DECEMBER, 1964

THE ULSTER MEDICAL JOURNAL

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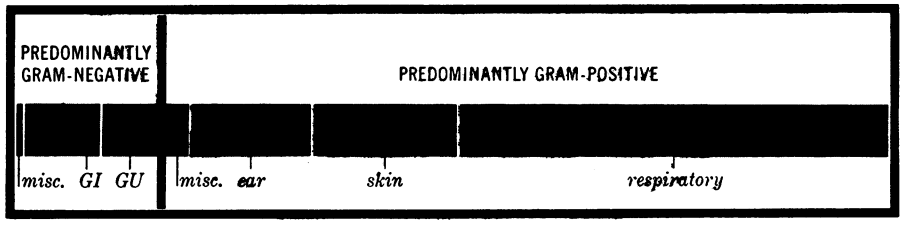

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Schaffer, L., et al. (1963). Clin. Pod., 2:642. Walters, E.W., et al. (1963). Antimicrobial Agents & Chemotherapy, Sylvester, J.C., ed., Braun-Brumfield, Inc., p. 210. Trakas, J.C., and Lind, H.E. (1963). Antimicrobial Agents & Chemotherapy, op. cit., p. 216.

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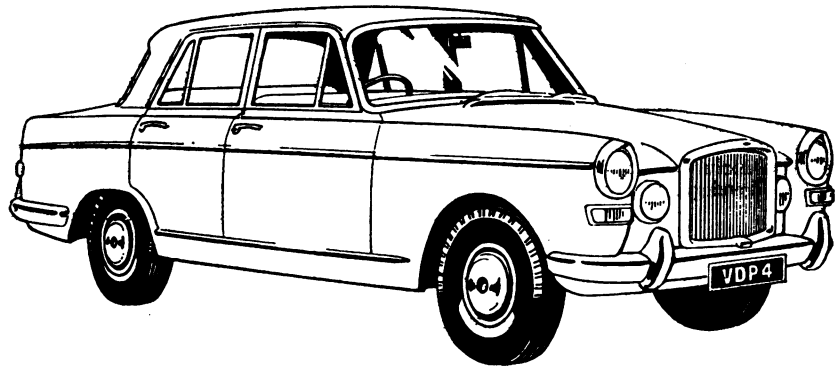

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THE STREPTOCOCCUS, RHEUMATIC FEVER AND GLOMERULONEPHRITIS. Edited by J. W. Uhr, M.D. (Pp. 429; figs. 180. 60s.) London: Baillière, Tindall & Cox, 1964.

THESE fifteen papers were presented at a symposium held in New York in 1962 and are concerned with group A hæmolytic streptococci and their relation to rheumatic fever and glomerulonephritis, and especially with advances made since an earlier symposium in 1951. All are highly specialised presentations by foremost workers, and, though all scientifically trained readers should be interested, few will fully understand all the work recorded.

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J. E. M.

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DATES OF PUBLICATION

It is hoped to issue two numbers each year: in June and in December.

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ULSTER MEDICAL JOURNAL

PUBLISHED ON BEHALF OF THE ULSTER MEDICAL SOCIETY

Vol. XXXIII DECEMBER, 1964 No. 2

WHERE IS OUR LOGIC?

By **KATHLEEN M. CATHCART, M.B., D.P.H.**

PRESIDENTIAL ADDRESS

to the Ulster Medical Society, 29th October, 1964

It was not difficult to choose a subject for my talk tonight. My greatest medical interest throughout the years has been the care of the expectant mother. My difficulty lay in deciding how to present my subject. The many learned ones here know so much. Our visitors are not interested in medical details and statistics. The whole historical background of obstetrics has always fascinated me. Looking back from the vantage of the twentieth century, one can trace what appears to us to be a strange lack of logic. Perhaps that is how one generation always views another. Time would not permit me to enter into every detail. Therefore I decided to develop my theme by looking at a few landmarks along the way, keeping in mind my question, 'Where is our logic?' Some of my statements may sound provocative, but perhaps that is the privilege of a President!

Birth is not a new and rare disease. It has been with us since the beginning of mankind. Yet it is almost unbelievable, in the light of our present knowledge, that the practical application of the study of birth has been so slow throughout the ages. This story of the slow evolution of obstetrics, with its strange pendulum of change swinging backwards and forwards, with many of its mysteries still unsolved, is one of intense interest. Yet so many of the discoveries in retrospect seem to be the outcome of logical thinking. Why have we been so slow to apply this logic or even to recognise it in its own age? Always there seemed to be an opposing force to a new idea and the central figure—the expectant mother—appeared to be forgotten in the clash of wits. To unfold the story of the evolution of midwifery one must begin with the midwife. One of the earliest mention of the word 'midwife,' apart from the Bible, is contained in the dialogues of Plato

in which Socrates, born in B.C. 491, the son of a midwife, likens his art to that of a midwife practising on the souls of men when they are in labour and diagnosing their condition, whether pregnant with the truth or with 'some darling folly.' To quote, "The midwives know better than others who is pregnant and who is not. And by the use of potions and incantations they are able to arouse the pangs and to soothe them at will; they can make them bear who have a difficulty in bearing and, if they think fit, they can smother the embryo in the womb."

That was a picture of midwifery as it was seen in the fifth century B.C. The midwife from the earliest times was the most important person to the expectant mother, and indeed the only person available. Even among the most primitive races, it was recognised that a woman in childbirth needed some assistance. Usually the mother, when in labour, retired from the tribe, accompanied by a friend or an older woman, preferably one who had already borne children—and this woman became the prototype of the midwife of today. This service of helping to bring into the world a new human being was left for centuries in the hands of untrained and unskilled women, many of whom were of the type immortalised by Charles Dickens in his 'Martin Chuzzlewit.' In those early days it was not unknown for the midwives, unskilled as they were, to perform Cæsarian Section upon the dead. Some religious laws dictated that this must be done if the mother died. Midwives even procured abortion, if desired, because under the Hippocratic Oath it was not ethical for doctors to do so. Indeed, up to the thirteenth century it was forbidden for physicians to attend normal cases of delivery. The doctor in the Middle Ages did not perform surgical operations —such things were below his professional dignity, and were left to whoever cared to undertake them, regardless of his qualification to do so. In 1580 a law was passed in Germany to prevent shepherds and herdsmen from attending women in labour—an indication of conditions in the sixteenth century.

It is almost unbelievable that it was not until 1813 that a medical organisation—the Society of Apothecaries—appealed to Parliament to provide training for midwives and rules for the regulations of their practice. It is incredible that it was not until more than fifty years later that the movement for the registration of midwives and the setting up of the Central Midwives Board came into being. It is sad to relate that much opposition to the Bill came from within the medical profession itself, who looked upon midwives as their rivals. They feared that, with their skilled training, the midwives would be considered by the public to be as good as doctors. Yet in the earliest of days the practice of midwifery was scorned by the medical profession. "Midwifery is an unfit occupation for gentlemen of an academical education," wrote an eminent doctor to another. "An imposture to pretend that a medical man is required at labour," wrote another. And so midwives reigned almost supreme in the practice of midwifery until the early nineteenth century. How could we, the medical profession, allow such a state of affairs to exist?

The first Midwives Act, which was passed in 1902, contained a curious clause which stated that, in an emergency, it was the duty of a midwife to advise the

relatives to call in a doctor, but take note, no provision was made for the payment of the doctor. I wonder what our doctors in the year 1964 would think of this omission! This was altered in the Midwives Act of 1918 when a doctor called in an emergency was paid by the local Supervising Authority.

Even with these Acts there were loopholes for illegal practice by untrained midwives—the payment was poor, and the work arduous with no provision for off-duty or sickness. The Midwives Act of 1963 improved conditions and gave midwives a salaried service with sickness and holiday pay.

Then we come to the Health Act of 1948 which did so much to revolutionise the whole aspect of medicine. It brought the free services of a general practitioner, a midwife, and a specialist to every expectant mother. With the complete advent of the doctor into obstetrics, midwives became maternity nurses. Then it was the turn of the midwives to complain that they could no longer follow out their vocation as their work was being usurped by the doctors. So the pendulum had swung round again. The important point is that now every expectant mother is entitled to the best possible care before, during, and after her confinement, but she had to wait many centuries before this was recognised.

Doctors in Obstetrics.

I have already stressed the background of the doctors in the field of obstetrics. It was a long time before the spirit of modern science was able to break down and overrule a certain sense of conservatism. It is amazing to think that midwifery only became a compulsory subject for medical students in the year 1854. One shudders to think of the untold misery that must have been caused by the interference—one can only use such a word—of untrained doctors who were summoned in an emergency by untrained midwives. Why did it take so long to realise that the bringing of a new life into the world required the utmost skill? Slowly the idea evolved that the expectant mother requires the services of a team—the cardiac specialist, the hæmatologist, the metabolists, the pædiatrician. In the year 1964 the picture has changed from the days of the isolated midwife struggling on her own to a team of experts bringing all their scientific knowledge to the care of the expectant mother. It is now possible for the mother handicapped by a disease—cardiac, diabetes—to compete with the healthy mother and to have a normal delivery of a healthy baby.

Ante-natal Care.

For centuries there did not seem to be anyone to suggest that some of the happenings in childbirth were preventable by the direct examination of the mother herself. It almost seemed that a mother came into labour, and one waited to see what would happen. Natural birth was defined as "when the child is born in due season and in due fashion"—not a very explicit statement. Abdominal palpation was first practised in 1878—less than one hundred years ago—following a classic treatise by Pinard from Paris. To us in this generation it seems such an obvious procedure. It is interesting to note that the methods described by Pinard are still in use today. Abdominal palpation did not become an integral

part of the regular teaching given to students and pupil midwives until early in the twentieth century. Even this idea of examining the expectant mother did not lay the foundations of ante-natal care as we know it today.

The story of Dr. Ballantyne of Edinburgh—the pioneer of the clinics of today—is well known to every obstetrician. He was appalled by the loss of fœtal life at a time when the birth-rate was decreasing, and so advocated the use of a "Pro-maternity hospital for the reception of women who were pregnant but not in labour and where the case could be 'scientifically investigated,' " to quote his own words. The first bed was occupied in 1901, but it seems strange that there was a time lag until 1915 before the advantage of examining every expectant mother was recognised and the first outdoor ante-natal clinic as we know it today was set up. It is not perhaps appreciated that the Maternity and Child Welfare Act of 1918 made it obligatory for Local Authorities to arrange for the care of expectant mothers. These ante-natal clinics were set up by Local Authorities in many areas even before clinics were in use in some maternity hospitals. The Health Act of 1948 certainly did not appreciate this fact. How were the Local Authority Clinics to fit in to the new scheme? The maternity services, with its triparte administration, is always a subject for discussion. The expectant mother of today may have her ante-natal care from three sources during her pregnancy—the hospitals, the general practitioners, and the Local Authority. I heard Professor Duncan from Cardiff aptly remark, "The fœtus is like a deep-sea diver with three men in a boat trying to rescue him." This triparte administration only works if there is co-ordination. I should like to thank Professor Macafee and the staff of the Royal Maternity Hospital; Mr. Price and the staff of the Jubilee Hospital and the general practitioners for their co-operation with the Local Authority in Belfast. Health visitors are attached to the maternity hospitals (and indeed to all hospitals in Belfast) and are of great assistance in the follow-up of mothers who have failed to keep appointments. This is a most important part of ante-natal care as we see it today.

So from a time when there were no ante-natal clinics, the pendulum has swung round, and today our many clinics are over-populated with hundreds of mothers patiently waiting, especially in our hospitals. True, the expectant mother was never so well examined as she is today with every possible test done in case there is some obscure disease lurking around, but have we time to realise that every mother is a separate individual with her own special brand of fears and fancies? What is the solution? I leave that question with you.

Breast Feeding.

In primitive countries all babies were breast fed—indeed they were forced to be because there were no other means of feeding. It is difficult for us to realise that even today, in this age of artificial dried milk, if for some reason a mother in some of these countries in the East is unable to breast feed her baby, that infant will surely die from starvation. One of the first printed books—indeed claimed to be the first—was written in German for the instruction of midwives, and with advice to expectant mothers, and in 1540 translated into English under

the title, 'The Byrthe of Mankynde.' The original title was 'Rosengarten' ('The Garden of Roses for Midwives and Expectant Mothers'). This book held supremacy during the sixteenth and seventeenth centuries and I cannot resist quoting in some detail from it on a chapter headed, "Directions for the nursing of Children and how to choose a good Nurse."

"I am of opinion that it is fit for every mother to nurse her child because her milk, which is nothing but the blood whitened, which nourished the child in the womb and of which the child was conceived and formed, is fitted and more natural to the child than the milk of a stranger, . . . , but in case the mother, sick or weak, hath no milk or that her husband will not let her nurse her child, then it is necessary to look out for a nurse, but most men do know how hard it is to get one." That last sentence is surely revealing as it shows the important role the father evidently played in deciding on the care of the infant. I shall say more about this later.

And so in the early days all babies were breast fed, either by the mother or by a suitable 'wet' nurse as she was called. Breast feeding was recognised for many centuries as the natural food for the baby. Now the pendulum has swung round and within recent years there is almost a rebellion by the mothers against breast feeding. It is no longer fashionable. True the infants continue to thrive on their artificial dried milk, but what do the psychologists say about it all? The mother is the most important person to the child. It derives a great feeling of security by the close contact with the mother during breast feeding. Is the restless adolescent of this present age the outcome of this failure to breast feed? Who can tell? Today the whole question and problem of breast feeding has to be handled carefully, both from the infant's and the mother's point of view. Many mothers—indeed the majority—are opposed to breast feeding, and an insistence on it by the doctor or midwife may only cause a feeling of guilt in the mother, and certainly can do much to strain the good relationship between the doctor and the expectant mother—an essential part of ante-natal care. That is the position as we see it in the year 1964. Perhaps the pendulum will swing back again, and once more breast feeding will be the fashion of the day. It is surely a sign of the times when an expectant mother asked me recently, "Are we not allowed to breast feed our babies now?" Is this lack of breast feeding in this present age failure on the part of the mothers—or failure on the part of the doctors to stress its importance? And yet do we, as doctors, really know the true value of breast feeding? If we do not, how can we advise?

Anæmia.

It is strange that, even after the discovery by William Harvey of the fœtal circulation, no emphasis was laid on the importance of evaluating the HB. level of every expectant mother. In the old days venesection, even in midwifery, was considered to be beneficial in many cases, so that a debilitated mother quickly became even more debilitated. Now it is recognised that the HB. levels of all pregnant women should be checked frequently, and the ideal is that no mother should come into labour with a HB. of less than 80 per cent.

The latest available information in the perinatal survey states that one-third of the entire population of pregnant women never had a hæmoglobin test carried out at any time during pregnancy. The mortality rate in these patients with severe anæmia (under 60 per cent.) was double the mortality of those patients with a hæmoglobin level of 70 per cent. or over. This is a striking statement. Women of the child-bearing age with hæmoglobins of 70 per cent. or under should have regular tests so that they do not begin another pregnancy with the added burden of anæmia. We may advise and give much treatment to improve the anæmia during pregnancy, but what efforts do we make to prevent its recurrence in a subsequent pregnancy?

Education for Parenthood.

It is only within the past 15-20 years that any serious consideration has been given to the education of the expectant mother. Dr. Dick Grantly-Read was one of the first to advocate some form of training during pregnancy, especially for labour. His book, "Childbirth without Fear," published in 1951, was read and valued by many of his patients. Immediately it divided the medical profession into two camps—those who said it was nonsense to try and train women to be mothers; others who cautiously said there might be something in it. but there were few enthusiasts. You will agree that an expert in any field has required training. Is it not logical that a mother should receive training and guidance in one of the most stupendous tasks which she is asked to perform—the delivery of her baby and its subsequent care?

It has always surprised me that we talk about the expectant mother. Should our concept not be the expectant parents. The psychologists lay great stress on the importance of the family as a unit, yet at the birth of part of a family, especially in hospital, so often the parents are separated, or shall I put it, it is not made easy for them to be together. I agree, of course, that the wishes of the parents should be respected. Some of the mothers have described to me that the birth of their baby was the loneliest experience in their lives. A husband, the father of four children, aptly described his experience to me when he said that the birth seemed to him to be a time "when all the females got into a huddle" and he was left on his own. This gives us a picture of how it appears to the parents even of today. This should not happen in the twentieth century. It is of interest to note that in the very earliest of times in some of the primitive races, following the birth of a baby, the father retired to bed and received the congratulations of the tribe while the mother continued in her everyday duties! It was felt that there was a very close bond between the new-born infant and the father. Therefore it was not wise or safe for the father to carry out his every-day pursuit of food hunting in case any accident should befall him and so bring evil upon the new-born baby. I do not think that we would advise that the fathers should be put to bed, but, in my opinion, it is not logical—indeed it is not right—to separate the parents so completely during the birth. A wider concept of the meaning of a family would do much to lay a solid foundation for the future well-being of this unit. The husband should be educated

in the care of his wife during her pregnancy. It should be explained to him that his wife's whole system is undergoing a change. Special mention should be made of the emotional stress that occurs during pregnancy, and very often following delivery. The earlier discharge from hospital makes it imperative that the father and indeed the mother herself should be made aware of the possible occurrence of these seemingly unexplained emotional outbursts. This is specially important with a first baby, otherwise a feeling of inadequacy to cope with the situation arises in the young parents, and what should be one of the greatest joys in life is missed and many precious things are destroyed. A completely scientific approach to this problem is not sufficient. One must also use imagination and have understanding of the situation. I speak from the experience of many talks with young parents.

This new psychoprophlactic approach to the mothers, whereby in a series of talks in the last few weeks they are prepared, or conditioned might be a better word, to accept the principle of painless childbirth, may have a place in their education. On the other hand, this new idea may be too scientific and not human enough. We want to try and give the mother the education she feels she needs, and not necessarily what we think she requires. I have seen a group of expectant mothers enthralled while a young mother, who has recently had her baby, brings him with her, and tells in her own way the simple story of her own experiences. The story is not told in scientific language, but it tells the mother what she wants to know.

