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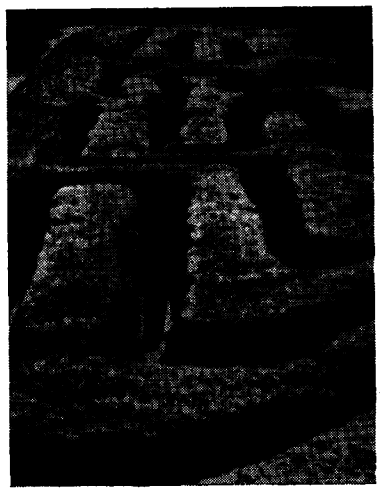

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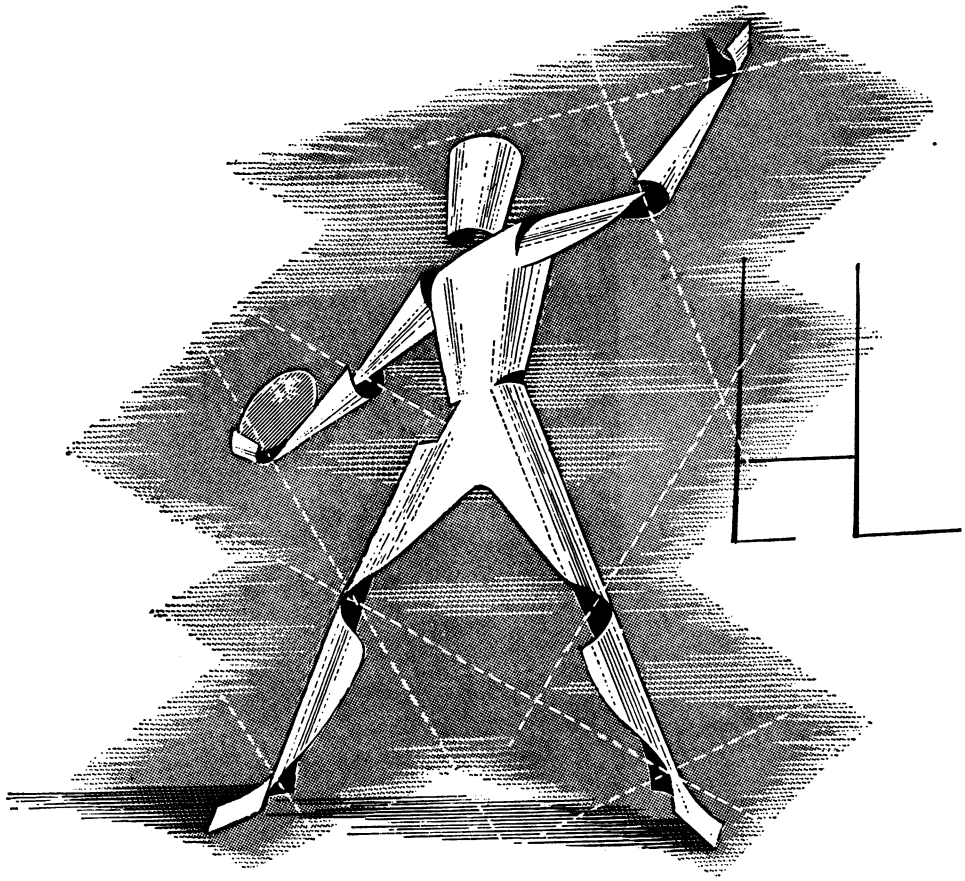

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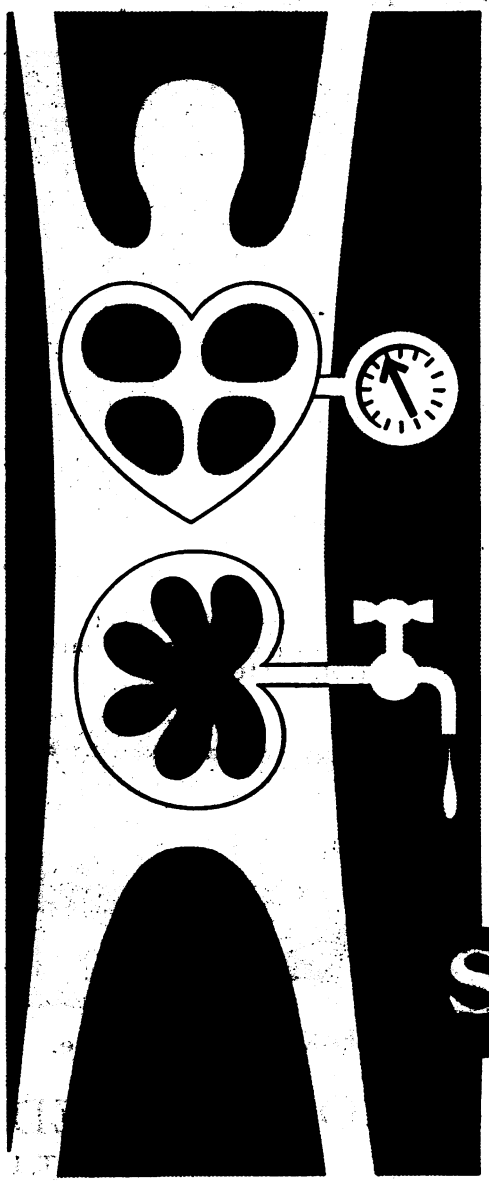

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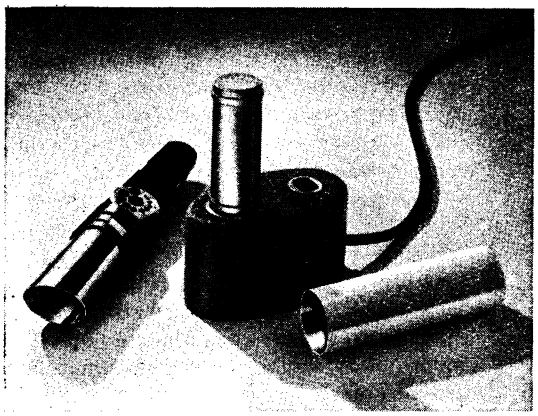

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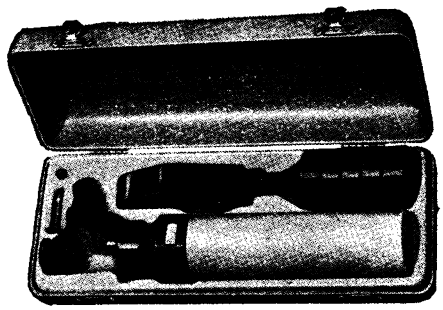

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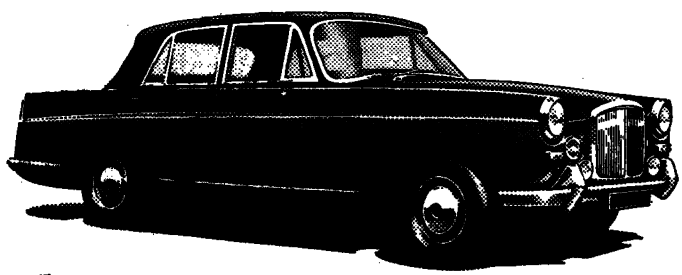

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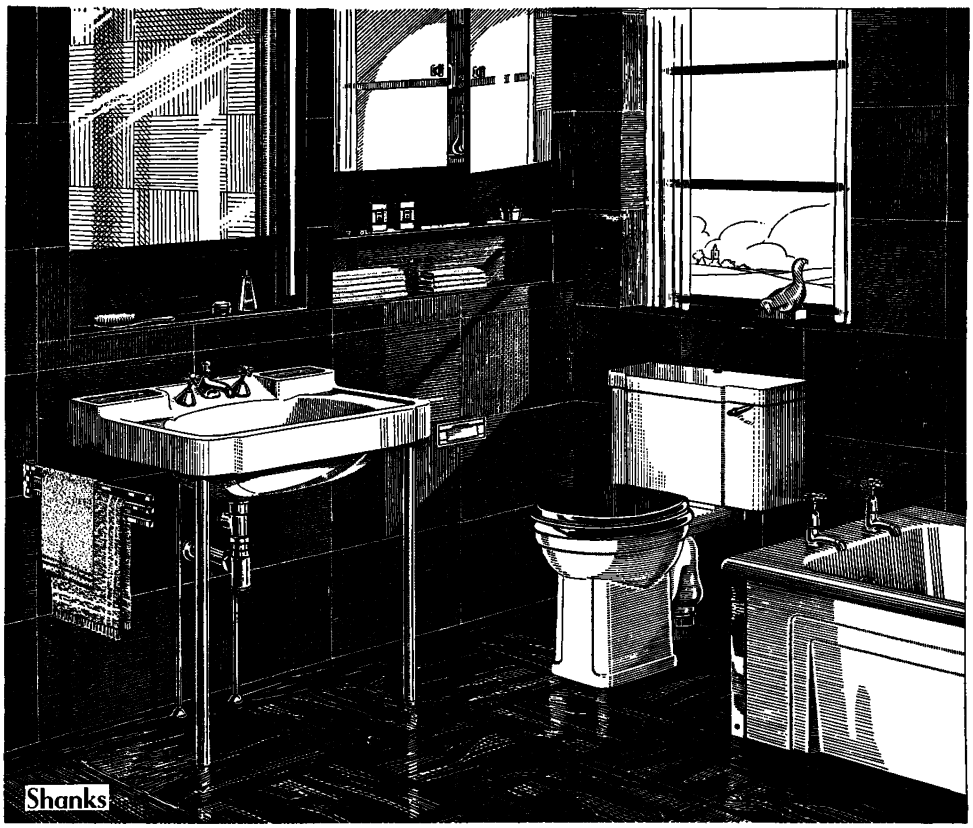

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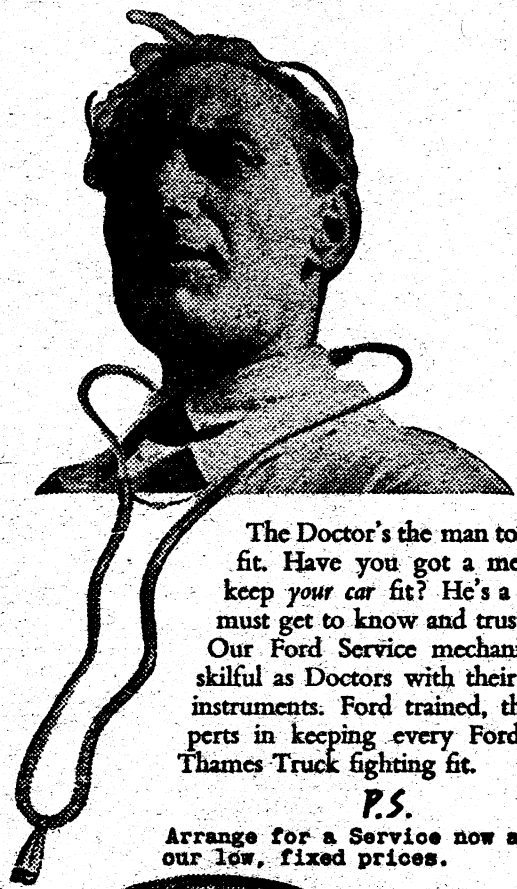

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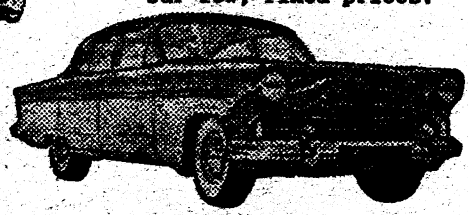

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ON BONE SETTING

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AN ADDRESS
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In times of stress, of pain or of sorrow, the human being will go to any length to try to find help, forgetting all that he may have learned of science or of truth. He may resort to prayer or incantation and this sometimes helps by the process of auto-suggestion. He is ready to jump at any cure or suggestion of cure that may be offered to him, never stopping to enquire as to the motives of those who would heal him or as to the basis on which their claims may rest. He is often swayed by any strong suggestion that may be made and accepts, without thought, explanations of his trouble which are neither based on known facts nor even fit in with common sense.

Primitive people have explained disease as the result of seizure of the body by demonic influences. The cure, if this theory is accepted, rests on the conjuring of the demon from the body. Later arose the idea of sin, either of the sufferer or of his parents, as the cause of ill health and the visible effects were evidence of God's displeasure. Many examples of this are to be found in the Bible. Thus arose the belief in the healing powers of the priest craft and in the value of the prayer that the priest might utter. Thus, too, came the acceptance of the remarkable virtues that seem to be inherent in the laying on of hands, for the priests, the medicine men, and the healers of all types soon found that incantation or suggestion accompanied by physical contact was far more effective in securing results than simple prayer alone.

The notion of Divine intervention, through the hands of man, in curing or alleviating the disease, which the same power has produced, is not peculiar to any age, race or religion or state of civilization. The healers of savage tribes believed that their powers to heal came to them from a divine source. It comes

as no surprise, therefore, to learn that the leaders of our modern pseudo-medical cults likewise believe themselves to be divinely inspired and to have what the public call the "curing hands" or the "healing touch." The medicine man of the past was surely a student of psychology; he knew the simple nature of his people's mental outlook, he appreciated the importance of the fundamental urge of sex, and, most important of all, he realized that a strong claim, no matter how improbable, is far more convincing than a weak one if neither can be proved.

From such an ancestry modern medicine slowly and painfully arose. Even yet it has not shaken off all the absurdities of the past and has still a long way to go before it can bask in the sunshine of eternal truth, and can finally, by its scientific efforts, discredit the quack healers inside and outside the profession, who are still to be found in fair numbers in every society.

Of all the cults of healing which have existed, that of the bone-setter holds pride of place, though in more modern times he has appeared under a variety of names, best known of which are the osteopath and the chiropractor.

We have always had manipulators and layers-on of hands with us. The osteopathic and the chiropractic titles date back a mere eighty years, during which short time their high priests and disciples have, thanks to the understandable though occasionally irritating conservatism of orthodox medicine and also to the frailty of suffering humanity, enjoyed the applause of the credulous and something more than a good living.

They have had offspring too, conferring on themselves strange combinations of letters which indicate to the unwary public what they can do and which seem to add authenticity to their claims. To the unwary these alphabetic appendages may seem in some cases to be straightforward medical qualifications as, for example, the peculiar diplomas that the healers of the British Chiropractors' Society have displayed in law courts from time to time. M.D., F.B.C.S. looks very like our own high medical qualifications M.D., F.R.C.S., which an orthodox practitioner can only obtain after many years of study and hard work. But no, the chiropractor's diploma states that he is a Master Diagnostician and a Fellow of the British Chiropractors' Society. Before the last war this high-sounding and impressive diploma, or should I say fraudulent diploma, could be obtained overnight, without study or preparation, by the simple method of sending a cheque to the London masters of the cult. The diploma came by return of post.

The story of quackery and of healing cults is a never-ending tale and a complete picture of the farcical scene would require endless research. Here it is sufficient to note that the United States, without doubt, gains first place so far as healing cults are concerned, and, of all the nations of the world she is most afflicted by her "healers." She has been lax in the past in recognising all sorts of quacks as reasonable practitioners in certain fields and has had a long uphill fight as a result in ridding the country of its unqualified "healers." She has not yet completely succeeded.

We have to admit that the healing art, as practised today by orthodox medical men, is a comparatively new development. In the last century, and especially in the past forty years, scientific medicine has advanced more than in the previous

two thousand years. Up to the seventeenth century much of the practice of medicine, both in England and in Europe, was in the hands of unqualified persons. Even where recognised training had been taken and the practitioners considered to be qualified most of the methods employed in treatment were mere quackery. Indeed this state of affairs continued until the genius of Robert Koch and Louis Pasteur burst upon an unbelieving world. From these men modern scientific medicine and surgery have stemmed and preventive medicine, the wisest surely of all approaches to disease, was finally born.

The unqualified men of past centuries were not, however, secret practitioners. They published many practical methods for the treatment of bone and joint injuries. Of such were the Wundärzte of the German-speaking countries, the Rabouteurs of France, and the Natural Bone-setters of England. They met the needs of the common people for conditions involving bone, joint or muscle, and were considered as reasonable and responsible practitioners, not only by the public but also by the law and by such enquiring medical minds as were to be found during those centuries of medical darkness.

The skill of the bone-setter was believed to descend in families, passing from father to son or even occasionally to daughter, much in the manner of other skilled trades. In the lay mind there was a considerable element of awe and mystery surrounding the peculiar talents of these men and it is therefore not surprising, when orthodox medicine finally arose in repudiation of bone-setters, that the practitioners of the art encouraged this awe and mystery.

In 1745 Prince Charles unfurled the Jacobite flag on the Braes of Mar in Aberdeenshire and how near to success this rebellion was. In the same year a rebellion of a different kind took place in London and was crowned by success. The surgeons who had been linked with the barbers for centuries petitioned Parliament to set them free from their old guild which had for long borne the title "Masters and Surgeons of the Mystery and Commonalty of the Barber-Surgeons of London." They were willing to sacrifice all claims to the worldly wealth of the old City Guild in order to work out a new ideal. Their prayer was granted and a new body corporate was created with the title "The Masters, Governors and Commonalty of the Art and Science of Surgeons of London." In the opening years of the nineteenth century this body became the Royal College of Surgeons of England.

Henceforth, the surgeons were determined to have done with "mystery" and in future there were to be no private, secret or occult practices, but a common fund of knowledge to which all might have access—a fund which every member might see, sample, sift, and prove and, wherever possible, increase. That their ambitions were crowned with success no one now doubts, though the going was slow until the days of Lister.

Since then surgery has moved from strength to strength though I might add that its advances in the past thirty years have made many a little uneasy and have caused not a few to wonder "whither are we drifting." The ability of men to reason and to think has probably not advanced at all during the period when surgery has advanced literally a thousandfold. Therein lies a tremendous challenge

to the future generations of our society—can we control scientific advance or will it engulf us and finally, like Frankenstein, destroy us?

At the time of the split in the barber-surgeons society there existed in England, and in Wales particularly, a class of practitioners known to the public as bone-setters. They were regarded in the eighteenth century as the legitimate practitioners of native orthopædic surgery: they treated fractures, dislocations, sprains and congenital deformities for the simple reason that the doctors either would not or could not deal with these conditions.

In Cheselden's time—he was the first warden of the newly formed Surgeons' Society—came the parting of the ways. The bone-setters continued to gather their knowledge in the school of local tradition, guarding their secrets jealously and working to rule of thumb as their predecessors had done for centuries. They were content to continue to work in the dark without trying to discover why the means they employed sometimes succeeded and at other times failed. The apprenticed surgeons, on the other hand, set their affairs in order to ensure for their successors and for the public a commonwealth of knowledge. It became a bounden duty of each member of the new company to try to find out the cause of disease and to search for a rational means whereby the cause might be removed or its effects combated. As a result, the surgeons began to study those conditions which the bone-setters had for so long considered to belong to them. British orthopædic surgery owes a lot to the bone-setters, though opinion about their influence is divided. Some have rejected the art of the bone-setter without hesitation, others have allowed that in certain cases he can do a good job and yet others were apparently openly referring patients to him at the end of the nineteenth century. On the whole, however, the reputation of the bone-setter declined as orthopædic knowledge became more and more a part of the armamentarium of general surgery—I use the word "general" in its proper context, not in the restricted sense in which it is nowadays employed.

By the latter part of the nineteenth century bone-setters were no longer thought of in connection with the problems of fractures and dislocations. As surgeons explored orthopædics and made rational observations about bone disease based on dissecting room and autopsy study, the bone-setter was gradually relegated in the public mind to the position of a quack. In England, by the end of the last century, the natural bone-setters had all but disappeared and were replaced by trained professional men who at last were interested in orthopædic problems.

Today one thinks of bone-setters as unqualified men who claim to cure disease or disorder simply by replacing something which is stated to be out of place. Manœuvres are practised for the replacement of a bone, a tendon, a muscle or nerve, and more recently, of course, an intervertebral disc, with an assurance which is nothing short of wonderful. The facts of anatomy, physiology and pathology, on which orthodox medicine is based, would only be a hindrance and an embarrassment to modern bone-setters, and so they don't trouble to learn them. It is the complacency with which they dispose of these fundamental sciences that amazes the orthodox practitioner most. Nevertheless, it has to be

admitted that they do help some people where orthodox medicine has failed even though their conception of what is at fault might not agree with known fact.

The methods of the bone-setter are manipulative, by forcing or wrenching a joint through its full range of movement or twisting it against the restraining influence of its ligaments. In this way adhesions in or around a joint following fracture, dislocation or prolonged immobilisation can be broken down and so full movement rapidly restored and with this the disappearance of pain. The "locking" of a knee by semilunar cartilage tearing and displacement can be overcome almost immediately. "Sprains" of joints, i.e., incomplete tearing of ligaments with hæmatoma formation in them can be quickly relieved when the manipulation either disperses the hæmatoma and the pain of its tension, or else, by rupturing the ligament, converts an incomplete and painful lesion into a complete and therefore painless one. Chronic sprains, with their well-known adhesive tendencies, form a happy hunting ground for the manipulator. Lastly, the so-called "hysterical joint" provides a not uncommon opportunity for a bone-setter's victory. The strong persuasive psychological effect of manipulation may often be the trigger which discharges the patient's mixed-up mental reaction and sets free the "matter" from the "mind." Many patients simply love to be cured, without effort on their own part, by a wonder or a miracle, and mental persuasion accompanied by the laying on of hands is accepted by the unthinking as such a wonder.

I feel sure that many bone-setters are consciously deluding and seeking worldly wealth, but there is undoubted evidence that certain of them are sincere practitioners of their art and are firmly convinced of their powers to heal. They do something which is at times helpful but they do not really understand what they are doing; otherwise how could they claim to replace a bone which does not exist into a normal position of which they know nothing? In other words, without knowledge of anatomy, they are left groping in the dark, and are forced to use a jargon of pseudo-medical terms which may or may not make sense to them but which would not for one minute delude anyone who has had the privilege of dissecting the human body. In this way we hear of joints which are "out" being replaced, of tendons or intervertebral discs which have "slipped" being put "back," and of bones being put "in." Why these structures are "out" or "slipped," or why they don't go "out" again once they have been replaced it is not thought necessary to explain. These terms suggest to the orthodox a conception of dislocation or subluxation which is known scientifically to be absolutely untrue, but which may make a little sense if one accepts the terms to have, not an anatomical, but a functional significance. Nevertheless, the manipulative art can be used successfully in certain cases and the first to admit it is the orthopædic surgeon. Day and daily, orthopædic surgeons manipulate joints with satisfaction to their patients. Unfortunately, in the profession as a whole, there is still a peculiar feeling that manipulation is not quite orthodox and that it is still something to be spoken of in a whisper and preferably in a subdued light. Indeed the whole thing is rather "Non U" to use a modern expression. It is this "hush hush" attitude to a practice, which is now on a reasonable, anatomical and entirely

rational basis, that has driven manipulative treatment underground or, if you prefer it, into the hands of the unqualified. Who can doubt that adhesions, round a healed fracture, or associated with a joint which has for long been immobilised or a joint which has been subjected to sprains, are not crying out to be stretched or broken down by the hands of a manipulator?

Through the work of Hey, Annadale and many others, manipulative treatment of a torn and displaced semilunar knee cartilage is today on a scientific basis and there is no necessity to go to the unqualified if such a condition is present. The doctor, trained in modern orthopædic methods, can do as much, if not more, for these types of case than the bone-setter can hope to do, since the qualified practitioner's manœuvres are based on sound anatomical knowledge whilst his unqualified brother must of necessity vaguely and often vainly imagine what lies under his hands.

The art of manipulation must be preceded by the ability to diagnose correctly. Without this ability disasters take place, when tuberculous joints and tumorous bones, for example, are manipulated by the unqualified with the idea that "something" is "out of place."

The qualified orthopædic specialist has, too, a most valuable weapon denied to the unqualified—anæsthesia—though he should use this with caution. When his patient is anæsthetised he is able to distinguish between the joint which is stiff through protective muscle spasm and the one which is stiff from adhesion formation. Only in the latter case does he manipulate, in the former he will, if he is wise, continue to insist on rest to the affected part.

Unfortunately there is reason to believe that a considerable number of qualified doctors know nothing of the work of Hey and Annadale and nothing of the discoveries their colleagues in the past fifty years have made in regard to the physiology of joints and the abnormal anatomy of trauma. Indeed there are many in practice who have forgotten much of anatomy, physiology, and pathology. What a terrible tragedy this is! The rules of this game of "healing" are founded on these three basic sciences: without them we cannot play the game with any assurance and we certainly cannot play it freely and for its own sake. So long as we allow ourselves to sink into this unreal and unreasonable state we shall have, and deserve to have, quacks who will profit by our mistakes. We will have to admit simply and humbly that we, ourselves, are nothing more than "qualified quacks," at any rate in regard to those "cases which bone-setters cure." Let us therefore put our house in order and study these cases and their treatment based on the facts of anatomy and physiology which, as practising physicians, we really should know. The modern bone-setter has undoubtedly helped not a few sufferers; on the other hand he has done irreparable damage to cases which orthodox and diagnostic medicine could have cured. His successes are advertised, and, as his failures and disasters do not make public headlines, the public cannot be completely blamed when it thinks that bone-setters know something which orthodox medicine does not know. It is my firm belief that the view taken by certain sections of the public that bone-setters have a secret which is hidden from our eyes is entirely wrong and absolutely groundless.

