he reveals he "had complete success in three cases in which it was necessary to perform the well-known operation of ovariotomy. Tumours of the womb were successfully removed in ten cases without a death." He attributed "the remarkable success attending not only the surgical operations but the general treatment of patients largely to the important facts that the building is of recent construction and that its sanitary arrangements are perfect"—surely an unusual modesty in a surgeon! It is interesting to recall that a case of typhoid fever in a nurse in 1902 caused the closing of the hospital for three months for a thorough overhaul of the drains which were then found to be very defective.

In 1888 he elaborated somewhat, pointing out that he had performed during 1887 ten abdominal sections without one death, and he attributed "the marked success he had attained to his attention to detail." "The operating room is large, 25 feet by 15 feet and 14 feet high, much larger than could be had in a private house, well lighted and well ventilated." (It was not until 1904 that electric light

was introduced into the Samaritan Hospital.) "The room and the beds are most carefully disinfected before each operation. The nurses are specially trained by myself, and, during a period after each operation, they are not permitted to see any other patients. This special nursing is almost as important as surgical skill in the operation, and in serious cases I cannot consent to dispensing with it unless there is not only a want of funds, but a request and consent on the part of the patient." In these days of antibiotic-resistant organisms and cross infection are there any of us who would dispute seventy-five years later these contentions of Dr. McMordie?

In his last annual medical report in 1892 he stated that "we have been singularly fortunate in never having had a death from chloroform" and that since the hospital's foundation in May, 1872, he had operated on over three thousand cases in which chloroform administration had been necessary.

Money is a thread running through all the early reports of Committee meetings and Dr. McMordie had much to do with the day-to-day expenditure and accounting, particularly in the early days, when the hospital often owed him considerable sums of money, which he had advanced in meeting bills.

An interesting episode is related at the Committee meeting of 28th August, 1877, when "a communication was read from Lizzie McCaghey and it was resolved that the Secretary write to her, that the communication had been so read, that the Committee had given it their consideration and that they approve of Dr. McMordie's conduct throughout the transaction. Further that the sum of 12s. being unused of her dietary be returned her." This was reported as done at the next meeting. Undoubtedly, McMordie at times appears to have acted in a high-handed way, and it is pleasant to think of the staunch Ulsterwoman, Lizzie McCaghey, standing up for her rights against any hospital professor! Indeed, McMordie seems later to have made a more considerable enemy in William Ewart, for, in 1882, Ewart proposed an amendment that Dr. McMordie be not elected a member of the Executive Committee. There was, however, no seconder, and Dr. McMordie was duly elected.

An entry of interest in the minutes of 2nd May, 1876, reads, "Dr. McMordie, who attended, mentioned that the nurse was not equal to all the work which was to be done from the increase of patients and recommended the employment of an aid as a servant." (Sic.) A resolution was passed "that in the event of a servant being engaged at 11s. per week, the wages of the present nurse be increased to 12s. per week."

At the Executive Committee Meeting on 10th July, 1878, "letters were read from Dr. McMordie stating that one of the nurses had got married and that he had engaged another, Rachel Jameson, at 10s. per week—also that the Matron, Agnes Crothers, had left—further that he was making the experiment of selling syringes and pessaries at the Hospital, on which he expected to make a profit and would render an accurate account of the sales." The Committee directed the Secretaries to authorize Dr. McMordie to engage a new Matron. This was Miss Mary Morrison, who acted in this capacity until in 1911 she was asked to resign,

the then Committee realizing "that the arduous duties and responsibilities were now too much for her." Her salary started at £30 per annum, and this was raised to £45 in 1893, finally reaching £50 in 1902. She was given a pension of £30 per annum after her resignation until her death in 1918. She is later generally stated to have been the first Matron, acting in this capacity for thirty-four years. No further mention is made of the above-named Agnes Crothers. Miss Morrison was responsible for inaugurating the training of probationer nurses about 1888.

McMordie's forthright character is indicated by the following incident. He brought to the notice of the North of Ireland Branch of the British Medical Association the case of a patient who had attended the Samaritan Hospital, and, later becoming too ill to attend, she had called in her general practitioner, who in turn called in another consultant who paid her five visits, charging in all £1 for his services. The patient was again seen at the hospital and she refused operation. She then consulted the specialist again, and he charged her 10s. for six visits. Dr. McMordie mantained that this was unethical, that the consultant should always charge the same fee for a consultation and that if the patient was unable to pay, he should give his services free. The Council of the North of Ireland Branch of the British Medical Association refused to allow any discussion of Dr. McMordie's complaint and merely marked the document as read. Dr. McMordie believed this was done because he was not a member of the British Medical Association and promptly brought the matter up, without the name of the consultant involved, in the form of a letter to the *Lancet* in 1888. The Editor of that journal was inclined to agree with his strictures on the British Medical Association.

Students were early encouraged by Dr. McMordie and the General Committee. At a Committee Meeting on 25th October, 1875, David Cunningham proposed and Nicholas Oakman seconded, "That students of four years' standing be admitted to the practice of the hospital (at the discretion of the Committee) for two days in the week on payment of two guineas per session of three months, which fees, through the kindness of Dr. McMordie, are to be devoted to the support of the hospital."

At the Annual General Meeting in 1879 McMordie, in an appeal for more free beds (costing £12 per annum) in the coming year, said, "Some of the senior students in attendance at the Queen's College have requested me to again form a class for clinical teaching, but I am not in a position to undertake this without a free ward. I have found by experience that patients who contribute towards the expense of their treatment cannot be availed of for purposes of instruction; for this a free ward is necessary. If the time has come for the formation of such a class it will give me pleasure to hand over to the funds of the hospital the fees payable to me by the students. This would materially aid in defraying the expense of the free department." As a result he succeeded in getting four free beds.

In 1882 Dr. William McKeown, at the annual meeting of the Benn Eye, Ear, and Throat Hospital, made a vigorous attack, accusing the Council of Queen's College of not providing adequate clinical teaching for students of medicine.

This was because medical students were apparently not attending his clinic, the Belfast Royal Hospital in 1882 having decided to establish special departments for diseases of the eye and ear and also for gynæcology. This was done to meet the teaching requirements of the new Royal University. A backwash of this controversy seems to have reached the Samaritan Hospital, and in the 1886 report McMordie said "he had had during the year some enquiries as to whether the hospital was open for the clinical teaching of students and I have been obliged to reply in the negative. However, the closing of the hospital to even advanced students is not owing to any want of inclination on my part to give clinical instruction or to any difficulty put in the way by the Hospital Committee. Those in charge of the local medical school have made no application to us to open the wards for clinical instruction, believing, I presume, that the requirements of the school are met by other arrangements." However, in 1888, McMordie remarks that as many of the senior students as could be present availed themselves of the privilege of being present at the operations during the year, and again in the report for 1889 he says "that during the year I had, with Professor Dill's approval, shown the senior members of his class some of the results of the operative work."

During McMordie's tenure of the position of Honorary Attending Physician at the Samaritan Hospital, Listerian principles were becoming recognised and practised and abdominal gynæcology was beginning to develop. The first battle-ground of controversy was the operation of ovariotomy, first performed by Ephraim McDowell of Kentucky in 1809, but developed and made acceptable by the work of Isaac Baker Brown and Sir Thomas Spencer Wells in the sixties and seventies. As McMordie was one of the first ovariotomists in Ulster, and as he was very reticent in his annual medical reports, an endeavour was made to find out more of his practice by tracing some of his published work. His papers appear chiefly to have been delivered before the Royal Irish Academy of Medicine or to be published in the *Lancet*.

In 1886 he published a case of double ovariotomy. The pedicles were tied with strong silk, using a Staffordshire knot, as in the technique of Lawson Tait. He used silver wire sutures for the abdominal incision, leaving them in for ten days.

In 1888 he published a case of a single girl, aged 26, who had a history of uterine hæmorrhage of five years' standing. He claimed a "cure by the sole treatment of removal of an enlarged cystic ovary," and maintained that the case must be considered unique. Perhaps this was a case of metropathia hæmorrhagica.

In 1889 he published a report of six consecutive laparotomies for cystic disease of the uterine appendages, with one death. One patient was pregnant at the time of operation, and subsequently was confined normally. In his report of these cases to the *Lancet*, he maintained there were many difficulties to be encountered in the practice of abdominal surgery in the North of Ireland which were not met in other parts of the United Kingdom. He held that tapping of ovarian cysts was extensively practised by a large section of general practitioners, repeated many times, and a gynæcologist was only called in when difficulties arose. He added that tubal pregnancies and hæmatoceles were often treated conservatively by

consulting physicians and general practitioners and many fewer cases came to operation.

Another case reported was removal of a large fibroid uterus with recovery, a wire being passed round the base of the uterus, followed by clamps and the stump fixed in the lower angle of the incision with the clamps in position. Another hysterectomy case had a less happy outcome, the patient dying on the fifth day, a result he ascribed to the fact that the patient "had been very intemporate." Other cases are one of insanity following ovariotomy, and one of removal of a prolapsed adherent ovary in the Pouch of Douglas for persistent pelvic pain.

By far the most interesting aspect of McMordie's work to emerge was, however, a somewhat sinister, if somewhat naïve, attitude towards the treatment of mental illness. In 1886 he reported to the Royal Academy of Medicine in Ireland a case in which he removed both ovaries where, as he put it, "confirmed masturbation had resulted in insanity—the habit having persisted in the presence of husband and children." He remarked that the habit was cured by the operation, but the insanity remained. This method of treatment was criticised by subsequent speakers, but McMordie remarked that he did not expect this somewhat new method to meet with unanimous approval. He claimed that clitoridectomy would not have cured the condition and stated that he had had the approval of Professor Dill for the procedure. It is interesting to recall that Baker Brown, one of the first ovariotomists, fell from grace and was ruined professionally as a result of his advocacy of clitoridectomy in cases of masturbation and its alleged ill results—insanity, epilepsy, catelepsy, and hysteria.

In 1888, before the same society, McMordie described the effects of an electric current applied to the female pelvic organs. One pole of a single cell battery was attached to a uterine sound inserted in the uterus and the other applied over the fundus. He described two changes—dilatation of the os and, if the females were healthy, an orgasm. He maintained there was no effect on uterine hæmorrhage and he believed that the extrusion of fibroids described by Apostoli and others was a coincidence.

Lastly, a curious letter to the *Lancet* in 1890, the year in which his health began to fail, commenting on hereditary transference of mutilation, described how a sheep at the time of impregnation was worried by a dog and had its throat extremely badly torn. In due course a lamb was born—"Its jaws were grown together and the head had the appearance of that of a dog. There was an opening in the throat through which the montrosity breathed."

In 1890 Dr. McMordie began to show the effects of an "affection of the nervous system" and Dr. John St. Clair Boyd acted as a locum tenens from 12th December, 1890, until 22nd September, 1891. McMordie then returned for a short time, but finally was compelled to give up work in March, 1892. The work of the hospital was then carried on by two locum tenens, Dr. D. J. McKinney and Dr. James Graham (the future City Coroner), with some assistance from Dr. Henry O'Neill. Dr. McKinney acted as assistant and chloroformist to Dr. McMordie from 1888 and appears to have been the first regular anæsthetist. He continued to act in the

latter capacity until 1920, although the appointment never appears to have been official. On 6th December, 1892, a new era began with the appointment as Honorary Attending Physicians of John Campbell, M.A., M.D., M.Ch., M.A.O., F.R.C.S.(Eng.), and John St. Clair Boyd, M.D., M.Ch., B.A.O.

Dr. McMordie died at his brother's home on 7th December, 1893, at the early age of 49. A short time ago I went to Seaforde and found the old manse, McMordie's birthplace, was now a farmhouse. The Reverend John Andrew McMordie and two of his sons, Hans and Robert James, were still remembered in the neighbourhood, but no one recalled the name of William Kirkpatrick McMordie. In the past few months, however, he has, for me, come to life again—a man of high courage at all times, of aggressiveness often coupled with moments of great inspiration, a man of vast industry, energy, and drive, with a capacity for original thought, of personal integrity allied with a certain naïvety, beloved by his many patients, and largely devoting his life, with an ardour beyond praise, in furthering the fortunes of the hospital he had founded.

Let me conclude with a quotation from the Epistle Dedicatory to Urn Burial by Sir Thomas Browne—

> "'Tis opportune to look back upon old times, and contemplate our Forefathers. Great examples grow thin, and to be fetched from the passed world."

My thanks are due to the Management Committee of the Samaritan Hospital for access to the old minute books and for a grant towards the cost of publication, to Mr. W. T. Boyd for the loan of the photograph of Dr. John St. Clair Boyd, to Colonel Cunningham for the photographic reproduction of the portrait of David Cunningham, and to Mr. Robin of the Photographic Department, Belfast City Hospital, and my son, Robert Campbell, for help with the illustrations.

Appendix I.

Named persons present at the initial public meeting at 74 Carlisle Street 28th July, 1873:

Rev. James Young.
Dr. Wallace.
Robert Boag, Esq. (Chairman).
H. Porter, Esq.
D. Cunningham, Esq.
Robert Mullan, Esq.
Nicholas Oakman, Esq.
Hans McMordie, Esq.
William E. Armstrong, Esq.
James Taylor Blackwood, Esq.
John Hunter, Esq.
Andrew Morton, Esq.
Etc.

Appendix II.

LIFE MEMBERS (Subscribers of £50 in one sum).

Original List (1879):

William Ewart, Esq., M.P.	David Cunningham.
James Craig.	Thomas Barbour.
James Carlisle.	George Benn.
Josias Cunningham.	George Horner.
Henry Irving.	Samuel Walkington.

No other name except that of W. W. Fulton was added until 1893, when, following a revision of the Rules, the term was no longer used. Samuel Barbour gave a subscription of £50 in 1877, but his name was not included in the original list.

Bequests for investment (to 1892):

1881	...	John Campbell	...	£50
1882	...	George Benn	...	£1,000
1891	...	Miss Charters	...	£1,000

Appendix III.

MEDICAL STAFF (1872-1892).

Honorary Consulting Physicians:

Professor James Cuming	...	Appointed 1873, resigned 1878.
Dr. Samuel Browne, R.N.	...	Appointed 1878, died 1890.
Professor R. F. Dill	...	Appointed 1890, died 1893.

Honorary Attending Physicians:

William K. McMordie	...	Appointed 1872, resigned 1892.
Angus M. Porter	...	Appointed 1873, resigned 1874.
John Campbell	...	Appointed 1892, resigned 1928.
John St. Clair Boyd	...	Appointed 1892, resigned 1905.

Matrons:

Agnes Crothers	...	Appointed ? , resigned 1878.
Miss Mary Morrison	...	Appointed 1878, resigned 1911.

Appendix IV.

HOSPITAL ATTENDANCES.

Year.	Extern. Number of Patients.	Extern. Number of Attendances.	Intern.
1873–75	3,054	12,115	nil
1875–77	3,224	—	245
1878	1,637	—	92
1879	1,445	5,341	120
1880	1,232	—	167
1881	1,077	5,446	171
1882	1,067	5,851	133
1883	1,046	5,694	103
1884	1,016	5,798	84
1885	1,023	6,620	98
1886	974	—	148
1887	950	4,212	113
1888	840	—	157
1889	857	5,080	96
1890	775	—	86
1891	479	—	56
1892	620	—	113

Appendix V.

RULES OR BYE-LAWS
OF
THE SAMARITAN HOSPITAL
24th February, 1885.

1. This Institution shall be called "The Samaritan Hospital for the Diseases of Women."
2. The Hospital shall have for its object the Treatment of Diseases peculiar to women.
3. An Annual Meeting of the Subscribers shall be held in January, on a convenient day, to be fixed by the Executive Committee, to receive and consider the Reports for the preceding year, to control the arrangements of the Charity, and to elect Members of Committee for the current year, in the place of those who retire by rotation in accordance with Rule 9.
4. Every Subscriber for the preceding year of £1 and upwards shall be entitled to take part in the proceedings at the Annual Meeting, and shall be eligible for election as a Member of the General Committee, and every Subscriber of £50 in one sum shall, during his life, be entitled to the same privileges.
5. After the end of each year, and before the Annual Meeting of the Subscribers, a Secretaries' Report shall be prepared by the Secretaries, a Treasurer's Report by the Treasurer, and a Medical Report by the attending Physician; and such Reports, after being approved of by the Executive Committee, shall be submitted to the Annual Meeting.
6. The Medical Staff of the Hospital shall consist of an Honorary Consulting Physician and an Honorary Attending Physician.
7. The present Honorary Attending Physician, Dr. W. K. McMordie, in acknowledgment of his strenuous and praiseworthy efforts in connection with the formation of this Institution, shall be appointed, and he is hereby appointed, permanent Honorary Attending Physician, being a confirmation of his previous appointment.

8. Every other Physician, now or hereafter appointed, shall be appointed for three years, but shall be eligible for re-election; and every such appointment shall be made by the General Committee.
9. The general management of the Institution shall be vested in a General Committee, consisting of fifteen Ordinary Members, the Trustees and the two Physicians for the time being. The Committee shall meet once in every six months; the first meeting shall be held some time after the Annual Meeting, and before the 1st March in each year. At the first meeting the Committee shall, out of their number, appoint a Chairman for the year. There shall also be an Honorary Treasurer and two Honorary Secretaries of the Hospital appointed, from time to time, out of the Members of the General Committee, but the Treasurer and Secretaries shall hold office as long as they are entitled to continue Members of the said Committee. The present Treasurer and Secretaries shall continue in office subject to this rule. Three Members only of the Ordinary Members of the General Committee shall retire by rotation each year, and they shall be eligible for re-election. The Chairman, Treasurer and Secretaries shall also be eligible for re-election. At any meeting four shall form a quorum.
10. There shall be two Auditors (neither of whom shall be a Member of Committee) elected annually by the General Committee.
11. The General Committee, at their first meeting held next after the Annual Meeting of the Subscribers, shall elect an Executive Committee.
12. The Executive Committee shall consist of the Chairman, the Treasurer, the two Secretaries, and five members of the General Committee, three of whom shall form a quorum.
13. The Executive Committee shall meet every three months, and shall have control of all ordinary matters of management and expenditure, subject to the control of the General Committee; but it may delegate to the Attending Physician such of its powers, in connection with internal management or expenditure, as emergencies or the immediate wants of the Hospital may require.
14. The Executive Committee shall appoint a Matron, the Apothecary, and the Servants of the Institution, and shall allow such salaries or recompense to them, respectively, during their service or employment, as shall seem fit.
15. The Secretaries shall, on receiving written notice from three Members of the Executive Committee, summon a Meeting of that Committee.
16. No person shall be permitted to introduce into the Hospital any books, tracts, or periodicals, without the consent of the Executive Committee.
17. No patient shall be permitted to receive visitors without the consent of the attending Physician.
18. Any patient wishing to receive spiritual consolation shall communicate her desires to the Matron, or to the attending Physician, who shall make immediate arrangement for the attendance and reception of the clergyman whose presence is requested.
19. These Rules shall be amended, altered, or added to, as occasion may require, by the General Committee specially summoned on a ten days' notice for that purpose, and after three months' notice of any proposed amendment has been given to the Secretaries.