We took a long time to realise that it was essential to educate doctors and midwives. How much longer will it be before we insist that parentcraft education should be an integral part of ante-natal care?

Post-natal Care.

It has been said that the index of the efficiency of the maternity services in any country lies in the number of occupied beds in the gynæcological wards of its hospitals. There is much truth in this. Great stress is laid on the importance of the post-natal examination of every mother six weeks after delivery. Is not this concept much too narrow? The aim should be the care of the mother during child-bearing years. Her health should be looked after in such a way that she does not begin another pregnancy with the disability in a previous pregnancy. This may sound an ideal, but in my opinion it is logical, and it ought to be within the bounds of possibility. If it is logical, it should be possible. Here I think is the place to bring in this question of planned parenthood—a vexed question, and so often shrouded in mystery even in this twentieth century. Obstetricians agree that advice should be given to a mother, if for health reasons, it is not advisable for her to have another baby. It is not generally acknowledged that marital difficulties often arise during and following a pregnancy, and these in turn may become psychological problems. Parents often wish to have definite medical advice on family spacing. Let me stress that at all times the wishes of the parents, and their religious beliefs, should be respected. Here I should like to pay tribute to the women doctors in Belfast who give their services in a voluntary capacity in the Family Planning Clinic.

There is another important point in connection with the after-care of the mother. Many mothers develop almost a guilt complex following a still-birth as they think that they are in some way to blame. A simple explanation makes such a difference, but the Belfast mother does not like to ask questions.

Landmarks in the History of Obstetrics.

Puerperal Sepsis.

It is only possible in the time at my disposal to mention a few landmarks, but no history of midwifery is complete without reference to that scourge of child-birth—puerperal sepsis—which cast its dark shadow from antiquity, and swept like a plague throughout the hospitals during the seventeenth, eighteenth, and nineteenth centuries—when maternity cases were first being admitted. The story of the discovery of the cause is dramatic, not only in its day, but for all time, and is well known to obstetricians. Semmelweis's instructions to the students in his hospital in Vienna to wash their hands in a solution of chloride of lime, after doing a post-mortem, met with much opposition. How could clean hands carry the disease? went up the cry. Our first thought here is to condemn this lack of logic, but we must remember that the science of bacteriology was yet unborn, and so Semmelweis in the year 1840 was in advance of his time and deserves the utmost credit.

The discovery of antibiotics in 1935 seemed to spell the end of all cases of puerperal sepsis. It certainly means that it is no longer a dread disease, but now the sepsis may be masked, and it is only at post mortem that the true cause of death is found. Germs in the year 1964 are still introduced in the same old-fashioned way.

Anæsthetics.

The discovery of anæsthetics by Sir James Simpson in 1847 should have marked the beginning of an era of profound importance for the expectant mother, with its promise of the relief of pain. What do we find? A violent controversy arose among the medical profession and even among the public. The Bible was quoted, "In sorrow thou shalt bring forth children." It was said that this proved that women must always be prepared to suffer pain in the performing of their natural function. Dr. Simpson himself tried to come to the rescue and quoted that the Hebrew word 'sorrow' meant toil or labour, but even that did not satisfy the medical profession. It was only in 1853, when Queen Victoria insisted on chloroform for the birth of Prince Leopold, that anæsthesia became a fashion.

It is difficult for us to appreciate that insensibility to pain was completely unknown before that date and the words 'anæsthetic' and 'anæsthesia' were coined at that time by Dr. Oliver Wendell Holmes.

Placenta Prævia.

Placenta prævia was a dread occurrence in obstetrics over many centuries with a high maternal and fœtal mortality. Prematurity was the chief cause of fœtal death. It took a man of vision to see that the remedy was to prolong the

pregnancy, yet without added risk to the mother. Professor Macafee's conservative method of the treatment of placenta prævia "arrested the attention of all obstetricians," to quote one book. It gained him international fame and the Belfast Medical School is justly proud of him. The saving of human life may be judged from the results:

In the year 1844, 30 out of 100 mothers died and the fœtal mortality was not below 60.

One hundred years later the results were dramatic—1 mother in 300 cases died and the fœtal mortality was more than halved and is decreasing.

Statistics.

I do not think it would be logical to talk about the progress of obstetrics without the added proof of statistics. I shall do it very briefly:

Maternal Mortality

The earliest London records tell us that in the seventeenth century one woman in forty lost her life at the time of the birth of her baby.

During the years 1837-1935 there was a constant maternal death rate of 4.5 per 1,000 live births.

Today the figure is .3 per 1,000 births registered in England and Wales and in Northern Ireland.

Stillbirth Rate.

It has been almost halved in the past twenty years:

1944—27.6 per 1,000 births registered in England and Wales.
1962—18 „ „ „ „ „ „ „ „
1962—22 „ „ „ „ „ Northern Ireland.

Perinatal Mortality Rate.

31 per 1,000 births registered in England and Wales.
38 „ „ „ „ „ Northern Ireland.

Neo-natal Mortality Rate.

1928—29.8 per 1,000 births registered in England and Wales.
1962—15 „ „ „ „ „ „ „ „
1962—18 „ „ „ „ „ Northern Ireland.

Obstetrics have made many advances in the past forty years and British obstetricians have been foremost in the field of discovery. They have been described as "clear-headed and purposeful men, groping intelligently with their craft."

That is why the tragedy of thalidomide has made the medical profession pause and think. Now the injudicious use of some antibiotics in the early months of pregnancy has come under suspicion. It would seem that in the care of the expectant mother we must always ask the question, "Is this drug really necessary?"

What of the men of the past? I have not meant to be critical, but have tried to look at the scene of the discoveries throughout the ages from the point of logic. The doctors and the scientists who carried on in their day with their new ideas in spite of much opposition are indeed worthy of congratulation on their courage and tenacity.

The Utopian dream of obstetricians has yet to be realised—painless childbirth with no maternal and no fœtal deaths.

The more difficult the problem the greater the challenge. Working with the human body with its complexity, with the human mind with its individuality and, above all, working with the mystery of a new life, calls forth the best in every physician.

I wonder what the President of the Ulster Medical Society, one hundred years hence, will have to say about our generation? Will he (or she) be amazed that all the births did not take place in a hyperbaric oxygen chamber—that we were unable accurately to predict the sex of a baby or to tell the day and the time of the onset of labour; that we could find no cause for pre-eclamptic toxæmia? Will he also ask the same question: "Where is *their* logic?"—and where *is* our logic?

"QUO VADIS?"

By **J. F. BEREEN, B.Sc., M.B., F.F.A.R.C.S., D.A.(Eng.)**

OPENING ADDRESS (WINTER SESSION), 1964-65

Royal Victoria Hospital, Thursday, 8th October, 1964

MR. CHAIRMAN, SIR, LADIES, AND GENTLEMEN,

This morning, on behalf of the senior medical staff of the hospital, I have the honour to address you. This is the opening oration for the clinical session of 1964-65. In other years, when the second M.B. examination was taken in June, students entered upon their hospital career about the end of September. With the change of the curriculum, I know that you have all been in hospital for some months now but, by tradition, this opening address is always delivered about the first week of October. So, today, at the request of my colleagues, I officially bid the new students welcome and I invite you to join us in the life of this great hospital.

Some time ago, when thinking about this oration, I considered that I should talk to you about my speciality—anæsthesia—and, in particular, its relation to my own department, Neurological Surgery. Suddenly the thought struck me that, on the 8th October, 1964, it would be almost thirty years, to the day, since I first sat in the King Edward Building and listened to my first oration—so ably and brilliantly delivered by Dr. Jack Smyth, who, until his retirement a few years ago, was Consultant in Charge of Clinical Biochemistry. That day marked a turning point in my life and so I decided that, this morning, I would speak, in particular, to the new students and to the students of the hospital in general.

Some three years ago you entered Queen's University—you had made one of the great decisions of your life—you had applied to be admitted to the Faculty of Medicine. For three years, you enjoyed the life of the University—the boisterous, tremulous, formative years enriched by the presence of, and by association with, your friends in the faculties of Arts, Science and the Law.

Some few months ago, you made the greatest decision of your life—you enrolled as a student of this hospital. No longer for you is there a common way of life—your friends in the Law, Science, and the Arts will become good citizens of the community—you, today, adopt a new way of life. From this day forth, your comings and your goings will be governed by the fact that you are a man of medicine. You are, indeed, a man of medicine but, more important, you are a 'Royal' student. Where'er you may go in the years to come, and many of you will go to the four ends of the earth, you will always be a 'Royal' student. I think it is only right that you should know what that means, as I have come to know it over the years. For this reason, I crave your indulgence to digress for a few moments.

The Glens of Antrim and, in particular, those two lovely villages of Cushendall and Cushendun, have given much to the culture and beauty of our Province. The haunting poetry of Moira O'Neill and the exquisite paintings of Humbert Craig have enriched our lives and coloured our day-dreams. But those glens have given much more to Ulster.

Some few weeks ago, I journeyed to Cushendall—not to see again the raging waves that inspired "Sea Wrack"—not to gaze again at the glens, which held Craig in their spell—the lovely Glen Ann and Glen Ballyeamon, rolling down to the sea, where Lurig forever stands sentinel. I made a sentimental journey to pay my own small tribute to one of Ulster's greatest sons.

From Cushendall I climbed the old cliff path that leads to the next village. At the top of that cliff, nestling in a little wooded grove, is the churchyard of Layde—now decrepit, neglected, broken-down, clustering around the ruins of a thirteenth-century monastery. In that churchyard, beneath a Celtic cross, lies the body of one, James McDonnell, Physician and Gentleman. The man whose vision and humanity, enthusiasm and ideals, devotion and determination made this great hospital possible. To the memory of that man must Ulster be always grateful and you and I eternally indebted.

James McDonnell was born in Cushendun in 1763—the second son of Michael McDonnell, Esq., whose family was one of the oldest in Ulster. He received his early education in this city and graduated in medicine at the age of 22 at the Unversity of Edinburgh. He returned to Belfast and, through his zeal and vision, in 1792 was opened the Belfast Dispensary in a house in Factory Row. That name no longer appears in the Belfast Directory—it is now known as Berry Street—but in that house James McDonnell began the story which continues here today on this site.

Very soon the house in Factory Row proved too small for the demands of the growing town and in the early years of the nineteenth century, with McDonnell as the main instigator, moves were made to set up a more adequate hospital. In 1815 a site was chosen in Frederick Street and the foundation stone of the Belfast General Hospital was laid by the Marquess of Donegall. In 1817 the new hospital of 100 beds was opened to receive patients and here McDonnell and his successors were to work until the great move of the Royal Victoria Hospital to the present site in 1903. With the opening of the hospital in Frederick Street, progress grew apace and the need for proper tuition of medical 'apprentices,' as you were then called, was appreciated. In 1827, James McDonnell gave the first clinical lecture to medical students in the wards of the hospital, and, from this small beginning, came the opening of the Belfast Medical School in 1835, within the walls of the Royal Belfast Academical Institution.

With these few dates, I have given you the barest outline of the origin and rise of the hospital. I would recommend to students two books which trace, with meticulous care and detail, the progress of the hospital from that house in Factory Row. The first book, published in 1851—"The History of the General Hospital, Belfast, and other Medical Institutions"—was written by a beloved

physician of that time, Andrew George Malcolm. The second—"The Royal Victoria Hospital (1903-1953)"—traces the progress of the first fifty years on this site and comes from the pen of that doyen of physicians and acknowledged historian of our times, Dr. Robert Marshall. Read these books and you will come to love your hospital.

When you come to know something of the great men who, over more than a century and a half, devoted their lives to build the traditions of this hospital, you will appreciate the amazingly powerful and dominant factors which influenced them. They were driven—at times, one thinks, almost mercilessly—to give of their best. Among the very foremost of moulding forces of life is that of an ideal. The wonderful ideals of service to humanity and the advancement of medical science were their driving forces. Those ideals have gone on with the progress of these buildings and the 'Royal' now stands, proudly and justly, in the very vanguard of the finest hospitals in these islands.

Now I return to you—my new student! What of you in this new way of life which you adopt today? That thought prompts the more pertinent question: "*Whither goest thou?*" in the vast cosmos of medicine?

You will spend a great part of your life, over the next three or four years, in the wards of this hospital compound. What can I offer you during those years? You will reach the lowest depths of despair and plumb the horrors of self-negation. You are an undergraduate in medicine, but, today, you also commence your post-graduate study and the subject of your thesis is Life—and what could be a more challenging subject? You will come to know life at its very degraded and lowest form and you will see the despair of abject fear. You will know life in its most perfect form and watch human courage at its greatest heights. Such things will have a powerful influence on the formation of your character and your being.

Trials bring a man face to face with God—God and he touch and the flimsy veil of bright cloud that hung between him and the sky is blown away. There is something in the sick bed and the aching heart, in the restlessness and languor of shattered health and the sorrow of bodily afflictions, and the cold, lonely, feeling of utter rawness of heart, which is felt when sickness strikes home in earnest. These trials will be yours in the coming years.

What can I offer you in recompense for disease, despair, and death? You are about to enter upon the most wonderful years of your life. The experiences, you now face, are the most thrilling and sustaining of any upon this life. You will marvel at the miracle of new-born life and look upon the radiant rapture of young motherhood. You will see the joy of a father, whose son is restored to health, and you will know the quiet look of gladness, deep in the eyes of a daughter, as she sits by the bedside of a convalescent mother. All this you will come to know and feel. You will experience the wonderful thrill of achievement when, for the first time, you share a part, with others, in returning a shattered human being to health.

There is so much more that awaits you and affects you so personally. Here you will learn true loyalty to ideals and the wonder of personal sacrifice—two

gifts engendered by the traditions of your hospital. In the next few years, you will form the life-long friendships that will endure till your last hour. Within this hospital compound, many of you will find your life-partners and then you and your family will, for all time, be inextricably linked to the 'Royal.'

There is one ever-remembered experience you will have—first, as a pupil, and again, for the first time, as a house officer. In the small hours of the night you will walk the long corridor—but you never walk alone! Be that corridor so crowded in the busiest visiting hour, it is never more so than the first time you think you walk alone. They jostle and shoulder each other as you walk—the great spirits who have never left—McDonnell, Malcolm, and their many, many great followers—ever watchful, ever helpful, ever jealous of the good name of this, their hospital. When, again, you walk that corridor as a consultant, perhaps for the thousandth time, it is still exactly the same experience. They still walk with you and you are humbled by the knowledge of what they gave of themselves to leave us this, our heritage.

When now I walk that corridor at night, I am reminded, so vividly, of some of the opening lines of Dylan Thomas in "Under Milk Wood." To me they are the very embodiment of the 'Royal' as she watches through the night:

> "And all the people of the lulled and dumbfound town are sleeping now.
>
> "Hush, the babies are sleeping, the farmers, the fishers, the tradesmen and pensioners, cobbler, schoolteacher, postman and publican, the undertaker and the fancy woman, drunkard, dressmaker, preacher, policeman, the web-footed cocklewomen and the tidy wives.
>
> "Listen. It is night moving in the streets!
>
> "You can hear the dew falling and the hushed town breathing. Only 'your' eyes are unclosed to see the black and folded town, fast, and slow asleep.
>
> "Time passes. Listen. Time passes. Come closer now. Only you can hear the houses sleeping in the streets in the slow deep salt and silent black-bandaged night.
>
> "Only you can see, in the blinded bedrooms, the combs and petticoats over the chairs, the jugs and basins, the glasses of teeth, 'Thou Shalt Not' on the wall, and the yellowing dicky-bird watching pictures of the dead. Only you can hear and see behind the eyes of the sleepers. From where you are, you can hear their dreams."

This hospital is no mere collection of bricks and mortar; this is a living entity that breathes and never sleeps.

To what point have I now come with you, my new men of medicine? We, your teachers, will give of our best to guide you to the most perfect pathways of your art and, on that journey, we give into your safe-keeping the traditions and ideals of this hospital. You are the new men of the 'Royal' and today you enter into your heritage. It is a rare and precious thing—guard it well!

You stand poised on the threshold of the most thrilling and fascinating era of the hospital. Plans are now being laid to rebuild the 'Royal.' Most of you will, I hope, see that work begun—some, maybe, take a part in the planning—and many more, I know, will work in the new buildings. What can be more stimulating than to watch a building grow, from small beginnings, to the perfect hospital of tomorrow, where your life may well be? There is an exhilaration—not to say an exultation—in the thought that life has offered to you the opportunity to give your services to mankind in the development of this great new hospital. To have such an object in life is to know the fullest life one can possibly achieve. It means the development—the deepening of one's whole life, the employment of every faculty. It means a glorious freedom, a thousand new interests, branching and growing in unexpected places. The one thing in life, that is supremely worth having, is the opportunity of doing worthily a piece of work, the doing of which is of vital consequence to mankind—not fame, wealth, or great talent, but a chance to do something worth while. The man who does only what he "can" do without strenuous effort, remains small of stature. His world is small; his horizon narrow and shuts him in. When man catches a vision, when he reaches for greater things, when he grapples with a task that is bigger than his present strength, and by grim, resolute, fight masters it, then he grows greater, gains new strength, broadens his life and gains a farther view.

The pivots in all the world's swinging to and fro have been men who thought for themselves. Seek the centre of any great movement and there you will find a man of intellectual independence. Without some degree of fixedness of purpose a man is in constant peril. Unless he can hold his own, amid the currents which play around him, he is in constant danger of shipwreck. There is nothing more important than the cultivation of a self-reliant and self-centred will. Some men are merely as leaves upon the ground, rootless, and swept to and fro by every gust of wind. Others, like the tree, are firmly rooted and can resist the shock of storms.