Hugh Owen Thomas, who was the leader in England of orthopædic surgery at the end of the last century, was a descendant of a family of bone-setters who had an excellent reputation and who had practised for many generations. His father, however, was wise enough to recognise the trend in medicine in the middle of the last century and insisted on his son taking formal medical training in Edinburgh University. He also taught him the family secrets of bone-setting. In spite of his origin Thomas was not inclined to think very much of bone-setting. On one occasion he said this—"In the practice of bone-setting nothing is to be found that can be added to our present knowledge, yet discussing the matter will show our own ignorance. That some bone-setters, who practised in past times, were in some special matters superior to their qualified contemporaries I know to be a fact, but this assertion does not apply to their general knowledge or practice, and concerning disease of joints I have never met with the slightest evidence that any of them had any knowledge on the subject which was not entirely wrong." About this statement of Hugh Owen Thomas we have no way of being absolutely certain, for the simple reason that bone-setters never publish papers, nor do they ever tell to the qualified profession what the public refers to as their secrets. Why is this? Is it that they have really nothing to tell or is it that they are bound together by some secret bond which enforces silence upon them. Surely the former is much more likely than the latter!

About two famous bone-setters we know a little. Mr. Richard Hutton had established himself as a professional bone-setter in London about the middle of the last century and his consulting room was frequently crowded with patients coming from all classes of society. He was the descendant of a family in the North of England who had exercised the art of bone-setting from father to son from time out of mind. Mr. Hutton became seriously ill in the year 1865 and was looked after by a certain Dr. Hood. Hood had heard of Hutton's care of many sick people and of many poor people from whom he had refused to accept fees. Hood refused to accept any fee from Hutton for what he did for him and in gratitude the bone-setter offered to teach Dr. Hood the secrets of his cult. Dr. Hood sent his son, Wharton Hood, who was a member of the Royal College of Surgeons, to observe the methods which Hutton used.

Wharton spent many hours with the bone-setter watching him treat the kind of cases that were in those days, and to a lesser extent today, the despair of the legitimate practitioner. After Hutton's death in 1871, Hood published a detailed account of the kind of cases treated and the methods Hutton employed. As a matter of fact, Hutton really had no secrets to reveal. His methods were known and used by his predecessors in John Hunter's time.

In 1927 Sir Herbert Barker (he was knighted in 1922) published a book entitled "Leaves from My Life." This book consists of two parts—the first has to do with his early life and the six months' training which he had from his uncle, another unqualified bone-setter; the second part consists of copies of testimonials from patients whom he had treated and paper-cuttings suggested the intolerance of the medical profession. A consideration of this book only bears out the long-held contention that bone-setters never tell. In Sir Herbert Barker's book

not one word is to be read of what he does, what his conception of the lesions which he is treating consists of, or on what he diagnoses disease process. The book simply tells us that he treats patients, that many of them write testimonials to thank him for it, and that orthodox medicine will not or cannot see "the light."

A consideration, therefore, of the lives of Sir Herbert Barker and of Mr. Richard Hutton only bears out the belief of our profession that there is nothing in bone-setting which, with a little thought based on anatomical and physiological knowledge, we could not practise ourselves. There is, however, a fundamental difference—none of us would ever claim to "put back" imaginary bones into imaginary positions, though we would claim to force joints through their full range of movement, thereby breaking down adhesions which are limiting the movement of these joints and causing disability.

As previously stated, the United States of America has been more pestered by a multiplicity of "healers" than any other country. Fortunately Britain has been comparatively free from various healing cults, so we must now turn to the U.S.A. for information about the "modern manipulator."

Osteopathy, like many healing systems, had a semi-religious origin. In June, 1872, Andrew Still, flung to the breeze the banner of osteopathy. Before flinging it, Still had been a free-lance doctor among the Shawnee Indians in Kansas. Whilst travelling about on the old American frontier Still became interested in some bones dug up in an Indian graveyard. He cogitated on what he saw and soon was convinced that bones are the most important elements of the living body and that the backbone is the bone of all bones in the control of disease. At this point, as he himself has written, he felt himself the recipient of a Divine revelation and this he emphasizes repeatedly in the story of his life. This aspect of his mission was perhaps a necessary ingredient lighting an inward flame which gave the founder and prophet the power to attract hordes of fanatical followers. He was finally convinced of his belief by a case which he treated in Missouri in 1870. He followed a woman and three children on the street and noticed that one of the children was suffering from what he calls "a bloody flux" so severe that a discharge was visible all along the sidewalk. He offered his help and describes vividly the course of the cure: "I picked him up and placed my hand on his back. It was hot whilst the abdomen was cold. I asked myself what is 'flux.' I began to reason about the spinal cord which gives off its motor nerves to the front and its sensory nerves to the back, but this gave me no clue to flux. I examined the child's back again—I found rigid and loose places in the muscles and ligaments of the whole spine. The thought came to me in a flash, that there might be a strain or a partial dislocation of the bones of the spine and that by pressure I could push some of the hot into the cold places and by so doing adjust the bones and set free the nerve and blood supply to the bowels. On this basis of reasoning I treated the child's spine and told the mother to report the following day. She came the next morning with the news that the child was completely recovered."

The apparently miraculous cure of the boy with diarrhœa naturally resulted in numerous calls for the services of the spinal adjustor and he modestly admits

that he treated many cases with success. Later he settled in Kirksville, practising osteopathy and teaching it to his four sons. Finally, in 1894, he secured the charter of the "American School of Osteopathy," the institution which was to deliver upon the people of the United States many thousands of followers and practitioners of the osteopathic system of diagnosing and treating disease.

The original Divine revelation of Still was that the primary cause of every disease is some interference with the blood supply or nerve function to the affected part, always caused by a displacement of one of the bones which make up the spinal column. This displacement, Still believed, brings about a change in the size of the intervertebral foramina through which the nerves pass from the spinal cord to the parietes. The result is pressure on these structures and disease at whatever distant point of the body to which the nerves may lead. The cure was therefore to adjust the spine by manipulation, so that nerve function becomes unimpeded. But the osteopathy of Still, which was handed down from heaven, was a somewhat different osteopathy from that which exists today.

The modern osteopath, while still holding on warily to these spinal manipulations or adjustments, though substituting the term "lesions in tension" for the original spinal displacements, has reached out to embrace all he can of modern medicine. He uses antibiotics and modern drugs, realises the value of X-rays, and in some cases even employs anæsthesia and surgery, for he would dearly like to be thought of as a doctor in the modern sense of the word.

In the osteopathy schools of the U.S.A. the students learn anatomy and physiology to the same standard as do the medical students. Thereafter their ways diverge—medical students to study disease for five to six years, and osteopathy students for a much shorter time, depending on the school they attend. All this must be taken as evidence that the osteopathy of today is essentially an attempt to cut down time and cost in preparation and to enter the practice of medicine by the back door.

Some osteopaths, even today, cling to the original spinal displacement hypothesis of Mr. Still and rant and rave about the ineffectiveness of orthodox medicine. In a book, published by a certain Mr. Wilfred Streeter in 1935, and entitled "The New Healing," we can read of what he calls the great medical superstition of bacteriology. He quotes from Bernard Shaw's "The Doctor's Dilemma" to prove the point he thinks he is making. He states dogmatically that osteopaths repudiate the conception that bacteria are the primary cause of bacterial disease and it is here that orthodox medicine and osteopathy diverge. The osteopath asserts that where bacilli are found in the body in association with disease they are there for a secondary reason; they have been caught in bad company. Bad company, i.e., disease, is due to maladjustment, derangement or impairment of the structural integrity of the body which stops, clogs or interferes with the flow of vital fluids. These words, and what do they really mean, are simply a restatement of the osteopathic founder's belief. To anyone who has watched the triumphs of bacteriology and its practical applications these words of Streeter condemn at once himself and the system of treatment which he practises.

The average osteopath would not now agree with Mr. Streeter, though I am sure he would have some other explanation for the continuation of "spinal adjustment" as a sensible approach to treatment.

It was, indeed, a weakness of osteopathy that it had ambitions to be a science and that it strived for respectability. When its schools increased their entrance requirements in primary education and when they extended their hours of study they had turned the corner and were on their way out. Osteopathy, growing complex and scientific, ceased to meet the demands for simplicity and so the blacksmiths, barbers, motor men, farm hands, etc., who sought an easy road to healing, turned by their thousands to the chiropractic schools where no preliminary education was demanded and where a diploma to any aspirant who could pay the necessary fees was guaranteed.

Looking over the successive calendars of the schools of osteopathy shows that their teachings have gradually been expanded and that the most modern of them now teach much that is taught in the older schools of medicine. Indeed one is left with the feeling that an intelligent modern osteopath who has been through a modern osteopathic school is not far short of an ordinary doctor in his theory and practice and only carries out manipulations in those cases where some local lesion might demand forcible movement for its amelioration. In other words, he practises medicine without his M.B., and manipulates at times so as not to be completely unfaithful to the memory of Andrew Still, and his absurd system of healing.

"The spine is a series of bones running down your back. Your head sits on the top end of it and you sit on the bottom." This is a simple explanation only surpassed in simplicity by the words of the late Fats Waller—"The hip bone's connected to the back bone and the neck bone's connected to the head bone." Surely this should be sufficient for the average man. But the spine is much more complex than that. Ask any chiropractor. He will tell you things about the spine which would bring a blush to the cheeks of anatomists, physiologists, and pathologists, or to any others who have not lost this delightful peripheral manifestation of emotional expression.

About twenty years after Andrew Still had flung to the breeze the standard of osteopathy a certain D. D. Palmer, of Iowa, laid his hands on the back of an office janitor who had lost his hearing following a back strain. Palmer manipulated the back and within ten minutes the janitor was cured of his deafness.

This story was later told in court by Palmer's son, who asserted that, as a result of the experience in the case of the janitor, his father had arrived by pure logic at the conception of chiropractic. But there is some evidence that the elder Palmer, whilst practising as a magnetic healer, also took a course down Kansas way from old man Still. It is difficult for the orthodox practitioner to see, at least in the early days of this century, any great difference between osteopathic manipulations and chiropractic thrusts.

The explanation offered by the chiropractor to account for all disease is very simple, and hence well calculated to attract the minds of those who like to think in the absence of facts. As one famous, or infamous, chiropractor once said,

"Don't talk to me of anatomy, physiology or other superstitious ideas, it is the system and the 'thrust' which are the important things."

The chiropractor's creed is simply that disease is caused by certain bones of the spine impinging on certain nerves and naturally disease is cured by pushing these bones off the nerves until, by some unknown mechanism, they are persuaded to stay off.

In the original school, founded by the elder Palmer, it is quite clear that anyone could embark on the study of chiropractic. It was not even necessary to be able to read or write, though at the time of the First World War the standard was higher than this. No primary education was necessary, though Palmer did insist and I quote his words "that each student must have a brain and know how to use it."

By 1921 there were may schools in America and the business of training practitioners for chiropractic was a most flourishing one. In the courses provided for students five points were discussed—the philosophy of chiropractic, how to use the chiropractic "thrust," how to "adjust" patients, something of obstetrics, and a lot about salesmanship.

In this year, 1921, Palmer made a speech at a convention of chiropractors in Montana. He appears to have been a little incautious, or perhaps the strong wine of success had gone to his head, for here's what he said: "Our chiropractic school in Davenport is established on a business and not a professional basis. It is a business where we manufacture chiropractors. They have got to work just like machinery. A course of salesmanship goes along with their training. We teach them the idea and then we show them how to sell it."

Part of the business too was advertising and one can find some interesting side lights in the American papers of the twenties and early thirties. For example, there was an organisation in Indiana formed to aid the chiropractor in reaching his prospective clients. It was frank when it admitted that "to advertise, inside the chiropractic, medical, and truth laws, requires some adroitness, some ingenuity of expression, and some more than common ability as a word-smith."

As might be imagined, the osteopaths and chiropractors soon became involved in arguments as to which cult was the superior, though, as I have said, there was a time when the orthodox observer could really see no difference between them. Later, osteopathy tried to become scientific and respectable; chiropractic never had such ambitions.

Mr. Palmer went ahead for a while when he suddenly appeared with a little device of his own called the "Neurocalometer"—"the little wonder instrument which so accurately locates impinged nerves." From that time onwards all the chiropractor had to do was to buy one of these instruments, put it on the spine and he immediately knew where to do his pushing. I may add that to obtain a "Neurocalometer" all you had to do was to pay two hundred dollars down and then fifty dollars a month for eighteen months. It is interesting that the "Neurocalometer" split the chiropractic brethren into two camps—those who thought it wonderful and those who, having tried it, wanted their money back because the machine did not do what was claimed for it. This device of Palmer's

was possibly introduced as a counterblast to Abraham's Box, the sale of which was limited to physicians and osteopaths. The humble chiropractor was excluded.

Albert Abrams was the quackiest of all quacks, though the first half of his life was spent in an orthodox fashion. He was a qualified doctor, and indeed at one time was Professor of Pathology in San Francisco. What he did after this is pretty strong evidence of, to say the least of it, gross eccentricity.

He introduced an electric machine of such apparent complexity as to make a Heath Robinson device look like simplicity itself. The box, or "dynamiser," was connected to several rheostats and finally to the forehead of some healthy individual. Into the box was placed, upon filter paper, a drop of blood from the patient. The individual at the other end of the machine stripped himself to the waist and then faced west in a dim light. The operator then percussed the abdomen of this healthy individual for various areas of dullness. It was Abrams' delusion that by this method he could tell whether the person, whose blood was in the box, was suffering from tuberculosis, cancer, syhpilis, malaria or various forms of sepsis. Not only that! The severity of the disease was measured in ohms of resistance. Still more wonderful, he asserted that he could explain, according to the position and amount of the dullness, the religion of the person whose blood was being tested. By this method he recognised six types of religion only—Catholic, Methodist, Seventh-Day Adventist, Theosophist, Protestant, and Jew. Not a bit of wonder, therefore, that the box was sold for cash only, no credit being allowed.

Scientific investigations were by law finally made on "The Box," and the conclusions were that it was a veritable jungle of electric wires violating all known laws of electric circuit construction and, from the standpoint of physics, the acme of absurdity. In spite of these findings the box flourished and in 1937 there was a famous case in Manchester, England (not Massachusetts), brought to light the fact that the box was not by any means unknown in Britain. Here the healthy individual was the operator's wife, who stood in black silk pyjamas, thereby adding lustre and delight to the whole absurd test. The box made two million dollars for Abrams, but is now in the limbo of forgotten things.

The use of these machines has sometimes been referred to as pseudo-scientific. To use such a term is to dignify these devices far beyond their merit. They are an absolute fraud and a continuous proof that a considerable number of people are willing to believe in anything that they do not understand.

But to finish with the chiropractor. It has been said that osteopathy is essentially a method of entering or trying to enter the practice of medicine by the back door. Chiropractic by contrast is an attempt to arrive through the cellar. The man who applies at the back door at least makes himself presentable. The one who comes through the cellar is covered with dust, he may carry a crow-bar and he often wears a mask.

Why do people go to bone-setters, osteopaths or chiropractors, anyway? Don't they ever help anybody?

People go to them because they have been directly influenced by advertising, in which reputable physicians do not indulge. They go also because they know

of some friend who has been helped, *or* thinks he has, by some manipulation or other. They go because they themselves believe that regular manipulations of joints are essential to well-being, and they get a kick out of it. They go because they say they have no faith in doctors.

They go when orthodox medicine has failed to help them. Let's be quite honest about this; doctors do fail at times and for four main reasons, I imagine:

First, our knowledge of life and of disease, in the widest meaning of the word, is unfortunately still very incomplete. The ordinary man in the street, when ill, feels that doctors should, by some unexplained means, be able to restore him to health, and that soon. Homo sapiens is still unable or unwilling to accept what he knows in his heart to be true—that he must one day die and disappear forever from this earthly stage. When orthodox medicine, therefore, is faced by as yet mortal or incurable conditions, or prolonged illness and has had to bow its head, who can blame the main actor turning to the unorthodox if cure, or the hope of cure, is offered him.

Secondly, there are in practice, enormous numbers of cases of self-limiting disease from which recovery is the rule and time and patience the cure. In these conditions, orthodoxy simply uses assurance and prescribes a placebo which it knows has not the slightest effect on the underlying disease process, but which is ordered as mental succour to the patient. The average patient knows nothing of the healing powers of the body, and if in his impatience he turns to the unorthodox he is certain to attribute the eventual spontaneous cure to the measures employed.

Thirdly, our approach to mental illness and psycho-somatic disturbance leaves much to be desired. In the first the spiritual healer, be he psychiatrist, cleric or mystic, has his successes, and, in the second the manipulator, the bone-setter or the osteopath have a huge field in which to reap fame and fortune.

Lastly, but maybe this should have come first, a poorly trained, stupid, incompetent or unprincipled doctor is as great a threat to scientific medicine as all the quack cults of healing put together.

THE 1957 EPIDEMIC OF POLIOMYELITIS IN BELFAST

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In the summer and early autumn of 1957 there was an epidemic of type 1 poliomyelitis in Northern Ireland. The principle area involved was Belfast County Borough (population approximately 450,000), where there were 162 cases of acute poliomyelitis, of which 114 were paralysed, giving a paralytic attack rate of 25 per 100,000.

Immunization against poliomyelitis was started in Belfast during May, 1957, but supplies of vaccine were limited, and by November, when the epidemic was over, only 1,523 children had completed the primary course of two injections.

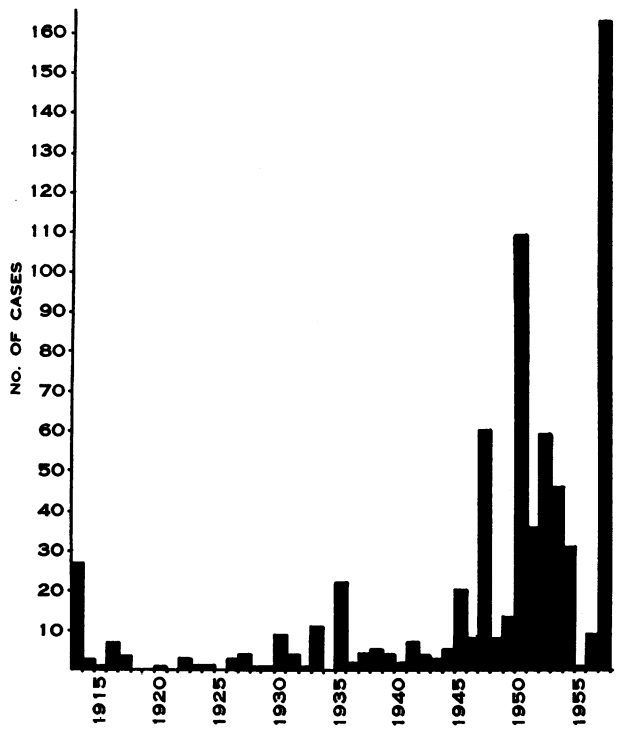

Fig. 1—Notified cases of acute poliomyelitis in Belfast from 1913 to 1957. The notifications for 1913 are from 16th September onwards. Since 1955 the figures are based on laboratory confirmed cases and not simply on notifications.

Since that time extensive vaccination has taken place and the 1957 epidemic may be regarded as the last one uninfluenced by vaccination.

The Incidence of Poliomyelitis in Belfast since 1913.

Although outbreaks of acute poliomyelitis had occurred in Northern Ireland before 1913 the disease did not become notifiable until the 16th September of that year, and between then and the 31st December, 1913, 27 cases were notified in Belfast. From 1914 until 1946 there was relatively little poliomyelitis reported and seldom as many as half a dozen cases were notified from Belfast in any one year; the greatest numbers occurred in 1935 and 1945 when there were 22 and 20 cases respectively (see Fig. 1).

In the summer of 1947 there was an epidemic of poliomyelitis in the British Isles and many areas, including Northern Ireland, recorded the highest incidence of the disease that had ever been experienced. In that year sixty cases were notified in Belfast. Since then there has been a marked increase in the number of cases reported (see Fig. 1). Despite great fluctuations in prevalence from year to year the average overall incidence has risen sharply. Thus the average number of cases per year from 1937 to 1946 was only six, but from 1947 to 1956 it was thirty-seven. Some of this increase is probably more apparent than real because of better notification, but it undoubtedly reflects the growing importance of the disease.

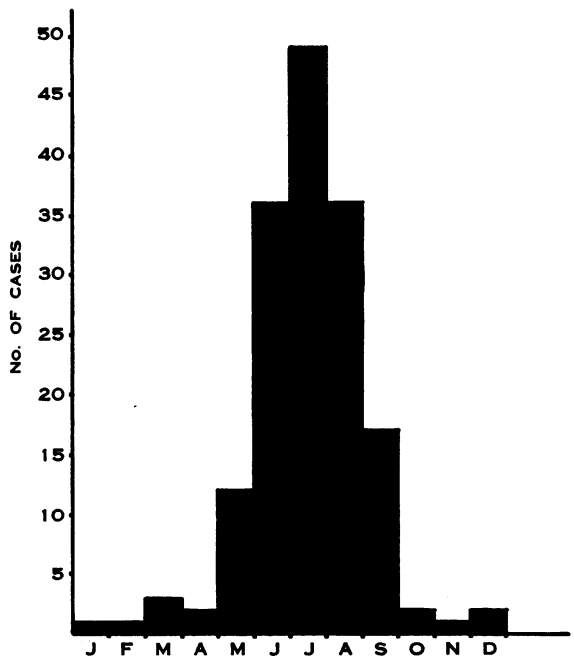

Fig. 2—The monthly incidence of acute poliomyelitis in Belfast, 1957.

The 1957 Epidemic.

In Belfast during the first four months of 1957 there were seven scattered cases of acute poliomyelitis, and there was nothing to suggest that an epidemic was to follow. However, in May, twelve cases were reported and nine of these were confined to adjacent streets in two areas. At this time an epidemic seemed likely, not only because the distribution of cases suggested a high attack rate among children, but also because the number of cases reported was high for the month of May and appeared to be increasing. In June the number of cases rose sharply and reached a peak in July, but by September the incidence declined and in October only sporadic cases were occurring (see Fig. 2). At first the majority of

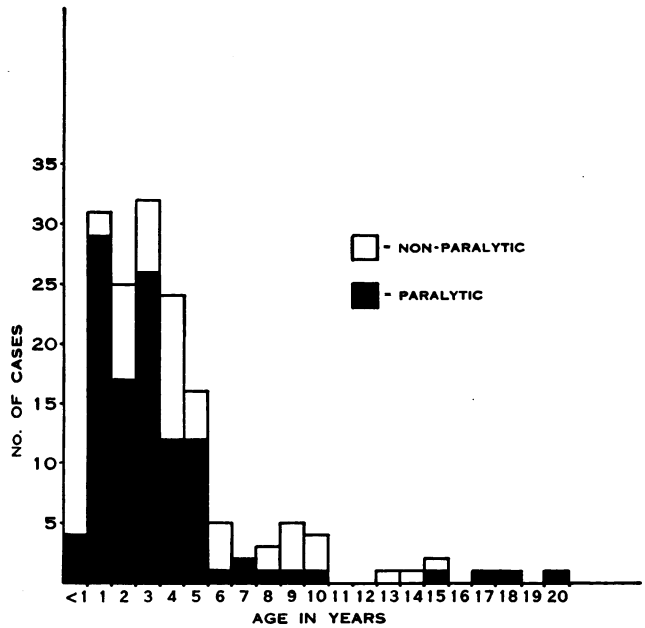

Fig. 3—The age of poliomyelitis patients in Belfast, 1957. There were four patients over 20 years of age, and all were paralysed.

cases were confined to certain parts of the city, but later the disease spread to involve all areas, though the attack rate varied considerably in the different city wards, from 5 to nearly 70 per 100,000.

Eighty-one per cent. of all patients were under the age of six years (see Fig. 3). There were no cases recorded in infants under the age of six months and only four in infants between seven and twelve months. The distribution of cases by age was similar to that found in other years since the war, and followed the pattern which was predicted from the results of a poliovirus antibody survey made in 1955 (Dane, *et al.*, 1956). The small number of cases in older children and adults is readily explained by the fact that the majority of children in Belfast experience inapparent natural poliovirus infections early in life and are

subsequently immune. The absence of cases within the first six months of life probably results from the high proportion of infants possessing passively acquired maternal immunity.

Of the 162 cases in all age groups 114 (70 per cent.) were paralytic and 48 (30 per cent.) were non-paralytic (see Fig. 3). Two of the paralysed patients, who were aged 4½ years and 6 months, died. There was no significant difference between the ratio of paralytic and non-paralytic cases in pre-school children and school children, but out of a total of thirty-five children under the age of two years there were only two who were not paralysed. We consider that the difficulties involved in making a clinical diagnosis of non-paralytic poliomyelitis in this age group must partly account for this high proportion of paralytic cases. There were only seven patients over the age of sixteen and all were paralysed. Among the forty-eight non-paralytic cases four (8 per cent.) had encephalitis and the remainder had aseptic meningitis.

In nine families there was more than one reported case, but in only two of these nine families was there more than one *paralytic* case.

Laboratory and Epidemiological Investigations.

The laboratory diagnosis of cases.

Specimens were received from 188 patients diagnosed provisionally as suffering from acute poliomyelitis or aseptic meningitis. Every known case of paralytic poliomyelitis and every case of aseptic meningitis admitted to hospital in Belfast during 1957 is included in this series.

Type 1 poliovirus infection was diagnosed in 159 of these 188 patients. In 156 instances the diagnosis was based on the isolation of type 1 poliovirus in monkey

TABLE 1.

The Laboratory Diagnosis for 188 Patients with a Clinical Diagnosis of Acute Poliomyelitis or Aseptic Meningitis.