Rules 6 and 8 were altered by a Special Meeting of the General Committee on 18th November, 1892, to

6. The Medical Staff of the Hospital shall consist of two Honorary Attending Physicians, in addition to Dr. McMordie, who has by Rule 7 been appointed for life; but the number may be increased by the Committee to three or four.
8. Every other Physician, now or hereafter appointed, shall be appointed for four years, but shall be eligible for re-election, and every such appointment shall be made by the General Committee; but at the first appointment made after the alteration in these rules, the two Attending Physicians shall be appointed on the condition that one of them shall retire in two years, and a ballot shall be taken between the two Physicians appointed, as to which name shall go out first.

MERALGIA PARÆSTHETICA AND THROMBOPHLEBITIS

By **EDWARD W. KNOX, M.D., M.R.C.P.I.**

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MERALGIA PARÆSTHETICA is well documented in world literature. Lee (1936) traced ninety publications on this subject following Bernhardt's original description forty-one years previously. Since 1936 there has been much further writing with the addition of new cases. The purpose of this paper is to draw attention to its association with deep thrombophlebitis of the lower limbs. This combination of diseases has not been emphasized previously, but is not uncommon, and is fully recognised here. The following two cases are presented as examples.

CASE REPORTS.

Case 1. Y. G., a widow, aged 60 years, was struck by a truck in January, 1960, receiving minor injuries to her right wrist and left ankle. Following her accident she had repeated attacks of aching in her left calf, aggravated by walking and relieved by rest. In late 1960 a small numb area developed on the lateral aspect of her left thigh. This caused her little discomfort until July, 1962, when the numb area was replaced by a larger area associated with a persistent burning pain. The pain was aggravated by the friction of overlying garments, and she had cut pieces out of these in an attempt to obtain relief. In September, 1962, her left foot, ankle, and calf became swollen for the first time, and this persisted until her admission to the Graduate Hospital on 19th November, 1962.

On examination the left lower limb was swollen with a Grade I œdema of the foot and leg. A selective tenderness over the deep veins was more acute in the calf and adductor areas. Lisker's sign was positive. Homan's sign was negative. Lasague's sign and Patrick's sign were negative. The knee and ankle reflexes were normal. An area of hyperæsthesia to stroking with a pin was outlined on the left lateral thigh. This corresponded to the sensory distribution of the anterior branch of the lateral femoral cutaneous nerve.

A diagnosis of recurrent deep thrombophlebitis, probably traumatic in origin, complicated by venous insufficiency and associated with meralgia paræsthetica was made.

Treatment consisted of strict bed-rest, leg elevation, and intravenous heparin, seventy-five milligrams, every eight hours. She was gradually made ambulatory from the eighteenth day following admission, her dosage of heparin being reduced three days later. On her discharge on the twenty-fourth day she was advised to wear an elastic support to knee level in the left limb, but no other special treatment. On leaving the hospital she still had a mild hyperæsthesia over the lateral thigh. When seen as an out-patient two months following discharge the hyperæsthesia was still persistent, but not troublesome or disabling, as previously.

Case 2. F. B. was a married woman aged 54 years. In June, 1960, while walking quickly to answer a telephone, she suddenly felt a tearing sensation in her left lower calf. This was followed by discoloration of the overlying skin and severe calf pain, the symptoms persisting for two weeks.

Since then, approximately at six-month intervals, an aching pain and a sensation of tightening recurred in the calf, the attacks lasting approximately two weeks. The pain was aggravated by standing or walking but relieved by rest. In late 1961 a persistent pain developed in the left upper lateral thigh. She consulted her internist, who treated her for arthritis presumably of the left hip joint.

On her admission to the Graduate Hospital in January, 1963, the lower limbs were equal in size. The peripheral pulses were present. The deep veins in the left calf and adductor areas were selectively tender, Lisker's and Homan's signs both being positive. Patrick's sign was positive; Lasague's sign negative. The knee and ankle reflexes were normal. An area of hypoæsthesia to stroking the skin with a pin was detected in the left thigh. This was inside, and did not correspond exactly to the sensory distribution of the lateral femoral cutaneous nerve.

A diagnosis of recurrent deep thrombophlebitis of the left lower limb, probably traumatic in origin, associated with meralgia paræsthetica, was made.

The patient was treated with bed rest, leg elevation, and intravenous heparin, seventy-five milligrams every eight hours. She was gradually ambulated from the fifth day onwards, her heparin was discontinued on the seventh day, and discharged eleven days following admission. On leaving the hospital she was symptom-free. The patient has not been seen since discharge, but we have been told the lateral thigh pain has returned.

Discussion.

Meralgia paræsthetica is a sensory mononeuritis of the anterior branch of the lateral femoral cutaneous nerve, the term meralgia being derived from the Greek words, meros (thigh) and algos (pain). The nerve arises from the second and third lumbar nerves. Crossing the iliacus muscle, it passes behind on the right the cæcum, and on the left the lower part of the descending colon. Leaving the pelvis below and medial to the anterior superior iliac spine, deep to the inguinal ligament, the nerve passes beneath, through or over the sartorius muscle, finally dividing into an anterior and posterior branch. The anterior branch enters a canal in the fascia lata in which it descends for a few inches before becoming superficial and distributed to the skin of the anterior and lateral thigh as far as the knee.

Ecker and Woltman (1938), in an analysis of one hundred and fifty cases from the Mayo Clinic, found meralgia paræsthetica to be chiefly a disease of middle age, occurring almost three times more frequently in men than in women. The disease is usually unilateral, commencing with a feeling of numbness in the lateral thigh. Later the numbness is replaced by a moderate or severe burning sensation. The aggravation of overlying clothing, complained of in Case 1, has been previously referred to by Osler (1918) and Lee (1936). The condition, once fully established, is usually chronic, persisting over a period of years (King, 1941). In long-standing cases hair may be absent over the area of skin supplied by the nerve (Lee, 1936; Mack, 1946). Hypoæsthesia or hyperæsthesia to touch, pin prick, and temperature are found over the skin area. Corlette (1944) describes a tender

spot close to and medial to the anterior superior iliac spine. Patrick's sign may be positive (Case 2), suggesting arthritis of the hip joint, but generally these patients have no limitation of pure abduction as would occur in true hip joint disease (Monrad-Krohn, 1949).

Although mentioned occasionally as due to systemic causes such as alcohol, lead or in association with diabetes mellitus, practically all the literature concentrates on local causes. It may be associated with appendix abscess or cæcal tumour (Musser and Sailer, 1900). Stookey (1928) carried out anatomical dissections, describing the nerve as sharply angulated as it emerges from the pelvis, being in constant tension when the lower limb is semi-flexed and the tension increasing as the limb is extended. This suggestion of irritation of the nerve at its exit from the pelvis is supported by Mack (1946), who found the nerve to be thinned at this site. He also states that at operation, if the patient coughs or strains, the inguinal ligament has a shutter-like action on the nerve. Obesity may be an ætiological factor, the excess fatty tissue making greater demands on the inguinal ligament and fascia of the thigh (Ecker and Woltman, 1938). Many causes of direct irritation are referred to—scabbards, hernial trusses, sacro-iliac belts, abdominal binders, adhesive strapping, and tight-fitting girdles.

Only one previous publication mentioning an association with thrombophlebitis could be traced (Fischer and Kreig, 1932). There is no obvious explanation why the two diseases should co-exist. The thrombophlebitis of both patients reported here was probably traumatic in origin, but there was nothing to suggest direct trauma to the lateral femoral cutaneous nerve. Many thrombophlebitic patients present with muscular cramps of the lower limbs. The cramps are more common in the calves and feet, but occasionally involve thigh muscles. Intermittent spasms with tension of the fasciæ latæ might irritate the nerve, but muscular cramps were absent from the patients' histories. A persistent or recurrent thigh œdema could conceivably produce a fascial tension, but again was absent here. Abnormal posture is a possible cause. The ipsilateral association of meralgia paræsthetica with sciatica is thought to be often due to the tilt of the lower portion of the lumbar spine away from the affected side putting the cutaneous nerve in the stretch (Ecker, 1947). Both these patients had a long-standing recurrent thrombophlebitis and both mentioned the aggravation of their calf pain by standing or walking. The possibility exists that they may have produced postural change by repeatedly transferring their body weight on to their healthy limb. On physical examination there was no obvious skeletal deformity.

The relief, at least temporarily, of the meralgia paræsthetica associated with the treatment of the thrombophlebitis may be due to the period of strict bed-rest and leg elevation advocated here. It would be of interest to know if the same relief would be obtained in patients treated in hospitals where anticoagulation with rapid ambulation is the routine treatment for thrombophlebitis.

Conclusion.

Deep thrombophlebitis of the lower limbs and meralgia paræsthetica may be present simultaneously in the one patient. There is no obvious explanation for

this relationship. Muscular cramps, œdema, and malposture have been considered as ætiological factors. It is of practical importance to recognise the association as occasionally a patient with deep thrombophlebitis may present complaining primarily of the lateral thigh discomfort of meralgia paræsthetica.

Summary.

Two case histories of patients with deep thrombophlebitis and meralgia paræsthetica have been presented to produce an increased awareness of this not uncommon association. Symptoms, signs, and suggested causative factors of meralgia paræsthetica have been briefly stated.

I thank Dr. Samuel Lisker, Director of the Peripheral Vascular Department of the Graduate Hospital, University of Pennsylvania, for drawing my attention to the association of above diseases, and giving permission for the publication of these cases.

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NEUROBLASTOMA (SYMPATHICOBLASTOMA) IN NORTHERN IRELAND:

A Review over a Ten-year Period

By **WILLIAM COCHRAN, M.B., Ch.B. (Aberd.), F.R.C.S.(Edin.)**

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SET against the background of all malignant disease, neuroblastoma is rare, but it is one of the commonest tumours of childhood, and while it fulfils all the accepted criteria of embryonic malignancy its course is peculiarly unpredictable and the efficacy of a variety of treatments remains uncertain and controversial. Reference to textbooks and the literature meets with many points of confusion and contradiction. This state of affairs, taken together with the fact that few doctors see enough cases in a lifetime to form a balanced view of the disease, must account for the misconceptions and pessimism of the generality of clinicians and pathologists when confronted with it.

The majority of accounts of neuroblastoma represent the experience of a department or hospital not necessarily related to incidence within a community, and are influenced by local or individual attitudes towards management; thus they may fail to give a completely true picture of the disease. It was, therefore, of interest when an opportunity arose to ascertain something of the attitudes to and behaviour of the tumour in the relatively closed community of Northern Ireland, when sufficient records became available through a survey carried out for a working party of the Medical Research Council.

MATERIAL.

The information reviewed here was obtained from clinicians and files in all hospitals in Northern Ireland, from the regional and university pathology services, and from the Northern Ireland Radiotherapy Centre; thus covering all possible sources of diagnosis. It is possible that the number of cases discovered underestimates the true incidence since some may have eluded recognition.

(a) Where spontaneous regression has occurred in a tumour giving rise to no symptoms.

(b) Where the pathologist has erred and placed the tumour in another class, though the prevailing high regard for accuracy, and the safeguards provided, in reporting on malignant disease make this highly unlikely.

(c) Where death has occurred for reasons unrelated to an asymptomatic tumour.

(d) Where death has resulted from advanced malignancy in circumstances where the absence of a diagnosis has been insufficient stimulus for the clinician to ask for a post-mortem, or where permission for this has been withheld.

It is considered that the existence of these potential sources of loss of material are not sufficient to detract from the group to be presented as an adequate representation of the disease as it occurred in Northern Ireland between January, 1951, and January, 1961. The incidence in relation to population was of the same order as that in neighbouring Scotland (MacGregor, 1961) (Table 1).

TABLE 1.

COMPARISON OF INCIDENCE OF NEUROBLASTOMA IN SCOTLAND AND N. IRELAND.

COUNTRY	PERIOD	NO. CASES	POPULATION	CASE RATE PER YEAR PER MILLION POPULATION
SCOTLAND*	1955–59 (Inc.)	51	5,100,000	2.00
N. IRELAND	1951–61 (10 yrs.)	30	1,400,000	2.14

*These figures from the Scottish Pædiatric Tumour Registry do not take adult cases into account, but the addition of these, necessarily few, cases can only serve to approximate the case-rates further.

Only malignant neoplasms have been selected, and the term neuroblastoma has been taken to embrace undifferentiated variants on one hand and ganglioneuroma-with-neuroblastomatous-elements on the other. Retinoblastoma and a single example of "Olfactory neuroblastoma" (Mendeloff, 1957) seem distinct enough as entities to be excluded. The other tumours of probable neural crest origin—melanoma, chromaffinoma, chemedectoma, and phæochromocytoma —have not been considered either.

HISTORICAL NOTE.

As early as 1864 Virchow was aware of the neural origin of the tumour. In 1906 Bielschowsky and Unger described the formation of the adrenal medulla by sympathogonia which invade the anläge of the mesodermal, adrenal cortex at the eighth week of fœtal life—a process continuing through intra-uterine life and even till puberty.

The 'classical' descriptions of Pepper (1901) and Hutchison (1907) are known to most undergraduates, but the inconsistency with which neuroblastoma conforms to the metastatic patterns described and the ignorance of the authors as to the true nature and origin of the syndrome hardly justifies perpetuation of the eponyms, and it is to Homer Wright (1910) that we owe the original description of the tumour in the basic form which we recognise today.

In 1929 Cushing and Wolbach described the phenomenon whereby malignant neuroblastomata naturally matured to benign ganglioneuroma. In the hope that this trend could be promoted by the employment of a factor essential to the maturation of red blood cells the Tumour Committee of the Hospital for Sick Children, London, in November, 1950, evolved a scheme of treatment whereby existing forms of therapy would be supplemented by the administration of massive doses of Vitamin B_{12} (Bodian, 1959). The initial, apparent success of

this treatment in producing remission, prolonging life and even causing permanent regression, has not been consistently repeated or widely accepted elsewhere, and like many other forms of therapy remains 'not proven.' It is, of course, accepted by the originators that the initial premise was false, for it is now known that regression to a fibrous scar or no trace is a more common form of spontaneous loss of malignancy than maturation to ganglioneuroma (Bodian, 1959; Wittenborg, 1950).

Gross, Farber, and Martin (1959) have demonstrated the striking improvement in results over the last forty years, which they have obtained by intensification of therapy, but we are still ignorant of the best forms of treatment and of the true nature and incidence of natural regression and the factors which influence it. There is, therefore, some value in the publication of unimpressive results on a geographical basis in that they contribute to a picture of the present situation against which future advance may be measured.

The Setting.

Over 3,200 malignant neoplasms were registered in Northern Ireland in 1960 (Cancer Registration Officer, Northern Ireland Hospitals Authority). In the preceding ten years, the period under review, the death rate from malignant disease rose steadily from 1.48 to 1.62 per 1,000 (Registrar General, 1951-60). In that period neuroblastoma has accounted for only 25 (just over 0.1 per cent.) of around 22,000 cancer deaths, yet the 22 deaths in childhood represent 12.5 per cent. of all deaths from non-leukæmic malignancy.

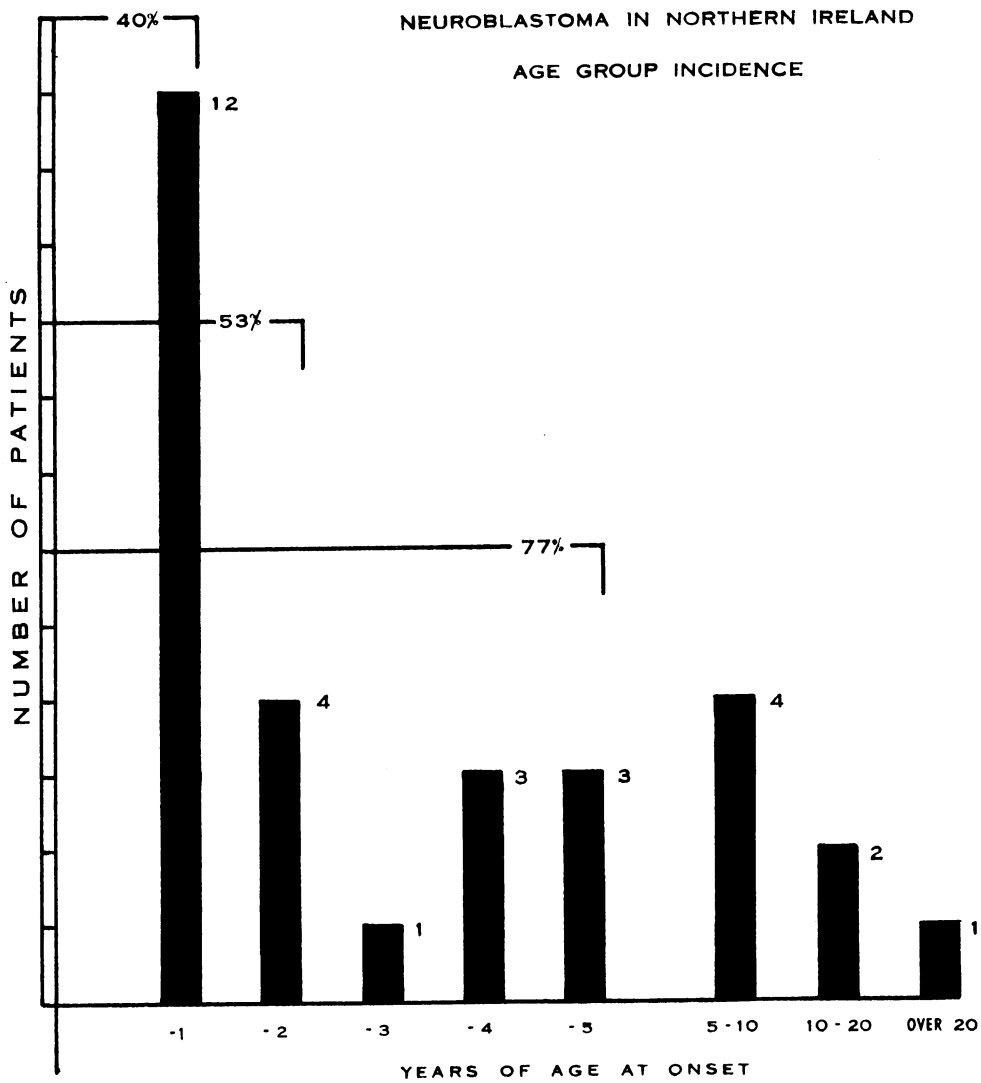
Surveying the literature, one gains the impression that (with fluctuating precedence from group to group) the overall incidence of neuroblastoma and nephroblastoma is very similar. In the Royal Belfast Hospital for Sick Children over the last twelve years the numbers of each have been the same but twice the number of Wilm's tumour patients have survived. Melanoma kills about three times as many people as neuroblastoma in Scotland, where the climate is similar to that of Northern Ireland, but few of them are children (MacGregor, 1961; Lancet, 1961).