Where do you—the student—stand in this new pathway of opportunity and endeavour? May I try to cast your horoscope of the future? What will you be? What will you do in this new world of medicine? If I can only measure the force and energy of your will, the question is answered. Nine-tenths of all the factors of the problem are in yourself and you will solve it for yourself and not another for you. You are a magazine of power for good or evil! You have startling possibilities! How will they be directed? To go forward into the life of the new hospital requires courage and much self-confidence. I have a great faith in the ability and tenacity of the present-day medical student. You face tremendous difficulties but you come of sturdy stock. As you go forward to these achievements, you will be motivated by the forces that impelled the McDonnells and the Malcolms to reach for the stars—you will be driven on, like them, by the great ideals of this hospital.

An ideal is the greatest thing in life. Man inhabits two worlds, the world of the visible and present, and the world of his day-dreams. This dichotomy of his

being keeps him in perpetual unrest. He is never in a condition where he cannot conceive a better. A grand ideal arrests and haunts us. It dominates by its sovereignty and will not be hidden or set aside. It may be impossible of attainment but, as a quaint thinker has said: "He who aims at the sun shoots higher than he who aims only at a tree." The fair vision of an ideal is the mainspring of our continual advancement. The man without an ideal plods on in the beaten and dusty track, while he who cherishes one that is worthy soars:

"Where the lost lark wildly sings
Hard by the sun."

"A man's reach," says Browning, "should exceed his grasp or what's Heaven for?"

Ideals are not bloodless ineffectual dreams or fancies which come and go and leave us where we are. Our real ideals are propulsive and directive. They go over into life and make us what we become. Our day-dreams are not the filmy nothings we sometimes deem them. They are the stars that guide our destinies; they hold us to fixity of purpose and to continued hope and effort. The day-dream is the seed-germ of purpose.

Shakespeare made no mere figure of speech when he said we were 'such stuff as dreams are made of.' The stuff that is in our day-dreams is the warp and woof of our lives. Our ideals are framed, not according to the measure of our performances, but according to the measure of our thoughts. When we frame our ideals and keep them constantly before us, when we feel and think for ourselves, we lay the main stones of the firmest foundation upon which a life is built. Ideals are like stars: you will not succeed in touching them with your hands, but if you choose them as your guides and follow them, you reach your destiny. Think no excellence so high that you cannot attain it. To your own courage and self-confidence add the ideals of this hospital and you will, indeed, be well equipped to reach a great destiny.

I will not detain you much longer, but, before I finish, I have one wish to express. When you leave this hall, I hope that even just a few of you will go out into the green space beyond the tennis courts and will look around. You look first to the East and before you lies this building, in which you now sit—the Institute of Clinical Science—the place where so many of your puzzled and tormented hours will be spent and where you will learn much of the wondrous ways of Nature and Medicine. Then you swing round to the South and look towards the Royal Maternity Hospital—where you will come to know the ever-present wonder of new life and, at times, the terrible anguish of death. Towering behind Maternity are the great bulks of Musson House and Bostock House. In those buildings, I would remind you, have lived, at one time or another, some of the finest women of this Province. The nursing profession, by meticulous and devoted care, has given much to the advancement of this hospital. Now look to the West and you see the great new Eye, Ear, Nose, and Throat building—soon to become an integral part of the 'Royal' and to take its place in the shaping of the future. Nestling below it, like a cottage at the hill-foot, is a building to which I am particularly attached. The Department of Neurological Surgery has

been my life, for some eighteen years, since my return from overseas in 1946. That department was started by the late Cecil Armstrong Calvert—one of the most devoted men who ever walked the wards of this hospital. From a small beginning in 1946, when we had both returned from neurosurgical units in the Army, he built it up into one of the most excellent units in Britain and his tragic death in 1956 robbed this hospital of one of her finest sons.

Now you come full circle and you look to the North. Before you lies that ugly, sprawling, but ever-lovable building—the Royal Victoria Hospital—and, as you lift up your eyes to the hills beyond, I hope, in the hearts of just a few of you, will re-echo the words: "*Here lies my life.*" If you are fortunate, as I have been, then here indeed will be your life. I am no prophet but I have a great faith in the medical students of this hospital and of one thing I am very certain—when the history of this great hospital is again written at the turn of the century, therein will be recorded, with pride and uncommon affection, the names of many of you young people sitting before me now.

So today, you, new students of the hospital, commence another chapter in that never-ending story that first started in Factory Row. I pass on to you your heritage—the traditions and ideals of the Royal Victoria Hospital. Cherish these ideals; they were the driving forces which inspired the McDonnells, the Malcolms, the Fullertons, and the many other great men. Think also of the not-so-great—the hundreds of men and women who gave lives of devoted service and who, so nobly, carried on that ideal, first inscribed on the foundation stone in Frederick Street: —

"This Hospital is Dedicated to the Sick
And to the Art of Medicine."

They also, in their own way, were truly great.

Take these ideals; make them your own. Add to them; and, in the years to come, you will indeed walk tall in the ranks of your fellow-men of this new way of life, upon which you have entered this morning.

PLASTIC SURGERY AND OPHTHALMOLOGY

By **SIR BENJAMIN RYCROFT, O.B.E., M.D., F.R.C.S.(Eng.)**
Queen Victoria Hospital, East Grinstead, Sussex

CRAIG MEMORIAL LECTURE

BETWEEN the two world wars it was realised that there was much common ground between the practice of plastic surgery and of ophthalmology: experience in World War II emphasised and established this association, and corneo-plastic surgery was born.

Corneo-plastic surgery may be defined as the reconstructive surgery of the eye and adnexa which is based on the principles of plastic surgery with the use of flap and graft. The common ground of plastic surgery and ophthalmology encompasses four main divisions, namely:

(i) The lids, in which are included congenital defects, such as ptosis and the treatment of extensive trauma and burns.
(ii) The cornea, especially with reference to partial and full thickness grafts.
(iii) The lacrimal apparatus.
(iv) The socket and reconstruction, either in the presence or absence of an eye.

An example in each section will be considered in detail.

(I) PTOSIS.

In congenital cases there is generally a difference of up to 3 mm. in the levels of the upper lids, and this defect can be a source of serious embarrassment. When the condition is bilateral and associated with epicanthus it is more than a cosmetic blemish, for it constitutes an obstruction of vision and the child has to tilt back the head to see clearly.

Ptosis is divided into four categories, namely (a) with lid lift, which is carried out by action of the levator palpebræ superioris; (b) without any lift of the lid; (c) bilateral ptosis associated with epicanthus; (d) a rare phenomenon of Marcus-Gunn, or the jaw-winking syndrome.

Where there is lift of the lid by the action of the levator the correct surgical principle is to shorten this muscle and so intensify the action: 4 mm. of levator resection will usually give about 1 mm. of lid lift: the approach to the muscle may be either through the conjunctiva (Bowman) or through the skin (Wolfe) (Figs. 1 and 1A; Plate 1).

Where there is no lift of the lid by the action of the levator muscle, the surgery is more difficult, since the lift must be transferred to the frontalis muscle, and this has been tried in various ways by the use of sutures, skin straps, gold chain or fascialata. The very diversity of the methods used indicates the unsatisfactory means of treatment. In our clinic the method of Romanes which uses a tendon

autograft cut from the extensor tendon of the little toe is used. This strip is attached to the lid margin and to the frontalis, which is thus enabled to lift the lid.

Owing to complications, such as entropion, trichiasis, corneal ulceration, and exposure, as well as diplopia, all operations which unite the superior rectus muscle to the lid are, in our opinion, ill advised.

(II) Corneal Surgery.

This includes the restoration of sight by corneal grafts, of which there are two types, mainly: (a) The lamellar or partial thickness graft; (b) the penetration or full thickness graft. In principle the partial thickness graft resembles the Thiersch graft of the skin, whilst the penetration graft is similar to the Wolfe full thickness graft. The lamellar graft is, in effect, a shaving of corneal tissue and is suitable for scars which are superficial and of no great depth, whereas the penetration graft opens the globe with consequent increased risk and is more suitable for those scars which extend through the whole thickness of the cornea. For the former type of thin scar a modern type of contact glass will often obviate the need of a corneal graft operation.

Either type of graft is chosen depending on the depth of the corneal scar: in shape the graft is circular and in size it varies from 4 to 10 mm. In unselected cases the operation of a corneal graft will restore sight to varying degrees in about 50 per cent., but in selected cases which have had no previous intraocular disease, such as glaucoma or uveitis, and when there is little or no corneal vascularisation, the success rate may rise to 80 per cent. or more: the use of fresh donor material makes the chances of success greater (Figs. 2 and 3; Plate 2).

Corneal scars which are suitable for replacement by clear corneal tissue from another eye may be caused by ulcers, infection, burns, and congenital defects. The use of animal grafts has not found favour in our country since the optical results and subsequent clarity of these grafts are not nearly as good as those which are obtained from human homografts. For complicated cases, an international study is in progress at the moment to consider the use of grafts made from plastic material in which the main problem is to maintain retention of the graft within the wall of the eyeball.

The donor supply of corneal grafts comes mainly from the dead, and the eye must be removed within twelve hours of death and used within three days if the best optical result is to be obtained. Within recent years the law has been altered so that it is now possible to bequeath eyes, or for near relations to give consent for the use of the eyes of a deceased relative in corneal graft surgery. It is the duty of a regional eye bank to collect, annotate, and distribute these eyes either given by bequest or consent so that a ready supply is always available for any ophthalmic surgeon who wishes to do corneal graft surgery.

At East Grinstead a Regional Eye Bank has worked for many years and is serving as a pattern for the formation of other eye banks. When information is received at the hospital, either from a general practitioner or a near relative that it is necessary to carry out a bequest, a registrar leaves in a special van to collect

the eyes. This van is fitted with surgical, bacteriological, and preservation equipment so that the eyes are placed under optimum conditions of storage as soon as they are received (Fig. 4; Plate 3). At the bank they are stored in a special refrigerator at +4° C. until they are required for use within the next two or three days. Immediately before use the eyes are treated with an antibiotic so as to ensure sterility. Research is being carried out to investigate a method of long-term preservation by deep-freeze storage at −79° C. The eye is first treated with glycerol and diamethylsulphoxide to protect it from the deleterious affect of low temperatures, and this is a method which is offering much encouragement for the long-term preservation of eyes in the future. Clear grafts in rabbits and in man have been obtained by eyes preserved at low temperatures and stored for over three months. There is no doubt that the modern progress of corneal graft surgery represents a great advance in the treatment of blindness for which hitherto no effective treatment was available.

(III) Lacrimal Surgery.

The surgery of the lacrimal apparatus is concerned with the relief of obstruction and the cure of the watering eye. Such obstruction may be caused either by infection or by trauma, and with the increasing number of road accidents, this group of lacrimal obstruction cases is growing rapidly. The skull injury which causes lacrimal obstruction is usually a fracture of the middle third involving the bony nasolacrimal duct. A watering eye is of considerable importance, for it is not only a social nuisance, but it is a hindrance to outdoor occupations, such as a fish salesman, a butcher, or in forms of sport. Fortunately, it is curable to the extent of 96 per cent. by appropriate surgery.

At East Grinstead all lacrimal surgery is done under hypotensive anæsthesia, and in this way the bleeding is controlled to a minimum. By the use of a drug the systolic blood pressure is reduced to 60 mm. mercury and active bleeding ceases: no suckers are required, and there is the minimum use of swabs. In this way the field is clear for the observation of fascial planes and bony displacements which occur so frequently in the course of operations following trauma. The incision to expose the lacrimal area is high up on the side of the nose and goes deep to bone: the periostium is stripped back and the area of the lacrimal sac defined and mobilised. The bone is opened either by a circular hand trephine, or in a more elegant fashion by the Stryker saw. The bony opening is enlarged to about the size of a sixpence, and the nasal mucosa should then be seen to be intact. An anterior and posterior flap is cut both from the nasal mucosa and the lacrimal sac: the flaps are united by sutures and kept apart for a week by an indwelling catheter. In this way free drainage is ensured: excellent results have been obtained by this method during the last ten years.

When, however, there is a stricture of the canaliculus, as, for instance, a cut from windscreen glass, then indwelling polythene tubes have been introduced to maintain patency (Fig. 5; Plate 3). These tubes form a loop inside the nose and around both canaliculi: they are quite invisible and are worn with comfort

for about six months. At the end of that time after removal over 60 per cent. of the cases are free from epiphora six months after operation. This is a new method of technique and one which has been found to be most useful in severe cicatrization of the canaliculi, and also in those cases where the unfortunate operation of removal of the lacrimal sac has previously been carried out. When, for some reason, it is not possible to perform an anastomotic operation to relieve lacrimal obstruction, the operation of lacrimal neurectomy may be tried by dividing the lacrimal nerve as it enters the posterior pole of the lacrimal gland: although this gives variable results, it is a procedure which is of some value and is to be preferred to the old operation of excision of the lacrimal gland.

(IV) The Socket.

When an eye is present the standard method of improving the capacity of the socket is by free mucous membrane grafts taken from the inside of the cheek. These autografts should be extremely thin and slightly over-correct the deficiency: they heal rapidly, but during the healing process the mouth tends to be painful and it is better that the graft should be excised from the cheek rather than from the posterior surface of the lip. They are used to reconstruct both superior and inferior fornices which may be contracted either from severe burns or injury, and it is an important feature of technique that the depth of the fornix shall be over-corrected, and that the mucous membrane shall be firmly fixed to the periostium of the orbital bony wall. A useful appliance to maintain the depth of the fornices is the Walser shell which is worn for three weeks or so after reconstructive surgery of this kind. Where, however, the socket is beyond redemption by local mucous membrane grafts, and where the eye has been lost such as in post-radiation cicatrization or from the secondary contracture following lifelong irritation with an artifical eye, the correct procedure is to excise the socket completely, and this practice has been followed for some years at East Grinstead. The lash line of the socket is excised together with the remnants of conjunctiva and the lacrimal gland. The edges of the lids are then stitched together by a primary suture, and a firm surface without any discharge results. The prosthesis technician can then fashion an appliance which gives a life-like appearance and which requires no after care (Figs. 6 and 7; Plate 4). The relief from such an appliance following on years of a discharging eye socket is much appreciated, especially by elderly patients. Here again, the use of hypotensive anæsthesia is of great value in this type of surgery.

Then again, one can line a socket which has had to be exenterated for a neoplasm by skin, but it is an undesirable practice to try and combine conjunctiva with skin because the oozing conjunctiva causes chronic desquamation of the skin with an offensive smell and irritant discharge.

Thus it is seen how the principles of the new craft of plastic surgery can be allied to the age-old tradition of ophthalmology, and in this way combine to offer the patient the best of two surgical worlds.

THE MYCOLOGICAL DIAGNOSTIC SERVICE: A FIVE-YEAR SURVEY (1959-1963)

By D. W. R. MACKENZIE, Ph.D., and LESLEY W. RUSK
Institute of Pathology, Grosvenor Road, Belfast

Introduction.

In March, 1959, the Belfast Hospitals Management Committee appointed a full-time research mycologist, and subsequently a routine mycological diagnostic service was established at the Royal Victoria Hospital. Since then a series of annual reports in this journal (Mackenzie and McArdle, 1960; Mackenzie, Corkin, and Bell, 1961; Mackenzie, Corkin, and Rusk, 1962, 1963) have described findings of clinical and mycological interest and afforded standards of comparison with other parts of the United Kingdom.

The present review is intended to provide a retrospective survey of the information accumulated by the diagnostic laboratory and indicate certain trends that have become evident within the past five years.

Numbers of Specimens.

Investigations have been made on 6,665 specimens from 4,597 different patients. Material was received from 60 clinics, hospitals, and laboratories in Northern Ireland, from dermatological practices, and from a small number of general practitioners. Investigations were not confined to human infections, and cultures of morbid material from veterinary and other sources were submitted from time to time.

Fungi of pathological significance were recorded on 1,988 occasions (29.8 per cent.), the overwhelming majority (72 per cent.) representing ringworm infections. Since no fewer than 389 specimens were positive by microscopy alone, it is probable that the actual number of infections caused by dermatophytes has been considerably higher.

It has already been pointed out (Mackenzie and McArdle, 1960) that the numbers of isolates of ringworm fungi made by the diagnostic service cannot be related to real incidences of infection. There is no way in which valid epidemiological assessments can be extrapolated from laboratory figures, and consequently any conclusions that may be made are almost wholly speculative. Nevertheless, there have been marked quantitative and qualitative changes with regard to the fungi isolated in the laboratory, and although it may be inadmissible to regard some of these changes as trends, it is often difficult to suggest other explanations.

Scalp Ringworm.

With *tinea capitis* it is generally true to say that acquisition of infection from human sources is consistent with comparatively low standards of hygiene. In contrast, infections from animals are unrelated to the degree of household cleanli-

ness, and can occur in any home, particularly those with pets. With any scalp infection, it is always desirable to locate the source, particularly when the fungus concerned has human to human transfer (anthropophilic). Only one such fungus in recent years has been an important cause of scalp ringworm in Northern Ireland, viz., *Trichophyton tonsurans* var. *sulfureum* (=*T. sulfureum*). Infections caused by this dermatophyte are recognised readily enough in the laboratory, but because symptoms are frequently mild and inconspicuous they may present a very real challenge in clinical diagnosis. Since infected hairs do not fluoresce under a Wood's Lamp, a valuable clinical aid in diagnosing infection is denied the clinician. One of the earlier lines of mycological research was the search for a reliable method to implement clinical examination. What was finally evolved was "Hairbrush Diagnosis" (Mackenzie, 1963), whereby visual inspection was replaced by serial examinations of fomites liable to harbour the fungus, such as hairbrushes, combs, pillows, etc. Presence of *T. sulfureum* was suspected on the basis of consecutive isolations from the same site, and appropriate control measures were initiated following this presumptive diagnosis.

In Table 1, which lists the specific agents isolated from ringworm of the scalp since 1959, the main interest centres around the marked reduction in numbers of isolations of *T. sulfureum*.

TABLE 1.