Laboratory Results	Laboratory Diagnosis	No. of Cases
Type 1 poliovirus isolated.	... Type 1 Poliomyelitis ...	156
No virus isolated. Fourfold or greater rise in C.F. antibody to type 1 virus.	... Type 1 Poliomyelitis ...	3
Echo virus isolated.	... Echo virus infection ...	4
No virus isolated. C.F.T. negative.	... Not Poliomyelitis ...	17
No virus isolated. No neutralizing antibody to any poliovirus type in convalescent serum.	... Not Poliomyelitis ...	3
Adequate specimens not available.	... ? ...	5
	Total - - -	188

kidney tissue cultures from fæcal specimens (see Table 1) and in three instances by the demonstration of a fourfold or greater rise in complement fixing (C.F.) antibody to type 1 poliovirus. In twenty patients from whom no virus was isolated it was possible to exclude the diagnosis of poliomyelitis by serological tests. Only one of these patients was paralysed. There were four patients with ECHO virus infections, two of whom had mild or transient paralysis. Lastly there were five patients from whom inadequate specimens were available: three of them were paralysed and almost certainly had type 1 poliovirus infections, and they have therefore been included in the final total of 162 cases of acute poliomyelitis.

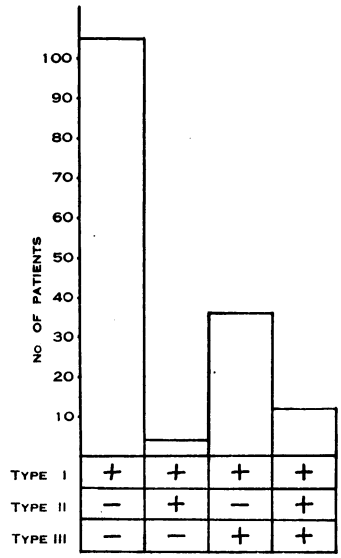

Fig. 4—Neutralizing antibody patterns to the three poliovirus types in convalescent blood samples from 157 type 1 poliomyelitis patients.

The incidence of previous heterotypic infections in cases of type 1 poliomyelitis.

Convalescent specimens of serum were available from 157 of the 159 laboratory confirmed cases of type 1 poliomyelitis and these were tested for the presence of neutralizing antibody to each of the three types of poliovirus. As might be expected, all of the 157 patients possessed type 1 antibody as a result of their recent infection, and the majority were found to have no type 2 or type 3 antibody indicating that they had not experienced previous inapparent infections with these types of virus. Previous heterotypic experience was several times more common with type 3 than with type 2 virus (see Fig. 4). At the time of the epidemic it was not possible to make a survey of poliovirus antibodies among normal children in Belfast, but from the results of a survey made in 1955 (Dane, *et al.*, 1956) it seems likely that about one-half of the normal population of the

same age as the poliomyelitis patients would have had type 2 antibody due to a past inapparent infection with that virus. In contrast only 9 per cent. of the poliomyelitis patients had type 2 antibody. This finding is in keeping with a former observation that the incidence of previous type 2 infection was considerably lower in patients with acute poliomyelitis caused by type 1 virus than in the general population of comparable age (Dane and Briggs, 1956). One explanation of this is that an immunizing infection with type 2 virus may render children less liable to paralytic disease if they are subsequently infected with type 1 virus.

A follow-up survey of the functional capabilities of patients.

All patients were seen by one of us (S.N.D.) between six and twelve months after discharge from hospital, and an attempt was made to gauge their functional capabilities. As the majority of the patients were children a system of grading

TABLE 2.

THE GRADING OF FUNCTIONAL CAPABILITY.

Grade I ...	Slight weakness.	... Ordinary school.
Grade II ...	Moderate weakness. Appliance needed for stability.	... Ordinary school.
Grade III ...	Severe weakness. Can move with appliance.	... School for physically handicapped.
Grade IV ...	Immobile.	... Education outside normal educational programme.

was devised which took into account the effect their disability might have on their education (see Table 2), using the Handicapped Pupils Regulations (N. Ireland), 1950, as a guide. It was felt that this type of grading would give a more accurate picture of the impact of the disability on the child's life than one based purely on residual muscle weakness.

TABLE 3.

RECOVERY IN PARALYSED PATIENTS.

		No. of Patients	Complete Recovery	Grade at Follow-up			
				I	II	III	IV
Initial Grading of Patients:	I	19	14	5	0	0	0
	II	48	15	9	24	0	0
	III	18	7	1	9	1	0
	IV	27	2	5	13	7	0
TOTAL		112	38	20	46	8	0

N.B. The two fatal cases are not included in the table.

The grade at onset which was assessed from the clinical findings in hospital during the acute stage of the illness was compared with the grade found six to twelve months later (see Table 3). Of 112 paralysed patients 38 recovered completely, 20 were left with slight weakness insufficient to need an appliance for stability, 46 needed an appliance but could attend an ordinary school, and only 8 were left with such severe disability that they had to attend a school for the physically handicapped.

Of the forty-eight children classed on follow-up as Grade II it seems fairly certain that after a time some will cast their calipers and move into Grade I.

The prognosis in acute poliomyelitis is known to be more favourable in young children than in adults and older children, and this may account for the fairly high rate of recovery or near recovery found in the present series.

Provocation paralysis.

It has been established by many investigators that inoculation of combined diphtheria-pertussis vaccine may provoke paralytic poliomyelitis. The provoking effect of the inoculation lasts for a few weeks and if inoculated individuals become infected with poliovirus during that period they are thought to be more likely to suffer from a paralytic illness than if they had not been inoculated. A correlation between the site of inoculation and the site of first paralysis has been demonstrated.

Four of the 162 patients in the present series had a recent history of prophylactic inoculation with combined diphtheria-pertussis vaccine. All were paralysed and in three of the four the site of first paralysis was in the inoculated limb (see Table 4). This comparatively small number of possible cases of

TABLE 4.

DETAILS OF DIPHTHERIA-PERTUSSIS IMMUNIZATION IN FOUR POLIOMYELITIS PATIENTS.

PATIENT	SITE OF INOCULATION	SITE OF ONSET OF PARALYSIS	TIME INTERVAL IN DAYS
P. T. ...	Arm ...	Right leg ...	21
W. L. ...	Left arm ...	Left arm ...	11
G. D. ...	Leg ...	Both legs ...	3
T. L. ...	Right hip ...	Right leg ...	12

"provocation paralysis" may reflect the general awareness among medical practitioners of the dangers associated with inoculations against diphtheria and pertussis during poliomyelitis epidemics. It should be added that there is no evidence that immunization with poliomyelitis vaccine has a provocative effect.

Poliomyelitis and smallpox vaccination.

It has been suggested that successful vaccination against smallpox may give some protection against paralytic poliomyelitis (McIver, 1956). We were reminded

of this suggestion during our investigations when paralytic poliomyelitis occurred in one identical twin who had not been vaccinated against smallpox while the other who had been vaccinated showed no clinical evidence of poliomyelitis.

If smallpox vaccination provides some protection against acute poliomyelitis it is reasonable to assume that any effect would be most readily demonstrable soon after vaccination. For this reason all poliomyelitis patients under the age of three years were examined for evidence of successful vaccination. The proportion of these patients who had been successfully vaccinated was compared with that of the general population of the same age which was obtained from local records (see Table 5). On the null hypothesis the number of patients

TABLE 5.

SMALLPOX VACCINATION IN POLIOMYELITIS PATIENTS AND AMONG THE GENERAL POPULATION.

AGE IN YEARS	NO. OF PATIENTS	NO. OF VACCINATED PATIENTS	PERCENTAGE OF GENERAL POPULATION VACCINATED	EXPECTED NO. OF PATIENTS VACCINATED
<1	4	3	69%	3
1	31	16	62%	19
2	24	17	72%	17

expected to have been vaccinated in each age group was calculated. No significant difference was found between the incidence of smallpox vaccination in paralysed patients and in the general population of the same age. We are unable, therefore, to confirm the suggestion that smallpox vaccination may confer protection against acute poliomyelitis.

SUMMARY.

In 1957 there was an epidemic of type 1 poliomyelitis in Belfast. The main features of this epidemic are described, and a brief account is given of certain epidemiological and laboratory investigations which were made.

ACKNOWLEDGMENTS.

We are indebted to Dr. F. F. Kane and Dr. G. F. W. Tinsdale of the Northern Ireland Fever Hospital, who kindly allowed us to summarize the clinical notes of patients and provided us with nearly all the specimens for laboratory tests; to Mr. G. W. Baker, F.R.C.S., M.Ch.Orth., and Mr. P. T. Crymble, F.R.C.S., Hons. F.I.C.S.; to Dr. H. G. S. Murray, who did the complement fixation tests, and to Professor G. W. A. Dick for his help and advice.

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TREATMENT OF INFECTED FINGERS, ILLUSTRATED BY A SHORT SERIES OF CASES

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THE number of spells of certified incapacity due to cellulitis and abscesses of fingers was 6 per cent. of the total from all causes in 1953-4 (Ministry of Pensions and National Insurance, 1953-4). Despite the fact that gross infections requiring radical treatment are now rarely seen, this figure prompts constant vigilance for advances in treatment. This paper reviews the treatment of infections of the fingers and illustrates it by 186 consecutive cases seen in ten weeks.

BACTERIOLOGY.

The bacteriology of finger infections is important to trace the source of the infection and to find the sensitivity of the organism to antibiotics. Swabs were taken from 150 finger infections and from 100 infections on other parts of the body in a different series of cases.

TABLE I.

ORGANISMS ISOLATED FROM 150 FINGER INFECTIONS.

ORGANISM	FINGER INFECTIONS No.	%	GENERAL INFECTIONS No.	%
Coagulase—Positive Staphylococci only	119	79.3	82	82
Coagulase—Positive Staphylococci found with other organisms	12	8	3	3
Other organisms (including Coag. Negative Staphylococci found alone)	12	8	4	4
Sterile	7	4.7	11	11
TOTAL	150	100	100	100

It can be seen from Table I that coagulase positive staphylococci were found in 87.3 per cent. (79.3 + 8) of finger infections and 85 per cent. of infections from other parts of the body. Thus, the great majority of finger infections are due to coagulase positive staphylococci and the proportion due to that organism is similar to that found in infections in other parts of the body. The fingers are probably infected from the same sources as other parts of the body.

TABLE II.

SENSITIVITIES OF COAGULASE POSITIVE STAPHYLOCOCCI FROM FINGER AND SKIN INFECTIONS.

		FINGER	SKIN	COMBINED
Penicillin	Sensitive	77 (58.8%)	53 (62.4%)	130 (60.2%)
	Resistant	54 (41.2%)	32 (37.6%)	86 (39.8%)
	TOTAL	131	85	216
Terramycin	Sensitive	131 (99.2%)	84 (98.8%)	214 (99.1%)
	Resistant	1 (0.8%)	1 (1.2%)	2 (0.9%)
	TOTAL	132	85	216

Table II shows the sensitivities of staphylococci (coagulase positive) to penicillin and terramycin in both finger infections and infections on other parts of the body.

It is seen that 41.2 per cent. and 37.6 per cent. of the coagulase positive staphylococci are resistant to penicillin in each case. Statistically there is no difference between these and consequently when combined we find that 39.8 per cent. of the organisms are resistant to penicillin and 0.9 per cent. are resistant to terramycin.

A figure of 39.8 per cent. of staphylococci resistant to penicillin is very much higher than 17 per cent. found to be resistant by Anderson (1958), but Meleney (1953) found 26 per cent. of staphylococci isolated from out-patients in 1953 to be resistant to penicillin and Williams (1956) found 23 per cent. resistant. Only 0.9 per cent. of the organisms in our series were found to be resistant to terramycin. Meleney's (1953) figure of 12 per cent. of coagulase positive staphylococci resistant to terramycin (isolated from out-patients) is significantly higher than this and indicates the need for restraint in the use of these drugs so that the emergence of further tetracycline-resistant strains of staphylococci may be avoided.

GENERAL CONSIDERATIONS OF TREATMENT.

1. *Incision.*

Many cases may not require incision, the infection being aborted in the early stages by antibiotics. These cases are not usually seen in hospitals and in this series 88 per cent. of cases required incisions. If incision is to be carried out two important principles must be observed.

(a) Incision should only be carried out when one is sure pus is present—if one cannot guarantee the presence of pus nothing is lost by one or two days' conservative treatment (i.e., antibiotics, analgesics, and splinting).

(b) Incision should not be more extensive than is absolutely necessary and trauma should be minimal.

2. *Anæsthesia.*

This can be either general or local. Local anæsthetic used as a digital nerve block can be employed when the infection is either on the middle or terminal phalanx, but the risk of spreading the infection precludes its use when the proximal phalanx is involved. Used in conjunction with a tourniquet (vide infra) this provides a rapidly acting and effective anæsthesia and no complications have been seen from the use of this form of anæsthesia. Ethyl chloride spray must be strongly condemned because the anæsthesia it provides is never complete, nor is it sufficiently long acting.

3. *Provision of bloodless field.*

This can be achieved by either tying a piece of rubber tubing around the proximal phalanx or by inflating a sphigmomonometer cuff on the forearm. The former method is by far the simpler and it is also very effective. The use of a tourniquet is condemned by Gordon (1951), but the value of a bloodless field in aiding thorough exploration and removal of slough far outweighs the disadvantage of a few minutes' ischæmia produced by the use of a tourniquet.

4. *Dressings.*

These should be simple and only dry surgical gauze should be used. Antibiotic powders form hard crusts which prevent drainage. Williams, et al. (1955), has shown that the use of paraffin gauze prolongs the healing time by an average of two days. Damp dressings should not be used, as pyogenic organisms thrive best in a moist environment and frequent dressings should be avoided as this increases the risk of cross infection. Harrison, et al. (1949), advocated dressing on the third post-operative day and every seven days thereafter. I have found it best to dress the wounds three days after incision, and then at intervals of four days because in the more extensively infected cases considerable pus and serous discharge accumulate. However, if the wound is dry and merely awaits epithelialisation, dressing can be less frequent. The gauze dressing is covered with "tubegauz" which provides a neat dressing, and also splints the finger.

5. *Immobilisation.*

In the early stage of finger infections immobilisation of the finger by plaster-of-paris provides great relief of pain. The method advocated by Pilcher, et al. (1948), has proved most successful—a plaster back slab is put over the hand and wrist, with the fingers held slightly flexed by turning the end of the plaster over the tips; the whole arm should be put in a sling with the hand elevated.

6. *Antibiotics.*

The use of antibiotics can be divided into two stages, i.e., pre- and post-operatively. As Table II shows, penicillin will be useless in 41.2 per cent. of cases in either stage. Webster (1947) and Gordon (1951) are in agreement that penicillin is a help in cases where pus has not formed, some infections being aborted by its use, and Harrison, et al. (1949), showed that patients receiving penicillin had a shorter mean healing time. Williams (1956) found that the number of acute

paronychia healing within one week was increased by the use of penicillin. Robins (1952) gives three uses for penicillin in hand infections:—

(i) It is employed to abort early infections.

(ii) Penicillin helps to localise the infective process and to limit its spread once suppuration has occurred.

(iii) Penicillin has radically altered the prognosis in severe infections involving bone, joint, and tendon sheaths.

Post-operatively Anderson (1958) found that "routine post-operative penicillin does not hasten healing in septic lesions of the hand which require surgical treatment, provided that a careful technique is based upon anatomically accurate diagnosis." It is impossible, in view of all the above findings, to lay down a series of rigid rules for the use of penicillin, and experience reveals the lesions most likely to benefit from its use. I favour the use of penicillin in the following circumstances:—

(i) To abort early infections.

(ii) When suppuration has occurred, but there is considerable surrounding cellulitis.

(iii) Post-operatively in gross infections.

(iv) In special infections (vide infra) where there is risk of osteitis developing.

When used, crystalline penicillin ½ mega and procaine penicillin 600,000 units are given initially, and procaine penicillin 600,000 units is given daily thereafter, and never for less than three days.

The use of tetracyclines obviously has its place and possibly the number of infections which could be aborted could be increased by their use, but the risk of increasing the number of resistant strains of organisms prevents its use except in the following circumstances:—

(a) In patients who would be given penicillin but who are sensitive to penicillin.

(b) In gross infections where the organism is shown to be resistant to penicillin.

(c) In cases where osteitis can be demonstrated, either at operation or radiologically. In this case the infection is sufficiently grave to permit the use of a tetracycline immediately instead of waiting for the results of sensitivity tests, especially as approximately 40 per cent. are penicillin resistant.

TABLE III.

GENERAL ANALYSIS OF 186 CASES OF FINGER INFECTIONS.

No. of Cases	Male	Female	Rt. Hand	Left Hand	Patients admitting Trauma	Average Weekly Wage
186	116 (62.4%)	70 (37.6%)	109 (58.6%)	77 (41.4%)	93 (50%)	£6 18 0

Ætiology.

Table III shows that 50 per cent. of cases admitted trauma and this agrees with Bolton, et al. (1949), who found the same figure; however, trauma may be minor in many cases and may not be remembered by the patient. The organism may enter the skin through the sweat or sebaceous glands, but trauma must be considered the most important single factor. This is borne out by the fact that the average weekly wage of the patient was £6. 18s., placing them in the labouring class, and that 62.4 per cent. of the patients were male. Again the right hand was involved in 58.6 per cent. of cases (and the right long finger was most frequently involved, i.e., in 19.4 per cent. of cases). Paronchia seem to be the important exception to this in that 50.7 per cent. were female and only 32.8 per cent. admitted trauma; here some other factor or factors seem to be involved.

Classification.

Table IV shows the classification of sites of infections in the fingers. Not all lesions fall neatly into each group, e.g., infections on the lateral surfaces, but this classification is simple and easily understood. In this table the "duration of the infection" is calculated from the time the patient first felt pain till he was

TABLE IV.

Classification of Finger Infections, Their Duration, Etc.

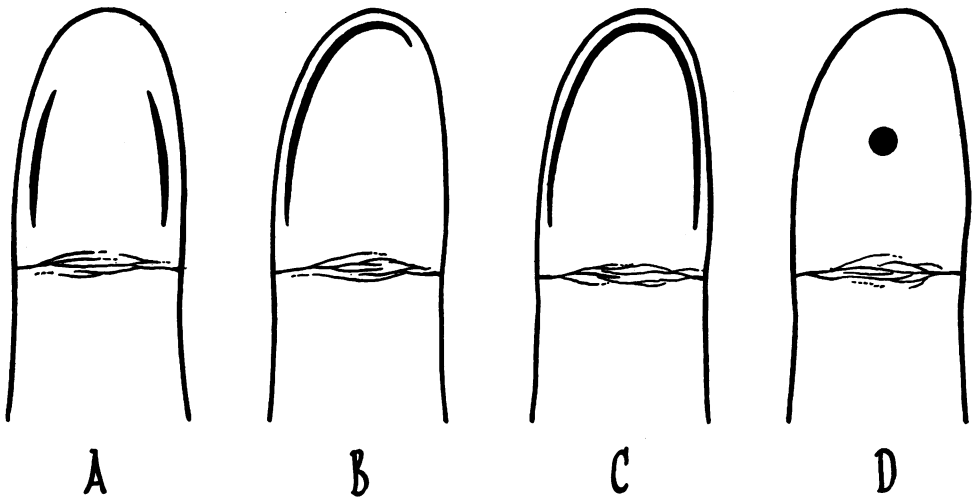
Position of Infection	No. of Cases	Average No. of Days before Attending	Average Duration of Infection	Average No. of Days Attending	Average No. of Attendances
Paronychia	67 (36.0%)	4.2	13.3	4.1	4.1
Dorsal (excluding Paronychia)	39 (21.0%)	3.8	15.4	12.1	5.2
Pulp	34 (18.2%)	4.6	18.2	13.0	5.2
Subcuticular	13 (7.0%)	2.3	8.7	5.8	3.2
Apical	13 (7.0%)	4.1	17.4	15.0	5.7
Volar	13 (7.0%)	3.7	11.9	7.9	4.1
Subungal	7 (3.8%)	5.7	13.9	8.2	3.7
Total	186 (100%)	4.1	14.4	10.4	4.5

discharged from the clinic. It is to be noted that the "healing time" is not given as this only shows the efficiency of incision (being the time from incision till the wound is healed). I feel that the "duration of infection" is the most important time, as it indicates the length of time the patient is incapacitated, and this is the time we must strive to shorten.

Discussion on the Individual Infections.

1. *Apical.*

This is an infection occurring at the tip of finger and sometimes extending under the nail. This area lies very close to the bone and osteitis is therefore very liable to occur. In this series of 13 cases, 3 (23.1 per cent.) developed osteitis. These three cases attended the clinic for an average of 24.3 days; the cases not developing osteitis attended an average of 11 days. Thus early incision (removal of necrotic tissue and overlying nail) is indicated, and penicillin therapy till the sensitivity of the organism is demonstrated, and then the appropriate drug is given till the infection is overcome.



(a) Through-and-through; (b) Hockey stick; (c) Alligator mouth; (d) Saucerisation.

2. *Pulp.*

Much has been written on the subject of pulp infections. Ætiologically trauma seems to be the most important single factor. Bolton, et al. (1947), and Robins (1952) found that two-thirds of their cases admitted trauma and here 61.8 per cent. had suffered an injury.

Some early cases may be aborted by antibiotics (as advocated by Gordon (1951)), but the majority (97.1 per cent.) in this series, on coming to hospital, required surgery. These patients had had pain for an average of 4.6 days. Incision is carried out immediately the presence of pus is assured. The "alligator mouth" incisions, whereby the whole pulp was opened from side to side, and "through-and-through" incisions (see figure) are not now generally advocated. Some

authors (Lowden (1951) and Robins (1952)) advocate the use of the "hockey stick" incision opening one side of the pulp as shown in the diagram. I find it best to "saucerise" the affected area. If a sinus is forming and pus can be seen under the cuticle this area is opened by an eliptical incision, removing all cuticle undermined by pus. The sinus to the deeper part is now explored and if necessary enlarged, allowing pus to drain freely. Slough, if present, is removed. If pus cannot be seen before operation the incision is made through the point of maximum tenderness and the same procedure carried out. It is claimed that tender scars are liable to result when this method is used on tactile surfaces. In the majority of cases this has not been my experience.

The most common complication of pulp infections is osteitis, and this occurred in 2 (5.9 per cent.) of the 34 cases. These cases attended for an average of 30.5 days, while the remainder attended for an average of 11.3 days. Osteitis may be suspected when there is gross infection involving the whole pulp, or when the incised abscess discharges for longer than four to six days. Radiological evidence (rarefaction of the bone) appears earlier than is generally supposed and can usually be appreciated within one week. In my experience osteitis results in two types of case—(1) where the infection has been neglected and the pulp is converted into a bag of pus; (2) where inadequate incision has been carried out, often under ethyl chloride anæsthesia, and only the superficially placed pus has escaped. This emphasises the necessity for providing adequate facilities for drainage when incision is carried out.

It was thought formerly that osteitis was due to ischæmia of the bone resulting from increased pressure in the pulp space. Boulton (1949) thinks that the bone is involved by direct spread from the pulp space. Provided the patient seeks medical aid sufficiently early osteitis need never occur. Once it is suspected the patient should be immediately given a tetracycline antibiotic (vide supra) for at least four days, advised to rest in bed, and the hand put in plaster-of-paris and supported in a sling. If sequestration has occurred the sequestrum should be removed. The bone infection can generally be controlled in a few days, but usually there is considerable soft tissue damage, and it is this which causes the prolonged healing time.

3. *Volar abscesses of the middle and proximal phalanges.*

These abscesses are not so common as the pulp abscesses, but are particularly liable to occur over the joints. Byrne (1954) suggests a right-angled incision across a digital crease and along the lateral aspect of the finger. Robins (1952) uses an antrolateral incision when the skin is intact, and when there is skin necrosis the abscess is incised through the devitalised skin. I have found the former type of case the more common and a transverse incision is made, excising a small ellipse of cuticle. The finger is then put in plaster-of-paris (in moderate extension) and this holds the skin edges apart and allows drainage.

4. *Paronychia.*

This was the infection most frequently seen (36.0 per cent. of cases) and the advanced state of the lesion frequently caused amazement. The position of the

infection and the extent of the nail fold involved cause separate problems and are best dealt with separately.

(a) An early paronychia without pus formation (redness and tenderness, usually at one of the corners of the nail) can be best treated by dry dressing and antibiotics. Unfortunately few of these are seen, but the majority heal rapidly without surgery.

(b) When pus is present, but has not undermined the nail, only the cuticle need be removed and the pus mopped out. These cases heal rapidly and do not require antibiotic therapy.

(c) When pus is just undermining the lateral edge of the nail a wedge of overlying nail is removed. Antibiotics are not required and healing is again rapid. When pus undermines more than the lateral half of the nail it is best to remove the nail in toto. The difficulty in these cases is in knowing exactly how much nail to remove and no hard and fast rules can be made.

(d) When the proximal part of the nail is undermined by pus the proximal half of the nail is removed, leaving the distal half of the nail in situ. This is the most difficult type of paronychia to treat, as healing is inevitably slow.

When incising paronychiæ which have no obvious subungual involvement it is important to stress that a probe should be gently introduced under the nail to find if the infection has spread under the nail.

5. *Dorsal infections of the proximal and middle phalanges.*

These are usually boils or carbuncles arising in the hair follicles. They are frequently extensive and considerable tissue damage leads to slow healing. The best treatment is the administration of penicillin which aids the localisation of the infection, and the hand is immobilised in plaster-of-paris and supported by a sling. When the infection points the cuticle can be gently removed without anæsthetic allowing the pus to drain. Unless the abscess fails to point surgery should be no more extensive as healing may be very prolonged. Thus treatment in these cases should be mainly conservative.

6. *Subungual infections.*

Sometimes splinters of wood, fish bones, etc., penetrate under the nail and infection results. Treatment is simple and obvious—the overlying nail must be removed. Antibiotics need not be used once surgery has been carried out, but may be used if there is no obvious pus present.