Histogram of Age Distribution.

The age distribution (see Fig.) here is almost precisely similiar to that of the large groups reported by Gross, Farber, and Martin (1959), Bodian (1959). It differs from the former group and that of Blacklock (1934) in that they show a peak incidence in the second year. Though principally a problem of the pædiatric era, neuroblastoma is a rare disease of adults and three such cases figure here—two girls in their late teens and a woman of 36.

The geographical distribution accords with population densities for Northern Ireland, and no predilection is shown for any particular area.

Blood group determination had been carried out in only a minority of patients so no conclusions can be made. Atwell has found the ABO distribution in the south of England to be the same in neuroblastoma as in the general population.



Genetic Aspects.

No evidence has been found to suggest a familial tendency as in retinoblastoma. The disease was found in twins in two instances. In the first, two sisters (monozygous twins) died at 9½ and 11 months respectively with massive liver involvement from a primitive, right abdominal sympathetic chain tumour (Dr. Muriel Frazer's patients). This is a record of interest in view of the prevalent impression that only one twin is likely to be affected. Indeed Aird (1957), in his authoritative textbook, states: " . . . if one of twins is affected the other escapes," and refers to observations of Wells (1950) and Brody (1940) as the source of this conclusion. Neither author, in fact, goes this far towards a

conclusion, nor does the information they adduce warrant it, and it would be unfortunate if the statement were used as the basis for reassurance of an anxious parent.

In the second instance a small neuroblastoma was found at necropsy in the first male of heterozygous twins, who died soon after birth. The second twin, now a boy of 4, was traced and found free from any evidence of the disease.

In five subjects a tumour was undoubtedly present at birth. Dissemination was present in one of these who died on the tenth day and was manifest in a survivor within the first week. In no case was any placental abnormality or involvement recorded.

Pathology.

The characteristic cell is identical with the sympathogonia which migrate from the neural crest to form the sympathetic chain and adrenal medulla—a small round cell with a dark staining nucleus and a scanty rim of cytoplasm, which increases in size as it matures, the nucleus becoming larger and vesiculated and the cytoplasm more abundant. With increasing maturity comes increasing evidence of neurofibrils which can be traced to the cells themselves. In the classical form the cells are gathered in rosettes round a central cluster of neurofibrils to form a distinct and unmistakable pattern.

Some authors (King, Storaasli, and Bolande, 1961) have found it convenient to make a histological classification in three grades of malignancy:

(a) An undifferentiated variety with scanty or non-existent rosettes and fibrils present as hyaline patches or not at all, variously termed 'sympathicoblastoma' or 'sympathogonioma.' I prefer to call it the primitive variety—there were twelve examples of this type.

(b) The classical neuroblastoma with abundant rosette formation. There were eleven examples of this type.

(c) A tumour with mixed elements of ganglioneuroma and neuroblastoma—the ganglioneuroblastoma. There were six examples of this type.

In one (adrenal) patient the histology was not determined.

This classification will be related later to various aspects of tumour behaviour.

Site of Origin.

Although most authors have found it to be necessary to describe a large proportion of their tumours as "of undetermined origin" it has been possible here to determine the site of origin confidently in all but one patient (Table 2).

The slight preponderance of adrenal tumours was expected, as was the finding that more than two-thirds of all the tumours arose in the abdomen. The difference in numbers in favour of the left adrenal is not so emphatic as in the Boston group of Gross et al.

One of the essential features of the syndrome described by Pepper (1901) is the predominance of subjects under the age of 2 years. This was not found to be the case; indeed, patients with right adrenal disease averaged 3 years of age as against 2 years for those in whom the tumour was left-sided, and while

four of the seven patients with a tumour on the right side were under 2, six of the nine with left-side tumour were under 2.

The poor prognosis ascribed to adrenal sites has been demonstrated once again, but we have not found this pessimistic outlook to be justifiably extended to the extra-adrenal, abdominal sites where two of the five patients survived, there was no evidence to be found to support the view that inaccessibility predisposed to greater advance in adrenal cases before such patients were seen. Nor was there much evidence of less specific symptomatology associated with disease at this site and there is virtually no difference in the distribution of grades of pathology

TABLE 2.

SITES OF ORIGIN.

	No. CASES	SURVIVORS	BREAKDOWN INTO SITES	No. CASES	SURVIVORS
Adrenal	16	1	L. Adrenal	9	1
			R. Adrenal	7	0
Sympathetic Chain	13	4	Pelvis	3	1
			Abdomen	5	2
			Chest	5	1
			Neck	0	0
No indication	1	0			
TOTAL	30	5			

between adrenal and elsewhere. No other explanation for the relatively poor survival rate of adrenal tumours was found.

MANNER OF PRESENTATION.

Frequently this rapidly growing tumour attains great size and has even caused dystocia. In textbooks neuroblastoma is frequently lumped together with nephroblastoma in emphasizing how insidious advance may be missed till it is detected by apparent bulk. Attention is drawn to the tendency for the mass to feel lobulated in contrast to the smooth outline of a nephroblastoma. Reiquam, Beatty, and Allen (1956) have found an appreciable proportion of their patients to present thus, but it has not been so in this group where only two tumours, both thoracic, have presented with swelling due to the tumour.

Non-specific symptomatology has been characteristic of early adrenal and abdominal disease. Vomiting, feeding disorder, abdominal pain and loss of weight may focus attention on the abdomen for detection of the tumour by palpation or may lead to intravenous pyelography (Table 3). On the other hand, simulation of blood dyscrasia, cervical gland pathology, neurological disease or bone sarcoma may be red herrings causing delay.

Five cases, all adrenal, were found in the first ten days of life. Only one of them had symptoms attributable to the tumour (persistent vomiting). In two who died in the first day macroscopically visible nodules were scattered through the right lobe of the liver. One must assume on present evidence that these were early neoplasm which would have developed as a malignant mass had the children survived; and the liver nodules must likewise be accepted as metastases rather than as evidence of multicentric origin, for there is no embryological explanation for the presence of sympathogonia in the substance of the liver. Nevertheless,

TABLE 3.

PRESENTING FEATURES OF NEUROBLASTOMA IN NORTHERN IRELAND.

Found only at Necropsy	3	...	2 R. and 1 L. Adrenal
Vomiting	3	...	R. Abdomen and 2 L. Adrenal
Epigastric Pain	3	...	L. Abdomen, R. and L. Adrenal
Irritability, Loss Wt., Listlessness, Anorexia	3	...	2 Abdomen and L. Adrenal
Anæmia (+Purpura in 2)	3	...	All Adrenal
Orbital Swelling	3	...	1 No indication, 2 L. Adrenal
Constipation	3	...	All Pelvic
Local Swelling due to Primary Tumour	2	...	Both Chest
Cervical Lymph Nodes	2	...	R. Abdomen and L. Thorax
Skin Lumps	1	...	Chest
Icterus	1	...	R. Abdomen
Weakness of Leg	1	...	L. Adrenal
Horner's Syndrome	1	...	R. Thorax
Ewing's Syndrome	1	...	L. Adrenal
TOTAL	30	...	

the dividing line between clumps of sympathogonia which will eventually mature to adult cells and the earliest stage of malignant proliferation is not well defined.

Attention was drawn to the disease by local swelling only in the case of two thoracic tumours; the other three thoracic cases presenting through metastases—Horner's syndrome, cervical adenopathy, and skin metastases.

The pelvic growths all produced symptoms of local compression; by constipation progressing to low bowel obstruction. All were diagnosed by rectal examination and delay corresponded to deferment of this.

No patient presented as renal acidosis or the cœliac syndrome or was detected through disturbed catecholamine excretion (Kogut and Kaplan, 1962), but prominent among the early symptoms of a survivor with a well-differentiated tumour was fat intolerance and diarrhœa which did not recur following radiation-induced remission.

Metastases.

Phillips (1953) found most patients with metastases when first seen, and Bodian (1959) put the figure at 67 per cent. of his 129 patients. Experience here has been similar.

In twelve patients (40 per cent.) the presenting feature was due to metastases, and in a further two to widespread local infiltration. Eighteen (60 per cent.) had metastases present when first admitted and a further five developed them during the course of observation or treatment. Of these twenty-three patients only two survived, while of the seven patients who did not exhibit dissemination, three survived (two of the remainder being perinatal deaths unrelated to tumour, and the other two, thoracic cases, dying from rapid invasion of the contiguous lung).

Phillips (1953) advocates concentration of attack on the primary tumour "as essential to control of the secondaries." In three instances excision of all macroscopically visible tumour tissue was applied to the primary growth in the known presence of metastases; in two supplemented by radiotherapy to the primary site, but in no case did the further development or progress of secondaries appear to be favourably influenced and all died within a month.

Involvement of the skull, with a predilection for the orbital region, is a characteristic of the disease occurring in 20 per cent. of published cases (Stowers, quoted by Onuigbo, 1961). Hutchison first drew attention to this aspect in 1907 without fully appreciating the nature of the primary. His basic contentions were: the predilection of the primary for the left side and an age over 2 years. While few, nowadays, accept the syndrome as defined by him, the frequency of ipsilateral skull involvement has been subject to controversy. Duke-Elder (1952) was impressed by the remarkable frequency of involvement of the left periorbital region from the left adrenal, yet in the same year Pack, Horning, and Ariel (1952) saw nothing to support it from their own experience or a survey of the literature. Onuigbo (1961) may have said the final word when he found that metastases selected the ipsilateral side preferentially, to an extent that was statistically significant, and argued in favour of a lymphatic, embolic spread. From the Northern Ireland survey we find the skull involved in seven of thirty cases (23 per cent.), all periorbital in situation. Six primary sources were in the left adrenal and in the remaining case no indication of the primary site was found. None arose from the right adrenal. From left adrenal sources the left side of the skull was involved four times, the right side once, and both sides once. The remaining instance was of left-side involvement.

Involvement of bones other than the skull demonstrated no ipsilateral preference. The femur was involved in three instances (twice from left adrenal, once from

thorax). Other bones were involved in single instances—cervical spines (from right adrenal), lumbar spine (thorax), pelvis (thorax), humerus (left adrenal), ribs (pelvis), sternum (abdominal sympathetic) (Table 4).

Finding regional lymph node involvement on only six occasions no doubt underestimates the true position, though there is equally no doubt that distant metastasis from a small localised primary is a strong characteristic of neuroblastoma. More striking is the high incidence of distant, non-regional lymph node involvement. This form of dissemination was confined to patients with adrenal or abdominal disease and there was no apparent tendency for the spread to remain on the same side of the midline. Cervical and axillary glands

TABLE 4.

SITES OF METASTASES.

SITING OF METASTASES	NO. SITES	COMPARATIVE ORDER OF BOSTON CASES (11)
Non-regional Lymph Nodes (Cervical – 3)	10	Bones other than Skull
Bones other than Skull	9	Regional Lymph Nodes
Skull (7) and Brain (1)	8	Liver
Liver	7	Skull and Brain
Regional Lymph Nodes	6	Lungs
Spinal Canal	4	Cervical Nodes
Lungs	3	Skin
Bone Marrow	3	Kidney
Adrenal Cortex	3	
Skin	2	
Kidney	1	
Stomach	1	
Pericardium and Heart	1	
Transperitoneal	1	

were affected each three times, the paratracheal twice, and the groin and supraclavicular nodes once each.

Small deposits were found three times in the adrenal cortex—twice from the abdominal sympathetic chain and once from the opposite adrenal; though the possibility of multicentric origin again arises here.

Bodian (1959) found spread to the spinal canal in a quarter of his cases and neuroblastoma is well known to share with ganglioneuroma and neurofibroma a tendency to assume a dumb-bell configuration in this situation. The four instances here may be lower than the true incidence, for they were sought only in those

patients showing neurological symptoms at some stage. One patient whose thoracic spinal canal was invaded directly had lumbar spinal canal and brain metastases.

Lung secondaries, arising from both adrenals and from the pelvis, were present in three patients and were twice bilateral. They appeared on X-ray as discrete opacities, few in number and favouring the upper lobes. Secondary liver involvement originated from the right adrenal in four instances and from the right abdominal chain in two; in the other case metastases from the left adrenal permeated both lobes of the liver. Permeation was the common form of liver lesion, but there was one example of a large discrete mass in the right lobe and another in which the whole organ was studded with pea-sized nodules. Those patients with right adrenal involvement who had liver secondaries were all under the age of 2.

Two patients presented with anæmia and purpura and these features later developed in a third. All showed malignant neuroblasts on examination of the (iliac crest) marrow. Marrow aspiration was negative in a further patient with profound anæmia. It is interesting to note that this patient had a severe degree of liver involvement, in view of the findings of Pack and Ariel (1960) that a factor associated with decreased red cell survival, distinct from marrow space occupation, was at work in such cases, and that the anæmia dramatically improves with irradiation of the enlarged liver.

Scott and Oliver (1932) suggested that bone metastases were to be found mainly in the older patients, averaging six years in their experience. I found five such patients under the age of 6 as against two over that age. This shows no clear preference for bone in the older age groups. All skull metastases were in children under 4 years, but soft tissue dissemination was spread evenly through the age group from 10 days to 36 years.

Survival and the Factors influencing It.

With one exception, who survived twenty-two months, all the deaths occurred within a year of onset, and the average duration from onset of symptoms was three and a half months. In Gross's group only one temporary remission was longer than two years, and he suggested that this period be accepted as a period of risk for prognostication. From results in their own charges and analysis of reported cases, Koop, Kieswetter and Horn (1955) (who favour surgery alone), and Sutow (1958) felt that a period of fourteen months was crucial. Exceptions to these rules occurred in all the above authors' reports but formed an insignificant minority, yet because of these exceptions assurance on a basis of this period of risk can never be absolute. Ariel and Pack (1960) found a death from recurrence after even as long as ten years from remission. Nevertheless, two years of remission would seem to be a useful and reasonable period to be used in reporting probable cures.

Five of our thirty cases are alive without signs of the disease for periods varying from two years to eight years. All have maintained complete remissions.

Certain factors appear to have influenced survival and will be examined (Appendix).

(a) *Pathology.*

There appears to be increased chance of survival with increased differentiation (Table 5). It is, however, possible that with small numbers such as this that the favourable relationship of differentiation may be fortuitous, for Bodian (1959)

TABLE 5.

SURVIVAL RELATED TO HISTOLOGICAL GRADING.

PATHOLOGY	NO. CASES	NO. OF SURVIVORS	DURATION OF SURVIVAL IN THOSE DYING FROM THE DISEASE
Primitive - -	12 ...	0 ...	1 week—1 year (Average $3\frac{1}{4}$ months)
*Classical - -	11 ...	2 ...	2 weeks—1 year (Average $3\frac{1}{4}$ months)
*Ganglioneuroblastoma -	6 ...	3 ...	4 and 22 months
Not known - -	1 ...	0 ...	3 months
ALL - -	30 ...	5 ...	$3\frac{1}{2}$ months

*Includes, in each class, one death shortly after birth from causes unrelated to the tumour.

found no clear-cut relationship in his much larger group. As far as they go, the Northern Ireland figures suggest that regression occurs, or can be induced, in a greater proportion of the more differentiated malignancies, but differentiation, in itself, is not associated with increased duration of life where regression fails to be promoted.

(b) *Age.*

Bodian emphasizes that, in his opinion, age is the most important prognostic factor—the younger the patient the better the prognosis and response to treatment, and Sutow (1958) is also convinced of the advantages of youth. King, Storaasli, and Bolande (1961), on the other hand, feel that age has no prognostic significance, while Ariel and Pack (1960) declare that the younger the child the worse the prognosis.

In this group four of sixteen patients under the age of 2 years survived (three were under 1 year), while only one of the fourteen over the age of 2 years survived. Age bore no relation to pathology. Each histological group had one adult case and in each histological group the age range and average were similar.

(c) *Treatment.*

Therapy may be divided into the following categories:—

No treatment - - -	10 patients...	1 survivor
Chemotherapy (inc. B_{12}) only -	3 ...	0
*Biopsy + Vit. B_{12} - - -	1 ...	1
Biopsy only - - -	2 ...	0
Biopsy and Radiotherapy - -	3 ...	1
Radiotherapy only - - -	4 ...	0
Palliative Radiotherapy - -	2 ...	0
Radiotherapy/Excision - -	4 patients...	2 survivors
Surgical Excision alone - -	1 ...	0
	30	5

*The very brief duration (one week) of B_{12} therapy here makes its employment of very doubtful significance.