SCALP RINGWORM, 1959-1963.

*SPECIES	HUMAN/ANIMAL ORIGIN	1959	1960	1961	1962	1963	TOTAL
Trichophyton verrucosum	Animal	14	10	15	16	20	75
Microsporum canis	Animal	19	16	11	8	18	72
T. mentagrophytes	Animal	3	4	0	2	1	9
T. sulfureum	Human	26	22	3	8	7	66
Per cent. "Animal" ringworm		58	57.7	89.7	76.5	84.8	70

*Only the four most commonly occurring species are listed.

As a result, the proportion of infections caused by zoophilic ringworm fungi has increased from 58 per cent. to 84.8 per cent. Since human infections with animal ringworm tend to occur as small localised outbreaks, are readily recognised, and can be promptly and efficiently treated, this "trend" towards diminishing anthropophilic infections is to be welcomed from the Public Health viewpoint.

The main reservoirs of "animal" (zoophilic) infections are almost invariably cattle (*T. verrucosum*), cats or dogs (*M. canis*). Although attempts are always made to locate infected animals within the home (generally cats or kittens), this is never attempted with cattle ringworm, since treatment of infected animals is at present wholly impracticable.

Favus, a distinctive disease of the lower hygienic classes caused by *T. schœnleinii* produces chronic hyperkeratotic lesions with a tendency to form superficial crusts (scutula). Although common at the beginning of the century, improving standards of cleanliness and elimination of the gross overcrowding that encouraged spread from person to person have virtually eliminated this type of ringworm from the list of British dermatomycoses. In 1962, however, favus of the scalp was confirmed in a 15-year-old girl, who had apparently become infected seven years previously. Interest in this mycotic anachronism centred as much on its source as its isolation. Investigations showed that the spread was familial, and that an unbroken history of infection could be traced back through the preceding two generations.

A similar fungus (*T. quinckeanum*), producing favus of mice and other animals (La Touche, 1959), is a rare cause of infection in man. It was isolated in 1959 from a scalp lesion on a 2-year-old child in Belfast—the first, and apparently the only occasion it has occurred in Northern Ireland. An unusual if not unique finding was that infected hairs fluoresced vivid green under Wood's light. Its origin was never found and it remains an epidemiological curiosity. Presumably the fungus had persisted precariously in a small population of house mice or had been derived from a household pet imported from Britain.

Ringworm of the Feet.

In view of the frequency with which dermatophytes are isolated from other parts of the body, the total number cultured from the feet is lower than might be anticipated. *Tinea pedis* was confirmed by culture and/or microscopy in 243 patients, a number that is small in comparison with other parts of the United Kingdom. It is the authors' impression that ringworm of the feet is uncommon in Northern Ireland. Whether or not this may be related to a lower proportion of immigrants from areas of high endemicity (e.g., Far East) is not known. It is interesting to note that the number of specimens from feet positive by microscopy or culture (243) represents only 19.1 per cent. of the total number received from that source, a figure that closely resembles the incidence reported by Holmes and Gentles (1956) in miners. In effect, only one out of every five cases in which *tinea pedis* could be suspected on clinical grounds, was actually confirmed by mycological examination to be so. Although skin or nail scrapings were frequently sent to the laboratory merely to exclude ringworm, this affords a clear indication of the difficulties associated with diagnosis. Another interesting finding was that *tinea pedis* was confirmed in only two children (aged 2 and 10) during the five-year period. In both children, infection was caused by *T. rubrum*.

Not infrequently the fungus obtained in culture was *Candida albicans*, but the significance of this occasionally pathogenic yeast in this site is not known. It is likely, however, that the fungus is preceded by the condition rather than the reverse.

Ringworm of the toenails (*Tinea unguium*) may be a comparatively common condition in Ulster, but was confirmed on only nineteen occasions during the five-year period. This, in turn, may be consistent with the apparent rarity in

Northern Ireland of infections caused by *T. rubrum*. During the five years of the survey only ninety infections by this species were confirmed by the diagnostic service.

As shown in Table 2, *T. rubrum* is only fifth in order of frequency, being preceded by *T. verrucosum*, *M. canis*, *T. sulfureum* and *T. mentagrophytes*.

TABLE 2.

RINGWORM SPECIES CULTURED 1959-1963.

Trichophyton verrucosum	353
Microsporum canis	139
T. sulfureum	130
T. mentagrophytes	118
T. rubrum	90
Epidermophyton floccosum	85
T. mentagrophytes var. *interdigitale*	50
M. gypseum	5
T. terrestre	3
T. simii	2
T. quinckeanum	1
T. megninii	1
T. persicolor	1
Unidentified	1
T. schoenleinii	1
T. equinum	1

Material from one male patient at the Skin Extern of the Royal Victoria Hospital gave rise to colonies of a hitherto undescribed *Trichophyton*. Although clinically typical of an infection with *T. rubrum*, there were significant differences when the fungus was examined in culture. This isolate was demonstrated at Nottingham at the eleventh annual meeting of medical and veterinary mycopathologists sponsored by the Medical Research Council.

RINGWORM OF THE GROIN.

Qualitative examination of cultures made from the groin again reflects the relative scarcity of *T. rubrum*. *Epidermophyton floccosum* was responsible for no less than 29 out of 34 cultures from patients with *tinea cruris*. *T. rubrum* accounted for only three of these infections, *T. mentagrophytes* and *T. sulfureum* accounting for one each.

One clinical rarity, viz., *tinea cruris* in a woman (English and La Touche, 1957), was confirmed by mycological investigation, an infection that had

apparently been acquired in the Middle East. As yet, no satisfactory explanation exists for the seeming predilection of this fungus for males.

Body Ringworm.

Infections of the trunk, limbs, and face between 1959 and 1963 show few obvious trends, and most of the common species associated with *tinea corporis* show little significant alteration from year to year (Table 3).

TABLE 3.

Ringworm of the Trunk, Limbs, and Face, 1959-1963.

Species.	1959	1960	1961	1962	1963	Total
Trichophyton verrucosum	24	41	52	92	68	277
T. mentagrophytes	8	13	33	13	13	80
Microsporum canis	22	7	9	13	10	61
T. sulfureum	11	15	12	10	13	61
Per cent. Animal Ringworm	83	80.3	88.7	91.2	87.5	85.2

One exception is cattle ringworm (*T. verrucosum*), the number of confirmed cases showing a marked increase between 1959 and 1962. There can be no doubt that this is the most common dermatophyte encountered in the mycological laboratory, and little doubt that it is the most common cause of ringworm in Northern Ireland.

One of the infections caused by *T. simii* (Table 2) occurred on the hand of a female laboratory technician. This is an exceedingly rare infection and has been reported previously only from monkeys and chickens (Stockdale, Mackenzie, and Austwick, 1965). The lesion appeared shortly after handling an experimentally infected guinea-pig, and the technician has the somewhat dubious distinction of being the first infected human to be recorded in Europe.

The increased number of infections with *T. mentagrophytes* in 1961 merits comment. This was partly due to a series of infections acquired from pet mice—all the animals being bought from the same pet shop (Mackenzie, 1961). Eventually ten children apparently became infected by handling these animals. This type of spread is known to occur in animal attendants where it might almost be regarded as an occupational hazard.

Pathogenic Yeasts.

Yeast isolated from material submitted to the laboratory were divided arbitrarily in three categories, viz., (1) *Candida albicans*; (2) yeasts other than *C. albicans* of a "potentially pathogenic status"; and (3) non-pathogenic yeasts.

C. albicans was by far the most abundant yeast being isolated on 265 occasions.

Sources are indicated in the previous annual reports and are not listed herewith since they could be regarded as misleading. For example, although *C. albicans* is a normal inhabitant of the mouth and gastro-intestinal tract of man, it was isolated in the laboratory on only forty-two occasions from the buccal cavity. In fact, relatively few clinical specimens of this nature were received. There is no reason to doubt that if routine mycological examinations were made on material received in routine bacteriological laboratories, the number of isolates would be reckoned in thousands.

Other Fungi.

Other fungi appearing in the laboratory included nine species of *Aspergillus*, the majority being isolated from ears or mastoid cavities. Smyth (1962) has already reported that species of *Aspergillus* are common causes of post-operative infection in Belfast and constitute an appreciable therapeutic problem. *A. niger* was the most common species from any source, being isolated on seventeen occasions. It was followed by *A. terreus* (16 isolates), *A. fumigatus* (10), *A. flavus* (9), *A. amstelodami* (2), *A. nidulans* (2), *A. versicolor* (1), *A. repens* (1), and *A. glaucus* (1). Of special interest was the finding of *A. nidulans* as a cause of osteomyelitis, this unique infection occurring in a 6-year-old child. Details will be included in a separate report (Redmond, Carré, Biggart, and Mackenzie, 1965).

As with *C. albicans*, the number of theoretical isolations of *Aspergillus* from certain sites is higher than was obtained in practice. The low overall incidence of this group (59) again reflects a low rate of submission of potentially infected materials. Implication of *Aspergillus* sp. as active pathogens presents even more difficulties than for *C. albicans*, difficulties which cannot be resolved by positive microscopy and culture alone. Even in the absence of other micro-organisms, *Aspergilli* cannot be regarded as more than opportunists with weakly pathogenic characteristics.

Of the remaining thirty-four isolates (species of yeasts, mucoraceous fungi, and other moulds), particular mention can be made of one isolate from a specimen of cerebrospinal fluid. This was positive on microscopy and yielded in culture a fungus resembling *Absidia ramosa*. Some evidence obtained by serological methods suggested that this organism was actively involved in a chronic meningitis: it is hoped to present an account of this unique finding elsewhere.

Farmer's Lung.

With the recent findings (Pepys et al., 1963) that "Farmer's Lung" was caused by inhalation of particles of microbially altered hay, and that precipitating antibodies to species of *Thermopolyspora* and *Micromonospora* could be detected in patient's sera, a serological test has become available for the diagnosis of this condition. Since "Farmer's Lung" occurs in Northern Ireland, the diagnostic laboratory test will be included amongst the services offered by the Mycological Laboratory. At present, standardised antigens are being prepared at the London School of Hygiene and Tropical Medicine and it is hoped that these will become available towards the end of 1964.

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AN OUTBREAK OF SALMONELLA HEIDELBERG INFECTION IN A GENERAL MEDICAL UNIT

Treatment with Ampicillin and Neomycin

By **WILLIAM F. M. WALLACE, B.Sc., M.B.**
Senior House Officer and Junior Tutor, Department of Therapeutics and Pharmacology, Queen's University, Belfast
and T. S. WILSON, M.B., M.R.C.P.I.
Senior Registrar, The Laboratories, Belfast City Hospital

On the 18th August, 1963, an elderly woman, who was a patient in a general medical unit at the Belfast City Hospital, developed severe diarrhœa. This was the beginning of an outbreak of *S. heidelberg* infection which lasted two and a half months; nineteen persons became infected, five had symptoms and there was one death.

The Ward Unit.

The unit consists of a male and a female ward, each with thirteen beds. The wards are on the upper floor of a forty-year-old building which is separate from the main hospital. They are connected by a landing to which stairs mount from the ground floor, where there are small casualty wards. A small kitchen also opens from this landing. Items such as bread and butter and toast are prepared here by the domestic staff for the patients, for themselves, and for the nurses, who take a light breakfast in the unit. Main courses are brought from a central kitchen and served from heated trolleys. At the time of the outbreak there were three doctors, nineteen nurses, and six domestics working in the unit.

Bacteriological Methods.

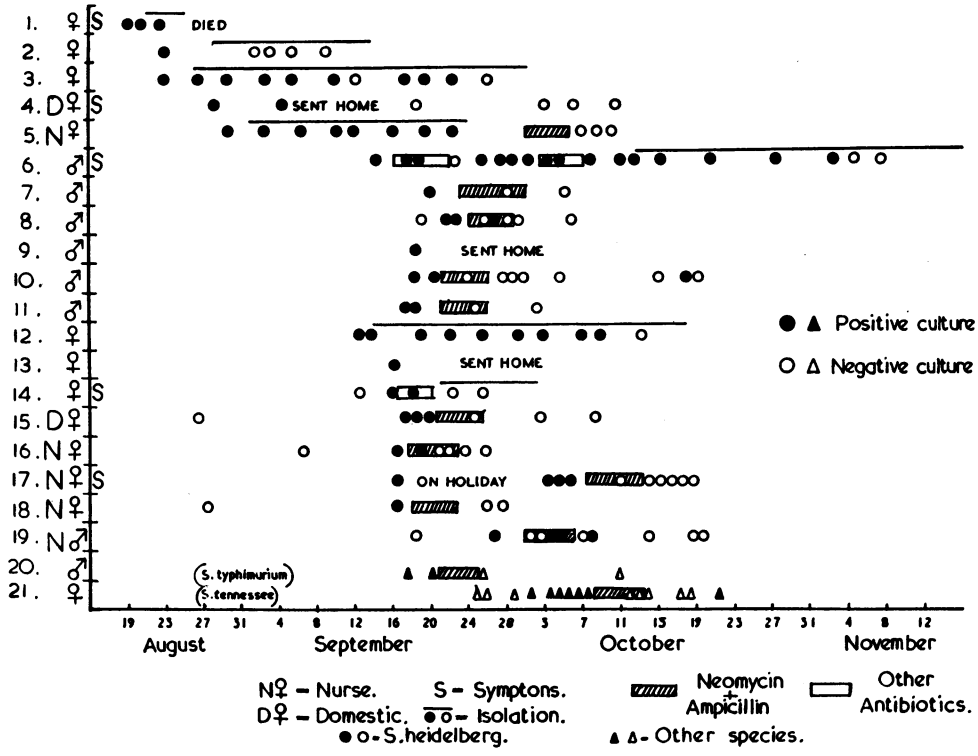
The bacteriological investigations were carried out at the laboratories, Belfast City Hospital. All fæcal samples submitted from patients and staff were examined as recommended by Hobbs and Allison (1945). Primary plating was performed on two selective media:

(a) Wilson and Blair's bismuth sulphite agar, prepared from the Oxoid brand powdered modification of this medium;

(b) Leifson's desoxycholate-citrate agar, as modified by Hynes (1942), to which 1 per cent. sucrose had been added (Murdock, 1954).

Secondary plating was performed on the same two media after overnight incubation in selenite F enrichment medium (Hobbs and Allison, 1945). The primary and secondary sets of plates were both examined after twenty-four and forty-eight hours. Suspicious colonies were inoculated into tubes of composite media (Gillies, 1956) and into tubes of dulcite and lactose. Strains which gave the biochemical reactions of the salmonella group after incubation for twenty-four hours were then tested with the appropriate antisera and their identity determined.

Disc sensitivity tests were carried out. These indicated that the strains of *S. heidelberg* were resistant to sulphonamides and tetracycline, while they were sensitive to neomycin, ampicillin, streptomycin, chloramphenicol, colomycin, and kannamycin.



The Outbreak.

The outbreak started on 18th August, and the unit did not return to normal working until 8th November (see figure). There were two phases.

Phase One.

Five persons were infected in this phase. The first case was a 70-year-old woman with myelomatosis and senile dementia. She had been an in-patient for seven months and was very disabled, being unable to walk. On 18th August she developed diarrhœa. Culture of her fæces next day revealed *S. heidelberg* infection. She was transferred to an isolation hospital, where she died on 25th August.

As soon as the presence of salmonella infection was recognised, one fæcal specimen was taken from each female patient and from each member of the medical, nursing, and domestic staff. Positive results were obtained from two further female patients, one nurse, and one domestic (Cases 2-5). The two patients and the nurse, who were all symptomless, were transferred to the isolation hospital. The domestic worker was supervised by her general practitioner in

her own home. By early October three consecutive negative cultures had been obtained from the nurse and the domestic, and they were allowed to resume work. One patient was returned to the ward to continue medical treatment on 13th September, having had four negative fæcal cultures. The other patient was discharged from the isolation hospital to her home.

When no further cases had occurred by early September, it was felt that the outbreak had come to an end.

Phase Two.

On 14th September an 86-year-old *man* (Case 6), who had just recovered from a severe attack of pneumonia, developed diarrhœa. Within twenty-four hours he had become critically ill and required intravenous fluids on account of extensive fluid loss by diarrhœa. Culture of his fæces revealed *S. heidelberg* infection, but he was too ill to transfer for isolation and was barrier-nursed in the ward.

The recrudescence of the disease suggested dissemination by a member of the ward staff. The following action was taken:—

(i) Both wards were closed for admissions. However, due to an oversight, one woman (Case 21) was admitted during the night of 24th September. It was rather disturbing to find salmonellæ isolated from her fæces on 1st October, but reassuring when the organism was identified as *S. tennessee*. She had no gastro-intestinal symptoms and had presumably been carrying the organism on admission.

(ii) Three fæcal specimens were requested from each patient and member of staff.

(iii) By arrangement with matron, nurses working in the unit were not transferred, and no fresh nurses were sent to the unit.

At this time there were twenty-two other patients in the unit, and twenty-six members of staff had duties there. Thirteen of these were found to be excreting the organism—five male patients, three female patients, four nurses, and one domestic. One of the patients, a woman who was recovering from an exacerbation of chronic bronchitis, had acute diarrhœa and vomiting with severe weakness, and one nurse and the domestic had marked malaise.

In addition, one man (Case 20), who had been admitted on 11th September, was found to be carrying *S. typhimurium*. He had no symptoms attributable to this organism.

Thus eleven patients in all (including the two excreting *S. typhimurium* and *S. tennessee* respectively) were found to be infected in this second phase of the outbreak. They were dealt with as follows:

Transferred for isolation without treatment	1
Discharged for supervision at home	2
Treated and discharged after negative cultures	4
Treated, but transferred for isolation on failure to disinfect	2
Treated and transferred to other units after negative cultures	2

The decision where to treat a symptomless patient was governed by the home circumstances. The two ill patients were kept in the unit until their acute symptoms had subsided and were then transferred for isolation.