7. *Subcuticular infections.*

These are frequently stated to be infected blisters, but this is not always the case. Pilcher (1948) advocates the removal of the cuticle without anæsthesia. I think it is better to use anæsthesia as all the raised cuticle must be removed. Also it is not always appreciated that these may be the superficial extensions of more deeply placed "collar-stud" abscesses, and these require more extensive surgery, and very careful cleansing is sometimes required to discover this.

SUMMARY.

The bacteriology, ætiology, and treatment of infections of the fingers are discussed. These are illustrated by a series of 186 cases of finger infections. The organism in the great majority of cases is a coagulase positive staphylococcus and these organisms are found in a comparable proportion of infections in all parts of the body. Of the coagulase positive staphylococci 39.8 per cent. were found to be penicillin resistant.

Infections of different parts of the fingers are discussed individually, and the results of therapy are commented upon.

I wish to thank Professor H. W. Rodgers and Mr. R. H. Livingston for their help in the preparation of the paper, Dr. Nelson and his department for the bacteriological studies, and Mr. G. Smith for making the diagram.

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REPORT OF THE VIRUS REFERENCE LABORATORY* QUEEN'S UNIVERSITY, BELFAST, 1959

By **J. R. L. FORSYTH, M.B., D. S. DANE, M.B., and G. W. A. DICK, M.D.**
with **D. C. WILSON, F.I.M.L.T., and J. J. McALISTER, F.I.M.L.T.**

THIS is the third report of the Virus Reference Laboratory and covers the work done in that laboratory during 1959. During the year specimens from 538 patients were examined in addition to a number of special investigations. The Northern Ireland Hospitals Authority has created an S.H.M.O. post for this laboratory and has established two technicians and one animal attendant.

POLIOMYELITIS.

Only 19 of the cases notified as poliomyelitis during 1959 were confirmed clinically; of these 13 were paralysed and 6 were "non-paralytic." In addition there were 3 paralysed patients who were not notified. The viruses isolated from fæcal specimens from these patients are shown in Table 1.

TABLE 1.

SHOWING VIRUSES RECOVERED FROM POLIOMYELITIS CASES.

		No.	Suitable Specimens from	No. from which Virus Isolated: Poliovirus 1	Poliovirus 2	Poliovirus 3	Echo/Coxsackie	No Virus
Notified	Paralysed	13	10	6	0	0	2	2
	Not paralysed	6	4	0	0	1	2	1
Not Notified	Paralysed	3	2	2	0	0	0	0

Type 1 virus was recovered from 8 of the 12 paralysed patients from whom suitable specimens for virus isolation were obtained. No isolations of type 2 virus were made during 1959 and only one type 3 strain was isolated, and this from a patient with no paralysis. This is in contrast to 1958 when 22 type 3 viruses were isolated—20 from paralysed and 2 from non-paralysed individuals.

The cases of poliomyelitis were widely scattered over Northern Ireland and the majority of the isolations were made during September-November inclusive.

Vaccine surveillance.

As in previous years, efforts were made to follow up all diagnosed cases of poliomyelitis and to obtain information on their vaccination status. Of the 16 paralysed individuals 8 were infected with type 1 poliovirus and 2 with a non-

*Assisted by a grant from the Northern Ireland Hospitals Authority.

poliomyelitis enteric virus. In 6 of the paralysed patients the clinical diagnosis could not be confirmed by virus isolation: from 4 of them suitable specimens were not obtained and in the other 2, although sensitive techniques were employed, no virus was recovered. The vaccination status of these paralysed patients is shown in Table 2.

TABLE 2.

VACCINATION STATUS OF PARALYSED PATIENTS.

GROUP	NO. IN GROUP	VIRUS ISOLATED	NO. WITH 0–3 DOSES OF VACCINE			
			0	1	2	3
A	8	Type 1 polio.	6	1	0	1
B	6	None	3	0	3	0
C	2	Non-polio. enteric	1	0	0	1

It may be seen that in the 8 individuals with paralytic poliomyelitis which was confirmed by virus isolation 6 had received no vaccine. The individual in this group who had received only 1 dose of vaccine showed symptoms three days after the injection. The time interval is too short for a causal relationship to be considered, or for antibody to have developed, and as far as vaccine effectiveness is concerned this child would be considered as unvaccinated. In Group B (Table 2), 3 individuals had received no vaccine and 3 two injections. The severity of the residual paralysis sixty or more days after onset in these two groups of patients is shown in Table 3.

TABLE 3.

SEVERITY OF PARALYSIS AT SIXTY + DAYS AND VACCINATION STATUS.

GROUP	DOSES OF VACCINE	NO PARALYSIS	RESIDUAL PARALYSIS WHICH WAS: MILD	MODERATE	SEVERE	DEATHS	TOTAL
A Poliovirus isolated	0	0	0	4	1	1	6
	1	0	0	1	0	0	1
	3	1	0	0	0	0	1
B Poliovirus not isolated	0	0	0	0	3	0	3
	2	0	2	0	1	0	3

The only individual (Table 3) who had received three doses of vaccine was admitted to hospital as a case of "post measles radiculitis." His weakness was mild and transient and he made a complete recovery. Indeed there may be some doubt as to whether the type 1 virus recovered from this child was responsible for his symptoms. Although the numbers are small, it can be concluded that during 1959 no child in Northern Ireland who had had three injections of vaccine suffered any permanent disability from infection with poliovirus. On the other hand, of the 9 paralysed individuals who had had no vaccine one died and the

others had moderate or severe residual paralysis when followed up sixty or more days after the onset of the illness. Of the 3 individuals who had had two injections, the only severely paralysed person was a pregnant woman. Pregnant women are known to have an increased susceptibility to poliomyelitis.

Non-Paralytic Poliomyelitis and Aseptic Meningitis.

As explained in the annual report for 1958 (Report, 1959), "non-paralytic poliomyelitis" is not a satisfactory diagnostic term, for symptoms of "non-paralytic poliomyelitis" may be caused by polioviruses, Echo and Coxsackie viruses, mumps virus, etc. A more satisfactory clinical diagnostic term is *Aseptic Meningitis* (q.v.).

During 1959 six cases of non-paralytic poliomyelitis were notified (Table 1), from only one of whom was poliovirus (type 3 isolated). Two strains of type 1 virus were isolated from cases of aseptic meningitis. The vaccination status of the three individuals without paralysis from whom poliovirus was isolated was as follows:—

No. from whom Virus Isolated	No. with 0–3 Doses of Vaccine			
	0	1	2	3
3 ...	2	0	0	1

Aseptic meningitis.

The total number of cases investigated and the viruses isolated are shown in Table 4.

TABLE 4.

Virus Isolations from Patients with Aseptic Meningitis (excluding Non-Paralytic Poliomyelitis).

Number of Cases	Number from which Suitable Specimens	Number from which Virus Isolated					
		Poliovirus			Echo	Coxsackie Viruses	Untyped Enteric
		1	2	3			
66 ...	61 ...	2	0	1	1	11 ...	12

Excluding the 3 patients who had aseptic meningitis due to polioviruses, of the 58 patients with aseptic meningitis from whom suitable specimens were obtained for virus isolation, non-polio. enteric viruses were recovered from 24 (41 per cent.). There was no evidence that there was any particular outbreak of infection with any of these non-polioviruses and, as with the polioviruses, the majority of the isolations were made during the autumn months. As noted in Table 1, viruses of the Echo/Coxsackie group were isolated from 2 patients who were notified as paralytic poliomyelitis. The paralysis in one of these patients was mild and transient and in the other it was of moderate to mild severity when followed up at sixty days. (The latter patient had had no polio vaccination and the former patient three doses of vaccine.)

Meningo-Encephalitis.

Mumps virus.

Five cases of meningo-encephalitis due to mumps virus were diagnosed serologically during 1959. This is in contrast to the epidemic of mumps meningo-encephalitis which occurred in 1958 when there were forty such cases (Murray, Field, and McLeod (in press)).

Other viruses.

In addition to the patients with mumps meningo-encephalitis, 30 cases of meningo-encephalitis or encephalitis were reported to the laboratory. In 2 of these there was serological evidence of infection with a virus of the Russian-spring-summer/Louping-ill group of viruses, and from one of them an unidentified enteric virus was isolated. As in previous years, there has been no evidence of infection with the virus of lymphocytic choriomeningitis in Northern Ireland.

There still remains a number of patients diagnosed as having encephalitis in which the cause has not yet been established. In some of these the illness began abruptly with fits, and it is hoped that further work will establish the cause and epidemiology of these infections.

Miscellaneous Coxsackie virus infections.

Coxsackie group B virus was isolated from two patients with clinical syndromes associated with infection with this virus. One of these patients was a child with Bornholm disease and the other a patient with myocarditis.

Respiratory Viruses.

Influenza.

In the first half of the year serological evidence of recent infection with influenza A virus was found in 31 patients and 6 had infection with influenza B virus. One strain of influenza A virus was isolated. In the autumn months three strains of influenza A virus were isolated from patients in Belfast and it was shown that these viruses were similar to the Asian (A_2) virus. These isolates in September were the first to be made in the United Kingdom during the autumn of 1959. No further isolates were made in Northern Ireland.

In view of the Northern Ireland experience with influenza during 1957 and 1958 it was predicted that a severe epidemic of influenza was unlikely during the winter of 1959-60 and it was advised that no extensive vaccination campaign against influenza was necessary.

Adenovirus infections.

One hundred and ninety-two paired sera and 139 single sera were examined by complement fixation tests for evidence of infection with adenoviruses. Of these sera 52 were found to have titres of 1 : 8 or over, suggesting past infection with an adenovirus. Only one patient showed a rising titre indicative of recent infection. As in previous years, there has been little evidence that adenoviruses are responsible for many cases of respiratory illness in Northern Ireland.

Psittacosis.

No cases of infection with the psittacosis group of viruses have been detected.

Poliomyelitis vaccines.

The effectiveness of the inactivated poliovirus vaccines in current use depends on their antigenicity. This is unfortunately subject to some variation and reports from North America indicated that at one time the antigenic potency of the important type 1 component in some batches of vaccine fell well below the useful level.

In order to check on the potency of batches used during 1959 in Northern Ireland samples of poliomyelitis vaccine were obtained from different manufacturers in Britain, North America, and France. The majority of the North American and British products tested were samples of batches which had been used in Northern Ireland. Vaccines were tested by an extinction limit titration of antigenicity in guinea-pigs (the Gard test).

The results are expressed as the highest dilution of vaccine which will still elicit an immune response in half the guinea-pigs inoculated (see Table 5). Unactivated Mahoney type 1 poliovirus, titre $10^{6.1}TCD_{50}$ per ml. was used as a control antigen for comparison.

TABLE 5.

THE TYPE 1 ANTIGENIC POTENCY OF POLIO VACCINES.

COUNTRY OF ORIGIN	LABORATORY CODE LETTER OF VACCINE BATCH	HIGHEST ANTIGENIC DILUTION
Britain	A	1 : 16
„	B	1 : 50
„	E	1 : 16
North America	C	1 : 3
„	F	1 : 6
„	H	1 : 25
„	J	1 : 50
France	M	1 : 160
Type 1 Mahoney	Control	1 : 40

Considerable variation in potency was found between the different batches tested. None of the vaccines can be considered as below the useful level, but an improvement in the general level of type 1 antigenicity is desirable. The most potent of the vaccines tested were produced using the monolayer tissue culture technique as opposed to the chopped tissue technique. More manufacturers are now using monolayer cultures, and in addition the type 1 component of British vaccines is being increased, therefore it is likely that the vaccines available in 1960 will be of a higher standard than those available in 1959. Indeed, a progressive increase in vaccine potency can be expected during the next few years.

Enteric virus survey.

Because of the very low incidence of poliomyelitis in Northern Ireland during 1959 a survey was made of the enteric viruses being excreted by children during the autumn. From the results of this survey it was hoped that the virtual absence of clinical poliomyelitis during the usual "polio season" might be correlated either with a low incidence of poliovirus circulating in the community or with the presence of polioviruses of reduced neurotropism.

There are considerable administrative difficulties in obtaining large numbers of fæcal specimens from a sample of normal children and therefore it was decided to test specimens from all children admitted to the Royal Belfast Hospital for Sick Children (R.B.H.S.C.) and in two wards in the City Hospital. In addition, Dr. V. D. Allison sent samples of all fæcal specimens from children which the Central Laboratory had received for bacteriological investigation. Specimens were collected as soon as possible after the children had been admitted to hospital. During the last week in August and during September specimens from approximately 250 children were tested in monkey kidney tissue culture for cytopathic viruses. Fifty viruses were isolated but only one of these was a poliovirus (type 1). This was from a child who was transferred to the Northern Ireland Fever Hospital as a frank case of acute poliomyelitis shortly after admission to the R.B.H.S.C. Identification of the remaining 49 viruses is incomplete but the majority will be classifiable as Coxsackie or Echo viruses.

From this survey we conclude that the low incidence of poliomyelitis during the summer and autumn of 1959 in Northern Ireland was probably associated with very limited dissemination of polioviruses at that time, rather than with the circulation of comparatively avirulent poliovirus strains. Nineteen hundred and fifty-nine was the first year when a significant proportion of the susceptible children in Northern Ireland had received poliomyelitis vaccine. It would be most unwise to conclude on the basis of one year's experience that vaccination was interfering with the customary spread of polioviruses in the community during the summer and autumn, but we have no evidence that this was not the case.

Viruses and disinfectants.

During the year a number of common bacterial disinfectants were tested for their ability to inactivate type 1 poliovirus and influenza A virus. These two viruses were chosen as representative members of the enterovirus and the myxovirus group respectively. There are no standard quantitative methods for estimating the action of disinfectants on viruses and therefore the technique described below was devised.

Disinfectants were tested at the dilutions recommended for anti-bacterial action. They were allowed to act at room temperature on a high titre suspension of partially purified virus for certain specified times. At the end of a time period a rapid 1:1,000 dilution of the virus-disinfectant mixture was made and the residual virus titrated. By this method a time-inactivation curve was plotted and the time taken for 99.9 per cent. of virus to be inactivated was calculated. The

difficulties involved in detecting complete inactivation of virus are very great. For this reason it was considered that the time taken to reduce infecticity 1,000-fold, which is much more readily estimated than complete inactivation, would serve as a convenient comparative measurement and also as an indication of possible effectiveness in the field.

Poliovirus suspended in water was inactivated very rapidly by the two chlorine disinfectants tested. However, the time taken for 99.9 per cent. inactivation was lengthened to several hours if organic matter in the form of 1 per cent. serum was added to the virus-disinfectant mixture. The coal-tar and chloroxylenol disinfectants tested had no action on poliovirus suspended in water, even over a period of twenty-four hours. Seventy per cent. alcohol was found to be rapidly effective, inactivating 99.9 per cent. of virus within a few minutes, but 50 per cent. and 10 per cent. alcohol had little or no action.

Though the chloroxylenol disinfectants had no action on poliovirus they were found to be highly effective against influenza virus. Inactivation of influenza virus occurred within a few seconds or a few minutes, depending on the concentration of disinfectant used.

We wish to acknowledge the continued help given by Dr. F. F. Kane and his colleagues of the Northern Ireland Fever Hospital, and the assistance given by members of the College of General Practitioners in the influenza-spotting scheme which is run in co-operation with W.H.O. influenza centre. We are grateful to Professor F. M. B. Allen and the Matron, Royal Belfast Hospital for Sick Children, for their help with the enteric virus survey.

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AN ASSESSMENT OF THE VALUE OF THE INITIAL GLUCOSE TOLERANCE TEST IN SELECTION OF PATIENTS FOR CHLORPROPAMIDE TREATMENT

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LITTLE information as yet is obtainable on the reliability of the pre-treatment glucose tolerance test as an indication of subsequent control of diabetes on chlorpropamide. Agreement on other indications of likely success (age of onset of diabetes over 40 years, absence of previous ketosis, relative stability, etc.) has been reached in numerous papers (Murray, et al. (1958), Hills and Abelove (1959), Lowenthal, et al. (1959), Ruiz-Guía (1959), De Salcedo and Borges (1959), Reyes, et al. (1959), Duncan, et al. (1959), Hamwi, et al. (1959), and others). It must be admitted, however, that even in diabetes arising before the age of 40 and not apparently brittle there may be a good response to chlorpropamide. Yuen (1959) claims good results in young diabetics and Jackson and Oakley (1959) have been encouraged by the outcome of chlorpropamide treatment in a few diabetic adolescents and children diagnosed prior to the development of symptoms and ketosis. There would not appear, therefore, to be any absolute criterion of future control.

The present study was undertaken to investigate the initial glucose tolerance test in a series of diabetic patients treated with chlorpropamide and to compare this curve with the subsequent outcome after three months of treatment. A small group of brittle diabetics was similarly analysed for comparison.

MATERIAL AND METHODS.

A total of sixty patients were selected for study comprising forty-eight stable diabetics who had been treated on chlorpropamide and whose pre-treatment glucose tolerance curves were available. In addition the initial glucose tolerance tests of twelve patients with ketosis (brittle diabetics) subsequently treated on insulin were used for comparison. Clinical details of some of these patients have previously been reported (Grant and Boyd, 1959). In all instances true blood glucose estimations were performed on venous blood by a modification of the anthrone method of Handelsman and Sass (1956).

Glucose tolerance curves.

Glucose tolerance tests were undertaken with the patients on average normal diet prior to testing. Using 50 gms. dextrose in 6 ozs. of warm water orally after fasting overnight and at rest in bed, a routine glucose tolerance test was performed

with an initial fasting and four half-hourly post-prandial blood samples for estimation of blood sugar level (B.S.L.).

The curves were analysed for profile and the initial (fasting) level, the peak value and the steepness of the curve in each patient observed as indicating the severity of the diabetic state. The profile was assessed by means of a simple sign test, all blood sugar values differing by less than 11 mg./100 ml. being considered within the error of the technique. A plus was given for a rise above the previous level, a minus for a fall, and a zero for no change (Fig. 1).

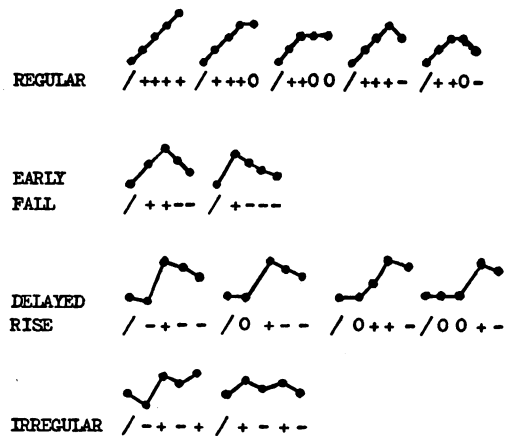

Fig. 1—Analysis of profiles of the pre-treatment glucose tolerance tests of sixty diabetic patients with sign test. (For explanation see text.)

Response to chlorpropamide.

On completion of three months' chlorpropamide treatment the forty-eight patients were assessed and placed in suitable response categories (Table I). Patients showing ketosis or obviously out of control were not, of course, continued on chlorpropamide but classified forthwith.

The criteria used were modified from those of Cardonnet, et al. (1959), and Sugar, et al. (1959), as giving a reasonably good idea of control with the information available. The groups were defined as follows:—

	Fasting B.S.L. mg./100 ml.		Average Daily B.S.L. mg./100 ml.
Excellent - -	under 120	...	under 200
Good - -	under 150	...	under 200
Fair - -	under 180	...	under 200
Poor - -	over 180	...	under 220
Non-ketotic failure -	—	...	over 220
Ketotic failure -	—	...	over 220 + ketonuria.

TABLE I.

COMPARISON OF INITIAL GLUCOSE TOLERANCE TEST PROFILES AND MEAN INITIAL AND PEAK BLOOD SUGAR LEVELS WITH RESPONSE CATEGORY IN FORTY-EIGHT STABLE DIABETIC PATIENTS TREATED ON CHLORPROPAMIDE AND WITH GLUCOSE TOLERANCE RESULTS IN TWELVE BRITTLE DIABETIC PATIENTS SUBSEQUENTLY TREATED ON INSULIN.

Type of Diabetes and Treatment	Profile				Initial Level Mg./100 Ml.		Peak Level Mg./100 Ml.		Total Patients = 60
	Regular	Early Fall	Delayed Rise	Irregular	Mean	Range	Mean	Range	
With Chlorpropamide (Non-brittle):—									
Excellent - - Good - -	24	5	6	4	225	400–123	362	560–226	39
Fair - - -	2	1	2	–	228	372 133	329	372 264	5
Poor - - Failure - -	1	1	–	2	220	288–174	365	392–334	4
Without Chlorpropamide (Brittle) - - -	8	3	1	–	214	276 142	445	564 258	12

RESULTS.

Initial glucose tolerance test curves.

The analysis of results obtained in the sixty patients is shown in Table I, where "excellent" and "good" responses are combined as are "poor" results and "non-ketotic failures" to form with "fair" response patients, three categories. The results in non-brittle and brittle patients are shown separately.

Glucose tolerance test profile.

The patterns of shape encountered in the curves of the series are shown in Fig. 1, where they have been somewhat arbitrarily divided into four groups. "Early fall" was classified if the only feature was a consistent fall at ½ or 1 hour. "Delayed rise" was considered descriptive of all curves not showing a rise in B.S.L. until one hour while "irregular" patterns showed prominent fluctuations in the B.S.L. All other responses were placed in the "regular" group. Although initially the four response categories—excellent and good, fair, poor and brittle were tabulated under the individual patterns encountered as shown in Fig. 1,

it was obvious that the scatter was too great and irregular for any trend to be seen and in Table I the analysis shows only the number of each category classified in the four profile groups defined above. Most patients can be seen to show the "regular" type of glucose tolerance curve with a steadily rising B.S.L. from the initial value and without a fall before 1½ hours. This was the principal pattern present in both brittle and non-brittle diabetics.

The only suggestion presented from this analysis is that "irregular" profiles are proportionately more common in the poor response categories of chlorpropamide treated diabetics, and that brittle patients tend towards more regular profiles. Analysis of the glucose tolerance test profile, however, proved disappointing and showed no clear distinction between the curves of either brittle or non-brittle diabetic patients nor could the type of curve be related to the subsequent response to chlorpropamide treatment.

Initial and peak levels of glucose tolerance tests.

The means of the initial and peak values for the glucose tolerance test blood sugar levels with their ranges are categorised also under the response groups in Table I. No significant difference could be found between the initial (fasting) levels in the diabetic response groups, any variation being between individual patients and unrelated to the chlorpropamide response or the presence of ketosis. The patient with the highest initial level of the series at 400 mg./100 ml. responded excellently to chlorpropamide while that with one of the lowest (142 mg./100 ml.) showed ketonuria. High initial values were associated with high peak B.S.Ls. The two highest peak B.S.Ls. were 560 and 564 mg./100 ml. These two patients fell into the excellent response category and brittle diabetic group respectively. Again the analysis of glucose tolerance test initial and peak blood sugar levels proved unhelpful in forecasting response to chlorpropamide.

Discussion.

Comparison of the initial and treatment glucose tolerance tests of diabetic patients treated on chlorpropamide has been undertaken by a number of workers. Investigations have shown that the mean glucose tolerance curve is depressed in a manner parallel to the mean pre-treatment contour; the suggestion being that chlorpropamide causes a general improvement in glucose tolerance while not altering the utilisation of glucose as shown by the mean profile of glucose tolerance tests (De Salcedo and Borges (1959), Lundback, et al. (1959), Dobson, et al. (1959), Grant and Boyd (1959). Reyes, et al. (1959), describe flattening and depression of the curve in ten patients after six days' chlorpropamide treatment, while Stowers, et al. (1959), suggest that the fasting blood glucose is reduced to a greater extent than the post-prandial levels on chlorpropamide. A possible relationship between the initial glucose tolerance test and the patient's response to treatment is not considered in the above papers.

Little information is available regarding the reliability of the oral glucose tolerance test as an indication of the severity of diabetes. In the interpretation of the test Joslin, et al. (1959), stress the importance of such factors as the previous physical and nutritional state, the patient's age, absence of infection,

state of mobility, absence of associated thyroid or pituitary overactivity and the ensurence of a normal balance of dietary protein, carbohydrate and fat. Assuming also that there is no defect of absorption, the initial hyperglycæmia and the shape of the post-ingestion glucose tolerance curve in the diabetic patient are due to lack of insulin and the consequent failure of the body to respond to the increase in body fluid glucose. The final fall of the blood sugar is due mainly to the excretion of glucose in the urine (Wright, 1957).

Blotner (1947) states that interpretation of the oral glucose tolerance test by the peak blood sugar level and rate of fall is probably the safest method in diagnosis. He considers the curve to be consistent enough to be of great value in the diagnosis of diabetes and groups patients into degrees of severity on the

TABLE II.

DUPLICATE GLUCOSE TOLERANCE TEST RESULTS IN THREE STABLE DIABETICS GIVING AN EXCELLENT RESPONSE TO CHLORPROPAMIDE AND IN ONE BRITTLE DIABETIC PATIENT.

B.S.L. in Mg./100 Ml.