Koop and his colleagues believe that surgical insult, even of such a minor nature as biopsy, can often influence the course favourably, and produce excellent figures from their own experience to back the assertion (Koop, Kiesewetter, and Horn, 1955). It is, therefore, interesting to note that all the survivors here had some form of surgical interference with tumour tissue; but there were, unfortunately, insufficient patients treated by surgery alone to serve as a basis for further examination of their belief. It may well be that surgical trauma can, on occasion, initiate a beneficial reaction of the auto-immune type and this aspect certainly deserves further investigation.

On the non-survivors who did not receive radiotherapy only two lived more than three months (in fact, survival averaged less than six weeks, while of those treated by irradiation of the primary site only one survived less than three months. The group denied radiotherapy was somewhat weighted with advanced cases, but there did not appear to be any consistent criteria (of stage of progression) for reference to radiotherapy.

Following irradiation of the primary site there were eight patients with clear evidence of remission. Three have survived for periods from two to eight years, and in five other patients remission lasted from four to seventeen months, being terminated by sudden, massive recrudescence. In four of these latter cases the mass disappeared completely (either to palpation within the pelvis or abdomen, or X-ray in the chest) and in a fifth whence a thoracic primary was excised a period of greatly improved health followed for six months after treatment by irradiation. Three patients, all with left adrenal primaries, showed no response whatsoever.

Total tumour dose was determined largely by tolerance, and varied from 1,300–3,500 R (av. 2,472 R). The survivors all received more than 2,500 R and the longer remissions were also related to the higher dosages.

No patient was given a planned course of chemotherapy at an appropriate stage. Apart from the case where it was given for a week after biopsy, vitamin B_{12} was given to three other patients in doses along the lines of Bodian's later recommendations, but they had all begun to slide on a downhill course of apathy and cachexia with widespread dissemination, and this course did not appear to be influenced by the therapy. Two patients received other forms of chemotherapy but in transient courses between a provisional diagnosis of acute leukæmia and an established diagnosis of neuroblastoma.

Only in one instance did investigation or treatment appear to expedite death, cardiac arrest occurring in the course of laparotomy.

(d) *Delay.*

The factor of delay may be significant at three stages in the management of malignant disease; in presentation, in diagnosis or, following diagnosis, in the initiation of specific treatment.

Phillips (1953) found in his series of fifty-eight cases that an average of four months elapsed between the first sign and treatment. Our experience here has been much better. In three cases there was a long delay (five months, ten months, and 12 months) before presentation or diagnosis. Two had well-differentiated pelvic tumours causing constipation which was not taken seriously and rectal examination deferred. One of these patients did in fact survive. In a third patient a small primary near the cœliac plexus was missed at initial laparotomy. In the remainder, no delay, to the point of diagnosis, was longer than five weeks from the onset of symptoms, and the average less than three weeks. Diagnosis established, there was no instance of delay in initiating specific treatment.

Discussion.

The picture of neuroblastoma derived from the thirty cases arising over a decade in Northern Ireland is very similar to that of the larger groups reported (Bodian, Gross et al., Blacklock, Sutow), and no new feature has been found other than that the disease may affect each of twin siblings. Its insidious nature is again illustrated in its silent progression with initial manifestation, in two-thirds of all patients, with metastases present and in a bizarre, vague manner which demands its inclusion in the differential diagnosis of diseases with unusual symptom complexes. Once its presence had become manifest little evidence of delay could be found up to the point where the clinician was in a position to decide whether and how to treat the disease.

Five of the thirty patients have had prolonged remissions and are probable cures; available evidence suggests that in each case the tumour disappeared rather than matured to simple form. In two examples remission seemed spontaneous, in three it was induced (or the natural tendency augmented) by irradiation, and there is some evidence to suggest that the probability of such an outcome is related to the amount of radiation given to the primary tumour site. There is insufficient evidence on which to assess the efficacy of other factors which have been reported as contributing to remission—surgical insult (Koop, Kiesewetter,

and Horn, 1955), vitamin B_{12} (Bodian, 1959), or chemotherapy (Gross, Farber, and Martin, 1959; Farber and Toch, 1951).

No figures are available for earlier years in Northern Ireland, but from the pessimism exhibited by senior clinicians it may be deduced that their experience of survival was of a low order. Such is the rarity of the tumour, that outside a central pædiatric unit, the chances of any doctor seeing more than one patient in a lifetime of practice are slight, and the likelihood of it being considered in differential diagnosis is equally low. This has not caused a delay in reference, but it may have contributed to the high percentage of untreated cases. Some of the survivors had more advanced disease than some of those given no treatment, demonstrating the absence of generally accepted criteria on which a decision to treat may be based or the form of treatment is determined. The unpredictable tendency toward occasional spontaneous remission is illustrated and can be seen to occur even from an advanced stage. The foregoing situation poses three questions; can we do better, should all cases be treated and if so, how?

Survival rates vary considerably. The only reports which I could find to compare with the Northern Ireland figures were those of the Scottish Pædiatric Tumour Registry (MacGregor, 1961), where the survival of six out of fifty-one patients (11.8 per cent.) is of the same low order as that of our region (16.7 per cent.). The general picture from individual reports in the literature is little different. The exceptions to this general picture, however, point clearly the possibility of better results.

Koop et al. (1955) have achieved a 36 per cent. survival rate based mainly on surgery, while Wittenborg (1950) (30 per cent.), and King et al. (1961) have achieved excellent results with radiotherapy as their principal agent. Their dosage level is higher than that which has been customary in this area, and since dosage is determined to some extent by tolerance the implication arises that more could have been done to improve the general condition of these patients before transfer for radiotherapy. The most arresting demonstration of the benefit which can ensue from planned intensification of treatment is given by Gross et al. (1959) in reporting their experience with 217 patients over thirty-seven years. They report in decades thus:—

1920-29—No treatment	0 % survival.
1930-39 / 1940-49 Surgery + radiotherapy	22–23% survival.
1950-57—Surgery/radiotherapy/chemotherapy	36.7 % survival.

The group is unselected and consists of all patients referred to their hospitals. This figure of nearly 40 per cent. salvage of young life must surely remove pessimism from the clinical attitude to this form of malignant disease.

It does appear that the multi-prolonged attack on neuroblastoma is, in the present state of knowledge, the most likely to produce maximum salvage. Surgery need not be withheld or confined to biopsy in the known state of metastasis, but should be extended to maximum, feasible ablation of the primary tumour. Radiotherapy should be employed in higher dosage, probably in excess

of 2,500 R, and increasingly efficient methods of concentrating tumour dose with lesser total body effect should assist towards this end. The Boston workers have established the effective place of antimetabolites in safe, adjuvant chemotherapy (Gross et al., Farber and Toch) and newer, possibly more effective varieties such as 5-fluorouracil are now available. Of other new chemotherapeutic agents, the oral nitrogen mustard, cyclophosphamide (Spurr and Hayes, 1960) has been shewn to produce, often dramatic, objective improvement in the disease (Cochran, unpublished). This and actinomycin-D has been shewn often to be, at least, of palliative value. In addition, the patient should not be denied the possible benefits of vitamin B_{12} therapy which is harmless and wholly compatible with all previous therapeutic agents. In the absence of proven ineffectiveness, its use can only be criticized on the grounds of expense.

Short of cure, the question of palliation arises, and full treatment on the above lines may be objected to where it might deprive parents and child of being together at home for the last few precious weeks. Yet one has the strong impression that intensive treatment, quite apart from possibly prolonging life, does alter the pattern of the remaining existence from a period of cachectic misery to a period of relative fitness and happiness, terminated by sudden, massive recrudescence.

One suspects that, in the atmosphere of hopelessness which too frequently pervades the clinical approach to these patients, supportive treatment may be denied or half-heartedly given, till the patient has 'earned' it by showing unexpected promise of response to specific therapy, or withheld so as "not to prolong suffering." For intensification of therapy to be fully effective then maximum build up and support is needed. It is in this aspect of therapy as much as any that leeway needs to be made up.

Few doctors would ever fully deprive a parent of hope, and, with neuroblastoma, this leaven is now a fully justifiable part of the honest, realistic explanation which is a parent's right.

Summary.

A survey to determine the incidence of malignant neuroblastoma in Northern Ireland for the period of 1951-61 is reported and the results examined in relation to recorded knowledge of the disease.

Set against the general background of malignant disease in the Province, neuroblastoma is a rare tumour, but it occupies an important position among diseases of childhood. Aspects such as site of origin, pathological features, manner of presentation and metastatic patterns are considered, and found to conform to the picture presented by larger, reported groups. The existence of the disease in each of twins (concordant neuroblastoma) is recorded, confuting the impression that the presence of the condition in one twin implied immunity in the other. Survival and remission are illustrated and examined in the light of factors which may have influenced them, such as pathology, age, treatment, and delay.

The insidious progress, bizarre clinical manifestations and unpredictable outcome characteristic of the disease is illustrated and it is seen that results in

Northern Ireland as a whole are no better and no worse than those generally obtained elsewhere. It is suggested that this low percentage salvage could be improved, as it has been in some clinics, by intensification of specific therapies which have shown promise of favourably influencing the disease and by their employment in a multi-prolonged attack with more generous supportive therapy. It is felt that the outlook for a child with neuroblastoma should not wholly justify the pessimism so frequently exhibited.

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APPENDIX.

Case Histories of Survivors.

Case 1. A female infant began to have constipation at the age of 7 months which progressed to a state of low intestinal obstruction a year later. At operation a friable mass was found plugging the pelvis. It was removed piecemeal, the visible residue being scraped off the sacrum. Six weeks after operation 2,750 R was given by conventional deep radiotherapy over twenty-one days. There was at no time any evidence of metastases. Histologically, the growth was ganglioneuroblastoma—mostly neuroblastoma with numerous areas of mature ganglion cells. Since completition of treatment nine years ago she has remained in excellent health with no trace of the disease.

Case 2. A girl of $9\frac{1}{2}$ years presented with a five-week history of abdominal pain, occurring in brief stabs and associated with diarrhœa and fat intolerance. Radiological disclosure of calcification below the level of the left kidney led to surgical exploration when a firm lobulated mass was found, arising from the abdominal sympathetic chain and invading psoas, pancreas, and the intervertebral foraminæ. Excision was regarded as sub-total in view of the difficulty in separating the mass from the pancreas. From three weeks after operation a total tumour dose of 2,500 R was given by deep radiotherapy over three weeks. There have been no symptoms since, diarrhœa has ceased, and she is menstruating normally seven and a half years after completion of treatment. At no time were distant metastases found. The histological picture was that of ganglioneuroblastoma.

Case 3. A 4-week-old baby girl presented with a three-week history of pea-sized, bluish lumps appearing over the skin of her arms. The lumps were shown to consist of classical neuroblastoma and X-ray revealed a large mass in the posterior mediastinum. No treatment was given, but in the four weeks which followed about half the tumours disappeared, but biopsy of a persisting lump showed no trend of differentiation towards maturation. Nevertheless, by three months all skin nodules had gone and biopsy of a site which had been marked showed no tumour, scar or abnormal cells. The child has remained well and developed normally over the last seven years. There has been no further illness and recent full medical examination in England showed no abnormality.

Case 4. A week-old baby boy had persistent bile-stained vomiting from birth. A right-sided abdominal lump was explored and was found to be a firm mass, the size of a plum, arising from the right abdominal sympathetic chain and extending across the midline into the lesser sac. A small biopsy only was taken and this showed the histological picture of

classical neuroblastoma. Commencing eighteen days after operation and interrupted by respiratory infection, a tumour dose of 3,000 R was delivered over sixty days. Three weeks after this the tumour was impalpable.

Two years later he presented with cyanotic heart disease and a large liver with a prominent nodule in the right lobe. Laparotomy revealed the nodule to be a simple cholangioma with the contiguous liver histologically normal. At operation no trace of tumour could be found at the primary site. He remains free of any sign of recurrence four and a half years from initial treatment.

Case 5. A seven-month-old female infant was admitted to hospital on account of persistent bile-stained vomiting of ten days' duration. Surgical exploration revealed a stony-hard, fixed, and irregularly lobulated mass replacing the left adrenal. A small biopsy was taken later, showing the tumour to consist largely of ganglioneuroma with considerable areas of neuroblastoma throughout. Massive dose vitamin B_{12} therapy was commenced, but only lasted for less than one week after operation. No further treatment was given and the tumour regressed beyond appreciation by palpation within six months. There has been no sign of disease since. Very hard, large, irregular axillary nodes were present at the time of operation and, though these were assumed to represent metastatic disease, this was not verified by biopsy. These enlargements spontaneously regressed till they disappeared four months after operation. The child is in good health three years from initial treatment.

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PATIENT, HOSPITAL, AND FAMILY DOCTOR: A SURVEY IN ONE PRACTICE

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Based on an Address to the Ulster Medical Society

DISSATISFIED doctors often complain that the status of the family doctor is being steadily lowered and that he will soon be nothing more than a writer of notes directing patients to different hospital departments. The investigation described here is an account of the patients referred to hospital in one particular practice over a period of twelve months.

Not much has been published on this topic. Fry (1959) gives an analysis of all patients referred to hospital during twelve months from a practice of 5,500 patients in the South London suburbs. Hopkins (1956) describes referrals over a three-year period from a practice which varied between 1,400 and 1,500, also in the suburbs of London. Forsyth and Logan (1960) did a survey for the Nuffield Provincial Hospitals Trust involving sixteen practices in the Barrow and Furness area. A group of 171 doctors from 106 practices (all members of the College of General Practitioners) kept records for a year of all patients seen and diagnoses made. The results have been analysed by the General Register Office and two volumes of "Morbidity Statistics in General Practice" have already been published which give the first detailed statistical account of illness as seen by the family doctor. Some information on referrals to hospital is included in Volume I.

THE PRACTICE.

The country practice here examined is just outside the Belfast City Boundary, but off the main roads, and though a fair proportion of the patients work in Belfast, they have mostly been born and brought up in a rural background. There is full access for patients to excellent hospital facilities, including all special departments. No patient need fail to get treatment because of lack of facilities, and it seems reasonable to suggest that the use made of hospital care may represent a maximum, for this particular practice and doctor.

There are in the practice a number of patients on the resident staff of a hospital. For various reasons these patients have been excluded from the observations described. During the period under review those remaining averaged 1,500 patients, the great majority living within a radius of four miles from the surgery, which is part of the doctor's house. One aspect of the practice population is that the proportion of patients over the age of 65 is about 13.5 per cent. (the average figure for Northern Ireland is 11 per cent.). Thus there are in the practice about 200 patients over the age of 65.

Method.

During a period of twelve months between 1st October, 1959, and 31st October, 1960 (four weeks' holiday is allowed for) separate records were kept of all patients referred to hospital externs and also of all patients admitted to hospital during this time, whether as acute admissions or from waiting lists. A group of eighteen patients referred privately to consultants have been allocated to appropriate externs. Records were also kept of all specimens sent for pathological examinations, of patients referred to the Mass Radiography Unit, of domiciliary consultations, and of patients who went direct to casualty departments who had not been seen first by the doctor.

Total Work of the Practice.

During the twelve months there were 4,309 attendances at the surgery and 2,349 visits to patients' homes. This amounts to 4.27 consultations per patient at risk. The "Morbidity Statistics in General Practice" show much variation in this figure—from 2.7 to 5.9 consultations per patient at risk. These figures do not include telephone consultations, the many occasions in patients' homes when one is asked for advice apart from the case under treatment or indeed those visits, which are not infrequent, when more than one patient is seen in one house. Most doctors have found it very difficult to keep continuous records in such detail.

During the year there were 38 births, of which 14 were at home and 24 in hospital.

There were 15 deaths—3 in hospital and 12 in patients' homes. Six of the deaths were due to "old age," two to strokes, and four were sudden deaths of the type usually attributed to coronary occlusion. During the year 58 patients joined the practice and 59 left it. Movements in and out of the practice were almost entirely due to people entering or leaving the area.

Referrals to Externs.

Table 1 gives the numbers of patients per 1,000 at risk who were referred to hospital externs for the first time during a period of twelve months.

TABLE 1.

N. Ireland.		Ballylesson.		Hopkins.		Fry.
244	...	120	...	245	...	38

Patients referred to externs per 1,000 at risk.

Fry's figures need some amplification. He has access at hospital to full X-ray facilities and also to full facilities for clinical pathology. During the year he referred an additional 60 patients per 1,000 for X-ray examinations and an additional 70 per 1,000 for pathology investigations; that is 168 patients per 1,000 at risk went to hospital either for consultant opinion or for special examinations.

The figures for Northern Ireland have been obtained from the Annual Report of the N.I. Hospitals Authority for 1960.

Hospital Admissions.

Table 2 gives the numbers for hospital admissions, and includes figures from the survey at Barrow and Furness by Forsyth and Logan. These are the averages for 9 urban and 7 rural practices, and are of added interest because they show how much the numbers vary even in the same hospital area. In this group of 16 practices the largest number of admissions was 108 per 1,000 (in a small urban practice) and the smallest 41 per 1,000 (in a large rural practice).

TABLE 2.

N. Ireland.	Forsyth and Logan.	Ballylesson.	Hopkins.	Fry.
105	... Urban: 77 ...	70 ...	28 ...	37
	Rural: 52			

Hospital admissions per 1,000 patients at risk.

It would be of the greatest interest to know what determines the wide variation in the numbers both of admissions and out-patient referrals seen in Tables 1 and 2. At present one can only guess.

Morbidity is known to vary with geographical location for a number of conditions. Hospital facilities are not always there for patients who need them. Housing conditions—and home conditions—may decide whether a patient must go to hospital. Social tradition and attitude to illness are important.

The family doctor himself may be the deciding factor. His referrals to hospital may be low because he neglects to diagnose illness and secure proper treatment for it, or because he practises good preventive medicine and treats most of his sick patients at home. His referrals may be high, because he is working under heavy pressure, has lost interest in his work, and merely wants to get rid of his patients as quickly as possible, or because he is giving his patients exceptional thought and care, diagnosing latent disease and making certain that his diagnosis and treatment in all cases is the most accurate possible.