The ward sister and three nurses who were carrying the organism were symptomless and were given ambulant therapy. It was felt better to keep them on duty, rather than to bring in fresh staff. They did not handle patients' food. The domestic (Case 15), responsible for food handling, was sent home on treatment.

The standard treatment used in this second phase of the outbreak was a five-day course of neomycin and ampicillin—one gram, four times daily, of each. The ampicillin was used in an attempt to eliminate organisms carried in the biliary tract.

The figure shows the fæcal results of all infected persons and the period of treatment.

By 22nd September there were only four female patients in the unit. These were all free of infection and were transferred to a small downstairs ward. The male ward became completely empty on 12th October. The wards were fumigated with formalin, and their walls washed with 1 in 40 cresol solution (Edgar and Lacey, 1963), and subsequently repainted. The opportunity was taken to thoroughly clean and modernise the kitchen.

The female ward was reopened for admissions on 15th October and the male ward on 8th November. Since then no further cases of salmonella infection have appeared.

TABLE 1.

SALMONELLA INCIDENTS IN ENGLAND AND WALES, 1951-1962[a]

YEAR	TOTAL	ENDOGENOUS SALMONELLA TYPES[b]			EXOGENOUS SALMONELLA TYPES[c]		
		S. typhimurium	*S. enteritidis*	*S. newport*	*S. anatum*	*S. bredeney*	*S. heidelberg*
1951	1711	1236	99	71	11	1	–
1952	2142	1604	145	40	10	4	–
1953	3171	2438	126	50	30	3	11
1954	3576	3038	70	35	20	20	16
1955	5383	4276	126	66	50	14	77
1956	4412	3245	199	97	78	55	136
1957	4278	2973	158	88	75	52	269
1958	4952	3406	113	118	55	50	308
1959	5132	3241	119	319	54	41	182
1960	4105	2943	145	54	17	3	118
1961	3855	2544	90	61	31	14	289
1962	2846	1864	93	64	19	103	133

a. Derived from Reports, Mon. Bull. Minist. Hlth. Lab. Serv. (1954, 1955a, 1955b, 1956, 1957, 1958b, 1959b, 1960, 1961b, 1962, 1963).

b. Endogenous salmonella types are those which were known to occur in the United Kingdom before 1940.

c. Exogenous salmonella types are those which were unknown or uncommon in the United Kingdom before 1940.

Discussion.

Historical Review.

S. heidelberg was first identified some thirty years ago (Habs, 1933). It was not isolated in Great Britain until 1953 (Report, 1955a), but within four years it had become second only to *S. typhimurium* as a cause of food-poisoning (Report, 1959b). Since then the annual number of food-poisoning incidents attributed to this organism has remained high (Table 1).

Despite its prevalence, the source of infection in most cases remained unknown until recently (Report, 1959b). Large-scale surveys of imported egg products (Report, 1958a), organic fertilisers (Walker, 1957; Report, 1959a), animal feeding-stuffs (Report, 1959a; Report, 1961a), and raw meat (Hobbs and Wilson, 1959) produced only very occasional isolations of *S. heidelberg*, although these products were often heavily contaminated with a large number of other salmonella serotypes. However, within the last few years *S. heidelberg* has been isolated from a number of animals, particularly pigs and cattle (Taylor, 1963) and the organisms have been found with increasing frequency in sausages and other made-up meat products (Reports, 1962 and 1963; Taylor, 1963). Two milk-borne outbreaks have recently been described (Knox et al., 1963; Hutchinson, 1964).

TABLE 2.

Isolations of S. Heidelberg in Northern Ireland, 1954-1963[a]

1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
0	35	11	33	11	4	4	23	3	20[b]

a. Information obtained from the records of The Laboratories, Belfast City Hospital, Belfast, 9.

b. Including nineteen isolations from present outbreak.

S. heidelberg was first discovered in Northern Ireland in 1955, and the annual isolations since then are shown in Table 2. Newell (1959) quotes unpublished data (Newell and Murdock), which suggested that the organism was introduced to Northern Ireland in a feeding-stuff for pigs which was imported early in 1955. This agrees with the later findings mentioned above, and strengthens the probability that pigs and pork products are one of the main sources of human infection with this organism in the British Isles.

Several outbreaks of salmonella infection are reported every year in hospitals and other institutions, and it has been recognised that in a number of cases the infection is probably not food-borne, but that cross-infection may play a part in its transmission (Report, 1954; Joint WHO/FAO Expert Committee on Zoonoses, 1959). Rubbo (1948) and Mushin (1948) described a hospital outbreak affecting children caused by *S. derby*, while an outbreak due to *S. enteritidis* was reported by Poole and Ardley (1958) and one due to *S. typhimurium* by Datta and Pridie (1960). Recent hospital outbreaks caused by *S. heidelberg* were described by Primavesi (1956) and Edgar and Lacey (1963). The incident described

by Primavesi was explosive in nature, being associated with contaminated sausage locally prepared from pigs which were found to be infected with *S. heidelberg*.

Newell (1959) mentioned that *S. heidelberg* had been implicated in many large outbreaks in hospitals and other institutions, and discussed possible reasons for this association. He also stated that probably a smaller number of these organisms was required to cause an infection than was the case with most of the other types of salmonella.

Such is the background to the present outbreak, several aspects of which are felt to be worthy of comment:

Infectivity.

In the present outbreak, the high degree of infectivity of the organism is confirmed by its recrudescence after the initial outbreak, and by the high infectivity rate among those at risk. It is of interest that only five of the nineteen persons infected with *S. heidelberg* had symptoms.

Mode of Spread.

As seen from the figure, each phase began in an "explosive" manner. This is suggestive of a food-borne spread. The fact that all who were infected had eaten food prepared by the domestic staff in the unit kitchen suggests that this food was the source of infection. This idea is supported by the fact that the doctors, who took no meals in the unit, were not involved in the outbreak. In fact, two domestics (Cases 4 and 15) were found to be carrying the organism—one in each phase of the outbreak—and it seems reasonable to suppose that they may have been responsible for disseminating the infection.

Treatment.

In the second phase of the outbreak, fourteen persons with salmonella infection were given antibiotic treatment. Apart from the first two cases, a standard treatment was given—five days of neomycin and ampicillin, one gram four times daily of each. The periods of treatment in relation to fæcal results are shown in the figure. Two persons reported mild bowel upsets attributed to the drugs, but no other adverse effects were observed.

The patients who were isolated were not given antibiotic therapy. An opportunity was thus given to assess the effect of the antibiotic therapy in this condition.

For purposes of comparison, only the cases infected with *S. heidelberg* will be considered. Ten of these received the combined treatment, and all but two became negative during or immediately after therapy. One of these two (Case 10) yielded a positive culture after six consecutive negatives in a four-week period. He was sharing the ward with a carrier (who was being barrier nursed) and reinfection cannot be excluded.

In contrast, of five persons who were not treated initially, all but one continued to excrete the organism for considerable periods—three weeks or more. Two of these—who were nurses—were subsequently given the combined treatment, and promptly became negative.

All but one of the above persons were symptom-free. The two groups cannot be compared statistically, but it would appear that the antibiotic combination used considerably shortened the duration of the carrier state.

There are a number of references to the use of ampicillin alone in the treatment of salmonella infections (Stewart et al., 1961; Ross et al., 1962; Bullock, 1963). These show that, while ampicillin is highly effective against a number of strains of salmonella *in vitro*, it is less effective *in vivo*. Stewart et al. (1961) suggest that this is due to concentration of ampicillin in the bile, and that, because of an enterohepatic circulation, the drug does not reach the lower ileum in effective concentrations. Bullock (1963) confirmed in humans that the drug is concentrated in the bile and suggested that it might thus be effective in biliary carriers. Sleet et al. (1964) report moderate success in treating paratyphoid fever with ampicillin.

It is suggested that, when neomycin and ampicillin are combined, the neomycin effects rapid disinfection of the gut, while the ampicillin prevents carriage of organisms in the biliary system. It would appear reasonable to expect that this drug regime might be of value in the treatment of infections due to other species of salmonella, including the enteric fever group.

In fact, a preliminary communication by Pettersson (1964) refers to the use of these two drugs in an outbreak of *S. typhimurium* infections. A different drug regime was used, but again the carrier state appeared to be shortened, though acute symptoms were not affected.

"Iceberg" Effect.

Of the nineteen infected cases, only five had symptoms, and in only three of these was the condition incapacitating. These three were all patients with markedly impaired resistance. Of the forty-eight persons tested in the second outbreak, two were found to be carrying other species of salmonella. These facts suggest that for every obvious case of bacterial food poisoning there are many inapparent infections. It would appear that there is a considerable incidence of subclinical salmonella infections in the general population.

Criteria for Negativity.

From the figure it can be seen that one or two negative fæcal cultures by no means excluded infection. However, apart from the carrier of *S. tennessee*, there was only one case (Case 10, referred to under "Treatment") where the finding of three consecutive negative results was followed by a further positive result. It would appear that three negative fæcal cultures provide a reasonable indication of freedom from infection in an outbreak.

Bacteriological Methods.

An analysis has been made of the relative performances of the selective media used for the isolation of salmonella organisms during this outbreak.

Salmonellæ were detected in the fæces of nineteen persons (excluding the single isolations of *S. typhimurium* and *S. tennessee*). Only the first isolation from each case or symptomless excreter has been considered. In nine instances both the

selective media were positive, while there were five positives on desoxycholate-citrate agar only and five positives on Wilson and Blair's medium only. Thus, if either of these media had been used alone, only fourteen positives would have been obtained instead of nineteen.

The value of the enrichment procedure with selenite F was also demonstrated, as approximately 50 per cent. more positives were obtained on the secondary plates than on the primary plates, the increase being fairly evenly distributed between both the selective plates (desoxycholate and Wilson and Blair). However, there were one or two instances with each medium where positive primary plates were followed by negative secondary plates.

Although the numbers considered here are small, the findings agree closely with those of Cook, Frisby, and Jebb (1951), who analysed the isolations of more than six hundred salmonellæ over a three-year period. They emphasised the value of using more than one selective medium, and of combining direct plating and enrichment techniques in order to obtain the maximum number of positive results.

Summary and Conclusions.

1. An outbreak of *S. heidelberg* infection, presumably food-borne, affected nineteen patients and staff in a 26-bedded medical unit. One patient died.
2. The history of infections with this organism is reviewed, and its high degree of infectivity emphasized.
3. Simultaneous therapy with neomycin and ampicillin shortened the duration of the carrier state.
4. The large proportion of symptomless carriers (fourteen out of nineteen cases), together with the finding of two incidental infections with other species of salmonella, indicates that there may be a high incidence of sub-clinical salmonella infections in the population.
5. It is suggested that at least three negative fæcal cultures are needed to exclude the carrier state.
6. The use of two selective media, and the combination of direct plating and enrichment techniques, increased the number of successful salmonella isolations.

We wish to thank Professor O. L. Wade and Dr. V. D. Allison for their guidance in the preparation of this paper. We are also grateful to Dr. W. P. Ferguson and Mr. W. N. MacDonald for their help in the bacteriological investigations.

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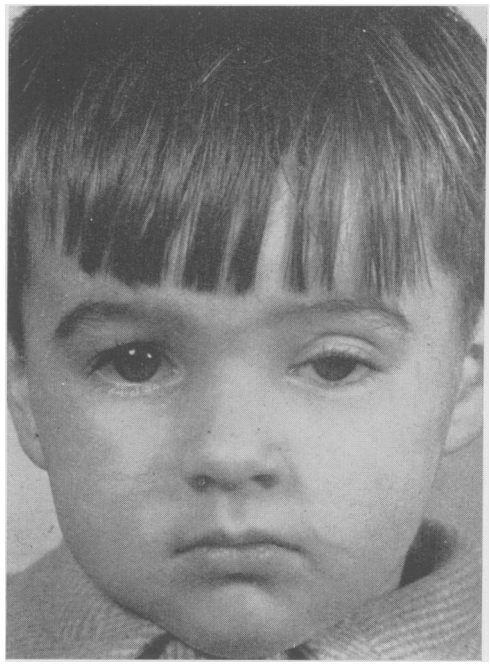
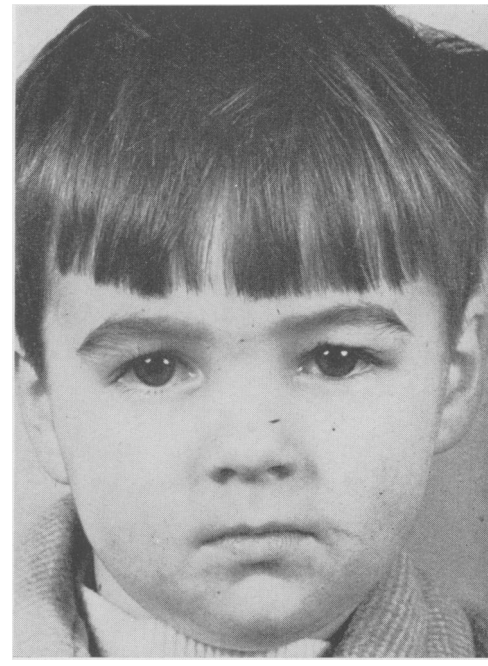


FIG. 1.

PTOSIS

FIG. 1A.

PTOSIS



Correction of left congenital ptosis by the tranconjunctival resection of the levator aponeurosis (Bowman).

PLATE I

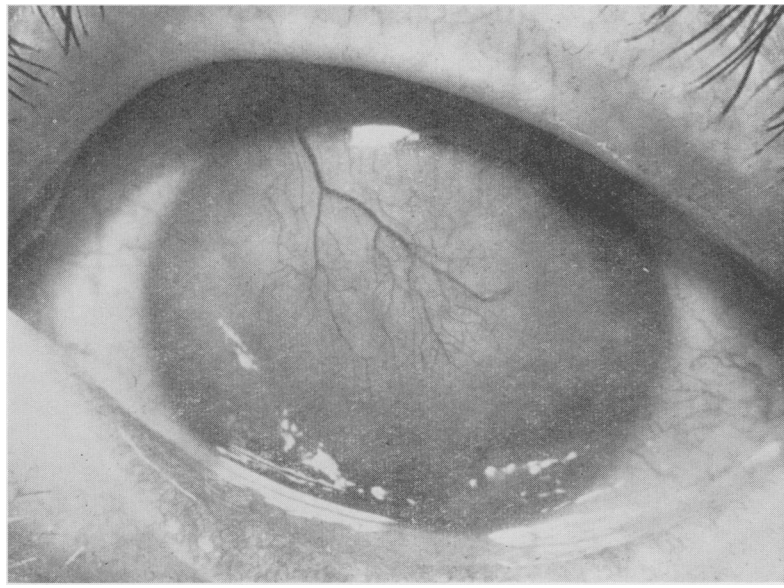


FIG. 2.

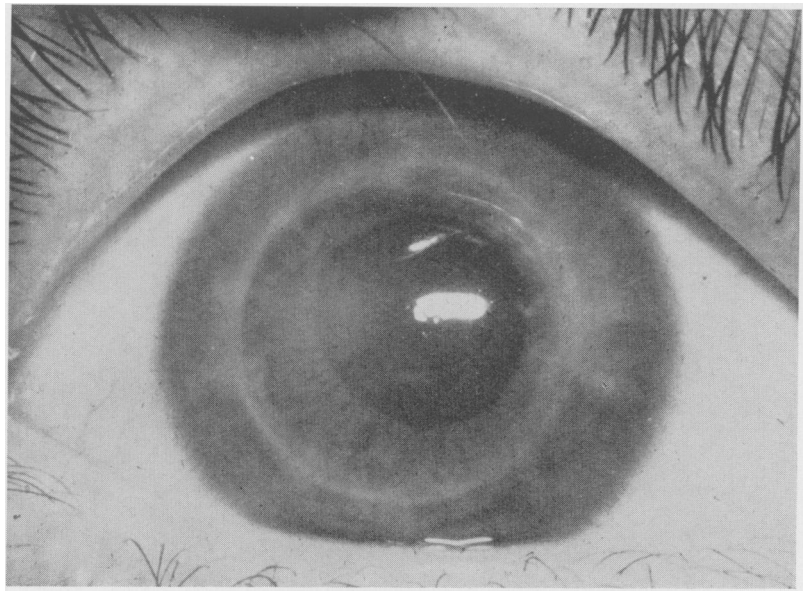


FIG. 3.

CORNEAL GRAFT:
A successful penetration corneal graft after lime burns which gave normal vision.

PLATE II

FIG. 4.

REGIONAL EYE BANK VAN:

The van is fitted with surgical, bacteriological, and preservation equipment, and it is used for the collection of donor eyes at home and in hospital.

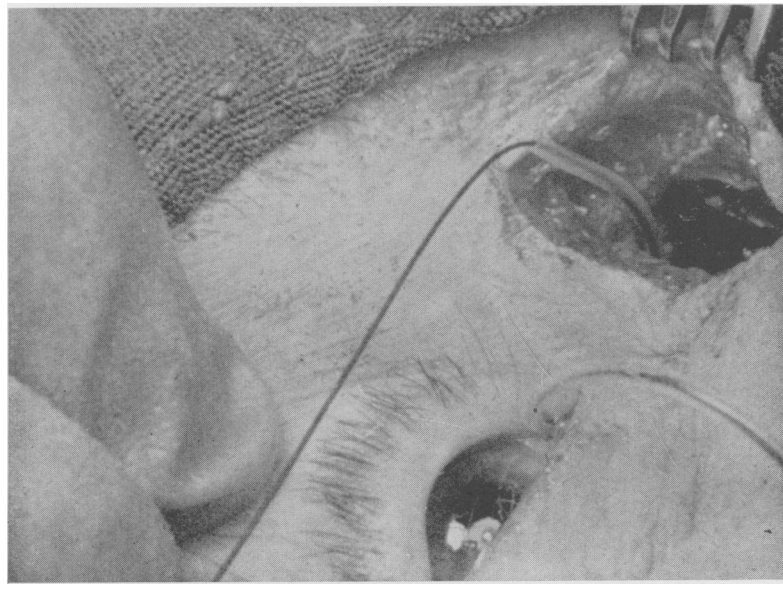


FIG. 5.