GLUCOSE TOLERANCE TESTS AND RESPONSE GROUPS		INITIAL	½ HOUR	1 HOUR	1½ HOURS	2 HOURS
EXCELLENT RESPONSE GROUP	Nov., 1955	268	298	302	274	274
	Sept., 1959	174	191	242	322	340
	July, 1951	194	250	292	242	248
	Aug., 1951	121	137	210	262	260
	July, 1958	187	228	294	348	314
	May, 1959	132	141	237	218	268
BRITTLE	Dec., 1957	151	156	188	223	164
	Jan., 1958	190	218	230	246	258

contour of the glucose tolerance test as does Lawrence (1947). Except in patients with malabsorption neither Blotner (1947) nor Lawrence (1947) found any advantage in the various forms of intravenous test. Increased precision in the glucose tolerance test by the exclusion of non-glucose reducing substances (estimated in the Folin-Wu method) is stressed by Mosenthal (1947), while Beckwith (1947) is concerned mainly with the rate of fall in the blood sugar at two hours in the interpretation of the glucose tolerance curve. In spite of the many influencing factors, Bodansky and Bodansky (1947) consider the response in the diabetic patient to be usually quite distinctive though with considerable variation, depending in large measure on the severity of the diabetes. Varley (1958), while also commenting on possible fallacies, considers the glucose tolerance

curve of considerable use in investigating abnormalities of carbohydrate metabolism. Indeed there is as yet no better means of diagnosis and of assessing the severity of diabetes.

From the above information it was felt, therefore, that the pre-treatment glucose tolerance test profile and initial and peak blood sugar level results might correlate with the outcome of chlorpropamide treatment and be useful in predicting results. Unfortunately, no relationship could be demonstrated on the most careful comparison. The reason for this lies in the unreliability of the test even when repeated in the same individual. Most discrepancies in the repeated glucose tolerance test have been noted in investigations in non-diabetic patients. Freeman, et al. (1942), while remarking on the sparcity of information on the reliability of the oral glucose tolerance test in normal subjects, found average variation in the fasting blood sugar of 9 (range 0-30) mg./100 ml., 31 (range 0-90) mg./100 ml. at 1 hour and 20 (range 0-50) mg./100 ml. at 2 hours on repeating the standard oral glucose tolerance test on 35 non-diabetic patients after an average interval of four to seven weeks. In the diabetic patient Bodansky and Bodansky (1947) and Stewart and Dunlop (1949) refer to divergence in the results of glucose tolerance tests repeated on the same individual after short time intervals, and Anderson, et al. (1956), in 100 unselected persons, found mean variations in the post-absorptive blood sugar of 22.2 mg./100 ml. when specimens were taken at two-minute intervals. Examples of the variation in glucose tolerance test results in four of our own patients are shown in Table II—results discovered in retrospect.

Summary and Conclusions.

A series of 48 stable and 12 brittle diabetic patients was analysed regarding the profile and the initial and peak blood sugar levels of the standard oral glucose tolerance test and the outcome of chlorpropamide treatment. No relationship could be discovered nor was there any distinguishing feature between the glucose tolerance test result of stable or brittle diabetics.

The literature related to the glucose tolerance test in patients treated on chlorpropamide is reviewed and reference is made to the unreliability of the test as a means of assessing severity of diabetes.

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THE EARLY TREATMENT BLOOD SUGAR AS AN INDICATION OF RESPONSE TO CHLORPROPAMIDE TREATMENT

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In a short-term study we had shown that a significant fall in the average daily blood sugar level on the second day of treatment is a valuable criterion of future response of the diabetic patient to chlorpropamide and that a maximum fall occurs by the eighth-tenth day of treatment (Grant and Boyd, 1960).

On the basis of a longer period of surveillance it was decided to investigate any relationship the blood sugar taken at an early stage of treatment might bear to the final assessment after three months' review. In routine practice it was hoped that one single blood sugar estimation done on a certain day of treatment might be sufficiently reliable in predicting the outcome of chlorpropamide treatment.

Materials and Methods.

Forty diabetic patients diagnosed after the age of 40 years were studied. Estimations of true blood glucose were performed on venous blood by a modification of the anthrone method of Handelsman and Sass (1956). Blood samples were drawn at 7.30 a.m. (fasting B.S.L.) and at 4.30 p.m. and 8.30 p.m. The mean of these three readings was taken as the average daily blood sugar level (B.S.L.) for the day concerned.

After an initial five days on diet alone (control period), during which blood sugars were taken as stated, the patients were started on chlorpropamide 500 mgs. as a single morning dose. Following the first five days of treatment blood samples were again drawn inclusive of the sixth-tenth days of treatment; designated the treatment period. The mean values for all the blood sugars during the two periods observed were calculated for each patient (control period B.S.L. mean and treatment period B.S.L. mean). These levels were used for statistical analysis by scatter diagram, any correlation being compared with the patient's response category after three months' treatment.

The criteria of response to chlorpropamide treatment used were modified from those of Cardonnet, et al. (1959), and Sugar, et al. (1949), being the same response categories previously set out (Boyd and Grant, 1960).

Figure 1 shows the points of intersection made by the control period mean B.S.L. and the treatment period B.S.L. mean on the X and $\hat{Y}$ axis respectively for each patient. An obvious relationship to the patient's response category was apparent. All diabetics showing an excellent or good response to 500 mgs. of chlorpropamide fell into a rectangle with the following boundaries—140 to 430 mg./100 ml. along the X axis and 70 to 165 mg./100 ml. along the $\hat{Y}$ axis.

Results.

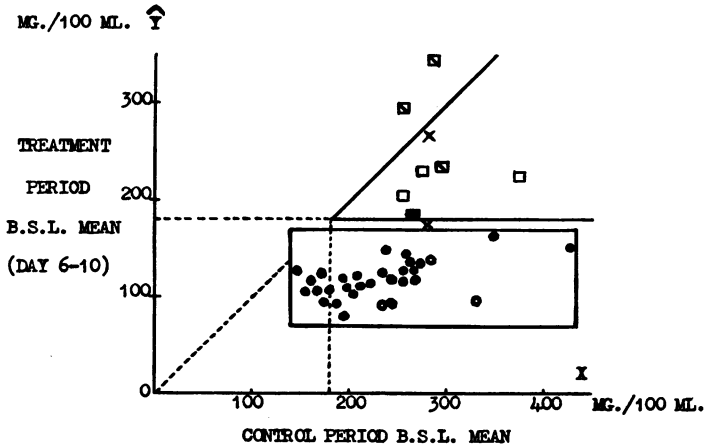

Fig. 1—Comparison of the mean control B.S.L. and mean treatment B.S.L. on chlorpropamide 500 mg. daily in forty patients whose final assessment after three months is shown by symbols.

Clinical Response.

Excellent or Good Group:	*Intermediate Group:*	*Failures:*
● Still on chlorpropamide.	X Fair control.	▣ With ketosis.
O Off chlorpropamide.	■ Poor control.	□ Without ketosis.

Patients with only fair control or poor control as well as failures either ketotic or non-ketotic had points which fell outside 250 mg./100 ml. on the X axis and above 170 mg./100 ml. on the $\hat{Y}$ axis.

From this observation two conclusions were reached. Firstly the control period B.S.L. means if high are not necessarily an indication of subsequent poor chlorpropamide response, for the highest figure in the excellent group was 424 mg./100 ml. and the highest in the failure group 375 mg./100 ml. Secondly, the treatment period B.S.L. mean (6th-10th day) was below 165 mg./100 ml. in all patients whose eventual control with chlorpropamide was satisfactory.

In ordinary clinical practice, however, carrying out three blood sugar estimations daily during a five-day control period and five-day treatment period is not practicable. We, therefore, wished to see if any single blood sugar reading taken routinely during treatment might give as good an estimate of B.S.L. control on chlorpropamide. It was supposed that should a patient be taken into hospital and placed on diet alone for one day, the fasting B.S.L. on the second day of diet might be used as a practical if rather crude representation of the control period. We, therefore, plotted this reading for each individual comparing it with the fasting B.S.L. on the eighth day of chlorpropamide treatment. The scatter here, however, was too great to compare with the original plot, but on the tenth

day of treatment with 500 mgs. chlorpropamide, which is illustrated in Fig. 2, there was a close agreement with the original. All patients showing excellent or good responses after three months' treatment with chlorpropamide again fell into a rectangle and no matter what the fasting B.S.L. was before treatment, by the tenth day of chlorpropamide treatment all were below 165 mg./100 ml. and all other patients with inferior responses had levels above this.

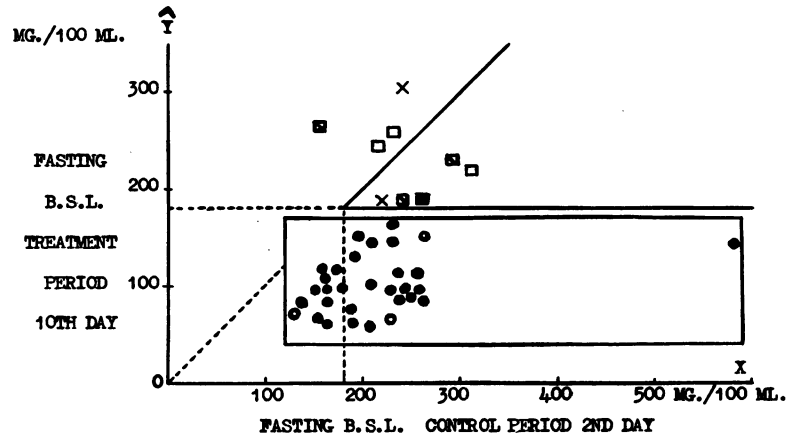

Fig. 2—Comparison of fasting B.S.L. on second day of control period and the fasting B.S.L. on the tenth day of treatment on chlorpropamide 500 mg. daily in forty patients whose final assessment after three months is shown by symbols.

CLINICAL RESPONSE.

Excellent or Good Group:	*Intermediate Group:*	*Failures:*
● Still on chlorpropamide.	X Fair control.	◪ With ketosis.
O Off chlorpropamide.	■ Poor control.	□ Without ketosis.

DISCUSSION.

The action of sulphonyl urea drugs differs from that of insulin in that not all diabetic patients respond to these compounds.

Reference has already been made to the difficulties encountered in the selection of diabetics suitable for chlorpropamide treatment. The "selection test" as used by Cannessa, et al. (1959), and the "response test" of Marble (1958) employed by Hadley, et al. (1959), occasionally have both shown results discrepant with the observed outcome of chlorpropamide treatment. We have been unable to find any correlation between the profile or blood sugar levels of the initial glucose tolerance test and the subsequent response category in chlorpropamide-treated diabetics (Boyd and Grant, 1960). It has indeed been suggested that the only reliable guide to assessing chlorpropamide response in any diabetic patient is by clinical trial.

In the present study the conclusion previously reached that high initial fasting and average daily blood sugar levels do not preclude good clinical control with chlorpropamide is further confirmed, following three months' surveliance of a larger series of patients. That a progressive fall in average daily blood sugar occurs over a period of five-eight days treatment (Grant and Boyd, 1960) is similarly verified. Although Lee, et al. (1959), state that the maximum response to chlorpropamide may be delayed until four weeks or longer, no patient in this series who failed at ten days showed a later response to therapy.

On comparison of Figs. 1 and 2 the similarity of scatter is very evident, suggesting that the fasting blood sugar level on the tenth day of treatment can be taken as representing the established effect of 500 mgs. of chlorpropamide, a dosage level accepted as adequate (Hamwi, et al. (1959), Knick, et al. (1959), and others). Indeed, Cardonnet, et al. (1959), suggests that a dosage of 750 mgs. daily should not be exceeded. The conclusion is reached, therefore, that all patients with excellent or good eventual responses will be expected to have a fasting blood sugar on the tenth day of treatment, below 165 mg./100 ml.

Analysis of the patients who showed an inferior response to chlorpropamide presents many problems. The answer to these gets close to solving the problem of the fundamental action of sulphonyl urea drugs in the diabetic patient.

The two patients in the fair category had fasting blood sugars on the tenth day of treatment of just over 180 mg./100 ml. and 310 mg./100 ml. respectively, while that of the poor response patient was 190 mg./100 ml. (Fig. 2). In Fig. 1 the treatment period B.S.L. mean showed a comparable picture in regard to the "fair" and "poor" responses. Of the two "fair" cases, the lower of the two, whose reading fell just above the excellent category response limit, was eating outside her diet, and on strict diet very probably would have fallen into the excellent or good response group. The other "fair" response patient was 170 per cent. of ideal weight, while the patient with a "poor" response was overweight by 54 per cent. This is in agreement with the previous observation that obese patients tend to have an inferior response to chlorpropamide, requiring higher dosage than those approaching their norm in weight (Grant and Boyd, 1959).

Of the non-ketotic failures, one patient was 200 per cent. of ideal weight and could not be controlled on chlorpropamide 1,000 mgs. daily. On the other hand, the other two 'non-ketotic' failures were only 115 and 83 per cent. ideal weight respectively. It is very difficult to explain what common feature prevented these three patients from responding satisfactorily. The two latter patients required 46 and 40 units of insulin daily for eventual stabilisation and since they had shown a trace of acetone on previous occasions it is probable that they were basically ketotic patients. The other non-ketotic failure probably was of the very obese resistant type, being 200 per cent. of ideal weight.

The 45° regression line in Fig. 2 has been passed by four patients whose fasting B.S.L. was higher on the tenth day of chlorpropamide treatment than it was before the start of therapy. Only one of these was a ketotic failure patient; the other two ketotic failures falling equidistant below the regression line. It would

appear, therefore, that partial control of a high blood sugar level in the ketotic patient by chlorpropamide is of little effect in counteracting the ketotic tendency. It would seem from the evidence presented that the most important determinant of success or failure of response to sulphonyl urea drugs appears to be ketosis, a diabetic effect not adequately counteracted by these compounds.

Summary and Conclusions.

A study comprising forty diabetic patients treated on 500 mgs. chlorpropamide daily is described. The control period mean B.S.L. plotted against the treatment period mean B.S.L. showed a definite relationship to the patient's response category after three months' treatment. The plot of the fasting B.S.L. on the second day of diet alone against the fasting B.S.L. on the tenth day of chlorpropamide treatment gave a very similar result.

The following conclusions are reached:—

(1) A high initial fasting or average daily B.S.L. does not preclude a good or excellent response to chlorpropamide.

(2) The fasting B.S.L. on the tenth day of treatment can be taken as representing the established effect of the drug and used as a criterion of future response. All patients in this series with an excellent or good eventual response to chlorpropamide had a fasting B.S.L. below 165 mg./100 ml. at this stage of treatment.

(3) Fair to poor responses are usually due to marked obesity with or without excessive dietary intake.

(4) Failure of response in patients of normal or subnormal weight is usually related to ketosis. Chlorpropamide may decrease the blood sugar in such patients but does not appear to influence the ketotic tendency.

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WILMS' TUMOUR—SOME OBSERVATIONS AND RESULTS OF TREATMENT AT THE NORTHERN IRELAND RADIOTHERAPY CENTRE, 1953-1959

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In the group of serious diseases occurring in childhood it is fortunate that Wilms' tumour is uncommon. It is of insidious onset, treatment is not satisfactory and it is often at a late stage when the clinician sees it for the first time. Early diagnosis is unlikely and most patients are brought to hospital because of a large swelling in one or other side of the abdomen. The tumour may be a neuroblastoma of the adrenal gland, a renal cyst, a retroperitoneal tumour, congenital hydronephrosis or similar rare abnormality, as well as Wilms' tumour, while enlargement of the spleen and liver may also have to be considered. Retrograde or intravenous pyelography may prove helpful in diagnosis, but almost always the diagnosis is uncertain until after laparotomy and biopsy.

Wilms' tumours are often large when first seen and this increases the liability to trauma with the risk of hæmorrhage into the tumour or rupture. A large tumour is more radio-resistant than a smaller one, though the tumours can often be greatly reduced in size with pre-operative radiation even when quite enormous. Handling of the child's abdomen should be reduced to a minimum since pressure may well expel tumour cells into the radicles of the renal vein and allow metastases to reach the lungs more easily. This does not necessarily herald a fatal outcome as evidenced by one of our cases below.

Histology.

Willis (1953) and others have given excellent descriptions of the cellular structure of these tumours. Enormous variations of cell type occur; innate ability to disseminate and the degree of radiosensitivity of the malignant tissues will determine the outcome but cannot be predicted.

Treatment.

For obvious reasons in tumours occurring commonly methods of treatment are likely to be established on a firm basis. In the case of Wilms' tumour considerable difference of opinion persists about some of the methods of control. Many authors have only small series of cases, e.g., thirty-eight cases occurred at the Boston Children's Hospital between 1940 and 1947. Only fifteen cases in Belfast have been referred to the Radiotherapy Centre since 1953 and as five of these are so recent an assessment can only be made in ten cases. The following methods of treatment are used:

1. *Surgery.*

Nephrectomy alone is used by some as the method of treatment. Ladd and White (1941) published a report of a series of 64 cases with 14 survivors. Harvey

(1950) reported 28 patients out of 180 surviving at two years. Surgery alone is not now considered to give the best results.

2. *Radiation only.*

While this method of treatment appears to have been used with success in some patients, and must be used in very advanced inoperable cases if any therapy is to be attempted at all, it is not justified by results. Dean (1945) reported 5 out of 20 patients who did well, and cures in occasional patients have been reported by authors such as Nesbitt and Adams (1946).

3. *Pre-operative Radiation followed by Surgery.*

This method of treatment has in recent years come into disfavour following the comments of Gross (1953) and the Boston School. Its supporters recommend it on the grounds that it may make surgery easier and thereby lessens the risk of dissemination of the tumour in addition to reducing or abolishing its malignancy. While these arguments may carry some weight, this method has disadvantages: —

(a) It delays the removal of the primary tumour, the source of disseminating cells.

(b) The tumour may be resistant to radiation.

(c) If the tumour disappears the parent of the child may refuse operation and no histological proof of disease be obtained.

4. *Surgery plus Post-operative Radiation.*

This method may seem irrational if one believed the disease to be confined to the kidney and to spread by the veins but the tumour may also spread by lymphatics and the lymphatics adjacent to the renal vein and along the para aortic lymph channels may become involved. In addition it is possible that contamination of the tissues adjacent to the renal pedicle by tumour cells may take place particularly if a tumour capsule ruptures at operation.

Gross (1953) reported very good results in his survey of cases treated between 1940 and 1947. There were eighteen two-year survivals among 38 cases. Warnings by other authors about assessing this time as a period of cure are given and many late recurrences have been reported.

5. *Surgery and Pre- and Post-operative Radiation.*

Gross (1959) commented favourably on this method. There can be little doubt that individual decisions about treatment methods are often needed, and it is not always possible to define a policy which can be attached to a whole group of patients. The present position appears to be that post-operative radiation is desirable either with or without pre-operative radiation.

Abeshouse (1957) examined 212 cases from the literature who had pre- and post-operative radiation. These had a two-year cure rate of 31 per cent. He compared them with another group who had post-operative radiation only and a survival rate of 28 per cent. Such a difference is quite insignificant statistically.

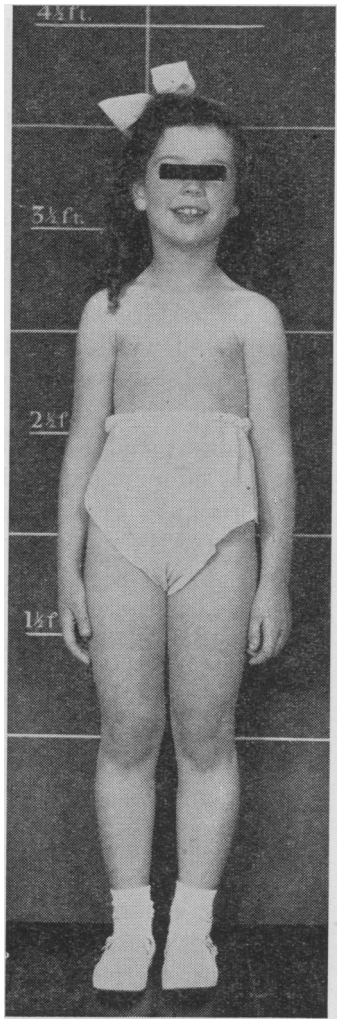
Cases Treated at Northern Ireland Radiotherapy Centre.

The results in the ten assessable cases at this Centre can be tabulated as follows. The series is of interest, containing a child who has survived over five years having been treated for pulmonary metastases.

Age	Description of Tumour	Radiation	Result
1. c.8/12.	6 cm. in diameter.	Post-operative; 2500r in 17 days.	Recurr. in 5/12. Died in 6/12.
2. 1 year.	Large tumour adherent to liver.	Post-operative; 1584r in 27 days.	Recurr in 2/12. Died in 4/12.
3. 1 year.	Large necrotic tumour. Capsule broke. Metastases in mesentery.	Too ill.	Died 1/12 later.
4. 5.10/12.	Large soft tumour with ruptured capsule.	Post-operative; 1730r in 20 days.	Recurr. in 9/12. Died in 12/12.
5. 5½ years.	5 cm. tumour. Capsule not ruptured.	Pre-operative; 2600r in 33 days. Little reduction in size.	Well 4½ years.
6. 2 years.	10 x 8 cm. tumour.	Post-operative. Chest metastases successfully treated (see below).	Well 5½ years.
7. 1 year.	12 x 8 x 9 cm. (700 gm.).	Post-operative; 2500r in 28 days.	Well 3½ years later.
8. 6.6/12.	"Turnip-sized tumour."	Post-operative; 1360r in 13 days to whole abdomen; 1925r to L. side in 28 days subsequently.	Recurr. in 2/12. Died in 8/12.
9. 6.10/12.	8 cm. tumour.	Pre-operative; 3500r in 20 days; 20 x 15 cm. fields to R. renal region. Chest metastases 6/52 later; 2300r in 41 days to whole chest.	Recurr. in 6/52 and died 9/12 later.
*10. 8.6/12.	Large mass in abdomen with chest metastases when first seen.	Whole upper half abdomen and whole chest.	No evidence metastases 8/12 later. To date.

*Case 10 was not proven histologically and received radiation only.

There are few cases with chest metastases which have survived. They have been described by Kerr (1939), Nesbitt and Adams (1946), Silver (1947), and Ng. and Low Beer (1956). Such survival confirms the radiosensitive nature of some of these tumours. The case of the child listed as No. 6 is of interest, and is briefly outlined below.



Case 6.

She was first seen at the Royal Belfast Hospital for Sick Children by Mr. Ian Fraser in August, 1953; she was 2 years old. There was a swelling in the right loin which suggested Wilm's tumour. Two days later operation was undertaken. A tumour 10 x 8 cm. in size was found in the upper pole of the right kidney. Removal appeared to be complete. Histology confirmed the diagnosis. An X-ray of chest before operation and on 10.9.53 was negative. She was subsequently referred for radiation and X-ray therapy to the right renal region was given between 15.9.53 and 5.10.54. The maximum tissue dose was 2,500r at 230 KV.

In March, 1954, there was a tiny area of opacity noted in the right upper lung field. It was not certain that this was a pulmonary metastasis until three months later, and the slow rate of growth of the tumour is of interest. As the patient's general condition was very good it was decided to irradiate the whole chest. 2070r in twenty days was given between 20.7.54 and 10.8.54. A film of the chest on 16.9.54 was negative. The present appearance of the chest film is satisfactory. The child has been in excellent health since. She presents no evidence of any pulmonary fibrosis and has a normal exercise tolerance test. Her height is normal and as in the other areas no evidence of interference with growth has been noted (see figure).

Comment.

It is gratifying that four out of ten patients have made a good response to treatment and probably three of them can be regarded as cured. Six patients are failures. All these died in one year or less after therapy. In two of them it will be noted that the capsule of the tumour had either ruptured or that the tumour presented with bad prognostic findings such as being very large and in one case was adherent to the liver. In another of the patients showing rupture there were metastatic deposits in the mesentery.

The three patients with a good result have all survived over three years, but there are reports of pulmonary metastases occurring after four years. The prognosis in children under 12 months is considerably better than in the older child.

Hypertension has not been described in any of our patients and it is not present in survivors. It is important as far as possible to protect the normal kidney from radiation. Radiation of the total renal substance may later induce a raised blood pressure.

In an attempt to derive knowledge from the follow-up of a large number of tumours Abeshouse has examined reports of 256 cases and this large group provides some interesting findings showing that bilateral involvement of the adrenal substance occurred in 12 (1.4 per cent.) of patients. The bilateral involvement is not unexpected as the disease is considered to have its origin in a developmental defect. Even such bilateral involvement may not mean a hopeless prognosis as Gross describes a child who, treated by radiation only to the abdomen and with prophylactic irradiation of the chest to low dosage of 600r, has survived for twelve years. The two-year cure rate was of the order of 30 per cent.

Abeshouse's study also showed that both kidneys could be affected equally and there was no increased tendency in either sex. Familial occurrence was not seen in this group of cases, though it has been reported by Maslow Chapian (1948), De Vries (1954), and a few other authors.

Ng. and Low Beer produce results of a carefully compiled group of twenty-seven cases who were treated by various methods. They received pre- and post-operative radiation but again the series is small and inconclusive.

Procedure for Treatment.

The following is suggested:—

1. Handling of the child's abdomen should be reduced to a minimum.
2. In children with large but operable tumours pre-operative radiation should be given with the intention of reducing the tumour size, rendering surgery easier and reducing the risk of capsule rupture. Post-operative radiation should be used as well even in the uncomplicated cases. If chest metastases are present radiation is likely to be the only hope of control.
3. In tumours which are smaller and in whom the surgeon feels that operation can be undertaken immediately, pre-operative radiation only delays the removal of the primary tumour. Post-operative radiation should be started immediately after surgery.
4. The rare bilateral tumours are probably best treated by radiation.
5. Rarely metastases in the chest may be treated successfully especially in cases with slow tumour evolution.

6. It is possible that intensive chemotherapy with some of the radiomimetic drugs may be able to palliate successfully certain types of metastatic lesion. No cures with this type of therapy have been reported.

My thanks are due to Mr. R. Wood, Photographic Department, Royal Victoria Hospital, for preparation of the photograph for reproduction.