Local authority services may make it possible to keep many patients at home. A good district nursing service, the availability of home helps, and such voluntary services as "Meals on Wheels" and night attendant schemes are all relevant.

Diagnoses.

It may be of interest to consider in detail the diagnoses of the patients referred from the Ballylesson practice under consideration.

TABLE 3.

Surgical	- 51	Gynæcology	- 13
Casualty	- 27	Skin	- 13
Medical	- 24	Eye	- 8
E.N.T.	- 20	Psychiatric	- 7
Antenatal	- 15	Dental	- 3

Total numbers of patients referred to hospital from Ballylesson.

Surgical: Seven of these were orthopædic, and 1 plastic surgery. There were 4 with cholecystitis, 3 with varicose veins, 2 with hernias, and among the others

were cases of carcinoma of the prostate, hæmaturia, recurrent pyelitis, renal colic, a branchial cyst, tuberculous cervical adenitis and epithelioma of the lip.

Casualty: Of the 27 cases, 6 went direct to hospital, usually from their place of work. The commonest reason for sending a patient to casualty was the possibility of a fracture. Fourteen were sent for this reason and a fracture was present in only three. This high negative figure is mainly because patients are increasingly aware of the possibilities of X-ray diagnosis and are—possibly quite rightly—unwilling to accept a provisional diagnosis.

Two patients with severe lacerations were sent for treatment. During the same period nine patients with lacerations and cuts of lesser severity were sutured at the surgery.

Medical Externs: Of the 24 patients concerned, 3 were sent to chest clinics, including one new case of phthisis. Three patients were sent to neurological clinics—one of severe epilepsy, one a hemiplegia of uncertain origin, and one a severe tinnitus. Among the rest were cases of angina, coronary infarction, rheumatoid arthritis, brain abscess, and recurrent bronchitis.

Eight patients were sent because of symptoms suggesting organic disease. Investigation and subsequent history failed to discover any organic basis for the symptoms.

E.N.T.: Of 20 patients, 8 were children sent for opinion because of recurrent tonsillitis. Three were referred to the Hearing Aid Clinic. The others included cases of deafness, nasal polypi, allergic rhinitis, and recurrent nose-bleeding.

Ante-natal: Fifteen patients were sent with a view to hospital confinement.

Gynæcological: Thirteen patients were referred, 6 because of irregular bleeding and 4 because of prolapse.

Skin: Out of 13 patients there were 2 cases each of psoriasis, eczema and acne, 1 of pityriasis rosea, and 5 of warts.

Eye: Nine patients were referred. Two of these were admitted at once—1 of irido-cyclitis and 1 of tenonitis. There was 1 case of cataract, 1 of a foreign body I had failed to remove, and 4 of defective vision.

Psychiatric: Seven patients were referred—4 cases of depression, 2 of anxiety states, and 1 of a severe facial tic.

A small number of patients attending hospitals for long-term supervision have not been included in the above classification—for example, diabetics and patients under chest clinic supervision.

There was a total of 106 admissions during 12 months, a ratio of 70 per 1,000 patients at risk. Of these 47 were acute or immediate admissions and 59 were admissions from waiting lists. The distribution is shown in Table 4.

TABLE 4.

Surgical	- 45	Gynæcology	- 8
Obstetric	- 23	Mental Hospital	- 5
Medical	- 12	Radiotherapy	- 2
Eye and E.N.T.	- 10	Geriatric	- 1

Patients admitted to hospital from Ballylesson (total numbers).

Surgical: Of 45 admissions, 23 were acute. The acute abdomen accounted for a third of the latter; there were 4 cases of acute appendicitis, and 2 patients were sent in as possible cases of appendicitis. Among the others were 1 case each of perforated duodenal ulcer, acute intestinal obstruction, fractured femur, compound fracture of the skull, hæmorrhage into a thyroid cyst, subdural hæmatoma, melena, and acute retention of urine due to prostatic hypertrophy.

Among those admitted from waiting lists were 2 for cholecystectomy and 3 for repair of hernias. Two proved to have carcinomas; 3 were admitted for varicose vein operations, and others were admitted for investigations of the renal and gastro-intestinal tracts.

Obstetric: Twenty-three patients were admitted—20 for booked confinement and 3 immediate admissions—1 of ante-partum hæmorrhage, 1 of premature rupture of the membranes, and 1 of severe anæmia.

Medical: All 12 admissions were acute. There were 3 chest infections, and 1 case each of status asthmaticus, melena, hæmatemesis, hæmoptysis, pulmonary tuberculosis, cerebral thrombosis, and electric shock.

E.N.T.: Six patients were admitted for tonsillectomy, 1 for adenoidectomy, and 1 for cautery of turbinates. The eye admissions were the cases of tenonitis and iridocyclitis already referred to.

Gynæcological: Of 8 admissions, 3 were immediate as incomplete abortions, 3 were admitted for repair operations, 1 for hysterectomy, and 1 for diagnostic curettage.

Mental Hospital: Five patients were admitted (or rather 4, of whom 1 was re-admitted). Two were cases of depression, 1 was a man of 87 with senile dementia, and 1 aged 77 with a toxic confusional state.

Radiotherapy: One patient with Hodgkins disease and 1 with a basal cell carcinoma were admitted.

Geriatric: One patient aged 78 was admitted after several episodes of cerebral thrombosis and died in hospital ten months later.

Domiciliary consultations are of the greatest benefit, both to the patient and to his family doctor. A consultation will often make hospital admission unnecessary and both the consultation and the continuing care of the patient add to the interest of the family doctor's work and increase his knowledge and experience.

In the smaller practice the numbers of consultations vary greatly between one year and another. In Table 5 the figures from Hopkins and from Ballylesson are the averages for three consecutive years. Those quoted from Fry and from the N.I. Hospitals Authority Annual Report are for twelve months.

TABLE 5.

N. Ireland.	Ballylesson.	Hopkins.	Fry.
9	6	20	4

Domiciliary Consultations per 1,000 patients at Risk.

The same interesting variation between the numbers of consultations is again to be noted.

The actual proportion of consultations given to each specialty was remarkably constant with the notable exception of psychiatric consultations. In the Northern Ireland average these took 11 per cent. of the total. In the figures both of Fry and of Hopkins 30 per cent. of the consultations were psychiatric. There were no psychiatric consultations in the Ballylesson figures for the three consecutive years considered.

Psychoneurosis and Psychosis in General Practice.

Opinions as to the prevalence of neurosis and psychosis in general practice vary widely. Hopkins stated that 40 per cent. of his patients suffered from psychoneurotic disorders. Fry (1952) put the figure in his practice at 10 per cent. My figures are 5 per cent. and this is in agreement with those in "Morbidity Statistics" which records the total consulting for mental, psychoneurotic, and personality disorders as 5 per cent.

The interests and aptitude of the family doctor undoubtedly play a large part in deciding what will be called psychoneurosis and what will not. Every disease affects the patient's psychological equilibrium and this will be more apparent to some doctors than to others.

The decision as to whether symptoms have an organic cause may be one of the most difficult facing the family doctor. Unfortunately sometimes even the most expert help and the fullest investigation leave one no further on.

There have been three cases of this type in the practice under investigation in recent years. In each I was at one time convinced that there could be no organic basis for the symptoms. Each had been fully investigated (including in two cases laparotomy). Yet within a year all three were dead, two from carcinomas and one from Addison's disease.

It is unfortunately just as easy to be misled by the seemingly organic symptoms of a patient with a severe, possibly suicidal, depression.

It is a matter of satisfaction to see the increasing attention paid in all departments of medicine to the importance of psychosis and psychoneurosis. The setting up of Departments of Mental Health in our medical schools will increasingly ensure that doctors are well equipped to deal with these very difficult problems.

Geriatrics.

Out of 200 patients over the age of 65, during the years examined, 4 were permanent residents in hospitals or institutions. Two were cases of senile dementia two occupied long-stay geriatric beds. One was 79 years old and the other three were over 80.

It is often stated that the present generation of younger people will not look after their old folk, and that this is the reason for the greatest pressure on accommodation for the elderly infirm. My experience does not bear this out. In a country district where houses are often not easily accessible and where, even today, water may have to be carried in buckets for a distance, the day-to-day problems of existence may be considerable for old people. In spite of this, relatives, or if there are no relatives (and this is very often the case), neighbours,

do a great deal to keep old folk in their homes as long as possible. The work of the district nurses in this respect cannot be praised too highly and good home-help schemes are of the greatest assistance.

It is usually only when the situation is quite impossible that an appeal for hospital or institutional help is made. In most cases old people stay in their homes until they are too frail for the welfare home type of solution, and it seems likely that there will be an increasing need for accommodation for "frail ambulant" old people.

Midwifery.

The figures for three years (1958, 1959, and 1960) have been taken. In the three years there was a total of 78 confinements. Of these 24 were fully booked cases, in 18 I undertook the antenatal care in co-operation with the hospital clinic and the confinement took place in hospital, and in the remaining 36 all care was undertaken by the hospital. Thus, in an average year, there were only 8 fully booked cases and 6 in which most of the antenatal care was undertaken by me. Among the three-year total of 24 booked cases there were 2 cases of P.E.T., 1 of retained placenta, 1 of prolapsed cord, 1 of transverse arrest, and 3 cases of twins, 1 complicated by an ante-partum hæmorrhage.

It will be appreciated that midwifery is a constant source of anxiety and concern. Indeed, its practice on a limited scale is only possible because of the ready accessibility of excellent hospitals and consultant help and the existence of the Flying Squad. Yet there are substantial advantages to put in the balance against the risks of home confinement. Many mothers greatly prefer to have their babies at home, not completely without reason. To the patient it often seems that hospitals are impersonal machines and that however efficient the care given, once the mother enters the door she becomes only one more item on a conveyor belt. Pregnancy and confinement can be emotionally disturbing and physically frightening, and many women prefer to undergo the experience in familiar surroundings among known faces.

Not to look after a patient during pregnancy and confinement is a great break in the continuity of family care. Conversely when one is the doctor of the parents and has supervised the safe arrival of the children, a feeling of confidence on the one hand and of fuller understanding and sympathy on the other is created which is invaluable in the doctor's work.

It is well recognised that for obstetric reasons many mothers must be confined in hospital, and there will always be others who prefer to have their babies in hospital. In these cases it is of the greatest help to the family doctor if he can supervise the antenatal care at his surgery, in close co-operation with the hospital, and take over the care of the mother and baby when they come home.

Whatever the arrangements, good communications between the family doctor and the hospital are very important. Otherwise it is apt to happen that the mother comes home on the seventh or eighth day and is without medical care for several days during the puerperium. The provision of general practitioner maternity units attached to hospitals in additional areas has been enthusiastically welcomed by family doctors and has made possible standards in midwifery which

were previously often difficult to attain. There has been some discussion on the relative roles of the consultant and the family doctor in obstetrics.

Expansion of the obstetric services have now happily made it possible for complications and emergencies to have essential treatment in almost all cases. The emphasis in obstetrics, as in many other fields of medicine, is placed more and more on preventive medicine. It seems clear that the family doctor's contribution will increasingly be the continuing personal care of the patient at all stages, including obstetric procedures which are needed often enough for him to be adequately experienced in them. If the best possible results are to be obtained for both mothers and babies there will be more than enough work for both consultants and family doctors.

Clinical Pathology and X-rays.

Open access to clinical pathology laboratories and to X-rays might be expected to influence the number of hospital referrals. In the practice examined routine urine testing, blood sedimentation rates using the Westergren tube and hæmoglobin estimations using Sahli's method (more recently the Zeiss hæmometer which is a much more satisfactory method) are done at the surgery. All other tests are sent to the Central Laboratory.

It is of the greatest value to be able to get such tests carried out, although the use made of this service was not great numerically. There were 22 such tests during twelve months—11 urines for examination and culture, 7 samples of pus or exudate for identification of organisms, 3 blood counts, and 1 blood sugar. This gives a rate of 14 tests per 1,000 patients at risk compared with Fry's 70 per 1,000. Routine Rhesus and Wasserman tests in pregnancy are not included in my figures.

Ten patients were referred to the Mass Radiography Unit during the year and most of these would have had to be referred to hospital if this facility had not been available.

The question of open access to X-rays is at times keenly debated. In the present survey 14 of the patients sent to casualty went for the exclusion of fractures, and there were negative findings in 11. Fry's figures are certainly very impressive, and suggest that some doctors at any rate would send many fewer patients to hospital externs if they had X-ray and clinical pathology facilities at their disposal.

On the other hand, Logan and Forsyth found that the use made of such facilities at Barrow was very variable—from 0 to 68 patients per 1,000 in the case of clinical pathology and from 0 to 85 per 1,000 in the case of X-rays, among the 16 practices considered. Moreover, they found no relationship between the number of patients referred to hospital and the frequency with which X-ray and clinical pathology services were used. They did not, however, attempt to relate the *quality* of medical care to the use made of such services.

A strong case could be made for providing open access to X-rays in Northern Ireland on an experimental basis. A number of such arrangements already exist in different parts of Britain.

Communications between Hospital and Family Doctor.

Letters from family doctors to hospitals are, it is sometimes said, not always all that might be desired. Are the letters in the reverse direction always satisfactory? In all cases a full and helpful report has reached me—but often only after quite serious delays. Out of 54 patients discharged from hospital 23 brought with them a short preliminary report which is always helpful. The complete reports were dated from 2 to 17 days after the date of discharge, with an average interval of 6 days. Between the signing of the report and its arrival with me there was a further interval varying from 1 to 9 days, with an average of 3.5 days.

I need not stress the importance of having enough information to ensure continuity of treatment. It is also destructive of a patient's confidence if, ten days after he has come home from hospital, he discovers that the hospital has still not communicated with his doctor. There is a case for the general use of the short preliminary report.

One further matter concerns the death of a patient in hospital. In an acute illness the family doctor will normally be in touch with the ward. In a prolonged illness, however, the patient may die without his knowledge, and it is helpful if the family doctor can be notified in a such a case.

Conclusions.

In a practice of 1,500 patients there were, during the course of twelve months, some 6,600 patient-doctor contacts. About one-third of these were home visits. One hundred and eighty patients were sent to hospital externs during the same period. One hundred and six patients were admitted to hospital, of whom 59 were from waiting lists.

No attempt has been made to relate these figures to the amount of serious disease looked after in patients' homes.

Comparison of these figures with some available from other investigations show very wide variations. From many points of view it would be of interest and importance to know why this is so. There is a clear need for detailed operational research into this as into so many other aspects of general practice.

Open access to X-ray facilities (such as already exists to laboratory facilities in Northern Ireland) might be expected to raise standards of medical care, or to improve the family doctor's skill, or to take some of the load at present borne by hospital externs—or to do all these things. An experimental scheme at least, combined, if possible, with a well-planned investigation of the effects, would be of interest and importance.

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OSTEOMYELITIS: Four Unusual Cases and an Assessment of the Modern Management of the Disease

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THE clinical features of osteomyelitis have changed in recent years and diagnosis is now more difficult. In this paper four cases of osteomyelitis will be described. No case was typical of the textbook picture and none was diagnosed on admission: indeed, the difficulty in diagnosis was a feature of each case and the differential diagnoses are interesting. Two of the cases had an acute onset. Two had an insidious onset and they had had antibiotic treatment before admission. This added considerably to the difficulty in diagnosis, and also illustrates very clearly one of the common dangers in the treatment of this disease, namely, the inadequate dosage in which antibiotics are often given. They are often given in insufficient dosage in many disease processes, especially chest infections, but in perhaps no other pathological process does the patient pay so big a price for this in terms of immobility as he does in acute hæmatogenous osteomyelitis. It is an embarrassing indictment that in these days of superlative antibiotics some practitioners increase their patients' misery by not using them properly.

Case 1. The patient was a girl aged 6 who complained of pain in the left groin three days before admission. It was fleeting in nature and the day before admission she was walking around without difficulty. Next day she was toxic and anorexic and complaining of severe abdominal pain. She had no treatment before admission.

Examination on admission revealed a temperature of 104.6° F. and a pulse rate of 130, and she was delirious. Her ears, throat, and chest were normal and there were no abnormal neurological findings. She was tender in the left side of her abdomen and rectal examination was normal. Her hip joints moved normally and there was no bony tenderness anywhere. It was thought that she might have some intra-pelvic inflammation or a C.N.S. lesion. Immediate investigations included a lumbar puncture, a full blood picture, a Paul-Bunnell, C.S.U. analysis and X-rays of pelvis and lower limbs. All were negative or normal except the blood picture which showed a white cell count of 10,000 and an E.S.R. of 94 mm. in one hour.

Still undiagnosed, she was put on intravenous fluids containing achromycin and was fever nursed. Next day her abdominal signs had increased and a laparotomy was carried out, but no intra-abdominal lesion was discovered and the abdomen was closed.

She deteriorated over the next forty-eight hours, her temperature reaching 106° F. at one time, when it was thought she was going to die. However, she rallied and began to improve and her convalescence was uninterrupted until her discharge twelve weeks later. The E.S.R. was repeated twice weekly and this

showed a slow but sure improvement. X-rays were repeated at the end of the first, second, and third weeks, and it was not till then that minimal osteoporosis was noted at the upper end of the left femur. Further pictures at fortnightly intervals revealed further reaction of osteomyelitis but by now her general condition was good. At the end of twelve weeks the child was well, but there was structural weakness in the bone.

Case 2. The patient was a 23-year-old male who was referred to the Surgical Out-patients by his own doctor because of pain in the anterior surface of the upper third of the left tibia which had been present for three weeks. There was no history of injury and he had no pain when walking around, although there was some stiffness at night, and he had never been off work. His own doctor had given him a ten-day course of intramuscular penicillin without much improvement.

On examination the temperature was 99 and was never more than this during the whole course of the disease.

The E.S.R. was 52 mm. in one hour and an X-ray showed a periosteal reaction involving the upper third of the tibial shaft with medullary cavitation, the picture being consistent with that of osteogenic sarcoma, thus confirming the clinical impression.