POLYTHENE TUBE INTUBATION:

Polythene tubes are used in combination with cystorhinostomy where severe strictures have been formed in the lacrimal passages after fracture, infection or removal of the lacrimal sac.

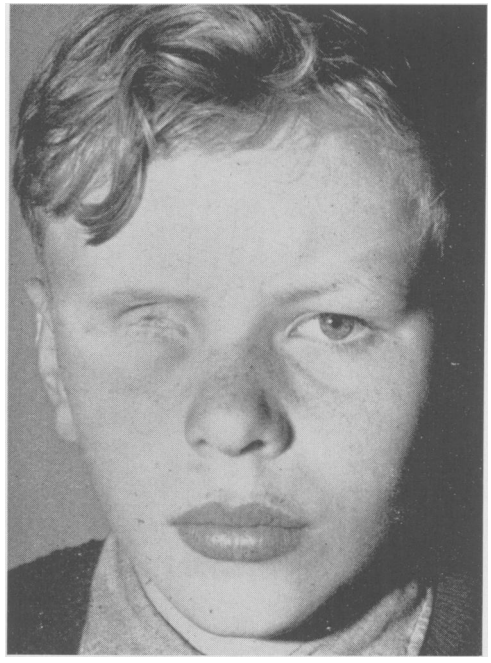


FIG. 6.

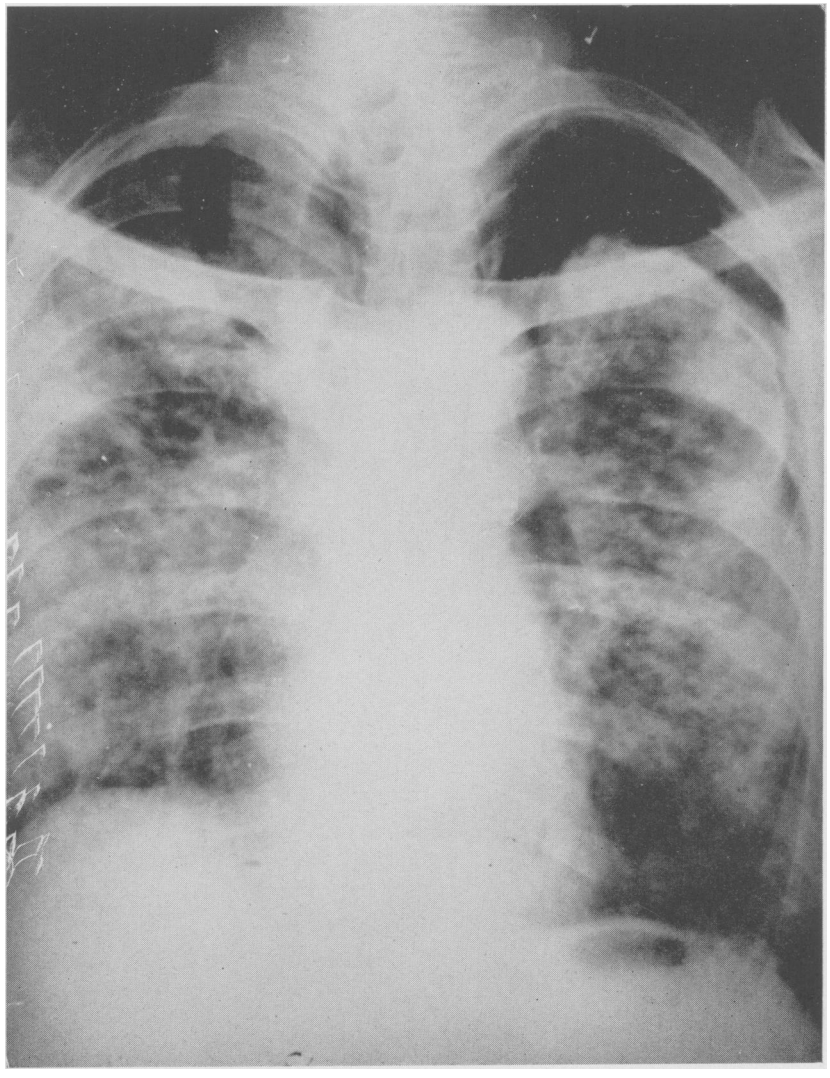
SOCKET RECONSTRUCTION BEFORE OPERATION.

The left socket shows severe contraction after radium therapy.

FIG. 6A.

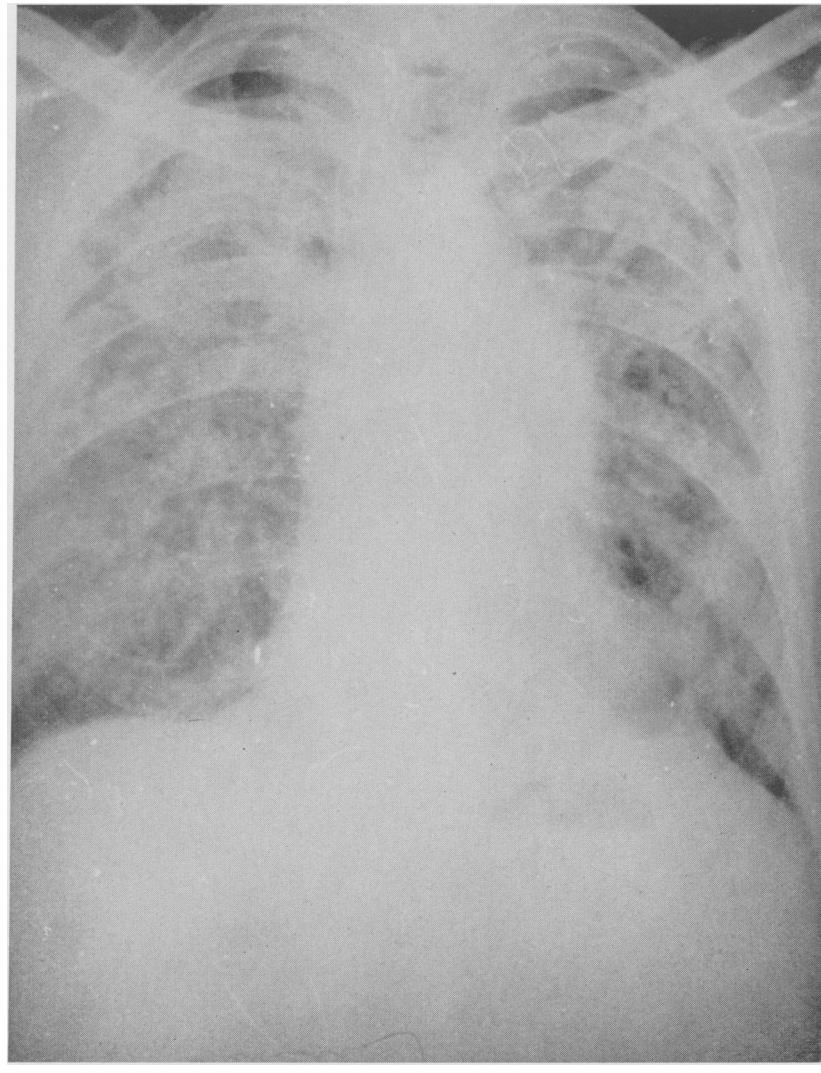
The same socket has been completely excised and a spectacle prosthesis fitted.

PLATE IV



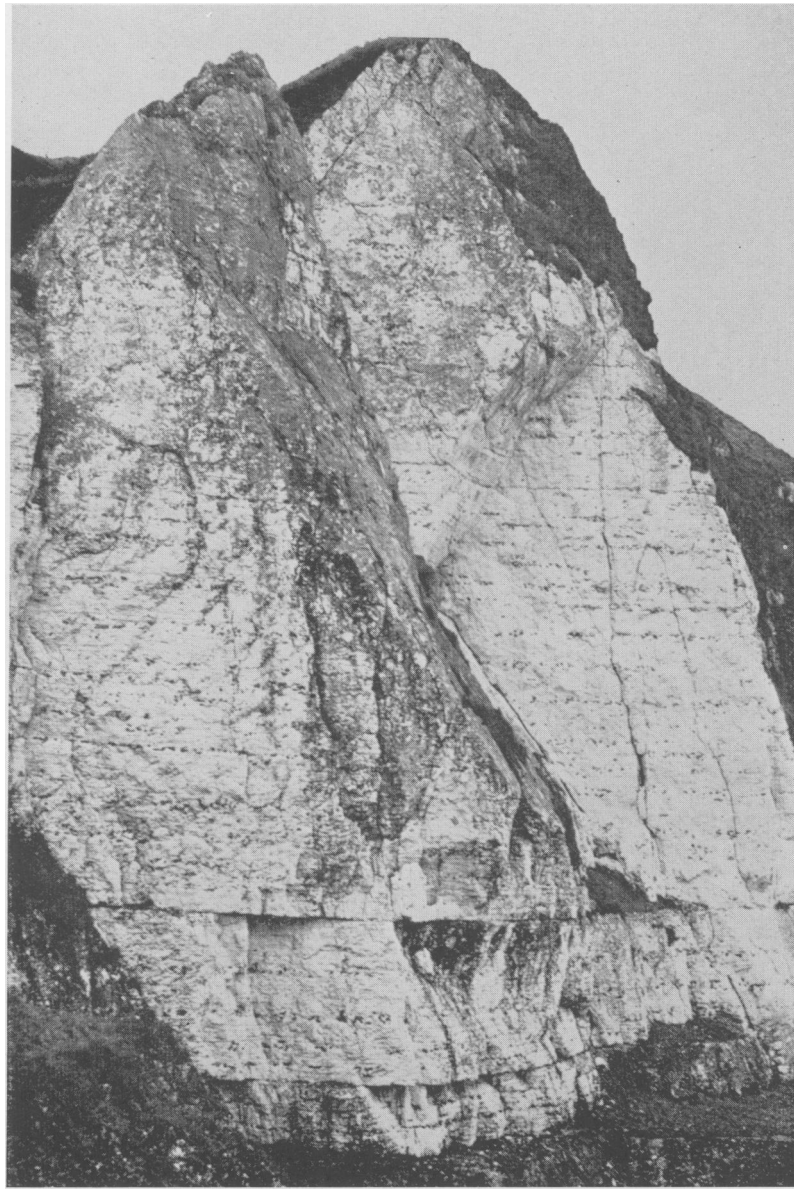
Extensive pulmonary fibrosis after six and a half years' exposure to flint dust as seen in Case 1.

PLATE V



Pulmonary fibrosis due to silicosis in Case 4. Death ensued in only three years after initial exposure to the dust.

PLATE VI



Horizontal parallel row of flints ("widow-makers") seen in the limestone strata.

PLATE VII

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MANAGEMENT OF BLEEDING ŒSOPHAGEAL VARICES WHEN PORTAL SYSTEMIC SHUNT IS INADVISABLE, WITH PARTICULAR REFERENCE TO THE USE OF BALLOON TAMPONADE AND SCLEROSING INJECTIONS

By G. W. JOHNSTON, F.R.C.S.
Lecturer in Surgery, Department of Surgery, Queen's University of Belfast
and H. W. RODGERS, O.B.E., F.R.C.S.
Professor of Surgery, Department of Surgery, Queen's University of Belfast

HÆMORRHAGE from œsophageal varices is a dreaded and frequently fatal complication of portal hypertension. In patients with cirrhosis the mortality within one year of the first hæmorrhage is from 25-75 per cent. (Britton, 1958; Baker et al., 1959; Palmer, 1951; Peskin and Miller, 1964). The most effective way of preventing recurrent bleeding is reduction of the portal pressure by some form of portal-systemic shunt, but unfortunately there are patients where this is impractical. The large variety of other recommended procedures in this situation is a sure indication that no one method is entirely satisfactory. Indeed Mikkelson and Pattison (1959) considered that if a venous shunt could not be constructed, no satisfactory alternative operative procedure was available for the treatment of bleeding from œsophageal varices.

There are a large number of patients in whom a portacaval shunt is impossible or inadvisable.

(1) A situation where shunt is contra-indicated is in the cirrhotic patient where advanced age, significant jaundice, resistant ascites, hypo-albuminæmia or a previous history of liver failure are present. Although these contra-indications to shunting are widely recognised, the treatment of those "surgical rejects" is less well documented so that methods helpful in the management of these cases are of some importance.

(2) When varices are secondary to an extrahepatic block the portal vein is rarely available for the construction of a shunt. As many as 70 per cent. of the patients with portal vein thrombosis have their first hæmorrhage before the age of 7 years (Aracari and Lynn, 1961), but unfortunately the conventional lieno-renal shunts are unsatisfactory before the age of 10 years, 80 per cent. becoming thrombosed (Clatworthy et al., 1964). It is in this extrahepatic group that Shaldon and Sherlock (1962) advocate medical management when portacaval shunt is impractical.

(3) In the cirrhotic patient, surgery as an emergency procedure carries a mortality of more than 50 per cent. Both emergency portacaval shunt (Walker, 1960; Sullivan et al., 1960; Patton, 1963; Brick and Palmer, 1964), and trans-œsophageal ligation of varices (Read et al., 1960; Palmer, 1961; Britton and Crile, 1963) carry this prohibition mortality in most centres. Indeed Crile, one of the surgeons who introduced the operation of trans-œsophageal ligation in the emergency treatment of bleeding varices, recently

stated that non-surgical measures of controlling active bleeding in cirrhotic patients are preferable to emergency surgical methods (Birtton and Crile, 1963).

Diagnosis.

When massive gastro-intestinal bleeding occurs an early and accurate location of the site and nature of the bleeding is essential. It is dangerous to assume that the bleeding lesion of the patient with known portal hypertension is œsophageal varices. The history and physical examination remain the keystone in diagnosis. Barium studies of the œsophagus, stomach, and duodenum should be undertaken routinely as an emergency procedure.

Where the diagnosis remains in doubt liver function tests, œsophagoscopy and gastroscopy, and measurement of the intrasplenic pressure add further information.

Treatment.

1. *General Measures.*

(a) Sedation.—All the common hypnotics, sedatives and analgesics may be poorly tolerated by the patient with cirrhosis and should either not be used or used with extreme caution. In the agitated patient, where sedation is considered imperative, small doses of pethidine or a short chain barbiturate such as phenobarbitone are the safest drugs to employ.

(b) Blood Transfusion.—No matter how trivial the initial hæmorrhage may appear, it is important to set up an infusion and cross match a very large quantity of blood. Fresh blood should be used because of the frequent deficiency of certain coagulation factors in the presence of cirrhosis, particularly prothrombin, factors V and VII and Christmas factor. Also 25 mgs. of Vitamin K_1–oxide (phytomenadione) should be given daily to try and improve the prothrombin concentration. Where large quantities of citrated blood are transfused it is important to give 10 ccs. of 10 per cent. calcium gluconate intravenously for every litre of blood given.

(c) Therapy to Prevent Hepatic Coma.—Even in the absence of any signs of impending coma, all these cirrhotic patients should be treated as potential cases of portal-systemic encephalopathy. The absorption of ammonia from the breakdown of blood in the gut is reduced by purgation, enemas, and neomycin therapy.

2. *Vasopressin ("Pitressin").*

Posterior pituitory estract lowers the portal pressure probably by constriction of the splanchnic arteriorlar bed. This temporary reduction in pressure presumably allows hæmostasis at the bleeding point. Vasopressin ("pitressin") is given intravenously in a dosage of 20 units in 100 ccs. of 5 per cent. dextrose over a period of 10-20 mins. This can be repeated four-hourly on a few occasions, but unfortunately the response diminishes with repeated infusions (Shaldon and Sherlock, 1960). Abdominal colic, evacuation of the bowel and facial pallor are fairly constant side effects, and, indeed, if they are absent, one should suspect that the "pitressin" being used is inactive.

3. *Œsophageal Tamponade.*

If bleeding continues œsophageal tamponade is employed, using some form of distensible balloon of which the best known is that introduced by Sengstaken and Blakemore (1950). We have found this to be a life-saving, though temporary measure. A new tube should be used for each patient and both balloons thoroughly tested for leaks before insertion. Persistence of bleeding after intubation indicates that the tube is improperly placed or that bleeding is coming from a site other than the œsophagus, such as gastric varices or peptic ulcer. It is probable, however, that gastric varices may be controlled in some patients if the gastric balloon is pulled firmly against the upper part of the fundus prior to inflation of the œsophageal balloon. Once the œsophageal balloon has been inflated the patient must not be left unattended.

In a small series of 30 intubations we have failed to control the bleeding in only two cases, one with proven gastric varices and one with suspected gastric varices. We failed to pass the tube in one other patient due to lack of co-operation. In another recent series, bleeding was controlled in 14 out of 17 intubations (Macpherson, 1964).

The only complication in our series was failure of deflation of the gastric balloon on one occasion which was overcome by injecting trilene into the balloon, causing it to burst. Undue prominence has been given to the hazards of the procedure and in one reported series of 50 patients only 20 per cent. were free from complications (Conn, 1958). Recent experience, however, indicates that the hazards can be greatly reduced by appropriate measures. Ulceration of the œsophagus or pharynx rarely occurs unless the tube is left in place for prolonged periods and traction applied (Bonn, 1958; Read et al., 1960), so that our policy has been to leave the tube for a maximum of 24 to 48 hours and never use traction. Ulceration of the nares is due to improper placement of the tube at the nostril and is aggravated by unnecessary traction. Aspiration of gastric contents into the bronchi during passage of the tube is unlikely unless the patient is in coma, and aspiration of swallowed secretions after inflation of the balloons can be reduced by the use of a four-lumen tube with a pharyngeal opening for suction. We have found that atropine is helpful in reducing the troublesome secretion of saliva. If the cough reflex is absent the patient is nursed in the three-quarter prone position with the foot of the bed elevated. Respiratory obstruction due to proximal slipping of the tube is unlikely in the absence of traction, and, anyhow, should not have a fatal outcome if the nurse in attendance is fully instructed in the care of the tube. Writing recently, Brick and Palmer (1964) claimed that the Sengstaken-Blakemore tube was the most "reliable emergency approach available."