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THE COST OF ARTIFICIAL FEEDING

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WHEN other arguments have failed, the cost of artificial feeding may occasionally be emphasised in an effort to persuade a recalcitrant mother to breast-feed her infant. To find out whether the cost is really large enough to influence such a mother in her decision we have calculated the cost of feeding a baby with different milk foods.

RELATIVE COST OF MILK FOODS USED IN INFANT FEEDING.

	Food	Total Cost of Milk Food and Sugar (1)		Approximate Nett Cost per Week (2)	
		First three months (approx. consumption = 2150 oz.)	Second three months (approx. consumption = 3220 oz.)	First three months	Second three months
		£. s.	£. s.	s/d	s/d
FULL CREAM MILKS (Fat content 3-3.5%)	Fresh cows' milk (i) (3)	3 13	5 10	4/10	7/6
	Cow and Gate full-cream (i) (4), a	4 6	6 8	5/10	8/10
	b	3 5	4 17	4/3	6/6
	c	2 13	4 0	3/4	5/2
	Ostermilk No. 2 (i), b	3 5	4 17	4/3	6/6
	c	2 9	3 13	3/–	4/7
	Trufood full-cream (i)	5 7	8 0	7/6	11/4
	National Dried Milk, full-cream (i)	1 13	2 9	4/1	5/1
	S.M.A.	6 10	9 15	9/3	14/–
	Evaporated milks	3 7	5 0	4/5	6/8
LOW FAT MILK FEEDS (Fat content 2-2.5%)	Fresh cows' milk (ii)	2 19	4 8	3/9	5/9
	Cow and Gate full-cream (ii), a	3 8	5 2	4/5	6/10
	b	2 12	3 18	3/3	5/–
	c	2 4	3 6	2/7	4/1
	Ostermilk No. 2 (ii), b	2 12	3 18	3/3	5/–
	c	2 0	3 0	2/4	3/7
	Trufood full-cream (ii)	4 3	6 5	5/7	8/7
	National Dried Milk, full-cream (ii)	1 8	2 2	3/8	4/6
	Cow and Gate half-cream, a	5 5	7 18	7/4	11/2
	b	3 19	5 18	5/4	8/1
	c	3 5	4 17	4/3	6/6
	Ostermilk No. 1, b	3 19	5 18	5/4	8/1
	c	3 0	4 9	3/10	5/10
	Trufood half-cream	6 11	9 17	9/4	14/2
	National Dried Milk, half-cream	1 14	2 11	4/2	5/3

(1) The cost has been based on the amount of milk food likely to be consumed by a baby of 7 lb. birth weight. In calculating this amount each milk food has been reconstituted according to a previously recommended scheme (Carré, 1959).

(2) The nett weekly cost has been determined from: —

(a) Cost of milk food and sugar. So long as a mother is not feeding her baby on National Dried Milk she is entitled to one pint of fresh cow's milk daily at approximately half-price, i.e., 4d. per pint. She will thus save about 2/4 a week (30/- in three months) on the cost of fresh milk for the family. Where applicable this saving has been set against the total cost of milk food and sugar.

(b) Cost of vitamin supplements, namely, three 6 oz. bottles of concentrated orange juice at 5d. per bottle, for each three-month period. Cod liver oil emulsion is provided free at Welfare Clinics.

(c) Cost of sterilizing bottles. A mother would require three 16 oz. bottles of Milton in each three months—cost per bottle = 4/-.

(d) Cost of feeding bottles and teats. It has been assumed that a mother would use two feeding bottles (1/7 each) and that during each three months she would need six teats (7½d. each).

(3) (i) and (ii) as applied to fresh cows' milk and all full-cream dried milks: —

(i) Full-cream milk feeds containing 3.5 per cent. fat, 3.5 per cent. protein, and 6.5 per cent. carbohydrate.

(ii) Full-cream milk food modified by dilution and addition of sugar. Content of mixture = fat, 2.5 per cent., protein, 2.5 per cent.; and carbohydrate, 8.5 per cent.

(4) Cost of Cow and Gate (full-cream and half-cream) and Ostermilk (Nos. 1 and 2) when

a Bought from chemist in 1¼ lb. tins at 6/3 a tin;

b bought from chemist in 1 lb. packets at 3/9 per packet;

c bought at Welfare Clinic. In Belfast these milk foods can be obtained from Welfare Clinics at a cost of 2/10 per 1 lb. packet of Ostermilk and 3/1 per 1 lb. packet of Cow and Gate.

Cost of other milk foods: —

National Dried Milk (full-cream and half-cream)	2/4 per 1¼ lb. tin.
Trufood full-cream and half-cream	6/3 per 1 lb. tin.
Carnation, Nestlé, Regal and Libby's evaporated milks ...	1/4 per ¾-pint tin.
S.M.A.	7/9 per 1 lb. tin.

Comments.

It can be seen from the table that there is considerable variation in the cost of artificial feeding depending on the choice of milk food. The weekly cost during the first three months ranges from 2/4-9/4. In the majority of instances the cost per week is between 3/6 and 4/6, or approximately the price of a packet of cigarettes. It is clear that under present-day conditions of comparative prosperity the spending of this amount of money is hardly likely to dissuade a mother from her intention to bottle feed.

The cheapest form of artificial feeding is not always, as generally believed, National Dried Milk nor even fresh cows' milk. In Belfast, using full-cream feeds, the cheapest method is to feed with Ostermilk No. 2 bought from a Welfare

Clinic. Using this food, the average weekly cost of artificial feeding during the first three months of a baby's life is 3/-, compared with Cow and Gate full-cream (obtained from clinic) 3/4, National Dried Milk full-cream 4/1, Ostermilk No. 2 and Cow and Gate full-cream (obtained from chemist) 4/3, evaporated milks 4/5, fresh cows' milk 4/10, Trufood full-cream 7/6, and S.M.A. 9/3.

If milk feeds with a low fat content are preferred the cheapest are modified Ostermilk No. 2 (ii) and Cow and Gate full-cream (ii). When these foods are bought from a Welfare Clinic the weekly cost of bottle-feeding during the first three months is only 2/4 and 2/7 respectively, compared with modified Cow and Gate full-cream (ii) and Ostermilk No. 2 (ii) (bought from chemist) 3/3, modified National Dried milk full-cream (ii) 3/8, modified fresh cows' milk (ii) 3/9, Ostermilk No. 1 (obtained from clinic) 3/10, National Dried Milk half-cream 4/2, Cow and Gate half-cream (obtained from clinic) 4/3, Ostermilk No. 1 and Cow and Gate half-cream (obtained from chemist) 5/4, modified Trufood full-cream 5/7, and Trufood half-cream 9/4.

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A HISTORY OF TONSILLECTOMY:

TWO MILLENIA OF TRAUMA, HÆMORRHAGE AND CONTROVERSY

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THE evolution of modern surgery has been rapid. Operations, which fifty years ago were unthought of, are now being performed as daily routine procedures. While the most spectacular advances have probably been in cardiac surgery, there have been major advances in all the surgical specialities. Some operations, however, have been practised for many years with varying degrees of popularity. One such procedure is tonsillectomy (tonsillotomy), which has been performed for over two thousand years, its popularity waxing and waning with the century. While recent advances are of great interest both to medical and lay persons, it is both interesting and instructive to trace the history of this operation back to the earliest times.

Operations have been performed on the tonsil from the earliest times. The first mention of tonsillectomy refers to Hindu medicine about 1000 years B.C. In West's Review of the History of Medicine there is the following reference:—

> "When the phlegm and blood are deranged in the soft palate and tonsils, they become large and like a full bladder, accompanied with thirst, cough and difficulty in breathing. When troublesome, they are to be seized between the blades of a forceps, drawn forward and with a semi-circular knife, the third of the swelled part is removed. If all be removed, so much blood may be discharged as will destroy the individual. If too little is removed, it will produce an increase in the swelling with fainting, swimming of head."

Celsus (25 B.C.-A.D. 50), a Roman aristocrat, who lived about the time of Christ, described a method of complete removal of the tonsil (tonsillectomy) as distinct from partial removal.

> "They ought to be disengaged all round by the finger and removed. If they are not separated by this method, it is necessary to take them up with a blunt hook and separate them with a scalpel; then to wash them with vinegar and anoint the wound with a styptic application."

This description leads one to believe that tonsillectomy was a relatively common procedure at this time. However, the casual reference to the control of bleeding might indicate that Celsus did not perform this operation himself.

Galen (A.D. 121-201) was apparently the first writer to advocate the use of a snare for amputating the tonsil. It is believed that the snare became a more popular method of removing tonsils than that described by Celsus. This method continued to be used until some four hundred years later when Aetius (A.D. 490) advocated again partial removal of the tonsil. He thought that only the part of

the tonsil which projects and is easily seen should be removed, that is about half of the enlarged gland. "Those who extirpate the entire tonsil remove, at the same time, structures which are perfectly healthy, and, in this way, give rise to serious hæmorrhage."

Paulus Aegineta (A.D. 625-690) describes clearly and precisely a method of complete tonsillectomy, describing the prevention and treatment of post-operative bleeding. He wrote:—

> "When, therefore, they are inflamed, we must not meddle with them; but when the inflammation is considerably abated, we may operate, more especially upon such as are white, contracted and have a narrow base. But those which are spongy, red and have a broad base, are apt to bleed.
> "Therefore, seating the person in the light of the sun, and directing him to open his mouth while one assistant holds his hand and another presses down the tongue with a wooden spatula . . . we take a hook and perforate the tonsil with it, and drag it outwards as much as we can without drawing its membranes along with it, and then we cut it out by the root with a scalpel suited to that hand, for there are two such instruments, having opposite curvatures.
> "After ligation, the patient must gargle with cold water or oxycrate; or, if hæmorrhage occurs, he may use a tepid decoction of brambles, roses or myrtle leaves."

Some 1,200 years are to follow before such a refined technique is described again. Unfortunately, after the death of Paulus, Europe descended into the Dark Ages, and tonsillectomy fell into disrepute. In fact, when the School at Salerno was at its height, tonsil surgery was limited to lancing of peritonsillar abscesses.

In 1509 Ambroise Pare, writing of tonsillectomy, thought it to be a bad operation, advocating gradual strangulation, using a ligature. If the tonsils were very big, he advocated a preliminary trachectomy. Guilleameau, a pupil of Ambroise Pare, was also a strong advocate of this method. He pulled the tonsil out of its bed and then a noose of thread or wire was slipped around its base and tightened until the circulation was cut off. Needless to say, this method attained no great popularity with the patient, as it was accompanied by severe infection, not to speak of intense pain. Indeed, one writer of this era was moved to record these words about tonsillectomy:—

> "This procedure is liable to resolve itself into physical combat between the surgeon and his patient."

About 1600 Peter Lowe, the founder of the Royal Faculty of Physicians and Surgeons of Glasgow, described the various methods of performing tonsillectomy in use at that time:—

1. *The Snare*: This was used as a method of strangulation.
   "Knit the Ecrescence with a strong thread, then tye it faster and faster every day until such time as it be cut and fall away of itself."
2. *The Ligature*: He considered this dangerous because it caused much loss of blood, and was very painful.
3. *Excision*: Lowe thought this method inadvisable. He says:—
   "Pull them away with crossett or other instruments either whole or in pieces."

Surgeons of these times were cautious against removing too much tonsillar tissue, because of the accepted physiology of the tonsils at that time. It was thought that the secretions of the nose were formed in the brain and entered the nasal cavity through the cribriform plate of the ethmoid. The function of the tonsils was thought to be to absorb the secretions and send them back. If large amounts of tonsillar tissue were removed the secretions then gathered in the larnyx, causing hoarseness. With these ideas in mind, one can readily appreciate why this operation had many opponents. Dionis, writing in 1672, was completely opposed to the operation.

> "Some of our ancestors propose the separation and evulsion of these glands, which operation they very easily performed. I refer you the methods which they propose to do it, which I think very cruel . . . for the function these glands being to separate and filtrate the sacroities which serve to moisten the tongue, larynx and œsophagus; these parts must find themselves deprived of that dew, which is of great use in tempering of the air in the lungs, and sliding the nourishment into the stomach."

Heister also denounced the operation in these words:—

> "This operation is not only too severe and cruel, but also too difficult in the performance to come into the practice of the moderns, because of the obscure situation of the tonsils."

Although very much in the minority, a courageous French surgeon at this time maintained "l'operation necessaire n'est ni dangereuse ni difficile."

In 1828, Physick of Philadelphia, a pupil of John Hunter, modified an instrument designed by Benjamin Bell for removing the uvula, and used it as a tonsil guillotine. He wrote:—

> "It is easy to cut off the whole or any portion that may be necessary of the enlarged tonsil. The operation can be fulfilled in a moment of time. The pain is very little, and the hæmorrhage so moderate that it has not required any alteration in four cases in which the Doctor has recently performed it."

This tonsillotome became the recognised instrument for removal of the tonsils for over eighty years. Most of the changes during these years were modifications of the original guillotine itself. Fahnestock of Philadelphia and Morrell McKenzie produced important modifications of the original guillotine.

Morrell McKenzie wrote of post-operative bleeding following guillotining of tonsils:—

> "As regards hæmorrhage after excision of the tonsils, I have only once met with a case where bleeding appeared actually to endanger life . . . and this was before I had discovered the means of arresting tonsillar hæmorrhage. . . .
>
> "Half tsp. of tanno-gallic acid sipped at intervals is excellent. During deglutition, the styptic fluid is worked into the cut surface of the tonsil, and hæmorrhage is effectively restrained in all cases. Marsh-Mallows give great relief by forming a coating over the wounded surface and thus protecting it."

In 1861 Borelli revived the old method of enucleation with the finger, as described by Celsus. It is evident that he appreciated the constant adherence of the lower portion of the tonsil, for he wrote:—

> "A small piece which does not afford sufficient purchase for the finger in order to be torn away is generally left at the inferior part. It only requires, however, to be seized with forceps, when it can be separated by a slight movement of torsion."

The first sign of a permanent change from partial to complete removal of the tonsils came in 1897. Ballenger in the U.S.A. realised that partial removal failed to alleviate symptoms completely in a large majority of cases. He began to remove the tonsil with its capsule, using a scalpel and forceps. His results, using this new technique, were so much better than partial removal, for a time the guillotine fell into disrepute in America.

Some ten years later, dissection tonsillectomy was pioneered in this country by George Waugh of Children's Hospital, Great Ormond Street. In 1909 he published, in the *Lancet*, his account of nine hundred cases of dissecting out the tonsils complete with capsule, using fine dissecting forceps and curved scissors. The operation was performed with the patient lying on his back with the head extended. The tongue was held out of the way with a stitch, and the mouth held open with a gag between the last molar teeth. Waugh became a great opponent of guillotine tonsillectomy, giving his reasons in these words:—

> "Even in highly skilled and experienced hands, the complete removal of tonsils by means of a guillotine is a task of such technical difficulty as to be, except in a few rare cases, quite impossible."

In the following year Whillis and Pybus in Britain and Sluder in America pointed out that a guillotine with a fairly blunt blade instead of a sharp one could be used in such a way as to enucleate the tonsil complete in its capsule. Whillis and Pybus gave the following figures for their series:—

Tonsil completely enucleated in its capsule - - -	74%
„ „ „ capsule incomplete - -	13.5%
„ „ „ in two pieces - -	9%
„ „ „ in three pieces - -	0.5%
Incompletely enucleated - - - - - -	3%

From this time onwards the value of complete removal of the tonsil has been accepted. In recent years the most satisfactory results have come from tonsillectomy by dissection, but in many parts of Britain enucleation of the tonsil is still performed with considerable success.

The improvements in surgical technique in this operation have been associated with advances in anæsthesia. In the early days no anæsthetic agent was used. In 1772 nitrous oxide was introduced and ether and chloroform appeared about the middle of the nineteenth century, and these agents allowed the operation to be performed with some degree of safety. The introduction of intubation by Magill after the First World War gave the surgeon adequate time and satisfactory conditions in which to perform the operation.

Like many other operations, tonsillectomy waxes and wanes in popularity. The eagerness with which the lay public advocate tonsillectomy for all manner of complaints has undoubtedly led to unnecessary operating. Also, from time to time, some prominent citizen undergoes tonsillectomy, and the consequent publicity leads to a spate of operations on the tonsils. However, this operation, like most others, when performed on selected cases, gives excellent results.

I am indebted to Mr. Ian Fraser, F.R.C.S., for his advice and encouragement in the preparation of this paper. My thanks are also due to the Librarian of the Wellcome Historical Medical Library.

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A CLINICAL ASSESSMENT OF ORPHENADRINE (DISIPAL) IN THE TREATMENT OF PARKINSONISM

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PSYCHOLOGICAL medicine is today emerging from an isolation born of neglect and the importance of its contribution to scientific knowledge is becoming increasingly recognised. More and more emphasis is being laid on its integration into the field of general medicine and the psychiatrist today is as much a physician of body as of mind. In no aspect of medicine is this more evident than in the elder science of neurology where the psychiatrist and physician meet on familiar ground to study different aspects of the same problems. One of these problems is the treatment of those patients who suffer from what is commonly called Parkinsonism, where the mental concomitants include depression which is often severe and delusional ideas. In a minority of cases the physical symptoms, especially tremor, can be alleviated by surgery or ultrasonic coagulation, but for the vast majority treatment depends upon the use of suitable drugs and compounds such as stramonium, artane and lysivane are commonly employed.

In the last few years attention has been drawn to a new drug called orphenadrine, marketed under the trade name of 'Disipal,' which showed great promise in treating cases of Parkinsonism. Certain special claims have been made for Disipal, one of which is that it possesses a euphoriant action which helps to relieve the depression so often associated with Parkinsonism—the so-called psycho-tonic effect. Chlorpromazine and various drugs of the phenothiazine series can be used in the treatment of schizophrenia, and in high dosage induce Parkinsonism symptoms. While the therapeutic value of this is still a very controversial subject, Disipal can be used to combat their unwanted side effects.

The aims of the present investigation were:—

1. To ascertain the efficacy of Disipal in controlling the symptoms of Parkinsonism: Tremor, rigidity, weakness, salivation, dysarthria and disturbances of gait.
2. To compare its efficiency with that of other commonly used drugs.
3. To study its effects, if any, on the mental concomitants of Parkinsonism especially depression.

PHARMACOLOGY.

Disipal is related to diphenhydramine (Benadryl), differing from it by the substitution of a methyl group. Because of its formula Disipal might be expected to be an anti-histamine agent like Benadryl, but with the addition of the methyl

group the anti-histamine action has almost disappeared and has been replaced by a strong atropine-like effect, i.e., it antagonises acetyl choline. Bijlsma, et al. (1956), report the acute LD50 dose in rats as 425 mgm. orally or 230 mgm. by subcutaneous injection.

The synthesis of this drug is a triumph for the research chemists because its action was predicted accurately by purely theoretical consideration from a knowledge of molecular structure. However, the actual translation of theory into reality took seven years and, after physiological assays and toxicity tests on experimental animals, it was finally handed over for evaluation by clinicians on suitable cases.

Material and Methods.

Twelve cases of Parkinsonism were selected—six male and six female. All were in-patients of a modern mental hospital and were under careful observation. The only criteria of selection were that they should be the worst cases and should have a marked tremor especially in the upper limbs. Their ages ranged between 41 and 62, and eleven were regarded as being post-encephalitic in origin. Their stay in hospital varied between four and twenty-nine years. All patients were mobile but five required continual assistance with dressing and eating. Their activities were restricted by their disabilities but most of them were able to walk for short distances in the immediate vicinity of their wards. Their physical condition varied only according to the amount of tremor and rigidity present. Four were subject to frequent and troublesome oculogyric crises. They were maintained on various combinations mainly of lysivane and stramonium. Two received lysivane, six lysivane and stramonium, three stramonium and one artane and stramonium.

Tremor was made one of the criteria because an apparatus was devised with which it was possible to measure the severity of the tremor with a fair degree of accuracy. It consists of an electrically-driven drum such as may be found in any physiology laboratory and which can revolve at different speeds, e.g., 5 or 11 rev./min. This drum carries a roll of ordinary graph paper and beside it is a vertical bar. To this bar is clamped at a variable position a strip of very thin flexible alloy shaped in the form of a right angle like the letter L and balanced around a small horizontal metal bar which acts as a fulcrum allowing the L piece to move in a vertical plane. At the tip of the horizontal limb is attached a tiny cup which serves as an ink reservoir. To the bottom of the vertical limb is fastened a ring lying in the horizontal plane. The patient places a finger or thumb in the ring and the tremor is transmitted through the fulcrum to the horizontal limb, causing a vertical movement of the ink cup and thus obtaining a tracing on the revolving drum. And so, in the most literal sense, the moving finger writes.

Every effort was made to standardise the variables involved. Thus the height of the ring above the table was constant for each patient on each occasion. The patient was placed at right angles to the apparatus as it was found that this gave maximum amplitude readings of flexion-extension movement which is the chief

component of Parkinsonian finger tremor. The patients were familiarised with the apparatus and procedure before commencing. Tracings were taken on three occasions:—

(1) While on their original drugs.

(2) After all drugs had been withdrawn.

(3) After they had been receiving Disipal for about two months.

Procedure of Tests.

Previous medicines were reduced gradually over a period of two-three weeks until at the end of this time the patients were not receiving any drugs whatsoever apart from occasional sedation at night. At this stage they all showed marked deterioration in their general condition as the full effects of the disease made itself felt. They all complained of weakness and objectively there was definite weakness, increased salivation and lachrymation and difficulty in articulation. They felt very miserable, lost interest in their former pastimes such as television, radio or reading, and had great difficulty in walking. Several of them retired to bed or lay on couches most of the day. A few patients showed increased excitability, became more irritable and noisy and oculogyric crises were more troublesome in the four cases prone to this disturbance.

Treatment was commenced with Disipal, giving one tablet of 50 mgms. morning and evening. This was continued for a week and the dosage was then increased by one tablet of 50 mgms. daily every four or five days. No cases of drug idiosyncrasy occurred. As dosages were increased two side effects made their appearance, namely, dizziness and blurred vision, which was reported by six patients. This occurred at dosage levels of four to seven tablets and disappeared within two days when the dose was reduced. In general the optimum dosage was found to be four to six tablets per day, i.e., 200-300 mgms.

Results.

It was found that of the twelve patients eleven were restored to the same condition as while on their previous drugs or improved in various ways. One patient, a female, was not fully restored although improved in one respect, viz., articulation.

Physical symptoms.

The symptoms of the patients after their drugs had been removed have been described. When Disipal was given and the correct dosage found these symptoms were all remedied. Muscular strength was restored and the patients resumed their former interests and activities. To consider a few of the individual symptoms:—

1. Salivation: This was controlled in all cases.

2. Muscular strength: In eleven cases this was restored to its former level and apparently increased in three cases because these patients were able to walk for longer distances and perform tasks for longer periods without becoming fatigued.

3. Speech: Articulation was improved in four cases and this was noted not only by the ward staff but by the patients' relatives.

4. Tremor: Studies of the graphs showed that tremor amplitude was reduced in five cases, was unchanged in six, and was increased in one. There was no change in tremor frequency and the actual changes noted were seldom striking.

The above symptoms are all capable of objective study but cannot readily be expressed in scientific units. All comparisons are drawn with the patient's condition while on his former drugs.

At this point some sceptic may seek to suggest that all this could conceivably be psychological, that the improvement was in the mind and not the body. In order to settle this point identical placebo tablets were substituted to all patients —the only person who knew about this change being the dispensing chemist. This, of course, involved the innocent deception of the patients, the nursing staff and the medical staff in charge of the individual patients who were scattered throughout the hospital. The substitution was carried out on a Friday and by the following Monday or Tuesday all the patients were either in bed or on couches, weak and miserable with increased tremor and salivation. In other words the syndrome of untreated Parkinsonism had been unleashed again. The patients were miserable, the nurses were bewildered, and the doctors were perplexed. One patient interpreted the situation in a typically paranoid fashion and alleged that the nurses had poisoned his medicine. The tablets were called in immediately and genuine Disipal dispensed.

Within two days the situation had changed quite dramatically. Eleven patients were up and about and were able to resume their former activities. All their symptoms reverted to their usual base line. The exception to this was the single female patient mentioned earlier and there was no great change in her condition. This experience would seem to indicate that the improvement in the patients' condition was due to the drug and not to any psychological support.

Mental state.

According to their histories only one patient was subject to marked or sustained depression, the others being liable to patchy depression or changes of mood such as might be expected in people suffering from the illness. Irritability and aggression occurred from time to time. One patient had mild paranoid delusions.

When the original drugs were withdrawn ten of the patients became depressed in some degree, the other two being irritable and aggressive. Insomnia was marked. When they were stabilised on Disipal this depression disappeared (in eleven cases) and they all felt in normal spirits again. When placebo was introduced depression again recurred as deep and distressing as before and again was relieved when Disipal was given.

Depression is sometimes defined as a mood disturbance with a characteristically sorrowful affect—a somewhat tautological definition. If it is hard to define it

is even more difficult to measure. There have been various rating scales prepared with the object of measuring psychomotor activity but they were not considered to be suitable for the present circumstances. For the purposes of this investigation, if a patient was lying on a bed or couch apathetic and retarded and sometimes mentioning suicide with an appropriate affect, he was rated as being depressed.

Discussion.

When receiving Disipal the depression was relieved. This immediately raises two questions:—

1. Were the patients more cheerful on Disipal than on other drugs?

2. If this is so, is it due to some specific euphoriant effect as claimed by some investigators?

To give a definite answer to these questions would require an objective scientific means of measuring small deviations of affect. From the subjective aspect five patients said that they felt better on Disipal than they had done on their previous medicines.