He was admitted forthwith for biopsy of the periosteum and the growth. The biopsy report stated categorically that this was not an osteogenic sarcoma but a non-specific periostitis, adding the rider that if there was any suggestion of a tumour in relation to the cavity further biopsies must be undertaken.

This was done a week later and this time copious amounts of pus were found in the medullary cavity, the organism being a penicillin sensitive staphylococcus. The second biopsy again showed non-specific inflammation and the patient was put on full antibiotic coverage. Check X-rays showed an increase in the size of the cavity with sequestrum formation and a month after the second biopsy sequestrectomy was undertaken and the bone packed. The wound was well healed in four months and the patient made a full recovery.

Case 3. This patient, a boy aged 15, was admitted with a brawny swelling over the left clavicle after lifting bags of potatoes two days before. He had no treatment before admission.

On admission he was febrile with a temperature of 105 and an E.S.R. of 34 mm. in one hour. There was a painful non-localised œdema of the whole of the left shoulder region. X-rays were negative. He was put on antibiotics and in five days he developed a well-marked tonsillitis. Two days after this chest X-rays revealed consolidation in the left lung with a basal effusion. Fifteen millimetres of turbid fluid were aspirated. He was quite ill during this time and two days later the cellulitis in the shoulder region increased and an incision was made into it releasing some serous fluid which cultured staphylococcus pyogenes. Three weeks later he had improved considerably but the E.S.R. was now 70 mm. in one hour. There was still no evidence of a bone lesion but a small basal effusion was present. By the end of six weeks the effusion had resolved and he had developed X-ray changes of osteomyelitis of the whole length of the clavicle with a pathological

fracture. At operation there was little or no pus and no sequestration. The bone was opened, curetted, and packed, and gradually healed after eight months.

Case 4. This patient was aged 26 and was seven months pregnant with her second child on admission. She had had a sore throat some two months previously and influenza a fortnight later and she had been treated by her own doctor with antibiotics. She had vomited three times in the week before admission and now had vague pains in both legs.

On admission her temperature was 99° F., but it fell to normal next day and remained so for three weeks. Full clinical examination revealed no abnormality except for a faint systolic murmur and her uterus corresponded to her dates. Investigations were started at once. Throat swabs and blood cultures were negative. A C.S.U. was normal. Electrophoretic patterns were normal, but a white cell count was 14,000 and her E.S.R. was 68 mm. in one hour.

She was put on aspirin (5 gr. t.d.s.) and she continued vaguely with her complaints. Her E.S.R. rose to 112 and 130 mm. in one hour in consecutive weeks. At the end of a month she developed a swelling in her right thigh and X-rays were taken of both femora. These showed extensive new bone formation around the middle third of the shaft of the right femur with similar changes at a slightly lower level in the left, the appearances being consistent with osteomyelitis. This was an interesting finding, as multiple bone involvement in osteomyelitis is rare. Next day the right thigh was explored and the femur drilled. Large quantities of thick pus were found and swabs were taken and the wound packed. Tetracycline therapy was started at once. A 4 lb. baby was born the next day after a 2½-hour labour. The child was discharged in four weeks, the mother in four months, and after eight months the mother had no disability.

Incidence.

Most authors over the past decade report a gradual increase in the incidence of osteomyelitis following the dramatic drop in the disease in the early forties. Today, as in 1945, it is mainly a disease of childhood. In much of the earlier literature a preponderance of male to female of 5 or 6 to 1 is noted. This is present in Kirker's reviews of 1947 and 1950-51. In 1955 Cullen and Glass in Manchester reviewed 206 cases and here the sex incidence was 2 to 1. However, in 1960 Winters and Cahen reviewed 66 cases in Louisiana and reported an equal sex distribution. The explanation of this trend is not clear. It was generally stated that the increased incidence in boys was due to the fact that they sustained a greater amount of minor traumata than girls and were thus more liable to the disease. But it is rather naïve to suggest that the young girls of 1945 were any less adventurous or less rough than their counterparts of today.

Diagnosis.

From a prognostic point of view early diagnosis in acute hæmatogenous osteomyelitis is of supreme importance. Any delay in instituting the correct treatment is attended by a much greater risk of relapse and a much longer stay in hospital than in those cases in whom treatment is started at once. However,

diagnosis is sometimes difficult and has not been made any easier by the early, inadequate exploitation of antibiotic treatment before the case is seen at hospital. The textbook diagnostic criteria are:—

(1) Acute onset with high fever and obvious toxicity;

(2) severe pain at one site in a limb;

(3) well localised tenderness and occasional swelling over the affected part.

When these are present a diagnosis can usually be made on clinical examination, and, even if the circumscribed pain and tenderness are absent, full antibiotic coverage would normally be given in the presence of the obvious toxicity. This was so in numbers one and three of our cases. Harris describes a series of forty-five cases seen at the Fulham Hospital, London, between 1951 and 1958. A correct diagnosis was made in only twelve of these and seventeen were diagnosed as anterior poliomyelitis, having been admitted to the near-by Western Fever Hospital with this diagnosis. Harris makes the point that it is much better to treat a case of poliomyelitis as an osteomyelitis than vice-versa. Of Winters and Cahen's sixty-six cases seen between 1956 and 1959, twenty-two were admitted with temperatures of under one hundred and no general systemic manifestations. Some of these were under 6 months of age when fever is not a prominent feature of the disease, but the majority of this group had had some form of antibiotic treatment prior to admission to hospital. It is significant that the diagnosis was made more difficult in this group and that the relapse rate and complication rate was much higher than in the series as a whole. A similar picture is seen in numbers two and four of our cases, both of whom had received antibiotic treatment before admission and who had only slight temperatures on admission. In each case the diagnosis on clinical examination was not at all obvious and indeed some time passed before the correct diagnosis was established. During this vital period no antibiotic coverage was given, as there were no general symptoms or toxicity to warrant it. It is my distinct impression that the early antibiotic treatment which these cases received successfully masked the general symptoms of the disease, but was not so successful in annihilating completely, in the affected bones, the bacterial invaders which were protected from the antibiotic by a certain amount of venous and arterial thrombosis and bone necrosis. Consequently the advance of the disease process was merely slowed down but never stopped, and this smouldering infection was able to proceed unhindered. This resulted in large areas of bone destruction and a long delay in healing. The evidence would thus seem to indicate that these cases might have been better off if they had received no antibiotics at all prior to admission. In the early days of penicillin many cases were doubless aborted successfully by one or two injections of penicillin, but this is now no longer the case and early insufficient dosage of antibiotics only serves to confuse the clinical picture. This presents a problem to the general practitioner who first sees the case. He is no doubt tempted to give some antibiotic when he sees a patient with a painful limb and a rising temperature. But osteomyelitis is not a common disease and the average doctor with a practice of two thousand might see one case in five years. Consequently I feel that every

case of suspected osteomyelitis should be admitted to hospital for observation without having received any treatment from his own doctor. The doctor may prefer to observe the case for twenty-four hours to confirm or reject the diagnosis. A twenty-four-hour delay in admission to hospital without antibiotics is preferable to a ten-day delay due to inadequate antibiotic cover.

Treatment.

The correct treatment of osteomyelitis is currently a topic of considerable debate. While formerly it was primarily a surgical problem and even a surgical emergency, the introduction of potent antibacterial agents has profoundly altered this concept and the present role of surgery is now a subject of vigorous argument. The picture is not made any clearer by the emergence of drug resistant organisms. However, the majority of students of the disease are agreed that the most important factor in treatment is antibiotic therapy. Twenty years ago in the golden days of penicillin the treatment of osteomyelitis underwent a revolutionary change. Many authors reported series with 100 per cent. cure rates and no complications; all this in a disease which had previously carried a 10 to 15 per cent. mortality and a 20 per cent. morbidity rate. Prospects were bright indeed when, in 1945, Altemeir and Reinicke wrote: "Penicillin has revolutionised the management of acute hæmatogenous osteomyelitis. The spectacular control of the bacteræmia, the bony infection, and the metabolic visceral complications have produced a radical reduction in morbidity as well as mortality." But as the years passed by this hopeful picture was not maintained. The staphylococcus aureus, responsible for the majority of cases, developed a resistance to penicillin. Twelve per cent. of Cullen and Glass's cases were penicillin resistant while five years later with Winters and Cahen the figure soared to 43 per cent. Harris, at the Royal Orthopædic Hospital in 1962, noted a 35 per cent. resistance rate.

All these authors are unanimous in stating that penicillin is now no longer the drug of choice in osteomyelitis. They maintain that an adequate dose of tetracyclines, 6 grammes in twenty-four hours for adults and a proportionately smaller dose for children, or of penicillin, plus other antibiotic or antibiotics, should be given until an indication of sensitivity is revealed through blood culture or aspiration or drainage of bone. Treatment should be carried on for a minimum of three weeks and often for as long as six weeks.

Koenig and Rogers suggest a combination of aqueous penicillin G and sodium methicillin. The penicillin G should be given in doses of six to ten million units daily and it can be given by continuous intravenous drip through a small scalp vein needle or by four-hourly intramuscular injections. The methicillin should be given intramuscularly, one gramme every four hours to adults or twenty-five milligrammes per kg. of body weight every four hours to children. Vancomycin in a daily dose of two grammes for adults or ten milligrammes per kg. of body weight for infants may be substituted for sodium methicillin or employed in those cases who are allergic to penicillin. Disadvantages are that vancomycin must be given intravenously and it is not without unpleasant side-effects. The rather rare

salmonella osteomyelitis, so often associated with sicklemia, should be treated with full doses of chloramphenicol given orally, intramuscularly or intravenously.

It is interesting to note that these views are at variance with the modern therapy of bacterial endocarditis which physicians now only academically divide into acute and subacute forms. In an important paper by Vogler, Dorney, and Bridges, which was later made the substance of a leading article in the *Lancet* (1962) the drug of choice in this disease is penicillin, and penicillin only, in massive dosage. Moreover, the organism responsible for the majority of cases of endocarditis is no longer the streptococcus viridans but the staphylococcus aureus. Osteomyelitis and endocarditis thus both start as an acute staphylococcal bacteræmia; the one proceeding to affect bone and the other the heart. Vogler's recommended daily dose of penicillin is six million units, but it may be increased to fifty million if the organism is pencillin resistant. In some unknown way swamping the organism with penicillin seems to overcome its resistance to the drug.

In the four cases of osteomyelitis described the drug used was one of the tetracyclines.

The other two aspects of treatment are immobilization and surgery.

Immobilization of the affected part, preferably by a plaster cast, gives support to the extremity and seems to prevent deformity. It also reduces the rate of dissemination of organisms along venous and lymphatic routes. Winters and Cahen lay great stress on the importance of immobilization and deplore its widespread neglect. They maintain that certain complications are more apt to occur without it. These include bone and joint deformity, pathological fracture, and dislocation of a septic joint.

There is at present no general agreement about the role of surgery and when it should be performed. A wide variety of views has been expressed in recent papers. Generally speaking, if pain and tenderness have not altered in forty-eight to seventy-two hours and if there has been no reduction in fever in spite of antibiotics, drainage should be carried out forthwith.

In the case of drainage of a chronic abscess or sequestrectomy the timing of the operation is not so important.

Summary.

Four unusual cases of osteomyelitis are described. They all presented diagnostic problems and were only diagnosed after varying lengths of time. Two cases had an acute onset and two had an insidious onset, the latter two having received antibiotic treatment before admission.

The incidence of the disease is on the increase and the sex ratio, male to female, is today one to one.

The diagnosis of the disease is sometimes difficult and it is being made more difficult by the inadequate use of antibiotics prior to hospitalization. This is illustrated in two of the described cases.

The disease is best treated in hospital and general practitioners should admit suspected cases for observation. Treatment outside hospital is to be deplored.

Adequate antibiotic cover is the most important factor in treatment. There are many views on the choice of antibiotic.

Immobilization and surgery are essential adjuncts in therapy and the timing of the latter in the acute case is important.

My grateful thanks are due to Mr. W. S. Hanna, F.R.C.S., for permission to use his case histories and for his valuable criticism and help.

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REVIEW

A HUMAN APPROACH TO GENERAL PRACTICE. By C. P. Elliott-Binns, M.B., B.Ch., D.C.H., D.Obst.R.C.O.G. (Pp. vii + 76. 7s. 6d.) Edinburgh and London: E. & S Livingstone Ltd., 1963.

The transition from academic and hospital life to general practice is effected with ease by some doctors and with varying degrees of difficulty by others. Perhaps the path is most difficult for those who have aimed at consultant or specialist practice and have failed to attain.

This little book has been written to help the entrant to general practice to come to terms with his new way of life. The older doctor who has achieved his own philosophy knows already what is written here and can confirm its truth from personal experience.

The author discusses such matters as the reconciliation of the conflicting interests in the doctor's life, his personal, family and social claims *versus* his duties towards his patients. He deals also with the organization of the practice, its delights and its frustrations, pitfalls in diagnosis and the maintenance of clinical standards.

When all these matters have been assessed, there remains still the paramount consideration of the doctor's philosophy. In the final summation this is based on the Christian ethic and the precepts of Hippocrates. "For where there is love of man, there is also love of the art." W. G. F.

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REVIEWS

COMBINED TEXTBOOK OF OBSTETRICS AND GYNÆCOLOGY. Edited by Sir Dugald Baird, B Sc., M.D., LL.D.(Hon.)Glas., D.P.H., F.R.C.O.G. Seventh Edition. (Pp. xii + 975; figs. 489. 105s.) Edinburgh and London: E. & S. Livingstone, 1962.

THE editor, in the preface to the seventh (1962) edition, records the death of the original 1923 editor, Professor Munro Kerr, and pays tribute to that outstanding master of midwifery whose work and teaching did so much to raise the standard of midwifery practice. A textbook which has gone through seven editions in thirty years, like good wine, needs no bush.

Under management of difficult labour routine antibiotics are advised in all cases where labour has lasted thirty-six hours, especially if the membranes have ruptured, but no hint is given that this routine should be preceded by search for the infecting organism.

If the outcome of labour has not become clear after twenty-four hours the circumstances should be reviewed. It is sometimes wise to make a vaginal examination under anaesthesia if there is any doubt about the cause of the delay or the prospects of its being overcome.

This attitude to delay in labour is altogether too passive. If labour has lasted fourteen hours without obviously having progressed well into the second stage, a complete review, including a careful vaginal examination, is imperative.

Breech with extended legs still appears to be regarded as unfavourable in spite of the work of Moore and Steptoe (1943), Stabler (1947) and Macafee (1956). The presence of extended legs is an advantage rather than a disadvantage as the risk of prolapse of the cord is diminished. In a large series of breech presentations delivered in the two large teaching hospitals in Belfast the average duration of labour both in primigravidae and multiparae delivered per vias naturales was exactly the same—eleven hours.

Surely it is time that we ceased to regard retention of the placenta for one hour, and a post-partum loss of twenty fluid ounces of blood as "normal." The acceptance of these out-dated conventions still leads to disaster in an appreciable number of cases.

The somewhat defeatist attitude of the section on thrombo-embolic disease is disappointing, whilst the statement that prophylaxis is unfortunately as unsatisfactory as treatment suggests that the writer is quite unconvinced by the emphasis laid on early diagnosis and prompt anti-coagulant therapy by, amongst others, Ullery (1954), Jeffcoate (1957), Parker et al (1957), Chalmers et al (1960), Stamm (1961). That the problem is important is shown by the rising maternal mortality shown by the Reports on Maternal Deaths in England and Wales (1952-54 and 1955-57) and Northern Ireland (1956-59) and the comments therein.

This reviewer found the chapter on the psychological aspects of midwifery and gynaecology one of the most interesting in the whole volume. What the writer has to say on good history taking should be studied carefully by all who practise obstetrics and gynaecology. In essence it insists "know thy patient," her outlook to life, marriage, child-bearing and motherhood, her relationship to her parents, especially her mother, to her husband and children, her relative maturity and freedom or otherwise from taboos, prohibitions and frustrations.

He has much helpful advice for obstetricians and midwives as to their approach to the patient in the consulting room and labour ward. It all comes down to our ability to obey, in practice, the command "do unto others," to bring interest and sincerity to our job, and to spend time in the doing of it. "The doctor who imagines that an impressive manner alone hoodwinks his patients is greatly deceived, as patients are connoisseurs in sincerity."

He has some pithy words on the subject of "Iatrogenic causes of Anxiety" which should be taken to heart by those who "run" our maternity hospitals.

To sum up, this chapter presents with great clarity and judgement, truths which this reviewer has only learnt painfully and partially after over forty years of practising and teaching midwifery and gynaecology. I commend it to all who contemplate taking up the speciality. It is a corrective to the error which haunts most of us, "knowledge comes, but wisdom lingers."

H. L. H. G.

THERAPIST-PATIENT EXPECTANCIES IN PSYCHOTHERAPY. By Arnold P. Goldstein, Ph.D. (Pp. xvi + 141. 30s) Oxford and London: Pergamon Press, 1962.

A BIBLIOGRAPHY of 342 references indicates the thoroughness with which the author has surveyed the literature related to his subject. Recent personality theories, such as those of Rotter and of Kelly, provide him with the keynote to his studies. Both tend to regard behaviour as basically anticipatory rather than reactive. The relationship between the degree of improvement expected by patients and their actual response to treatment is not a straight line, but curvilinear, i.e., that those patients who expect only moderate improvement, would do best, whilst those with either high or low expectancies would change little.

The author has interesting comments to make on placebo effects. One use suggested for the placebo is to fulfil initially, culturally reinforced ideas as to what constitutes treatment, whilst the patient is learning something about the nature of psychotherapy. Should this not be done, then there will be those who may lapse from treatment, because their expectations have not been fulfilled. Thy cannot fit psychotherapy into their conceptual model of treatment.

There is a useful examination of the psychotherapeutic transaction. Cultural differences between therapist and patient leading to a high drop-out rate, the disruptive effect of expectational discrepancies, and an explanation for improvement whilst waiting to be taken on for systematic psychotherapy are dealt with.

This book, written in technical language, will be of more value to those specially interested in understanding the dynamics of psychotherapeutic interviews. Had the final chapter been written in more general terms, it could have helped considerably to enlighten those learning psychological methods of treatment, and who find difficulty in adapting their techniques to suit individual patients.