4. *Injection of the Varices.*

The treatment of œsophageal varices by the injection of sclerosing agents through an œsophagoscope was first described by Crafoord and Frenckner in 1939. Although many consider the method unsatisfactory, Patterson, in 1948, said, "To my knowledge, no other method has been proposed which can so

effectively protect these patients bleeding from œsophageal varices from recurrence of hæmatemesis." Although we do not consider it the routine treatment of bleeding varices in all cases, it is particularly useful in those patients where surgery is contra-indicated.

The technique of Macbeth (1955) is used with a few minor modifications. The largest œsophagoscope which can be passed with safety is used, since a small-bore instrument fails to distend the varices prior to injection or compress them after injection. Although the most important site of injection is at the extreme lower end of the œsophagus, it is sometimes more convenient to inject the proximal varices first, so that the instrument can compress the puncture sites and prevent bleeding while the more distal varices are injected. We now use much greater quantities of the sclerosing agent than previously, and have injected up to 35 ccs. of ethyl oleamine oleate with no untoward effects. A short period of œsophageal tamponade after injection prevents any bleeding from needle punctures and probably aids in the sclerosis of the vessels.

Thirty-seven patients at the Royal Victoria Hospital, Belfast, 22 with cirrhosis and 15 with extrahepatic block, have received a total of 72 injections, one patient receiving as many as nine. In the extra-hepatic group the ages ranged from 7 months to 39 years with a mean age of 19. In the patients with cirrhosis the range was from 16 to 75 with a mean 51 years. In the non-cirrhotic group injection therapy resulted in relief from bleeding for as long as 4½ years with an average relief of 14 months. Trusler and his colleagues (1962) give similar results. On the other hand, in the cirrhotic group, the maximum freedom from bleeding was 2 years with an average of only 6 months. After injection therapy episodes of bleeding not only become less frequent but also tend to be less severe and on repeat œsophagoscopy the varices are of smaller calibre (Samson and Foree, 1942; Moersch, 1947). In one of our patients, with cavernous transformation of the portal vein, who had suffered 12 major hæmatemesis between the ages of 6 and 16, no varices were seen on œsophagoscopy 2 years after completion of a series of 6 injections. In patients coming to autopsy after injection therapy, thrombosis of the veins (Samson and Foree, 1942; Fearnon and Sass-Kortsak, 1956) and perivenous fibrosis with thickening of the intima (Moersch, 1947) have been noted.

Injection therapy is a minor procedure and is remarkably free of complications. Some mild retrosternal pain, pyrexia, and tachycardia are usual for 24-48 hours after injection. One 18-year-old girl with portal vein thrombosis developed a deep venous thrombosis of the leg four days after injection of her varices. It is emphasised that injection therapy is not used as a definitive treatment but is used to tide the patient over until a shunt becomes a practical procedure.

5. *"Urgent" Portacaval Shunt.*

There are many reasons why emergency portacaval shunts have carried such a high mortality in the past. They were usually performed as a last resort in the patient who continued to bleed in spite of all available medical measures. Not infrequently this persistent bleeding was the result of a breakdown in the

coagulation mechanism secondary to advanced hepato-cellular failure. Also, because of the hæmorrhage, the gut was full of blood which is a rich source of ammonia and a major factor in the production of coma. Alterations in blood volume, changes in electrolytes, hypotension, and general anæsthesia were probably contributing factors to a fatal outcome. Thus 7 of 9 patients who had emergency shunts in the Royal Victoria Hospital, Belfast, since 1948 died within an average of four days from the operation.

However, if bleeding recurs after application of all the usual emergency conservative measures, surgery must be undertaken if the patient is to survive. In this situation an "urgent" rather than an "emergency" portacaval shunt is probably the procedure of choice. With a Sengsktken-Blakemore tube in place for forty-eight hours prior to the operation, no further blood loss can occur and time is available for restoration of the blood volume and correction of any electrolyte disturbances. It is also possible to evacuate the accumulated blood from the bowel by purgation and enemas, and to sterilise the gut with neomycin, thus reducing the chance of portal-systemic encephalopathy subsequent to shunting. Some workers have reported a lower mortality for this type of "urgent" portacaval shunt than for transœsophageal ligation (Palmer, 1961; Shaldon and Walker, 1962). Recently two of our patients required "urgent" portacaval shunts because of persistent bleeding and both had successful outcome.

Summary.

Portal systemic shunt operations are impossible or unwise in some patients with portal hypertension.

Conservative measures, including the use of œsophageal tamponade and injection of varices are advocated in order to tide over the young patient with obliteration of the portal vein, until the age of 10 years, when lieno-renal shunt carries a greater chance of success.

Conservative management is also preferable in the episode of acute bleeding in the presence of cirrhosis, or where a shunt is contra-indicated because of advanced age, jaundice, procoma and hypoalbuminuria.

Injection of varices is put forward, not as an alternative method of treatment but as an adjuvant to the medical and surgical methods at present in vogue. Where injection therapy fails to control the episodes of acute bleeding "urgent" portacaval shunt is preferable to a direct surgical attack on the varices.

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ACUTE SILICOSIS

By G. A. SCOTT, M.D., M.R.C.P.(Lond.), M.R.C.P.(I.)

Consultant Physician to the East Antrim Management Committee (Northern Ireland Hospitals Authority), Moyle Hospital, Larne

A QUARTER of the earth's crust is composed of silicon, so it is not surprising that the inhalation of dust has been recognised for centuries as a cause of shortness of breath in miners and stone operatives. In 1649 Dimerbrook (Collins, 1915) described chest rigidity associated with dyspnœa in the granite workers of the Carpathians, who were themselves painfully aware of the occupational hazards encountered, since they referred to their implements as 'widow-makers,' because many of the local women had married several times due to the extremely high incidence of lethal respiratory disease in their male partners. Even to this day the above term is used by European immigrants in the iron mines of Michigan, in the same sense as in the seventeenth century, although the risks are happily minimised by modern protective procedures. The real nature of silicosis was first recognised by two English physicians (Peacock, 1861; Greenhow, 1895), when they demonstrated the presence of a hard gritty material, which they called 'sand,' obtained at autopsy from the lungs of a mason and knife-grinder respectively. The ceaseless and ever-expanding exploitation of mineral resources has, from time immemorial, provided ample opportunity to study the deleterious effects of siliceous dusts on the health of workers exposed to them, and evolve the necessary modern protective measures which have made acute silicosis a rare disease. It is chastening then in this day and age to have the doubtful privilege of observing the effects of an atmosphere freely charged with freshly fractured flint particles, on the unprotected respiratory system, where environmental control did not exist, because the noxious nature of the dust was not appreciated. The misadventure occurs where limestone of high calcium content is extensively quarried and processed either for itself (calcium carbonate), its bye-products, or for admixture with local aluminous clays in the manufacture of cement. When crude chalk is crushed flints contained therein are enucleated and separated as they are of little commercial value. Small independent enterprises, however, may acquire these rocks, and crush them into a small aggregate about the size of lentil seeds; this is bagged and sold as 'Poultry Grit.' It was following such an occupation that the cases to be described contracted acute silicosis, and it seems ironical that Visconti gave this disease its present name ninety-three years ago, when he described pulmonary disability in a flint worker.

Case 1. In April, 1953, a 50-year-old man presented with a sudden severe pain in the left side of his chest. It was then revealed that he had worked for six and a half years at a flint-crushing plant producing chick-grit, and had inhaled copious quantities of the associated dust. In three years his weight had declined from twelve to ten and a half stones. For a year he had been harassed day and night by an unusually severe and unproductive cough, and gradually increasing

dyspnœa finally incapacitated him. Extreme cyanosis and full play of the accessory muscles bore eloquent testimony to the degree of his respiratory distress. There was a left pneumothorax with opposing mediastinal shift, basal crepitations, and right-sided bronchospasm. There was no evidence of primary cardiac disease, the blood pressure was 160/80, and the sounds were closed, but there was a sharply reduplicated pulmonary second sound. The electrocardiogram portrayed right ventricular preponderance. An X-ray film of the chest (Plate V) showed extensive fibrosis of both lungs with basal emphysema, and a left-sided pneumothorax. The cardiac shadow did not appear to be outside normal radiological limits. Death ensued in a few months from respiratory failure.

At autopsy the lungs were heavily consolidated with gritty siliceous dust, harshly 'audible' on sectioning, indicating the volume of extraneous material contained in them. Indeed, on the side on which the pneumothorax had occurred it seemed a mechanical impossibility for the lung to collapse further, so that the radiograph was a good measure of the small amount of air-containing lung on which the patient's survival depended. There was no macroscopic evidence of tuberculous disease. The right ventricle was markedly hypertrophied. Histologically the dense fibrosis was compatible with a pneumoconiosis. Repeated ante-mortem tests of sputum and gastric contents, as well as post-mortem tissue culture, did not recover the tubercle bacillus.

Death occurred seven years after this patient had begun to crush flints. He was exposed to the dust for six and a half years, and the final period of incapacity prior to death was only six months.

Case 2. In April, 1954, a 52-year-old man complained of a hacking cough and gradually increasing dyspnœa for the previous six months. He had crushed flints for six years. Again the picture was one of considerable respiratory distress, with orthopnœa, cyanosis and bronchospasm, associated with a distressing unproductive cough disturbing to all the members of his household. Examination of the cardiovascular system was normal except for a sharply reduplicated second pulmonary sound. Respiratory excursion was seriously limited, and there was basal emphysema, widespread crepitations, and bronchospasm. Tests for vital capacity initially showed a mean average of 1,000 ccs. The usual routine for the isolation of the tubercle bacillus proved negative. An electrocardiograph showed right ventricular strain. Death followed eight years after taking up the occupation of flint-crushing, the period of exposure being six years. Post-mortem examination revealed heavily consolidated lungs, with gritty material present in abundance and exhibiting dense fibrosis microscopically. The right ventricle was much hypertrophied.

Case 3. This 47-year-old man had previously been an athlete, and a miler of quality. He had crushed flints for a period of three years, and after a three-year respite at alternative employment again resumed flint-crushing for a further two and a half years. He complained of dyspnœa on the slightest exertion, even the most modest incline forced him to halt frequently to regain his breath, circumstances which were extremely frustrating to him having regard to previous ability. Clinically the signs were those of bronchitis and emphysema. His incapacity was such that he was unable to follow any employment. There was limited respiratory and diaphragmatic movement, and vital capacity was greatly reduced. There was considerable radiological consolidation of the apical and mid-zone regions. Search for the tubercle bacillus was negative. This patient suffered considerable

psychological trauma, as he was aware that the deaths of the above two patients was related to their work, because compensation had been awarded their relatives.

The case to be described was employed in another but similar works, and had inhaled the same type of dust.

Case 4. In September, 1958, a 69-year-old man was examined because of an extremely incapacitating dyspnœa. He was deeply cyanosed, and in obvious respiratory distress. For three years he had worked in an atmosphere which was heavily contaminated with flint dust. His weight had decreased in twelve months from 13 st. to 10 st. 7 lb. The cyanosis, orthopnœa and incapacity were out of proportion to the physical signs of emphysema and bronchitis. The distressing nocturnal cough did not admit of slumber at all. He had a gross palatal defect with congenital absence of the posterior nares, presumably a serious deficiency in his respiratory defences. Sharp reduplication of the second pulmonary sound was again in evidence, and, of course, associated with right ventricular preponderance on the electrocardiogram. X-ray of chest (Plate VI) showed diffuse fibrosis of both lung fields with coalescence of the lesions in the upper zones, especially the right, appearances consistent with silicosis and with a mixture of stages II and III.

At autopsy fibrous adhesions were dense over both upper lobes, the coronary arterial system was healthy, but there was marked hypertrophy of the right ventricle. The lungs showed a general picture of diffuse fibrosis, nodulation, congestion, and œdema. Fibrotic portions subjected to micro-incineration and viewed with prisms showed the presence of large quantities of doubly refractile material of a siliceous nature in the lung tissue.

Figures of the lung analysis were as follows:—

Total silica percentage of dry matter - - -	2.46
Free silica „ „ „ - - -	1.89
Ash „ „ „ - - -	4.84
Total silica percentage of ash - - -	50.9
Free silica „ „ - - -	39.1

Normal lung silica is taken as 0.2 per cent. weight of dried lung (Foweather, 1939).

Prior to entry into the flint-crushing trade all the above patients had been healthy and robust specimens of manhood. Even Case 4, who took up the fatal occupation late in life, exhibited a remarkably healthy vasculature at autopsy for one of his years.

Discussion.

In view of the apparent prevalent lack of knowledge of the nature and substance of flints, it may be appropriate to describe their origin and composition. These stones occur in quantity in the bedding planes of local chalk (Plate VII), varying in size from small cobbles to boulders 18 in. high by 12 in. wide ('Neptune's Cups'). They enclose microscopic traces of marine exuvia such as sponges, echini, and brachiopods, links with a previous ocean heritage. Whether they were formed contemporaneously (syngenetic) with the enclosing calcareous sediment, or subsequently (epigenetic), or even precontemporaneously, is a subject for lively debate among geologists (Kirkaldy, 1962; Edmunds, 1960). It seems that a composite viewpoint may be necessary to embrace all the evidence. It is likely

that some flint was deposited as a syngenetic gel of direct organic origin secreted by tiny organisms and with some excretions collecting later transported in solution and redeposited, and some as a replacement of the limestone by silica by a process of chemical pseudomorphism after or during the formation of limestone (Geikie, 1903; Watson, 1962). These stones are extremely firm and compact in texture, of Scale 7 hardness (Moh's Scale). If there is controversy about their exact origin, there is little doubt about their chemical composition, as they are composed of an intimate mixture of crystalline insoluble silica and amorphous silica soluble in caustic potash; a total of 98 per cent. silica, whilst the remaining 2 per cent. is formed by a thin covering lamella of calcium carbonate fused to the surface of the stone.

The cleavage of any mineral depends on its crystal structure, and flint which is a cryptocrystalline substance has a very poor cleavage. It is more liable to fracture than to cleave, which it does breaking with a conchoidal fracture, in consequence of which much fine dust is evolved in order to obtain an aggregate fine enough to be used as poultry grit. During crushing a pall enveloped the machinery, so that at all stages the workmen were exposed to the heaviest possible respiratory dose of unadulterated flint particles, especially during cleaning of the plant and its pit. Then the haze was so dense that it was impossible for the operative to see the blade of the shovel wielded. The suspended aerial particles were as fine as flour, the bulk of them being below 5 microns in diameter, a size that could readily enter the alveoli, and remain there (Davies, 1949).

Quartz and flint are said to be the most soluble and therefore the most pathogenic of mineral dusts (King, 1947); they dissolve in the plasma to the extent of 10 mgms. of silica per 100 ml. Freshly fractured particles allow of maximal dissolution of silicic acid from their surfaces, and the pathogenicity of any dust is in direct relationship to the rate at which it will release this acid in solution (King and Belt, 1938). These facts accepted, it will then be appreciated that the respiratory defences of the above patients were subjected to a maximal pathological insult, the protective cilial action of the mucosa, and the mechanism of bronchial peristalsis were blunted chemically as well as being overwhelmed physically.

The most acute cases of silicosis hitherto described have been those associated with sandblasting, where the quartz content of the inhaled dust was high, and in the manufacture of scouring powder, the latter occupation probably producing the most lethal type of the disease, thought to be due to the presence of an additional factor, which aided the deleterious action of silicic acid, i.e., the presence of free alkali (Macdonald et al., 1930; Middleton, 1936; Belt, 1939) or of oxalic acid (Srutek, 1948) in the scouring powder. An important factor in an outbreak of acute silicosis in girls making abrasive soap powders was thought to be an allergic swelling of the bronchial mucous membrane due to the inhalation of soap powder. It is of comparative interest to note that in fatal cases of silicosis (excluding silico-tuberculosis) investigated by the British Factory Department up to the end of 1948 (Annual Report by the Chief Inspector of Factories, 1948) there were fifty-nine deaths in sandblasters, and the average period of exposure preceding incapacity was twelve years. In twelve deaths due to scouring powders

this period was 8.4 years. In the three fatal cases described who had been in continuous contact with flint dust an eight-year period not only covered the period of exposure but also included the period of incapacity prior to death. It seems probable that the inhalation of almost pure silica in crushing flints for chick-grit causes the most rapidly lethal form of acute silicosis. This is due to unlimited contamination of the inspired air with freshly fractured flint dust allowing of maximal solution of silicic acid in the pulmonary tissues.

The health of the worker has always been zealously guarded by those industries which breach the earth's crust in search of mineral wealth. Acute silicosis, however, still appears unexpectedly, and a deficiency of mineral knowledge is more likely to contribute to its incidence than any negligence or default. Preventive measures are readily apparent after an event, and in the prevention of a misadventure such as has been described a simple initial step might be the control of the movement of flints wherever they are enucleated from the limestone strata. This would enable official advice and information to follow in the wake of their distribution so that those operating the most humble plant, not dignified by the title of factory, would become aware of the lethal potential of these stones should they be crushed without adequate safeguards from the dust. This is so fine and cloying that simple face masks will not contain it. Complete automation from crushing to bagging is essential for final elimination of risk, and is practicable and feasible having regard to expense and other factors. As in other spheres this would entail efficient exhaust ventilation, enclosed crushing area, automatic bagging, damping down of machinery whilst idle for cleansing purposes.

Summary.