The claim that orphenadrine had a specific anti-depressive action was first advanced by Friesewinkel (1957). An examination of his report, however, shows that he bases his conclusions on the result of projective techniques. Professor Eysenck (1959), in his review of personality testing, makes it clear that such techniques lack validity and are not universally acceptable. Doshay and Constable (1957) report a euphoriant effect in thirty-one out of thirty-seven patients, while Robitscher and Pulver (1957) record a similar experience. Fouks, et al. (1959), noted that many of their patients felt better mentally even though sometimes they did not display much neurological improvement. A critical scrutiny of these reports, however, fails to show any series of controls or objective methods to prove specificity. No one as yet appears to have sought to show that the drug possesses anti-amine oxidase activity.

It seems more reasonable to suppose that a patient whose physical symptoms are controlled in a satisfactory manner will feel better as a result of this and to prove a specific euphoriant effect would require a separate carefully controlled trial on patients suffering from depression per se quite apart from Parkinsonism. If, however, a significant proportion of patients feel better on orphenadrine than on other drugs then due notice should be taken of this as a recorded fact and the accumulated experience of different investigators covering really large numbers of cases will give a good indication of its value.

The results given here are in general agreement with previous reports. Most of them, e.g., Berggreen (1958), emphasize the difficulties of accurate evaluation. Within the limitations outlined earlier it seems justifiable to draw the following conclusions:—

1. Orphenadrine controlled the effects of Parkinsonism in a satisfactory manner in eleven out of twelve of the patients in this series.

2. Side effects were confined to dizziness and blurred vision and these soon disappeared when the dosage was reduced. It appears to be a reasonably safe drug—no toxic effects were noted on kidneys or bone marrow, the blood picture remaining normal apart from very mild normocytic anæmia in a few cases. There was no sign of jaundice or liver damage.

3. The average dose was four to six tablets (200-300 mgms.).

4. As far as could be judged objectively the physical state of the patients in the majority of cases was at least as good as when they had been receiving lysivane and stramonium. In four cases an improvement was noted in their speech—one might say a distinct improvement.

5. The mental state of the patients was satisfactory but a specific euphoriant effect could not be proved. It was noted that five patients stated that they preferred Disipal to their previous medicines.

It is obvious that no one drug can be expected to be successful in every case and that the best one to use is often a matter of experiment. If present trends continue it seems likely that orphenadrine will establish itself as a standard drug in the treatment of Parkinsonism either by itself or in suitable combinations.

Summary.

The symptoms of eleven out of twelve patients suffering from Parkinsonism with associated mental symptoms were controlled in a satisfactory manner and improvement was noted in articulation in several cases when compared with their previous drugs. Side effects were slight and no toxic signs were found. The mental state was satisfactory and some patients expressed a preference for the drug. It appears to be as efficacious as other more commonly employed anti-Parkinson agents.

We wish to thank the Resident Medical Superintendent of Purdysburn Hospital for his permission to carry out this trial and Camden Chemical Co. Ltd. for their generous supplies of the drug.

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REPORT ON THE MYCOLOGICAL DIAGNOSTIC SERVICE, ROYAL VICTORIA HOSPITAL, 1959

By **D. W. R. MACKENZIE, B.Sc., Ph.D., *and* MAURA McARDLE, B.Sc.**
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In March, 1959, the Belfast Hospitals Management Committee appointed a full-time research mycologist to the Royal Victoria Hospital. In addition to research on various aspects of human mycoses, a routine diagnostic service was

TABLE I.

Sources of Pathological Specimens and Number of Samples containing Pathogenic Fungi.

Hospital	Number of Samples	Number yielding Pathogenic Fungi
Ards	17	3
Armagh	1	0
Banbridge	4	0
Belfast City Hospital	79	22 (incl. 2 microscopy alone)
Bush House	1	0
Coleraine	13	4
Daisy Hill	5	4
Derry	21	7 (2 by microscopy alone)
Downe	3	0
Lagan Valley	3	2
Lissue House	10	4
Lurgan and Portadown	12	4
Mid-Ulster	4	1
Moyle	9	2
Musgrave Park	1	1
Route	14	5
Royal Belfast Hospital for Sick Children	478	243 (29 by microscopy alone)
Royal Victoria Hospital	336	107 (15 by microscopy alone)
Tyrone	13	3
Ulster Hospital for Children and Women	7	2 (1 by microscopy alone)
Waveney	18	3
Private patients (not seen in hospitals)	38	20 (2 by microscopy alone)
Total	1,087	437 (51 by microscopy alone)

established for the mycological examination of pathological material and the detection and identification of pathogenic fungi. This report deals with the specimens received for analysis and the mycological findings during the period March, 1959, to 31st December, 1959. During this ten-month period 1,087 samples from 627 patients were received from twenty-one hospitals in Northern Ireland. The number of specimens received and the number yielding pathogenic fungi is shown in Table I.

Ringworm.

The most common pathogens were the ringworm fungi which accounted for 318 (82.8 per cent.) of the total number of pathogenic organisms obtained in culture. This total did not represent an equivalent number of cases, however, as material from many infected patients was removed at frequent intervals to determine the course of infection following griseofulvin therapy. The actual number of cases of ringworm was 179, of which ten species of ringworm fungi were implicated. Table II shows the species recorded and the type of infection from which they were isolated.

In addition to the 1,087 specimens received from hospital and other patients, 1,051 samples from various sources were examined in connection with an outbreak of *T. sulphureum* infection at a Belfast residential school for girls. In the course of these studies the pathogen was isolated on ninety-four occasions, but full details of clinical and mycological findings will be published elsewhere (Mackenzie, Burrows, and Walby, 1960).

Beare (1958) has reported that *T. sulphureum* is the most common cause of scalp ringworm amongst children in Northern Ireland, and the results obtained during the first ten months of the diagnostic service would seem to confirm his observation. It must be pointed out, however, that the high number of *T. sulphureum* scalp infections obtained in 1959 was maintained largely by the single outbreak mentioned above, in which nineteen children were found to be infected. It must also be pointed out that the numbers of cases of specific mycotic infections recorded in the present communication do not necessarily indicate their relative incidence. Comparisons and conclusions cannot be made from the data in Table II, which represents no more than the numbers of isolates made at the laboratory. Table III shows the number of specimens examined for each of the sources listed in Table II.

Although conclusions cannot be drawn from a series of unrelated observations, it is nevertheless clear that only three species of ringworm fungi are common, viz., *T. sulphureum*, *M. canis*, and *T. verrucosum*. *T. rubrum* was isolated on several occasions, and this may suggest that it is no longer a rare dermatophyte in Northern Ireland. *M. gypseum* and *T. megnini* are uncommon pathogens, but both have been previously reported from Northern Ireland. On the other hand, *T. quinckeanum* has not been reported until now, and this is therefore a new record for Northern Ireland. It was obtained from a scalp lesion on a two-year-old Belfast girl, and was treated satisfactorily with griseofulvin therapy (750 mgm. daily). The pathogen can usually be traced to an animal source, particularly to mice, although cats or other domestic animals may be the agents of spread.

TABLE II.

SPECIES OF RINGWORM FUNGI AND THEIR ORIGIN.

SPECIES	CHILD / ADULT	SCALP M	SCALP F	BODY M	BODY F	HAND M	HAND F	FOOT M	FOOT F	GROIN M	GROIN F	NAIL M	NAIL F	CHIN M	CHIN F	TOTAL NO. POSITIVES M	TOTAL NO. POSITIVES F	TOTAL
Trichophyton sulphureum	Child	6	25	3	10	–	–	–	–	–	–	–	1	–	–	9	36	48
	Adult	–	1	1	–	–	1	–	–	–	–	–	–	–	–	1	2	
Microsporum canis	Child	13	8	6	8	–	–	–	–	–	–	–	–	–	–	19	16	42
	Adult	–	–	1	6	–	–	–	–	–	–	–	–	–	–	1	6	
Trichophyton verrucosum	Child	7	3	6	2	–	–	–	–	–	–	–	–	–	–	13	5	40
	Adult	4	3	9	3	–	–	–	–	–	–	–	–	3	–	16	6	
Trichophyton rubrum	Child	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	19
	Adult	–	–	2	1	1	–	10	1	1	–	1	2	–	–	15	4	
Trichophyton mentagrophytes	Child	2	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	11
	Adult	1	1	4	1	1	1	–	–	–	–	–	–	–	–	6	3	
Trichophyton interdigitale	Child	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10
	Adult	–	–	–	–	–	–	8	2	–	–	–	–	–	–	8	2	
Epidermophyton floccosum	Child	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–	12
	Adult	–	–	1	1	–	–	5	1	3	–	–	–	–	–	9	2	
Microsporum gypseum	Child	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	1
	Adult	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
Trichophyton quinckeanum	Child	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
	Adult	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
Trichophyton megnini	Child	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
	Adult	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	
TOTALS -	Child	28	37	16	21	–	–	–	–	–	–	–	1	–	–	44	59	185
	Adult	5	5	18	12	2	2	23	4	4	–	1	2	4	–	57	25	

NOTE: (1) A "child" is an individual up to but not including the age of 16 years.

(2) "M" and "F" refer to male and female respectively.

In this case, the infection is thought to have been acquired from a young cat, although confirmation was not possible.

Other Pathogenic Fungi.

Candida albicans was isolated on thirty-five occasions from a number of sources, the majority being from the perineum, groins, or the interdigital spaces of the feet.

Other yeast-like fungi included *C. parapsilosis*, *C. tropicalis*, *Torulopsis glabrata*, and *Pityrosporum ovale*. *Malassezia* (microsporon) *furfur*, the cause of pityriasis versicolor, was recorded on seven occasions. *Aspergillus niger* was isolated on one occasion from an otomycosis. *Scopulariopsis brevicaulis*, an organism of uncertain pathogenic status, was isolated from a dystrophic toenail.

TABLE III.

Numbers of Specimens Examined.

Source	Children	Adults	Total
Scalp	324	31	355
Body	147	159	306
Hand	5	91	96
Foot	6	209	215
Groin	2	21	23
Nail	7	43	50
Chin	–	14	14
Perineum	–	22	22
Ear	–	2	2
Mouth	–	4	4
Total	491	596	1,087

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REVIEWS

INTRODUCTION TO PHARMACOLOGY. By J. J. Lewis. (Pp. xii + 826; figs. 163. 55s.) Edinburgh and London: E. & S. Livingstone Ltd., 1960.

THIS book has been recommended as the official text book for Queen's University students taking the introductory course in pharmacology and therapeutics at the start of their clinical work. It is an excellent book for these students who have just finished two years of physiology, for not only is much of the subject matter already familiar to them but the approach to the whole subject which is adopted by the author is very much that of a physiologist.

The book is not a text book of therapeutics and it does not discuss the treatment of disease by drugs, but it does present very clearly and very interestingly much of what is now known of the mode of action of drugs. There is strong emphasis on the relationship between the chemical structure of drugs and their action. This subject is of growing importance in modern medicine and it is right that it should be presented to students early in their medical career. There is frequent reference to the many ways in which studies of drug action in tissues and cells have thrown new light on physiological processes.

One very commendable feature is the full index which occupies eighty pages. I have one criticism: in these modern times I think the author ought to include a short bibliography after each chapter. I believe that students should be encouraged to read original papers and I think that sources of further information, review articles, etc., should be indicated for the student who wishes to pursue some aspect of the subject in fuller detail. O. L. W.

OSTEOCHONDRITIS DISSECANS. By I. S. Smillie, O.B.E., Ch.M., F.R.C.S.(Ed.), F.R.F.P.S. (Pp. viii + 224; illustrated. 60s.) Edinburgh and London: E. & S. Livingstone, 1960.

THIS book, of more than two hundred pages, must become a landmark in the literature of this obscure and intriguing condition. The author has been fortunate in having had the opportunity of seeing the large number of cases, three hundred in all, which form the clinical material on which the book is based.

The volume is divided into three sections. The first deals with the various types of osteochondritis dissecans and clearly differentiates the four groups:—abnormal ossification; the juvenile type; the adult type, and the often unrecognised tangential osteochondral fractures. Emphasis is laid on the different causes and the points about radiological diagnosis are excellent. The second section deals with the peculiarities of different joints and the last details the clinical findings and treatment.

In such a work accepted knowledge must form a large part, but a great deal of original thought is also included. The many theories of causation are well and truly ventilated and the facts on which they are based are clearly indicated. Here and there a little fantasy creeps in. His theory of a remaining anomolous centre of ossification bouncing about in the epiphyseal cartilage until it cuts off its own blood supply suggests a form of epiphyseal felo-de-se.

The reasoning leading to the conservative reconstruction of affected joints is presented in a masterly and convincing fashion. The author's remarkable ingenuity is shown in many of the operative approaches, and in the designing and adaptation of special instruments.

It would have been of great value if some information regarding the relationship of osteochondritis dissecans to subsequent arthritis could have been included. Figures have not been published yet which indicate how many osteochondritic joints become arthritic. Until this important aspect is clarified, it is impossible to see, in true perspective, the value of even the most ingenious conservative reconstructive operation. Mr. Smillie has exercised much thought on this book and the result is stimulating, interesting, and controversial.

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A SYMPOSIUM ON IMMUNIZATION IN CHILDHOOD. (Pp. 139. 17s. 6d.) Edinburgh and London: E. & S. Livingstone Ltd., 1960.

THE object of this symposium was to try to resolve conflicting viewpoints on immunization schedules and to recommend acceptable schedules for general use in Britain. The discussions and recommendations in this symposium are therefore timely and should help to remove existing confusion.

The symposium consisted of five sessions, and the first dealt with "The Risks of Immunization," covering provocation poliomyelitis, pertussis vaccination, and, perhaps most important, faults in the sterilization of syringes and needles. Radical changes in the present practice of sterilizing syringes and needles are heralded, especially for mass inoculations with the ever-present risk of syringe hepatitis and other infections by multiple inoculations from a single syringe. Boiling is no guarantee of sterility and exposure to dry heat is the method of choice. The only safe procedure is a single sterile syringe and needle for each person.

Poliomyelitis and pertussis vaccination were under review in the second session, and the former gave rise to an interesting discussion in which Dr. Salk, Professor Lépine, and Professor Dick took part. There was general agreement that both vaccinations were effective, given good vaccines.

In the third session immunization against diphtheria and tetanus and the use of combined prophylactics (diphtheria-tetanus-pertussis) was discussed. There was some divergence of views on the latter, particularly in view of the risk of provocation poliomyelitis, although it was agreed that the combined prophylactics were efficient immunizing antigens.

The fourth and fifth sessions were devoted to discussion of immunization programmes and the adoption of recommended schedules. Two schedules were adopted, one (Schedule A) covering the age-period 5 weeks to 15 years, involving 11 visits by or to the doctor, and the other (Schedule B) covering the age-period 2 months to 15 years, involving 9 visits by or to the doctor. In both schedules the scheme included inoculation against diphtheria, tetanus, pertussis, poliomyelitis, smallpox, and tuberculosis. The advantages and disadvantages of each schedule were discussed and it was left to the doctor to decide whether to use "Schedule A" with a longer course of single prophylactics, or "Schedule B" with a shorter course including triple vaccine, but a slightly greater risk of post-inoculation poliomyelitis.

The main purpose of the symposium was attained and authoritative guidance is given which should be of value to doctors and school medical officers in planning future immunization procedures.

V. D. A.

OUTLINE OF ORTHOPÆDICS. By John Crawford Adams, M.D., F.R.C.S.(Eng.). Third Edition. (Pp. vii + 440; figs. 313. 35s.) Edinburgh and London: E. & S. Livingstone Ltd., 1960.

THIS book contains all a medical student, preparing for his final examinations, needs to know about orthopædics. It is not a synopsis, neither is it a traditional text book, but it is easy to read. Stress is laid, in various sections, on the most important part of orthopædics which a student requires in his general surgical training, viz., on the methods of clinical examination of joints and limbs. This feature alone should make the book a "must" for medical students.

The author stresses the importance of conservative methods in treatment and reminds the reader that most orthopædic operations are really "luxury" procedures. On the other hand, in those conditions where only surgery can be expected to cure he does not worry or confuse the undergraduate reader with details and only mentions the more important operative principals.

Like all publications of E. & S. Livingstone, the book is delightfully laid out with suitable line drawings, photographs, and X-ray reproduction which makes it very difficult for the reader not to grasp at once the essential features of the problems discussed. The reviewer will certainly continue to recommend this book, as he has done with the previous editions of it, to his students.

R. J. W. W.

A SYMPOSIUM ON IMMUNIZATION IN CHILDHOOD. (Pp. 139. 17s. 6d.) Edinburgh and London: E. & S. Livingstone Ltd., 1960.

THE object of this symposium was to try to resolve conflicting viewpoints on immunization schedules and to recommend acceptable schedules for general use in Britain. The discussions and recommendations in this symposium are therefore timely and should help to remove existing confusion.

The symposium consisted of five sessions, and the first dealt with "The Risks of Immunization," covering provocation poliomyelitis, pertussis vaccination, and, perhaps most important, faults in the sterilization of syringes and needles. Radical changes in the present practice of sterilizing syringes and needles are heralded, especially for mass inoculations with the ever-present risk of syringe hepatitis and other infections by multiple inoculations from a single syringe. Boiling is no guarantee of sterility and exposure to dry heat is the method of choice. The only safe procedure is a single sterile syringe and needle for each person.

Poliomyelitis and pertussis vaccination were under review in the second session, and the former gave rise to an interesting discussion in which Dr. Salk, Professor Lépine, and Professor Dick took part. There was general agreement that both vaccinations were effective, given good vaccines.

In the third session immunization against diphtheria and tetanus and the use of combined prophylactics (diphtheria-tetanus-pertussis) was discussed. There was some divergence of views on the latter, particularly in view of the risk of provocation poliomyelitis, although it was agreed that the combined prophylactics were efficient immunizing antigens.

The fourth and fifth sessions were devoted to discussion of immunization programmes and the adoption of recommended schedules. Two schedules were adopted, one (Schedule A) covering the age-period 5 weeks to 15 years, involving 11 visits by or to the doctor, and the other (Schedule B) covering the age-period 2 months to 15 years, involving 9 visits by or to the doctor. In both schedules the scheme included inoculation against diphtheria, tetanus, pertussis, poliomyelitis, smallpox, and tuberculosis. The advantages and disadvantages of each schedule were discussed and it was left to the doctor to decide whether to use "Schedule A" with a longer course of single prophylactics, or "Schedule B" with a shorter course including triple vaccine, but a slightly greater risk of post-inoculation poliomyelitis.

The main purpose of the symposium was attained and authoritative guidance is given which should be of value to doctors and school medical officers in planning future immunization procedures.

V. D. A.

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SURGICAL TREATMENT OF BONE AND JOINT TUBERCULOSIS. By Robert Road, M.Ch.Orth., F.R.C.S.(Ed.), F.R.C.S.(Eng.); W. H. Kirkaldy-Willis, M.D., F.R.C.S.(Ed.); and A. J. M. Cathro, M.D. (Pp. viii + 137; figs. 90. 30s.) Edinburgh and London: E. & S. Livingstone Ltd., 1959.

THIS book, in the main, represents the orthodox treatment of a diminishing disease, and covers orthopædic tuberculosis as affects the whole skeleton. In the sections pertaining to the upper and lower limbs and joints thereof the content conforms largely to orthodox practice laid down along standard principles and sets out the modern attitude to the disease. The principles of surgical excision, ankylosis and more adequate surgical drainage are emphasised, while the details of surgical assault on the lesion are set out in an easily readable manner. Although the first author is an Oswestry surgeon, much of the book content appears to have been written by a surgeon practising in Africa. The writers emphasise how environmental factors, racial peculiarities, etc., exert modifying and perhaps aggravating effects on the natural history of this lesion. Alongside the anti-tuberculosis campaign orthopædic tuberculous lesions are fast diminishing in England and Scotland and cross-Channel colleagues indicate that many of this type of patient are immigrants from this island or abroad. In the North of Ireland tuberculosis of bone and joint, although less encountered than in early post-war years, is still commonly met with, although it is strange to observe that the commonest lesion seen is that of the spine; tuberculous arthritis of the hip and knee and other more peripheral joints being less frequently encountered.

In regard to the treatment of the hip joint requiring surgical fusion, two techniques of arthrodesis are described. The first method is the staple arthrodesis first written up several years ago by W. H. Kirkaldy-Willis; this represents a Chandler-type procedure by fixation of the joint with a large specially constructed staple. The second method, first described by Abbott and Fisher of St. Lewis, 1931, is the abduction arthrodesis. Both of these methods require dislocation of the hip joint and a rather extensive debridement. This dislocating procedure, with excision, is unusual and in most instances unnecessary in current British practice, where the Britain-type procedure of extra-articular arthrodesis is most commonly employed. This latter method is only applicable when hospital and economic conditions permit, a fairly lengthy period of pre-operative conservative and antibiotic sanatorium-type treatment being necessary. In African and Oriental countries, and indeed in America too, where in the first two instances racial temperament and fear of hospitals, and in America where costs of institutional treatment are high, conditions favour a technique which demands the minimum length of stay in hospital. Under the National Health Service of Great Britain and Northern Ireland methods for hip fixation as outlined in this monograph are not to be recommended, unless extensive trial of these methods proves their merit.

It is in regard to the section on the spine that these authors have made a noted contribution. Indeed many workers in the past have pointed out that results of treatment of Pott's Disease leave much to be desired, so that the contribution of these authors is a notable and courageous one. They suggest quite radical departures from many of the die-hard orthodox methods of the past, such as posterior spinal fusion of the Hibbs and Albe variety with almost complete disregard for drainage excision and grafting of the cold abscess within the bodies of the vertebræ. Although Ito and his colleagues in Japan in the 1930's pioneered the radical excision of the vertebral body lesion, it was not until 1956 that A. R. Hodgson and F. F. Stock, reporting from Hong Kong, produced a series of about thirty cases dealt with by this method. Their paper, published in the British Journal of Surgery, was, however, a preliminary report, and as yet a final report has not appeared in the literature.

We in Belfast, as the result of our dissatisfaction with the behaviour of cases of Pott's Disease treated by orthodox methods which often give rise to increasing collapse and kyphosis formation, chronic sinues, late on-set paraphegia, etc., and encouraged by the advances in modern anæsthesia and anti-tuberculous therapy recessitation, etc., have embarked on a programme of more radical excision and fusion of the vertebral body lesions carried out by direct approach to the vertebræ via the transpleural and retroperitoneal routes. We now

find that this formidable surgery, which although difficult at first until the operative routines and techniques are developed, has improved the prognosis for what had often been regarded as previously hopeless cases and on which the whole gamut of orthodox surgery such as antero lateral drainage, posterior spinal fusion had often already been carried out. Encouraged by the satisfactory results of such surgery on these more chronic lesions, we believe that the sooner the direct major assault on the lesion is made the better may be the prognosis for the patient and the shorter the period of hospitalisation required.

The authors are to be commended again for writing a comprehensive review of present-day orthopædic methods and tendencies in treatment of this diminishing although, as yet, potentially crippling disease of the skeleton. N. S. M.

CHILD-BIRTH WITHOUT FEAR. By Grantly Dick-Read, M.D. Fourth Edition. (Pp. xv + 266; plates 16. 12s. 6d.) London: Heinemann Medical Books, 1960.

THE psychosomatic approach to child-birth has received considerable attention of late, especially in France and Russia and recently so-called natural child-birth was the subject of annotation in the British Medical Journal. In Britain and many other countries the late Dr. Grantly Dick-Read was well known for his writings on this aspect of midwifery. It is timely, therefore, that a revised and enlarged edition of this widely read book should appear. It was completed just before the author's death in June, 1959.

In the fourth edition the author recapitulates his theory of natural child-birth based on the concept of a fear-tension-pain syndrome and he describes his methods to overcome fear. Discussion of this syndrome is preceded by a chapter on elementary anatomy and physiology. As the book is largely written for the benefit of the public, this chapter should lead the reader to a better understanding of the changes which occur in pregnancy and of the process of labour.

One chapter is devoted to breast-feeding and rooming-in. Advantages of these procedures are fully discussed. For the mother who wishes to breast-feed the advice contained in this chapter should be of help. Unfortunately the number of women who show any interest in breast-feeding appears to be steadily diminishing. The important subject of diet during pregnancy is discussed at length. The necessity for an adequate intake of iron is emphasised. Perhaps the need to reduce salt intake during pregnancy could have been stressed a little more.

Preparation for labour is discussed in another chapter. A series of exercises designed to promote complete relaxation are described in detail. The various exercises are well illustrated by photographs. This chapter should be of value to those who are being confined at home or who, for one reason or another, cannot attend organised relaxation classes.

The evil effects that spring from fear have been known for many generations and the removal of fear and promotion of confidence must be the aim of all who practise midwifery. The good obstetrician and midwife have always been conscious of this need, but the reader is left in no doubt that in the author's opinion the medical profession as a whole is not sufficiently aware of it. In this latest edition, however, Dr. Grantly Dick-Read discusses the present-day attitude of the public and medical profession towards natural child-birth and he now believes that the profession is at last becoming more receptive to his ideas. This is probably true, but possibly not to the extent suggested in his book.

In parts this book is emotional and sentimental and so may not appeal to the medical practitioner as much as it might otherwise do, but it does make one re-examine more orthodox methods (always a good thing to do from time to time), and it does emphasise the importance of the psychosomatic aspects of pregnancy. As this subject probably does not always receive sufficient attention during a doctor's training, the young obstetrician should benefit from reading this book.

In conclusion, this edition contains a new chapter on the practice of natural child-birth in emergency and another on the value of religious faith as a help during child-birth. A. E. M. S.