The author has done a valuable service to all who wish to study interview techniques. This book should be read both by exponents and critics of psychotherapy alike. J. G. G.

AIDS TO ANATOMY (POCKET ANATOMY). By R. J. Last, M.B., B.S.(Adel.), F.R.C.S. Twelfth Edition. (Pp. v + 408; figs. 73. 12s 6d.) London: Baillière, Tindall & Cox, 1962.

THE present edition of this book is six times as long as the first edition which appeared in 1876. This simple comparison indicates the tremendous demands now made on students of anatomy as compared with those of eighty-six years ago. Topographical anatomy alone is treated, and this is done systematically in fourteen chapters on joints, muscles, vessels, the nervous, digestive, respiratory, urinary and genital systems. A very short chapter on the ductless glands in which the pituitary is dealt with in a very cursory manner concludes the book. The line diagrams are generally good, but it is a pity to introduce the term "modiolus" when illustrating and writing about the orbicularis oris musculature, as this term is so closely associated with the cochlea that confusion may ensue. This twelfth edition, which has been thoroughly revised, will serve for easy revision of topographical anatomy before all professional examinations. W. R. M. M.

MEDICINE AND THE NAVY. By Christopher Lloyd and Jack L. S. Coulter. Vol. IV, 1815-1900. (Pp. xi + 300; illustrated; 50s.) Edinburgh and London: E. & S. Livingstone Ltd.

THE publication of this, the fourth volume of "Medicine and the Navy," is a notable achievement both for the authors and publishers. The four volumes together contain probably the most complete and authoritative description of the evolution of naval medicine that has been written. The work owes its inspiration to the late Surgeon Commander John Keevil, who had been deeply interested in the subject for a number of years and had collected a vast amount of material. It is unfortunate that he has spared only time enough to write the first and part of the second volume before his untimely death. But he would have rejoiced had he lived to see the masterly and scholarly way in which his successors, Professor

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Christopher Lloyd and Surgeon Captain Jack Coulter have completed the task that he began.

The present and final volume deals with naval medical affairs in the nineteenth century, between 1815-1900, a period during which, apart from the Crimean War, there were few major naval engagements. But this was an age of exploration and of administrative and hygienic reform; one that witnessed great changes in the status of the naval surgeon and of the Royal Naval Nursing Service. So, in the fourteen chapters, the authors give attention to these and other related matters such as the award of the Gibert Blane Medal, "Victualling," "Fevers" and "Other Sea Diseases"; the closing chapter dealing with the royal naval hospitals at the period. In chapter one there is possibly a minor printing error where on page three Beatty (instead of Gillespie) is named as Nelson's physician but this is a small matter and for accuracy of detail and readability few books of this kind can equal the standard the authors have set. There is a particularly interesting chapter on surgeon-naturalists, men who took advantage of their position as ship's doctor on voyages to distant parts to make a study of plants, animal life and the mineralogy of the places they visited. Notable among them were Sir John Richardson, who accompanied Franklin's expeditions into Arctic regions in 1819-22 and 1824-27; Joseph Hooker, who sailed as assistant surgeon and botanist with the "Erebus" and "Terrn" expedition, and Thomas Henry Huxley, who is said to have joined the Navy after a brilliant undergraduate career "because of poverty." It was his voyage as surgeon-naturalist on board H.M.S. "Rattlesnake" to the Great Barrier Reef that decided him to turn his attention from medicine to biology.

The book will, of course, appeal especially to past and present members of the Royal Naval Medical Service but it will attract readers from a much broader sphere on account of its historical interest and the manner in which it so clearly depicts the fearful effect epidemics of disease had on the conduct of fleet operations in the past. It was these epidemics rather than wounds actually sustained in battle that caused the deaths of so many sailors in former times and their sacrifice should not pass unnoticed in history books which have dealt more with the general conduct of operations and more with *material* than *personnel.* R. S. A.

VISUAL PROBLEMS IN AVIATION MEDICINE. Edited by Dr. Armand Mercier, Chairman of the Vision Committee Aero Space Medical Panel. (Pp. vii + 120 40s.) Oxford, London, New York, Paris: Pergamon Press.

THIS collection of papers has been published on behalf of the Advisory Group for Aeronautical Research and Development, North Atlantic Treaty Organisation.

The object is to stimulate further research and each paper is written either in French with English summary or in English with French resumé.

The papers deal with the various problems which can arise in relation to high-altitude and high-speed flight and which may have marked visual effects.

Man has been outstripped by the machine, and normal visual acuity and refraction no longer ensures normal vision under all circumstances.

Electronic devices are used more and more to supply the deficiences of some physiological functions. Acceleration can produce limitation of ocular mobility, pupillary dilatation, and severe constriction of visual fields. Bubbles of nitrogen may form under contact lenses at high altitude.

In darkness, fog, and where there is no object on which to focus, accommodation remains in a state of constant activity varying from 0·5 to 2 dioptres. This can contribute to man's other limitations and the startling example is given where two aircraft approaching each other at 1,800 m.p.h. on the same course and coming out of clouds five miles apart, would be too close for avoiding action to be taken.

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This is a fascinating little book for all who are interested in vision and flight. V. A. F. M.

Christopher Lloyd and Surgeon Captain Jack Coulter have completed the task that he began.

The present and final volume deals with naval medical affairs in the nineteenth century, between 1815-1900, a period during which, apart from the Crimean War, there were few major naval engagements. But this was an age of exploration and of administrative and hygienic reform; one that witnessed great changes in the status of the naval surgeon and of the Royal Naval Nursing Service. So, in the fourteen chapters, the authors give attention to these and other related matters such as the award of the Gibert Blane Medal, "Victualling," "Fevers" and "Other Sea Diseases"; the closing chapter dealing with the royal naval hospitals at the period. In chapter one there is possibly a minor printing error where on page three Beatty (instead of Gillespie) is named as Nelson's physician but this is a small matter and for accuracy of detail and readability few books of this kind can equal the standard the authors have set. There is a particularly interesting chapter on surgeon-naturalists, men who took advantage of their position as ship's doctor on voyages to distant parts to make a study of plants, animal life and the mineralogy of the places they visited. Notable among them were Sir John Richardson, who accompanied Franklin's expeditions into Arctic regions in 1819-22 and 1824-27; Joseph Hooker, who sailed as assistant surgeon and botanist with the "Erebus" and "Terrn" expedition, and Thomas Henry Huxley, who is said to have joined the Navy after a brilliant undergraduate career "because of poverty." It was his voyage as surgeon-naturalist on board H.M.S. "Rattlesnake" to the Great Barrier Reef that decided him to turn his attention from medicine to biology.

The book will, of course, appeal especially to past and present members of the Royal Naval Medical Service but it will attract readers from a much broader sphere on account of its historical interest and the manner in which it so clearly depicts the fearful effect epidemics of disease had on the conduct of fleet operations in the past. It was these epidemics rather than wounds actually sustained in battle that caused the deaths of so many sailors in former times and their sacrifice should not pass unnoticed in history books which have dealt more with the general conduct of operations and more with *material* than *personnel.* R. S. A.

VISUAL PROBLEMS IN AVIATION MEDICINE. Edited by Dr. Armand Mercier, Chairman of the Vision Committee Aero Space Medical Panel. (Pp. vii + 120 40s.) Oxford, London, New York, Paris: Pergamon Press.

THIS collection of papers has been published on behalf of the Advisory Group for Aeronautical Research and Development, North Atlantic Treaty Organisation.

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DISEASES OF THE NERVOUS SYSTEM. By Sir Francis Walshe, M.D., D.Sc., F.R.S. Tenth Edition. (Pp. xii + 381; figs. 60. 35s.) Edinburgh and London: E. & S. Livingstone, 1963.

THE appearance of the tenth edition of this textbook twenty-three years since it was first published reflects its great popularity. The author alludes in the preface that its reviewers would probably not be drawn from the ranks of those to whom the book is particularly directed, namely, students and general practitioners. I am certain that the book would have their enthusiastic and grateful approval. It is clear and precise and easy to read. One never has the feeling that the many advances in neurology over the past couple of decades have been haphazardly inserted but rather the text keeps a first edition freshness while being up to date. As in the ninth edition the author's son, Dr. John Walshe, has written a competent chapter on liver-brain relationships.

All practitioners will gain from reading this book and I would highly recommend it for senior medical students. It is well produced at a reasonable price. L. J. H.

CARDIAC OUTPUT AND REGIONAL BLOOD FLOW. By O. L. Wade and J. M. Bishop. (Pp. xv + 268; illustrated. 45s.) Oxford: Blackwell Scientific Productions, 1962.

PROGRESS in medicine and science depends on asking the right questions and having the means to answer them. The key questions about the circulation of the blood are (1) what is the cardiac output? and (2) in what proportions is it distributed to the various parts of the body? These questions have, until recently, been difficult to answer, and so it has been traditional not to ask them. Observations have been made of more easily measured parameters, such as arterial and venous pressures, the size of the heart, the rate and rhythm of its beat, and the action of its muscle as revealed by the electrocardiograph. These, and other measurements, and the methods of clinical examination are of unquestioned importance, but they leave us in ignorance as to the exact effectiveness of the pumping action of the heart.

Only in the last two decades have methods, both based on Fick's principle, and employing measurements respectively of foreign dye concentration, and of gaseous exchange, been brought to a state of generally acknowledged reliability and been widely employed for measurement of the cardiac output in a variety of normal and diseased conditions. The methods are complex and exacting, and require the co-operation of highly skilled observers. The total amount of data is still not very large.

One of the most notable contributions from anywhere in the world to this field was made by the group in Birmingham led by K. W. (now Professor) Donald from 1951 onwards. O. L. Wade, now Professor of Pharmacology and Therapeutics at Queen's University, and J. M. Bishop were two senior members of this group. Their monograph, written with vivid clarity, critically discusses and evaluates not only the previously published and a good deal of unpublished Birmingham work, but reviews all the other important work in the field.

Mention can be made here of only a few of the interesting conclusions that emerge. In patients with heart disease there is, surprisingly, a very poor correlation between the cardiac output and the extent of the disability due to breathlessness on the presence of congestive heart failure. Cardiac output is much more severely reduced when valvular disease places a burden on the right ventricle than when it does so on the left ventricle. Auricular fibrillation has little effect on the output of an otherwise normal heart, but severely restricts the output in patients with disease of the mitral valves. Patients with heart disease reduce the flow of blood to areas of the body other than the heart, brain and active muscles, to extremely low levels, so that some venous blood returns almost completely stripped of oxygen. Blood is re-distributed much more drastically than in a normal person similarly exercised. The stimulus for, and mechanism of, this redistribution remain to be discovered.

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AIDS TO BACTERIOLOGY FOR NURSES. By E. Joan Bocock, S.R.N., S.C.M., D.N. (London), and Katharine F. Armstrong, S.R N., S.C.M., D.N.(London). Second Edition. (Pp. xi + 188; figs. 43. 10s. 6d.) London: Baillière, Tindall & Cox, 1962.

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CORRELATIVE NEUROANATOMY AND FUNCTIONAL NEUROLOGY. By Joseph G. Chusid and Joseph J. McDonald. Eleventh Edition. (Pp. 386; illustrated; $5.50.) Los Altos, California: Lange Publications, 1962.

THIS is one of a series of well-known medical publications, the popularity of which in America can be judged by the fact that, since 1938, when the book first appeared, there have been no less than eleven editions.

The authors intend it for the beginner in neurology and recommend that it should be used as an aid or supplement to standard works. But the British undergraduate, accustomed to pocket-sized volumes of this kind, may be put off by its size ($10'' \times 6\frac{1}{2}''$) and its 373 pages of tightly condensed information presented in synopsis fashion. To the post-graduate, however, it has much to offer in providing the greatest range of accurate information within the smallest possible compass. Thus, the introductory chapter gives a brief resumé of the embryology of the nervous system. Chapter two deals with neuro-chemistry; chapters three and four with the anatomy and physiology of the brain and spinal cord. In section II peripheral nerves and autonomic function are discussed; section III considers the clinical principles of neurodiagnosis and includes chapters on electromyography, electroencephalography and radiological examination. Many experienced neurologists will find the book useful for reference in preparing lectures and clinical demonstrations and one of its best features is the profusion and excellence of the illustrations.

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GERIATRIC NURSING: A STUDY OF THE WORK OF GERIATRIC WARD STAFF. By G. F. Adams and P. L. McIlwraith. (Pp. xix + 77; figs. 2. 7s. 6d.) London: Published for the Nuffield Provincial Hospitals Trust by Oxford University Press, 1963.

THIS study is the result of combined effort on the part of many people. It is partly the work of a team of experts trained to observe, question, analyse and, if need be, criticize. It is partly the work of senior nurses, women of courage and tenacity, who have already brought the art of geriatric nursing to an exceedingly high level. Above all, it is the work of a physician who was once faced with 360 "chronic sick" in wards containing sixty-five beds (and precious little else) in four rows, and who, thanks to new building, skilful reconstruction, and leadership, transformed a block, known euphemistically as "Convalescents" but better deserving as its motto, "Abandon hope all ye who enter here," into a dynamic unit.

In the appendices are set out in detail the exact procedures and the time and staff required for such care of the elderly as will enable the greatest possible number to return to active life in the community, and the rest to survive in comfort, and at the last, to die with dignity.

Appendix 14, on night staffing, is an admirable analysis of allocation of duties between members of a ward team, with shrewd comments on the profitable use of different grades of staff. Such details about a part of the nursing which rarely comes directly under the eye of the consultant are most valuable.

The notes on methods and equipment (Appendix 15) though brief, because the subject is dealt with more fully in the Whittington Hospital report, are useful on account of their local applications.

Plans of the new wards are also given, showing that a section in each is devoted to long-stay patients in whom rehabilitation is not to be hoped for. It is Dr. Adams' contention that similar sections should be planned in the building of all hospitals, so that the load of heavy nursing may be more evenly spread within each hospital. It is interesting to recall that this was originally the practice in the Belfast City Hospital, when each ward had a proportion of long stay patients, at the further end, to be sure, but sufficiently integrated to enjoy contact with younger patients and the cheerful atmosphere of progress and recovery. It is not possible to undertake specialised rehabilitation techniques in such circumstances, and only patients unlikely to require these facilities should be retained. In fact, with the continually increasing demand for geriatric beds, of which adequate numbers are still not available, the situation is re-creating itself, with the sad difference that the old people who used to be the favourites of all the staff, are now viewed with resignation, if not with actual resentment, as being out of place in an acute ward. Such is the result of insidious "conditioning"! The conclusions reached in this report, since they are based on exact calculations, are not matters of opinion, but of hard fact. They show clearly that the standard of nursing required in a geriatric unit is in no way inferior to that in acute medical wards and can only be maintained by comparable numbers of staff of similar grades.

Given the essential establishment, and the provision of geriatric beds in all training schools, so that all nurses may have an opportunity to become proficient in the meticulous techniques required, the nursing of elderly patients would be found to be exacting indeed, but giving full scope for all the skill, ingenuity, and tenderness, which distinguish the true nurse from the technician. The supposed unpopularity of geriatric nursing is almost entirely due to two factors: from sheer lack of experience, many matrons and tutors simply do not know what opportunities there are, not only for devotion and conscientiousness (which do not necessarily exclude academic ability!) but also for technical skill. And, secondly, because of unrealistic establishments, those women who do embark on this branch of nursing, find themselves overworked, jaded and depressed.

To assist with the care of an aged parent throughout weary terminal illness is to learn at bitter cost just how highly skilled is this art which is so lightly regarded by those

who should be leaders in their profession. One thinks of the ready acceptance of one nurse to one baby being the correct staffing for an infants' ward. And one wonders, wryly, why other nurses should be expected to care for thrice as many geriatric patients, whose needs are as great, whose demands more vocal, and who weigh approximately fourteen times as much.

The problem of caring for an ageing population is a complex one. It often calls for what might seem to the outsider to be great sacrifice within the family (only that "love knoweth no measure, but is fervent beyond all measure") and for much generosity from the whole community. Few, however, will escape a stay in hospital in their later years. Many will die in hospital. It depends very much on the action taken as a result of this report whether that experience is foreseen with tranquillity or with despair. M. J. L. F.

SOME ASPECTS OF INTERNAL IRRADIATION. Edited by T. F. Dougherty, W. S. S. Jee, C. W. Mays, and B. J. Stover. (Pp. xviii + 529; illustrated. 100s.) Oxford: Pergamon Press, 1963.

THIS well-bound volume is comprised of thirty-three edited papers from a symposium held at Heber, Utah, in May, 1961.

Most of these papers deal with the effects of internally deposited, bone-seeking, radio-nuclides in various mammals. Detailed and comprehensive information is given on the results of a large-scale experiment, using adult beagles, carried out in the University of Utah, and almost half the papers in this volume are based on the various physical and biological effects of radium, plutonium, mesothorium, radiothorium and strontium 90 on these animals.

An additional attraction is the fact that an account is given of the discussion following the presentation of each paper. In these, the experts in many cases pin-point the remaining problems and outline the direction in which further research will be required.

A section is devoted to papers on the physical problems of distribution and dosimetry of alpha and beta emmitters in the body, and contains contributions from such distinguished British medical physicists as Professors Lamerton and Spiers.

Although the need for longer term animal studies is recognised, this book probably comprises the most comprehensive collection to date of data on the effects of internally deposited radio-nuclides. Even if the difficulties in extrapolating most of the results obtained in their application to man are all too apparent, the available information on humans who have ingested radium and mesothorium (early luminous dial painters and patients injected with thorotrast) correlated with the results of these animal studies using the same and other radioisotopes, may help to define more precisely the hazard to man involved in the use and misuse of these substances.

A book of this nature, presenting such a mass of new data, should grow in importance as the use, and associated hazards, of these bone-seeking radio-nuclides becomes more widespread. A. R. L.

THE PATHOGENESIS OF ESSENTIAL HYPERTENSION: PROCEEDINGS OF THE PRAGUE SYMPOSIUM. Edited by J. H. Cort. (Pp. 477. 100s.) Oxford: Pergamon Press, 1962.