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THE sixth edition of this excellent book retains the style and character of previous editions. The comprehensive information which it contains is clearly and concisely presented and covers the whole range of medical emergencies. The text has been carefully revised and brought up to date and new chapters on emergencies resulting from nuclear and allied radiations and emergencies in ear, nose, and throat disease have been added. The detailed cross-reference system greatly facilitates rapid consultations. Of the few deficiencies in the book perhaps those in the section on anti-coagulant therapy are the most important. At a time when anti-coagulants are being more and more widely used in treatment of both in-patients and out-patients more detailed suggestions as to dosage would be helpful, and the range of oral preparations should be extended at least to include warfarin sodium. It is a pity that there is an error in the strength of heparin injection B.P. Nevertheless, these minor defects do not detract significantly from the great value of this book, which should be available for reference in all casualty departments and acute reception units. It is strongly commended to doctors in both general and hospital practice. T. F.

FUNDAMENTAL TECHNIQUES OF PLASTIC SURGERY AND THEIR SURGICAL APPLICATION. By Ian A. McGregor, M.B., F.R.C.S.(Eng.), F.R.F.P.S.(Glas.). (Pp. viii + 244; illustrated. 30s.) Edinburgh and London: E. & S. Livingstone Ltd., 1960.

THIS book sets out to provide an introduction to plastic surgical methods for those who have received no formal training in plastic surgery.

It is divided into two parts, the first of which covers the basic techniques with chapters on wound care, the Z plasty, free skin grafts, and the various types of flaps. These chapters contain much valuable and practical information and should prove most helpful to all surgeons, particularly those who treat trauma.

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The chapter on hand surgery deals almost entirely with injuries and covers this aspect in a satisfactory manner.

In the other chapters in this section many advanced procedures have been included in which the difficulties and subtleties of technique and post-operative care are not sufficiently stressed, and these might well encourage the surgeon to attempt such reparative operations without fully realizing the dangers involved, e.g., the repair of a total loss of the upper eyelid is a procedure which should not be attempted except by one fully trained in this type of work.

The book is well produced and fully illustrated with photographs and diagrams. N. H.

PYELONEPHRITIS. By Fletcher H. Colby, M.D. (Pp. vii + 214; figs. 95. 60s.) London: Baillière, Tindall & Cox, 1959.

THIS little book is based upon the author's experiences of pyelonephritis at the Massachusetts General Hospital.

In the opening chapters renal embryology, anatomy, and physiology are discussed, followed by chapters on the incidence and ætiology of pyelonephritis. There are special sections on pyelonephritis in infancy and childhood, in diabetes, and in pregnancy, and on the relationship between pyelonephritis and hypertension. In addition there is a chapter on urinary tract infections and the use of antibiotics in these infections.

Throughout the book there are numerous references, and this forms a very valuable addition to the text.

This book can be especially recommended to all those interested in urological disease.

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PEPTIC ULCERATION: A Symposium for Surgeons. Edited by Charles Wells and J. S. Kyle, M.B., B.Ch., F.R.C.S. (Pp. xi + 260; figs. 42. 42s.) Edinburgh and London: E. & S. Livingstone, 1960.

THE sub-title of this book is "A Symposium for Surgeons." It is in fact a collection of papers on nearly all aspects of peptic ulceration written by eight authors, seven of whom are past or present members of the Liverpool school, and edited by the two authors whose names appear on the cover. The work clearly represents the Liverpool school, but it is of some interest to us that three of the authors are past or present members of the Belfast school.

Professor Wells states in his preface, "Some basic knowledge is assumed." The book is therefore not absolutely comprehensive, so that routine knowledge of clinical features, diagnostic measures, and operative procedures are not all dealt with in detail. More emphasis is placed upon recently acquired knowledge, particularly in regard to etiology, the post-gastrectomy syndromes, and post-operative nutritional problems. The latter chapters, written by Professor Welbourn, are, as one would expect, quite outstanding. The opening article on epidemiology is unusual and highly informative. Another interesting feature is the inclusion of English translations from the German of early papers of the great masters of gastric surgery, from Bilroth to Schoemaker.

The whole work is of a very high standard and contains a great deal of useful information. It makes an excellent gateway to learning for the serious post-graduate student or intending research worker. The book will be of great interest and value to all practising abdominal surgeons and there is in it much useful information for physicians and gastro-enterologists. For the F.R.C.S. candidate this work will be of considerable value, but the inclusion of descriptions of a number of somewhat bizarre procedures may detract slightly from its value in this direction. T. K.

THE SURGICAL TREATMENT OF FACIAL INJURIES. By Varaztad Hovhannes Kazanjian, M.D., D.M.D., and John Marquis Converse, M.D. Second Edition. (Pp. xxx + 1110; figs. 1115. 256s.) London: Baillière, Tindall & Cox Ltd., 1959.

A SECOND edition of this important work appears some ten years after the first. It has been considerably enlarged by the addition of six new chapters and four hundred new illustrations and by the expansion of the existing chapters, which have been rewritten.

A new chapter now introduces the subject of fractures of the facial bones and a separate chapter is devoted to facial injuries in children. A valuable addition is a chapter devoted to fractures of the fronto-ethmoid region and fittingly this has been written in collaboration with neurosurgeons. Dr. Judah Zigmor contributes a comprehensive chapter on X-ray examination of the facial bones in which he details the important projections and techniques for the general survey and more localised examinations of the facial bones.

A new chapter on transplantation of tissues is of general interest and a separate chapter is now devoted to scars of the face.

This is in every way an outstanding book which covers the subject thoroughly and must be regarded as the standard reference book on the subject of facial injury. N. H.

AN INTRODUCTION TO DENTAL SURGERY. By R. P. Jepson, F.R.C.S., and B. N. Catchpole, F.R.C.S. (Pp. x + 166; figs. 53. 21s.) London: The English University Press, 1959.

THIS little book, written for dental students, deals essentially with surgical conditions of the head and neck. There are general chapters on inflammation, burns, and neoplasms, and the book is essentially similar to other surgical textbooks written for dental students in recent years. All the illustrations are in black and white.

One feels that coloured photographs, instead of the black and white illustrations, would have helped greatly in the understanding of the text. J. M. M.

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A new chapter now introduces the subject of fractures of the facial bones and a separate chapter is devoted to facial injuries in children. A valuable addition is a chapter devoted to fractures of the fronto-ethmoid region and fittingly this has been written in collaboration with neurosurgeons. Dr. Judah Zigmor contributes a comprehensive chapter on X-ray examination of the facial bones in which he details the important projections and techniques for the general survey and more localised examinations of the facial bones.

A new chapter on transplantation of tissues is of general interest and a separate chapter is now devoted to scars of the face.

This is in every way an outstanding book which covers the subject thoroughly and must be regarded as the standard reference book on the subject of facial injury. N. H.

AN INTRODUCTION TO DENTAL SURGERY. By R. P. Jepson, F.R.C.S., and B. N. Catchpole, F.R.C.S. (Pp. x + 166; figs. 53. 21s.) London: The English University Press, 1959.

THIS little book, written for dental students, deals essentially with surgical conditions of the head and neck. There are general chapters on inflammation, burns, and neoplasms, and the book is essentially similar to other surgical textbooks written for dental students in recent years. All the illustrations are in black and white.

One feels that coloured photographs, instead of the black and white illustrations, would have helped greatly in the understanding of the text. J. M. M.

PEPTIC ULCERATION: A Symposium for Surgeons. Edited by Charles Wells and J. S. Kyle, M.B., B.Ch., F.R.C.S. (Pp. xi + 260; figs. 42. 42s.) Edinburgh and London: E. & S. Livingstone, 1960.

THE sub-title of this book is "A Symposium for Surgeons." It is in fact a collection of papers on nearly all aspects of peptic ulceration written by eight authors, seven of whom are past or present members of the Liverpool school, and edited by the two authors whose names appear on the cover. The work clearly represents the Liverpool school, but it is of some interest to us that three of the authors are past or present members of the Belfast school.

Professor Wells states in his preface, "Some basic knowledge is assumed." The book is therefore not absolutely comprehensive, so that routine knowledge of clinical features, diagnostic measures, and operative procedures are not all dealt with in detail. More emphasis is placed upon recently acquired knowledge, particularly in regard to etiology, the post-gastrectomy syndromes, and post-operative nutritional problems. The latter chapters, written by Professor Welbourn, are, as one would expect, quite outstanding. The opening article on epidemiology is unusual and highly informative. Another interesting feature is the inclusion of English translations from the German of early papers of the great masters of gastric surgery, from Bilroth to Schoemaker.

The whole work is of a very high standard and contains a great deal of useful information. It makes an excellent gateway to learning for the serious post-graduate student or intending research worker. The book will be of great interest and value to all practising abdominal surgeons and there is in it much useful information for physicians and gastro-enterologists. For the F.R.C.S. candidate this work will be of considerable value, but the inclusion of descriptions of a number of somewhat bizarre procedures may detract slightly from its value in this direction. T. K.

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GENERAL ANÆSTHESIA FOR DENTAL SURGERY. By R. S. Walsh, M.A., B.M., B.Ch., F.F.A.R.C.S. (Pp. viii + 94; illustrated. 21s.) London: Longmans, 1960.

In the author's preface to this book it is stated 'written primarily for students and general practitioners of both medicine and dentistry.' With this proviso, one will understand why the introductory physiology and pharmacology occupy only seventeen pages of the book. To summarise such important basic data in this space is a very difficult task and in this Dr. Walsh has been very successful. One might criticise his chapter on pharmacology as he gives all the details of the drugs and then, when they are mentioned later in the text, he reiterates his summary of their actions. This unnecessary repetition appears on more than one occasion. It is appropriate that on the subject of dental anæsthesia almost as much space should be devoted to the section on apparatus as that which deals with the basic principles of physiology and pharmacology. However, the author has assumed that all dental anæsthetists will have an intermittent flow apparatus at their disposal and, while this does apply frequently when anæsthetics are given in dental surgeries, it does not always apply to hospital practice where ordinary non-anæsthetic personnel may have to use the standard Boyle's machine. The limitations of this machine for dental anæsthesia are adequately pointed out, but little attempt is made to suggest how the machine can be used should there be no alternative piece of equipment available.

By far the largest portion of this book deals with the use of nitrous oxide and oxygen and with adjuvant drugs where these are necessary. This section is very clearly written and should be of great value to occasional anæsthetists. Consultants may take exception to the technique which somewhat resembles that of "do-it-yourself." However much one may dislike this approach, it must be realised that there is little alternative for the occasional anæsthetist and for the general practitioner who has to give the majority of dental anæsthetics which are administered in this country.

The author, quite rightly, mentions and elaborates in some detail the conditions where he thinks that anæsthesia should not be administered in the dental chair and where hospitalisation and, possibly, full general anæsthesia should be used. The reviewer feels that, if his advice were taken more frequently, there would be fewer accidents in dental anæsthesia administered in the dentists' surgery. The limitations which this type of anæsthesia imposes are many and the author of this book has surely done a great service in emphasising this point.

The author proceeds to give a section at the back on administration of anæsthetics for major dental surgery. It is not possible to deal with this subject in a book such as this one and, while much wise advice is given, it must, of necessity, be "do-it-yourself" techniques and these are not suitable for the major dental cases and plastic surgery of the jaws and fractured mandibles which are described. It will be noted that the preface of the book states it is "for the trainee specialist anæsthetist whose opportunities to gain experience are . . . limited." It is felt that the last two chapters of the book, dealing as they do with major anæsthesia in the operating theatre, would be better omitted.

This book, undoubtedly, fills a great need for the general practitioner and the occasional anæsthetist whose only contact with the unconscious patient may be in the dental chair. The style of writing is easy to follow and the book is well illustrated. Provided it does not lead the occasional anæsthetist into a sense of false security, wherein he may try to cope with the more major problems which are discussed in the book, it can be recommended for general practitioners and dentists alike. J. W. D.

BEDSIDE DIAGNOSIS. By Charles Seward, M.D., F.R.C.P.(Ed.). Fifth Edition. (Pp. xix + 479. 25s.) Edinburgh and London: E. & S. Livingstone Ltd., 1960.

Dr. Seward's book has reached a fifth edition in ten years, and must be on the way to becoming a medical best seller. It is successful because it is oriented towards the needs of the physician "in practice," whose difficulty is in making a differential diagnosis of the chief

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This is not a book in which to learn "diseases," but it is an excellent one from which to learn clinical medicine. R. A. W.

BRITISH OBSTETRIC AND GYNÆCOLOGICAL PRACTICE. By Sir Eardley Holland, M.D.(Lond.), F.R.C.P., F.R.C.S., F.R.C.O.G., and Aleck Bourne, M.A., M.B., B.Ch. (Cantab.), F.R.C.S., F.R.C.O.G. Second Edition. (Pp. xiv + 1228; illustrated. 147s.) London: Heinemann Medical Books, 1959.

THE launching of a very large textbook of obstetrics compiled by over forty contributors was an immense task and inevitably the first edition of British Obstetric Practice contained minor errors and some overlapping of the subject matter. These faults have been eliminated in the present edition and the book has been drastically revised to include many of the recent advances in obstetrics.

New chapters on the physiology of the placenta and the adaptation of the fœtus from intrauterine to extrauterine life are valuable and welcome additions. There are many gaps to be filled in the knowledge of placental physiology but the new chapter tackles the subject very well and includes much information of great practical value. The reader will also appreciate how much remains to be discovered and that only by further research into placental physiology will some of the causes of stillbirth be revealed.

Perinatal mortality is mainly influenced by the intrauterine environment, by the stress of labour, and by the immediate adaptation from intrauterine to extrauterine life. An excellent account of this adaptation is given in a new chapter and the application of physiological principles to the resuscitation of the newborn has rationalized many of the methods.

The chapter on the physiology of pregnancy in the first edition has not been included, but the subject matter has been added to the appropriate chapters. While this leads to much searching for information in different parts of the book, it has made the individual chapters on such subjects as cardiac disease much more complete by commencing with a full and accurate account of the relevant physiology.

The account of normal pregnancy and labour are excellent and newer studies on uterine action, normal and abnormal, have been incorporated.

There is a growing tendency to omit vaginal examination as part of ante-natal supervision, and the reviewer is pleased to note that this authoritative book categorically states that this should always be made. Younger (and some older) obstetricians please note!

The bulk of the book deals with abnormal midwifery and a very full and accurate account is given of the many problems, supported by a comprehensive and up-to-date bibliography.

Much of the confusion regarding the ætiology of pre-eclampsia has been dispelled in the excellent section on toxæmias of pregnancy and, wisely, only relevant theories and established facts are presented.

Some very interesting advances in the ætiology and classification of contracted pelvis are presented and the Caldwell and Moloy classification of "normal" pelvic variations has been rightly criticized.

The operation of symphysiotomy is not widely practised in the United Kingdom but, should any obstetrician wish guidance regarding the technique, a simple and relatively safe method is fully described.

In a short review it is quite impossible to do full justice to every section of the book. There are a few minor points regarding treatment with which some obstetricians would disagree, but the recommended management of the different complications are thoroughly sound and represent the view of the great majority of British obstetricians.

British Obstetric Practice has achieved its purpose in providing a complete and authoritative account of obstetrics. It can be thoroughly recommended to all practitioners and obstetricians, and will be of especial value to those preparing for higher qualifications in obstetrics.

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ESSAYS ON THE FIRST HUNDRED YEARS OF ANÆSTHESIA, Volume 1. By W. Stanley Sykes, M.B.E., M.B., B.Chir., D.A. (Pp. 171. 30s.) Edinburgh and London: E. & S. Livingstone, 1960.

READERS must not get the impression that this is just another book on the history of anæsthesia. The author retired from anæsthetic practice when muscle relaxants and techniques were introduced and, in the intervening time, he has accumulated an enormous amount of interesting data on the early days of anæsthesia. In his preface he states that he has photographed nearly six thousand pieces of early apparatus and has cross-indexed every reference to anæsthesia in the first hundred years of its history in British journals.

From this collection of data he has produced a most fascinating series of essays. He has not attempted to cover the historical aspects of anæsthesia in systematic order and the book may be quite unintelligible to those who have not read some of the standard history books on this subject. Its appeal to readers in general might have been increased had he included a very short synopsis of the early history of anæsthesia at the beginning. The first of these essays is 'The Effect of Cantharides on the Hedgehog.' In this he shows the futility of pharmacology as it was taught to him as a student and the dangers of applying animal experiments to human subjects. He follows this by the most interesting description of life in the medical profession at the time just prior to the introduction of anæsthesia. The difficult conditions under which medical practitioners worked in those days is almost unbelievable and their financial remuneration was extremely small. It is hard to believe, in these days of state medicine, that just one hundred years ago the physician had to use the tradesman's entrance to homes. The picture which he paints obviously shows that conditions were not conducive to new advances in medicine and surgery except in the large teaching centres and it is not hard to see that the early work of the English pioneers of anæsthesia could easily have gone unnoticed and that the final discovery of the anæsthetic properties of either would find a more receptive medical profession in the United States than in Britain.

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Chapter 6 is entitled 'Stupidities,' and rather than stupidities of anæsthetists, one finds that this actually deals with stupidities of surgeons. This can be illustrated by two references direct from the book. "The stoppage of the heart would have saved his life" . . . "mistakes made by a surgeon can usually be rectified by a more skilled surgeon at a later date . . . an anæsthetist's mistakes, on the other hand, tend to be permanent and final."

Dr. Sykes seems to have picked out all the controversial issues in the first hundred years of anæsthesia and he has written these in a most glowing form. He is obviously not a beginner in the field of writing and his penmanship is such that one would expect from a writer of detective fiction. This is not a book which students should expect to obtain information from prior to an examination but rather one which one would sit down in front of a cosy fire and enjoy. Its title may suggest that it should only be read by anæsthetists but, in fact, it would make most fascinating reading for any medical practitioners, particularly surgeons and obstetricians. It is a volume which would be very much appreciated as a present and is a worthwhile addition to Livingstone's list of interesting historical books. J. W. D.

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THIS book quickly reveals to anyone who has to see such injuries the wide experience and skill that the authors have to draw on. It is full of helpful clinical and practical operative advice where this is sought, but the real message of this edition seems to be encouragement to undertake more meticulous and extensive primary repairs. The classification of hand wounds into "Tidy and Untidy" immediately appealed to my experience as did the criticism of what appears to be a growing tendency to leave extensor tendon injuries splinted but unsutured.

Numerous illustrations of the various lesions are included and good advice is given to those who might lightheartedly undertake what must be painstaking surgery.

The book is thoroughly recommended to all who concern themselves with hand injuries; whether this be active operative interest or only medico-legal evaluation of the results, the knowledge within its covers will give the reader a much better grasp of the possibilities of repair. R. H. L.

ANTIBIOTIC AND SULPHONAMIDE TREATMENT. Edited by M. E. Florey. (Pp. ix + 150. 10s. 6d.) London: Oxford University Press, 1959.

THIS little handbook for practitioners and students, despite its convenient size, contains a wealth of information. It is ideal for the doctor who wishes to remind himself of the names and uses of the antibiotics and sulphonamides; but, as is inevitable where new views and drugs appear every month, it was already out of date when the preface was written in March, 1959.

The descriptions of the drugs are concise and easy to understand and the recommendations on treatment are appropriate to their use in general practice. However, if the recommendations were followed in hospital then the problem which has arisen over resistant organisms both there and in other closed communities would become progressively more serious. Although they refer frequently to the development of resistant strains of staphylococci and of cross infection with *ps pyocyanea, B. proteus* and yeasts, the authors do not seem to realise the danger of the development of resistant strains during the treatment of an individual case. They recommend the serial use of single antibiotics in the treatment of osteomyelitis and frequently recommend the use of erythromycin by itself in the treatment of infection due to staphylococci already resistant to other antibiotics. Such a policy encourages the development of resistant strains especially when antibiotics such as streptomycin, erythromycin and novobiocin are used in this way.

The failure of the authors to adjust their recommendations to current needs for hospital treatment makes this a dangerous book in the hands of students and house officers. P. C. E.

BODY FLUIDS IN SURGERY. By A. W. Wilkinson, Ch.M., F.R.C.S.E., F.R.C.S. Second Edition. (Pp. x + 276; figs. 12; tables 30. 21s.) Edinburgh and London: E. & S. Livingstone, 1960.

EVERY surgeon must understand thoroughly the physiology and pathology of the body's fluids and electrolytes so that he may deal effectively with the disturbances which he encounters in his patients. Knowledge of this subject has increased enormously in the past few years and Professor Wilkinson has made notable contributions to it. In this second edition of his well-known book he reviews the whole field in a critical and practical manner and states his own views on controversial matters. In addition to chapters on water, the main electrolytes and acid-base balance, there are others on the metabolic effects of injury, shock, disorders caused by alimentary diseases, the influence of associated diseases of the heart, liver, and kidneys, and on disturbances during infancy and childhood.

The subject matter is excellent but the presentation fails to do it justice. The reader is frequently jarred by sentences which are constructed awkwardly or which lack clarity. It is to be hoped that these deficiencies will be made good in the next edition. R. B. W.

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THIS book quickly reveals to anyone who has to see such injuries the wide experience and skill that the authors have to draw on. It is full of helpful clinical and practical operative advice where this is sought, but the real message of this edition seems to be encouragement to undertake more meticulous and extensive primary repairs. The classification of hand wounds into "Tidy and Untidy" immediately appealed to my experience as did the criticism of what appears to be a growing tendency to leave extensor tendon injuries splinted but unsutured.

Numerous illustrations of the various lesions are included and good advice is given to those who might lightheartedly undertake what must be painstaking surgery.

The book is thoroughly recommended to all who concern themselves with hand injuries; whether this be active operative interest or only medico-legal evaluation of the results, the knowledge within its covers will give the reader a much better grasp of the possibilities of repair. R. H. L.

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The descriptions of the drugs are concise and easy to understand and the recommendations on treatment are appropriate to their use in general practice. However, if the recommendations were followed in hospital then the problem which has arisen over resistant organisms both there and in other closed communities would become progressively more serious. Although they refer frequently to the development of resistant strains of staphylococci and of cross infection with *ps pyocyanea, B. proteus* and yeasts, the authors do not seem to realise the danger of the development of resistant strains during the treatment of an individual case. They recommend the serial use of single antibiotics in the treatment of osteomyelitis and frequently recommend the use of erythromycin by itself in the treatment of infection due to staphylococci already resistant to other antibiotics. Such a policy encourages the development of resistant strains especially when antibiotics such as streptomycin, erythromycin and novobiocin are used in this way.

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The opening section on "General Considerations" includes good, up-to-date accounts of chemotherapy, blood disorders in relation to surgery, water and electrolyte deficiencies, blood transfusion and malignant disease. It is difficult to pick out other chapters for special mention, but those on the central nervous system and on the heart are outstanding. It is refreshing to find references to the use of artificial kidneys and pump-oxygenators, to modern views on the ætiology of Hashimoto's disease, the adreno-genital syndrome and cancer of the lung, to current practice in the management of paraplegia, tuberculosis of the kidney, ulcerative colitis, peripheral vascular disease and cardiac arrest, to the problems of surgery in the tropics, and to numerous other growing points in medicine and surgery.

It is inevitable that a book of this size should contain items that can be criticized in detail, but they are few and relatively unimportant and do not detract from the general high standard.

The undergraduate will find it more than adequate for his needs. The post-graduate will find in it a great deal of useful background information, but will require to read more detailed accounts of surgical treatment and of operative surgery. The printing and production are excellent, the index is adequate, and the price is reasonable. R. B. W.

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DR. MACGREGOR has devoted almost her entire professional life to the study of the pathology of infancy and childhood and all who know of her work in Edinburgh have the greatest admiration and respect for her integrity and for her views. This book has been long awaited and is a major contribution to pathological literature.

The first part deals with pathology of the fœtal and neonatal period and the second with developmental malformations, and these sections, representing aspects still very poorly discussed in standard textbooks of pathology, make up more than one-third of the book. Other parts deal with infective diseases, rheumatic, "collagen," and allergic diseases, metabolic and nutritional disturbances, injuries and poisoning, neoplasms and diseases of the blood. All conditions likely to be encountered in pædiatric practice in this country are clearly presented, though details of rare conditions of the nervous system, blood, and skin will be sought in detailed general textbooks on these subjects.

The approach is the traditional one of Scottish pathology with emphasis almost entirely on anatomical changes, both gross and microscopical. On almost every page the careful reader will find some sentence or some phrasing which will show that the author is writing from very real experience, and certainly this is no digest of the literature, but is experience refined over the years. There are numerous references, but the book is too much the author's own to deal really critically with the literature.

A purely anatomical approach has great value but it is not the whole of pathology which must increasingly attempt explanations in terms of disturbed function. Even on a descriptive basis it is sometimes lacking though it is at its best in descriptions of congenital anomalies and tumours. It tends to result in a series of notes rather than a systematic study, and, in such chapters as that on the placenta, the failure to attempt an integration of modern physiological and histological research with the pathological findings is especially disappointing. There it has resulted in a chapter containing nothing which might not appear in a student's textbook of midwifery.

For the pathologist, and especially for the hospital pathologist, this is an indispensable companion. The clinician will find it difficult but rewarding reading, but he may think it somewhat disjointed and lacking in a broad basic approach to the problem of disease.

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Dr. Riley, starting with some observations on experimental carcinoma in mice, has greatly expanded our knowledge of the function of these cells. By a series of ingenious correlations he has shown that the mast cell, though not the only, is yet an important source of histamine production. His observations in this connection are convincing. This cell is then shown to be an important chemical factory, but further functions are likely to be assigned to it, especially in its relationship to fibrous tissue.

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The procedures required for the proper examination, diagnosis, and treatment of all the more common and important conditions are dealt with fully. The student is not burdened with descriptions of clinical rarities or with detailed operative techniques.

The important relationship of ophthalmology to general medicine and neurology is emphasised and there is a most useful appendix giving the visual requirements for the public services. Wholeheartedly recommended to all those interested in ophthalmology. J. R. W.

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