THIS is a report of the symposium held under joint W.H.O. and Czechoslovak Cardiological Society auspices in Prague in 1960. The entire production is in English and the editors must have had many difficulties.

The symposium covers papers on the definition and natural history of hypertension, epidemiological studies, the nervous system and essential hypertension, the hæmo-dynamics of essential hypertension, vessel wall factors and metabolic factors. In spite of this wide coverage there is still room for debate of what contitutes hypertension, and the casual reading evidently gives little information. The contributors have produced an interesting series of papers, but perhaps even more interesting is the diversity of their opinions upon what is, or is not, a common disease process. J. H. B.

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A book of this nature, presenting such a mass of new data, should grow in importance as the use, and associated hazards, of these bone-seeking radio-nuclides becomes more widespread. A. R. L.

THE PATHOGENESIS OF ESSENTIAL HYPERTENSION: PROCEEDINGS OF THE PRAGUE SYMPOSIUM. Edited by J. H. Cort. (Pp. 477. 100s.) Oxford: Pergamon Press, 1962.

THIS is a report of the symposium held under joint W.H.O. and Czechoslovak Cardiological Society auspices in Prague in 1960. The entire production is in English and the editors must have had many difficulties.

The symposium covers papers on the definition and natural history of hypertension, epidemiological studies, the nervous system and essential hypertension, the hæmo-dynamics of essential hypertension, vessel wall factors and metabolic factors. In spite of this wide coverage there is still room for debate of what contitutes hypertension, and the casual reading evidently gives little information. The contributors have produced an interesting series of papers, but perhaps even more interesting is the diversity of their opinions upon what is, or is not, a common disease process. J. H. B.

who should be leaders in their profession. One thinks of the ready acceptance of one nurse to one baby being the correct staffing for an infants' ward. And one wonders, wryly, why other nurses should be expected to care for thrice as many geriatric patients, whose needs are as great, whose demands more vocal, and who weigh approximately fourteen times as much.

The problem of caring for an ageing population is a complex one. It often calls for what might seem to the outsider to be great sacrifice within the family (only that "love knoweth no measure, but is fervent beyond all measure") and for much generosity from the whole community. Few, however, will escape a stay in hospital in their later years. Many will die in hospital. It depends very much on the action taken as a result of this report whether that experience is foreseen with tranquillity or with despair. M. J. L. F.

SOME ASPECTS OF INTERNAL IRRADIATION. Edited by T. F. Dougherty, W. S. S. Jee, C. W. Mays, and B. J. Stover. (Pp. xviii + 529; illustrated. 100s.) Oxford: Pergamon Press, 1963.

THIS well-bound volume is comprised of thirty-three edited papers from a symposium held at Heber, Utah, in May, 1961.

Most of these papers deal with the effects of internally deposited, bone-seeking, radio-nuclides in various mammals. Detailed and comprehensive information is given on the results of a large-scale experiment, using adult beagles, carried out in the University of Utah, and almost half the papers in this volume are based on the various physical and biological effects of radium, plutonium, mesothorium, radiothorium and strontium 90 on these animals.

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TEXTBOOK OF VIROLOGY FOR STUDENTS AND PRACTITIONERS OF MEDICINE. By A. J. Rhodes, M.D., F.R.C.P.(Edin.), F.R.S.C., and C. E. van Rooyen, M.D., D.Sc.(Edin.), M.R.C.P.(Lond.), F.R.C.P.(C.), with the assistance of contributors. Fourth Edition. (Pp. xvi + 600; illustrations, 152; tables, 60. 108s.) Baltimore: Williams & Wilkins Co., 1963.

THE fourth edition of this textbook has been almost completely rewritten. Although the total number of pages is less than in the previous edition, a new format with double columns to a page and a larger page size has very greatly increased the content of this fourth edition. It is, however, still a manageable textbook. Another major change is that virus infections are arranged according to the biological properties of the causative viruses. While this makes for a more systematic approach to the subject and will be welcomed by science students, the arrangement in earlier editions in which infections were arranged according to clinical, pathogenic and epidemiological features of the disease was in many ways more attractive to medical students and practitioners. Thus, for example, in the third edition in the section on eye diseases, there were sequential chapters on trachoma, inclusion conjunctivitis and other forms of viral infections of the conjunctiva while in the fourth edition one has to search for information on epidemic keratoconjunctivitis and conjunctivitis due to Newcastle Disease virus, and trachoma and inclusion blenorrhoea are now grouped (admittedly in their rightful taxonomic place) with the other members of the basophil group of viruses.

Among the contributors to this edition are the following: D. M. McLean (arborvirus group), A. J. Beale (poliomyelitis), D. B. W. Reid (statistical methods), K. R. Rozee (cell culture methods in virology) and L. Simmeritch (induction of tumours by viruses).

The reviewer feels that there is a certain imbalance in the space devoted to the various subjects. Thus while there are ninety-four pages devoted to arborviruses and fifty-one to poliomyelitis, influenza receives only twenty-two, and respiratory syncytial virus (RSV) one quarter of a page. While the former provides an admirable and up-to-date survey of the arborviruses and will be of value to those with interest in this group of viruses, it seems excessive for a textbook for students and practitioners of medicine, and RSV is certainly more important to students and practitioners than the probable vector of Wesselbron virus which receives more attention.

While there are lists of many virus diseases of animals, there is practically no information in the text about any of them, so the textbook, while giving an excellent outline of the fundamental properties of the various groups of viruses of man and animals, falls short in the information which a student would require about some of the viruses of animals.

The third edition of this book was undoubtedly a "best buy" for medical students and practitioners. The fourth edition has, the reviewer thinks, become too big and too detailed for this market although an excellent book for science students and specialists. The illustrations are very good, the text clearly written and accurate and the bibliographies of value to general readers. G. W. A. D.

OPHTHALMOLOGY: A TEXTBOOK FOR DIPLOMA STUDENTS. By P. D. Trevor-Roper, M.D., F.R.C.S., D.O.M.S. Second Edition. (Pp. x + 668. 90s.) London: Lloyd-Luke (Medical Books), 1962.

WHEN this textbook was first published six years ago, it soon became the constant companion and invaluable guide to the postgraduate student preparing for an ophthalmic diploma.

The general presentation and the pleasant literary style are still evident, and although this edition has been brought thoroughly up to date and many new illustrations included, it still remains a manual of reasonably modest proportions.

The anatomy, physiology, optics and diseases of the eye are clearly and concisely described, and treatment is based on the author's own clinical experience and the current teachings of Moorfields Eye Hospital and the Institute of Ophthalmology in London. V. A. F. M.

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THE scope of this book in its third edition has been widened so as to include much more information on the pre- and postoperative management in cardiac surgery, including open heart procedures. There is also some useful information on purely investigative cardiac techniques. All in all, the book remains a most excellent conpanion for the resident or registrar in thoracic surgery which can be recommended unreservedly. M. S.

THE MIDDLE YEARS. By Albert Sharman, M.D., D.Sc., F.R.C.O.G. (Pp. xi + 71. 6s. 6d.) Edinburgh and London: E. & S. Livingstone, 1962.

THIS little book sets out to explain to womenfolk what exactly is meant by the "change of life" or climateric. In order to do so with greater clarity and understanding the author conducts his reader through puberty, menstruation, ovulation and pregnancy with sufficient simple anatomy and physiology to make them interesting. He then proceeds to explain the onset of the menopause, leading to the "change of life" or climateric and wisely makes a determined onslaught on the legends and fears that have grown up regarding this transition phase, laying many of the "bogies" and emphasising the many rewarding accomplishments that remain to the middle-aged woman. In passing, he has a reassuring word for those who require a hysterectomy and advises a full discussion with the gynæcologist of its significance.

In treatment of menopausal symptoms the author rightly places the psychological approach first with its clear explanation of this natural process in a woman's life, and of how much her mental attitude and approach to the problem can do to solve many of her difficulties. Given a sound understanding of the process the need for special treatment is less in time and amount and much more likely to be effective.

Reading this small book carefully should do much to restore a woman's confidence and serenity, whilst a careful perusal by the average husband should help him to contribute through his wife's climateric an understanding and sympathy of a most helpful nature.

H. L. H. G.

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THE first section of the book deals with the normal physiology of water and electrolyte, and the second with the imbalances which may occur in pathological studies. Both subjects are considered in great detail, with many tables, charts and diagrams of varying complexity. Some of the information given is in excess of the requirement of the practising physician, but it will be useful to those studying the subject in depth and also to research workers. The uninitiated will find both these sections forbidding and would be advised to start with a simpler and more connected text.

The section on treatment is somewhat bewildering. More than thirty-five electrolyte and parenteral repair solutions are listed, and are, therefore, presumably considered to be of practical use. It is difficult to believe that the author actually uses all these in his practice and indeed, if his reader has attained an understanding of the subject from perusal of the first two sections of the book, then they are quite unnecessary. It is rarely necessary to use more than five basic solutions in the treatment of any case, no matter how complex the metabolic disturbance may be.

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THE relative backwardness of the Russians in the biological sciences has been a continual source of surprise to many people in the western world. It contrasts strongly with their brilliant achievements in the physical sciences and in technology. The depressed state of the biological sciences is a new thing since Russian standards in physiology were on a par, if not superior to those in the more advanced European countries until the nineteen-twenties. What has happened since that time? Conversation with scientists from eastern European countries would suggest that a number of factors were involved. There was a fall in the status afforded to people working in the medical sciences compared with that afforded to those in the basic sciences. Pavlovian teaching tended to be accepted as physiological dogma. Papers were rarely accepted for publication in Russian physiological journals if they did not contain some reference to Pavlov's work. Finally, the Russian scientists suffered from restriction of travel and of free interchange of ideas with scientists of other countries. These may account partly for the retarded evolution of physiology in Russia.

Grigor'eva's book on vascular innervation has the style and feel of an uninspired monograph written in western Europe in the early nineteen-thirties. The author discusses the innervation of the smooth muscle in a variety of blood vessels. Conflicting conclusions of different authors, using different methods on different tissues, are presented in a sequence, determined largely by date of publication. The evidence presented is largely histological. The book must, therefore, be judged on the quality of the reproductions of the histological preparations. Here again one feels the scientific clock has been put back. What photomicrographs there are are poorly reproduced on poor quality paper. Most of the figures are drawings made from microscopic sections. These are idealized and over simplified and therefore do not carry much scientific weight. There is little excuse for the absence of electron photomicrographs. There can be no excuse for a book of this type not having an index.

Who should buy this book? I think it should be bought by libraries. It could be consulted by histologists, physiologists and anatomists who want a guide to the earlier literature in this field. There are almost forty pages of references, including a number to Pavlov. I do not know a more complete set of references to work on the histology of vascular innervation. I. C. R.

CLEFT LIP AND PALATE. By W. G. Holdsworth, F R.C.S.(Edin.), F.R.C.S.(Eng). Third Edition. (Pp. xi + 204; figs. 158 + vii colour plates. 50s.) London: William Heinemann, 1963.

THAT a third edition of this specialized book has become necessary just twelve years after its first publication is testimony to the active progress which is being made in this field, and also indicates the success which has attended the previous editions.

Once again the author has brought the work completely up to date and includes descriptions of all the modern methods for the treatment of lip and palate clefts. A section on the use of orthodontic appliances for the pre-operative control of the alveolar elements in the new-born is included, and the technique of bone grafting between the alveolar ends is now described.

A special chapter on the environmental and genetic factors which may play a part in the causation of clefts has been contributed by J. W. S. Harris of the London Hospital Medical School and Professor H. C. Killey of the Eastman Dental Institute writes on the use of obturators in the treatment of defects of the palate. All this has been achieved with only a very small increase in size and once again both author and publishers are to be congratulated on producing a book which should prove most valuable to all who are in any way concerned in the treatment of lip and palate clefts. N. C. H.

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HUMAN INTERSEX. By David J. B. Ashley, M.D. (Pp. 357 + xi. 40s.) Edinburgh and London: E. & S. Livingstone, 1962.

THE extraordinary development of research and increase in knowledge of sexual anomalies and human genetics, in the last decade, has outdistanced most clinicians leaving us sadly bewildered. The steady outpouring of papers has literally swamped us and if we are to gain any insight into this rapidly increasing field of medical understanding we are dependent on the specialist to analyse and distil new knowledge and to present it in ready assimilable form. The appearance of Dr. J. B. Ashley's book fulfils this important need and it will be welcomed by anatomist, pathologist, pædiatrician, general physician, endocrinologist and gynæcologist in turn. Here the author has successfully synthesised the work of many disciplines giving us a splendid monograph on intersex and its related problems.

The book consists of 357 pages divided into twenty-one chapters. The first five chapters deal with sexual development in its genetic, embryological and physiological aspects. The following three chapters deal with the cytological aspects of nuclear sexing, leucocytes and the application of nuclear sexing to the study of tumours, particularly those of the chorion, teratomas and tumours of the seminoma/disgerminoma type.

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THERE is no doubt that this is a thoroughly competent introduction to genetics planned for students of biology. It is abundantly illustrated, supported by examples from general biology and thoroughly up to date. There are over two hundred figures and some are in superb colour. It is the work of an experienced teacher who develops the subject logically, and questions at the end of each chapter enable the reader to test his progress. The approach is refreshingly free from difficult mathematical considerations. While valuable to the student of biology the medical man must be warned that it is not all easy reading and this broad understanding of biology is not to be acquired in a few easy sessions.

FOOTPRINTS ON THE SANDS OF TIME, 1863-1963: THE STORY OF THE HOUSE OF LIVINGSTONE. Edinburgh and London: E. & S. Livingstone, 1963.

IT is with special pleasure that we record this volume celebrating the centenary of the House of Livingstone. With it we have received the special catalogue of 160 pages listing over four hundred titles. This slim volume, itself a superb example of the bookmaker's art, is an interesting account of the growth of the House of Livingstone from the bookseller's shop to the great organisation which now so well presents so much of British medicine to the whole world. Only those who, as authors, have watched with anxiety the role of the publisher as midwife in the birth of their brain child know the importance of that work. As numerous reviews in this Journal have testified, the House of Livingstone have consistently maintained the very highest standards of presentation and publication. The catalogue shows how many famous authors and books are, and have been, published by the House of Livingstone and how completely the whole of medicine is covered by their publications.

ILLUSTRATED PHYSIOLOGY. By Ann B. McNaught, M.B., Ch.B., Ph.D., M.I.Biol., and Robin Callander, F.F.Ph. (Pp. viii + 287. 30s.) Edinburgh and London: E. & S. Livingstone, 1963.

EVERY page carries black and white line drawings and a few are multicoloured. These illustrations incorporate text material which is often very detailed. The whole represents a most interesting experiment in visual presentation. A considerable number of the illustrations are sufficiently easy to attract and to be of value to junior students, nurses and medical auxiliaries. These can be understood immediately by more senior students and would be useful for teaching or revision. In others the amount of text tends to detract from the illustrations and detailed study and even some knowledge of the subject is necessary.

Many of the students for whom this book has been prepared have no opportunity to acquire a detailed, first-hand knowledge of structural anatomy. This attempt to supply a structural basis for the understanding of physiology is valuable, and the need for it an interesting commentary on the value of a combined approach to form and function.

CANCER: A GENERAL GUIDE TO RESEARCH AND ITS TREATMENT. Edited by Professor N. N. Petrov. (Pp. xvi + 387; figs. 102. 80s.) Oxford: Pergamon Press, 1962.

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EMERGENCIES IN MEDICAL PRACTICE. Edited by C. Allan Birch, M.D., F.R.C.P., D.P.H., D.C.H. Seventh Edition. (Pp. xii + 784; figs. 123. 50s.) Edinburgh and London: E. & S. Livingstone, 1963.

WHEN a textbook reaches seven editions in fifteen years and is translated into two European languages it is clearly filling a place in the needs of the medical profession. The reason for this is its comprehensive approach to emergencies in medicine, pædiatrics, medical obstetric problems, tropical diseases and in other associated specialties. A great deal of useful advice is given in medical procedures and their hazards and the medico-legal field is not neglected.

In a series of fourteen appendices information is given regarding various emergency hospital and laboratory services.

Throughout, this book is entirely practical and brings together a great deal of information found in specialised volumes on medicine, medical jurisprudence and toxicology. It is well indexed for easy reference, and I would thoroughly recommend it to hospital and general practitioners and especially to those in charge of casualty departments or acute emergency admissions. M. W. J. B.

INTRODUCTION TO PHARMACOLOGY. By J. J. Lewis. Second Edition. (Pp. xii+926; figs. 183. 45s.) Edinburgh and London: E. & S. Livingstone, 1962.

WITHIN two years of its first publication, this book is now in its second edition. This in itself reflects the success and popularity of the work.

The book, as the author puts it, "is not intended to be a textook of therapeutics" and its main emphasis is on the structure and mode of action of drugs. It sets out to do its stated task admirably well and, in general, the subject matter is clearly and interestingly presented. Perhaps the diversion into a detailed discussion on enzyme kinetics in the midst of the section dealing with mode of action of drugs is a little confusing, but such are minor criticisms and rarely encountered.

For the medical student, a textbook with more emphasis on clinical therapeutics must come first; but for the inquiring few who would like to find out more about actions of drugs, they would be justly rewarded in referring to this volume.

The author is to be congratulated in producing an excellent addition to the pharmacological textbooks. T. K. C. K.

FAT EMBOLISM. By Simon Sevitt, M.D., M.Sc., M.A., F.R.C.P.(I.), D.P.H. (Pp. 233; figs. 62. 60s.) London: Butterworth, 1963.

AN ever-increasing percentage of the work coming to the pathologist stems from trauma. Whilst many of the problems of traumatic shock are being overcome the coma of cerebral fat embolism is all too commonly fatal. This lesion all too often fails to be demonstrated. Eighty to a hundred per cent. of patients who die with recent fractures show emboli in their lungs.

This monograph covers the aetiology of fat emboli, their origin and mode of action and their eventual fate. There is a competent chapter on embolism of the brain which is responsible for most fatal cases. There is also a chapter on the medico-legal aspects of the problem.

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