The four cases described contracted acute silicosis by inhaling a dust containing 98 per cent. silica and pathological changes developed rapidly in the lungs producing an early fatal result. Although the cardiac outline was apparently normal on X-ray films, possibly due to the heavy overlying pulmonary shadowing, the right ventricle was always considerably hypertrophied at autopsy. This was reflected clinically by a sharply reduplicated second pulmonary sound. The well-documented affinity of the tubercle bacillus for tissues impregnated with silica was not demonstrated (Gardner, 1930, 1947); perhaps the defences were overwhelmed before this association could develop.

Control of flint movement and automation of the crushing process would provide complete protection against the dust, and perhaps the time-honoured procedure of industrial medical inspection in rural areas might now be ripe for reappraisal, so that flints, at present an attractive feature in situ in the limestone strata, could not earn the soubriquet of "Widow-makers" of the twentieth century when they are crushed for commercial purposes.

I wish to thank Dr. J. E. Morison, M.D, D.Sc., for pathological help in these cases. also Dr. D. A. R. Orr, M.D., D.M.R.D., and Mr. J. Browne for the photography.

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HÆMOGLOBIN LEVELS IN ADOLESCENT SCHOOLCHILDREN

By **B. C. CLARE DAVISON***

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

INTRODUCTION

IT has been suggested that lack of interest in school work, disinclination to study, and poor educational attainment may be sometimes associated with low hæmoglobin levels. This study was primarily designed to test the hypothesis that there is no difference in the mean hæmoglobin levels between girls of high and low educational attainment, i.e., girls in the highest and lowest educational streams, in two Belfast schools. An opportunity of estimating the hæmoglobin levels of a group of boys of similar age was also taken and some comparisons have been made between these values and those of the girls.

Earlier work relevant to the hæmoglobin levels of schoolchildren (for example, Medical Research Council, 1945; Davidson, Fullerton, and Campbell, 1935; Fysh, 1950) suggested that such factors as age, diet, and family size influenced hæmoglobin levels. The hæmoglobin level during early childhood was found to be the same in each sex, but from adolescence onwards males had a higher value; this difference was most marked during the reproductive period (Medical Research Council, 1945). It is possible that girls who have attained the menarche have different hæmoglobin levels to those who have not. Therefore, it is essential that these factors be taken into account when comparing different educational streams if the relationship between educational attainment and hæmoglobin level is to be assessed.

In this study appropriate allowances were made for differences in age and family size between compared groups, but no satisfactory method could be devised, with the resources available, to take dietary differences into account. Although some factors associated with menstruation were considered, the data available were too unreliable to use, as girls could not always remember exactly when menstruation had first started.

METHODS.

The subjects of this study were children over the age of eleven years in the highest and lowest educational streams of a grammar school for girls, and two secondary intermediate schools, one for girls and the other for boys, all in Belfast. The girls' grammar school was situated in a good residential area and the other two schools were in a working-class area. Each child was interviewed in order to obtain information about the following: date of birth, number of sibs, and, where relevant, the age of onset of menstruation and the average

*Present Address: Medical Research Council, Population Genetics Research Unit, Old Road, Headington, Oxford.

duration of menstrual periods. The educational attainment stream of each child was ascertained from school records.

The schools were visited on several occasions between November, 1961, and March, 1962, to conduct interviews and, during these visits, single blood specimens were obtained from the subjects by finger prick. On all occasions these specimens were taken between 1.30 and 3.45 p.m. in order to eliminate variation between children due to the diurnal variation in hæmoglobin level such as has been reported by Walsh, Arnold, Lancaster, Cooke, and Cotter (1953), and Elwood (1962).

Hæmoglobin determinations were made on each specimen the day it was collected as follows: 0.05 ml. blood was diluted with 10 ml. of 0.04 per cent. ammonia and the concentration of the resultant oxyhæmoglobin measured in an E.E.L. photo-electric colorimeter, using a yellow green filter (Ilford No. 625). The corresponding hæmoglobin level was then estimated, using a conversion factor of 0.255. One observer (the author) collected all information, obtained all specimens, and made all determinations.

Before the work started eight repeated determinations were carried out, using whole blood standardised to 13.4 gm. hæmoglobin per 100 ml. blood; the results obtained were within 2 per cent. of this standard. An opportunity arose later to test the observer's accuracy. Five determinations were made in duplicate by both the observer and a colleague, on blood specimens obtained from ten subjects. Analysis of variance of the results showed no significant (at $P<0.05$) differences between the means obtained by the observer and her colleague, and no significant interaction between them and the subjects. The difference between the grand means obtained by the observer and her colleague was less than 0.10 gm. hæmoglobin per 100 ml. blood.

In what follows "gm. hæmoglobin per 100 ml. blood" is expressed as "gm. Hb." and 14.6 gm. Hb. is taken as equivalent to 100 per cent. The word "significant" refers to a result likely to arise by chance in less than five of a hundred trials (i.e., $P<0.05$). Standard errors, where quoted, follow the "$\pm$" sign after the estimate to which they refer. In the tables the grammar school and the secondary intermediate schools for girls and boys are referred to as schools A, B, and C respectively, and the highest and lowest educational streams are referred to as streams 1 and 2 respectively.

Results.

There were 769 children aged eleven and over in the two streams in the three schools. Data were obtained for 740 (95 per cent.). Refusals to take part in the survey and absentees accounted for the remainder. There were 607 children in the age group 12-15 years and since most of the children in the grammar school who were outside this age group were over 15, and most of those in the two secondary intermediate schools were below age 12, the analysis has been limited to the 607 children aged 12-15, considered in two age groups 12-13 and and 14-15. Thus, initially, twelve groups of children, defined by age, educational

stream, and school were considered. There were 61 (10.0 per cent.) with levels less than 12.5 gm. Hb. and 41 (6.8 per cent.) with levels greater than 14.5 gm. Hb.

Hæmoglobin Levels and Sibship Size.

A detailed statistical analysis was carried out to see if sibship size influenced the hæmoglobin level, but in no case was any relationship found. The available numbers were insufficient to rule out completely the possibility of an association between sibship size and hæmoglobin level. However, the results of this preliminary analysis suggest that in these data such an association, if it exists, is unlikely to affect materially comparisons between the twelve basic groups.

TABLE.

MEAN HÆMOGLOBIN LEVELS OF 607 BELFAST CHILDREN BY SCHOOL, AGE, AND EDUCATIONAL ATTAINMENT.

SCHOOL	AGE GROUP IN YEARS	STREAM	MEAN ± S.E. GM. HB.	DIFFERENCES BETWEEN STREAMS ± S.E. (Stream 1–Stream 2) GM. HB.
A ...	12–13	... 1 ...	13.31 ± 0.14	... 0.15 ± 0.17
		... 2 ...	13.16 ± 0.09	
	14–15	... 1 ...	13.71 ± 0.13	... 0.13 ± 0.19
		... 2 ...	13.58 ± 0.14	
B ...	12–13	... 1 ...	13.43 ± 0.12	... 0.23 ± 0.16
		... 2 ...	13.20 ± 0.11	
	14–15	... 1 ...	13.42 ± 0.12	... −0.14 ± 0.23
		... 2 ...	13.56 ± 0.20	
C ...	12–13	... 1 ...	13.14 ± 0.09	... −0.06 ± 0.15
		... 2 ...	13.20 ± 0.12	
	14–15	... 1 ...	14.01 ± 0.15	... 0.69 ± 0.20**
		... 2 ...	13.32 ± 0.13	

Significant difference ($P<0.05$) marked**.

Hæmoglobin Levels and Educational Attainment.

The table shows the mean hæmoglobin levels of the twelve groups and the difference between the means of streams 1 (high educational attainment) and 2 (low educational attainment) for each group of children of similar age and school. There is no significant difference between means of the two streams in the girls' schools in any of the four comparisons. The largest difference occurred among girls aged 12-13 in the secondary intermediate school, but even in this group the mean for stream 1 was only 0.23 ± 0.16 gm. Hb. greater than that for stream

2. The greatest difference between any two of the eight groups of girls studied was only 0.55 ± 0.16 gm. Hb.

The only significant difference between the means of the two streams in the boys' school was found in the age group 14-15, where the mean for stream 1 was 0.69 ± 0.20 gm. Hb. greater than that for stream 2. If it is accepted that the hæmoglobin level in boys rises during adolescence then an equal increase in the mean hæmoglobin level should have been found in stream 2. As this was not the case, then either the greater hæmoglobin value of those of high educational attainment is confined to this particular school, or there is a relationship between hæmoglobin level and educational attainment in adolescent boys. A survey of a large number of boys in this age group would be required to determine the true conclusion.

Therefore these results do not offer any evidence of a difference in the mean hæmoglobin levels between girls aged 12-15 years in a high educational stream, and girls in a similar age group in a low educational stream in the two girls' schools survey. However, there was evidence of a difference between boys aged 14-15 years in the two educational streams in the secondary intermediate school.

Summary.

Estimates of the hæmoglobin levels were made from blood specimens obtained from 740 girls and boys at three Belfast schools. An analysis of the 607 of these children who were aged 12-15 years in the highest and lowest educational streams of the schools showed no significant (at $P<0.05$) differences between streams in either of the two age groups except in the boys in the age group 14-15; in this exceptional group the mean hæmoglobin level was greater in the higher educational stream than in the lower.

Acknowledgments.

This research was carried out as part of a dissertation for the D.P.H. (Queen's University, Belfast). I am indebted to Dr. A. L. Walby, Senior Medical Officer for Schools, Belfast, in making it possible to carry out this survey in the three schools. I also wish to thank Professor J. Pemberton and Professor E. A. Cheeseman for their help and advice.

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MEDICAL EDUCATION IN THE UNITED STATES

By **W. S. B. LOWRY, M.B., B.Ch., M.Sc., A.Inst.P.**
Resident Medical Officer, The Royal Victoria Hospital, Belfast

IN 1957 three medical students from Oxford, Cambridge, and London spent part of a summer vacation observing teaching methods at three American medical schools. They were very impressed with the undergraduate training and the enthusiasm of the students. Their findings were discussed in *The Lancet* (Cohen, Hughes, and Richardson, 1957). These views were subsequently given wide publicity in the United Kingdom and in the United States. Since that time I have been to the United States on two occasions. I spent over one year working and studying as a full-time student in an American medical school. Subsequently I completed my medical studies at the Queen's University of Belfast. I feel that although the points made by Cohen et al. in favour of the American schools are interesting and challenging, they do need some explanation.

HIGH SCHOOL.

In order to understand medical education in the U.S.A. it is necessary to know a little about general education in that country. All Americans attend high school until 17 or 18 years of age. This democratic ideal raises the level of education of the majority but pulls the best pupils down towards the lowest common denominator. Many medical students admitted to me that they "hardly cracked a book at high school." An Edinburgh headmaster, on an exchange visit, said that the main purpose of American education is to equip students with social poise and confidence. Thus, on leaving school, the transition to the adult world is not so abrupt.

COLLEGE.

After high school many students attend an undergraduate college for four years and take a general college degree. It is here that basketball and fraternities flourish. After two years in college the academic level is about the same as matriculation in the United Kingdom; except that the American student may have started subjects outside the British school curriculum such as, semantics, accountancy, or anthropology.

GRADUATE SCHOOL.

University education as we know it begins ***after*** college education. At this point the best students go to graduate school to study such subjects as law or medicine. The average age of entrants to graduate school is about 22 years.

In the United States the prestige of the doctor is exceptionally high. Thus there is strong competition for admission to American medical schools. There are about ten applicants for each place. Each applicant must have a college degree which includes subsidiary courses in physics, chemistry, biology. Medical school deans have made it clear that they wish to encourage pre-medical students to

specialise in the humanities whilst at college. However, because of the pressure ahead, most of the students ignore this advice and anticipate their medical studies by reading bacteriology, histology, genetics, biochemistry, comparative anatomy, physiology, or psychology. Moreover, each applicant for medical school must sit a national entrance examination and also attend for a series of lengthy interviews. Referees are closely questioned about the applicants' suitability for medicine. Few women are admitted to medical school. There was only one girl in a class of sixty students. Many students are married and an occasional one even divorced.

Examinations.

Cohen et al. felt that "the worst kind of incentive—fear of examinations—has been largely removed" in American medical schools. This is not so. The strain of examinations is always present. First week is probably the most traumatic. It is known as "bone week" in many schools. During that week the student studies nothing but the skeleton. The following week he is examined on it and his marks count towards his final percentage. It is essential to get off to a good start. If the student obtains a low mark he may find it impossible to recover his grade. One student, whom I knew, fell ill for three weeks and automatically lost the whole year. These small examinations, which may be oral or written (multiple-choice, short answer or essay), continue weekly or fortnightly throughout the entire curriculum. However, there are only a few failures. These are usually in biochemistry in which the standard is high. Careful selection of students eliminates "bad risks." As a result, most of these carefully selected students are certain to finish in the required time.

Examinations at the University of Virginia and several other medical schools are conducted without an invigilator. Each student signs a pledge of honour at the end of his paper. The thought of future doctors cheating and lying is properly considered as absurd.

Intense Work.

American medical schools are costly and there are very few scholarships. The competition is keen. On the first day of the first semester the American student works as hard as his British counterpart does before the final examination. The intense enthusiasm is seen in every aspect of the student's work. For instance, many students make tape recordings of important lectures and play back the lectures afterwards to clear up gaps in their notes. Most students study each evening and week-end and have no extra-curricular interests. The anatomy dissection room is open day and night, Saturday and Sunday. A visiting anatomy teacher described how one American student requested home ten minutes early because his wife was in labour. An English surgeon lamented, "They must have taken the fun out of medicine."

Cohen et al. noted that, in contrast to the British student, the American student is keenly interested in research and he attempts to keep up with the journals. This is surprising because the educational systems are more likely to produce the opposite result. For instance, when the American college student takes a four-month course in, say, geology, he is left with the feeling that he knows the

fundamentals of that subject. The British student, on the other hand, is more likely to be conscious of the remaining gaps in his knowledge. Sir Geoffrey Crowther noted this and said that in the U.S.A. education is like filling up a series of empty bottles, whereas in Britain it is like lighting a fire.

Degree Standard.

The M.D. is the only degree awarded in medicine in the United States. Before 1911 it was almost possible to buy this degree at one of the old "diploma mills." However, since then the curriculum has been scrutinised and standardised by the American Medical Association and the medical degree is now one of the most difficult to obtain. European observers are occasionally apt to underestimate the standard of the American medical degree, because, unfortunately, there are still a few obscure undergraduate colleges in the U.S.A. that award honorary degrees of doubtful merit in athletics and divinity.

Conclusions.

There are a number of important differences between British and American medical education:

Firstly, the American college acts as a filter where students are able to mature before deciding whether to study medicine. The enthusiasm of those attracted only by the glamour may wane and, consequently, they will drop out before excluding someone else from a place. At the same time those who have not yet decided about medicine can sample pre-medical courses without committing themselves.

Again the examination system in the U.S.A. is more satisfactory. Americans are amused at the ridiculous figure of the British student in his best Sunday suit undergoing a massive inquisition during the final ten days of terror. In the United States the final examination is spread out thinly over the whole curriculum. As a result, the American medical student works hard from start to finish and cramming is unknown.

Above all, however, the additional incentive to study medicine in the U.S.A. must be admitted; even the students enjoy an incomparable standard of prestige.

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ABO BLOOD GROUPS AND CARCINOMA OF PANCREAS

By **A. L. MACAFEE**
Department of Pathology, Queen's University of Belfast

In a combined series of 620 patients with carcinoma of the pancreas collected from many centres in the British Isles (Aird, Lee, and Roberts, 1960) it was found that there was evidence of some strength that carcinoma of the pancreas was commoner in persons of group A than in persons of blood group O or B. However, they stressed that it was possible that some of these cases may have been due to tumours of the bile ducts or of the ampulla of Vater. This paper presents the findings in an additional 119 patients.

Materials.

The data were derived from the case records of 119 in-patients who were treated in the Belfast hospitals during an eight-year period, 1953-1960 inclusive. There were 74 males and 45 females. All patients had laparotomy with a macroscopic diagnosis of the tumour, or a post-mortem examination with histological confirmation of the diagnosis. The patients and blood donor controls were drawn from the same population. The ABO blood group distribution was known for a large series (11,327) of current blood donors normally resident in the County Borough of Belfast.

TABLE 1.

Distribution of 119 Patients with Carcinoma of the Pancreas by the ABO Blood Group compared with the Distribution expected from the Controls.

Blood Group	Patients Total No.	Patients Percentage	Controls Percentage	χ^2
A	36	30.26	37.01	1.460
O	56	47.08	48.75	0.070
B+AB	27	22.66	14.24	5.974
Total	119	100.0	100.0	7.504

Comparisons of ABO distributions between patients and controls.
Blood groups A and AB combined for χ^2 test.
$\chi^2 = 7.504$ d.f. = 2 $0.05 > P > 0.02$

Results.

Table 1 shows the ABO distribution of the 119 patients compared with that expected from the 11,327 controls. There was a significant difference ($P > 0.05$)

between the observed and expected distributions. About 23 per cent. of the patients were blood group B and AB combined in contrast to only about 14 per cent. of the combined values in the controls ($\chi^2=7.504$; $0.05>P>0.02$).

Discussion.

Woolf's (1955) method has been used to compare and combine these data with some of those from the literature (Table 2).

TABLE 2.

Carcinoma of the Pancreas.

Relative Incidence in Persons of Group A compared with Incidence of One in Persons of Group O.

Centre	Total Number of Patients	Relative Incidence A:O	χ^2	P
1. London	109	1.56	4.50	0.05>P>0.02
2. Birmingham	53	1.03	0.01	0.95>P>0.90
3. Bristol	54	1.18	0.31	0.70>P>0.50
4. Cardiff	43	1.39	0.97	0.50>P>0.30
5. Liverpool	133	1.52	5.36	0.05>P>0.02
6. Manchester	78	0.81	0.77	0.50>P>0.30
7. Sheffield	26	3.87	7.15	0.01>P>0.001
8. Leeds	22	0.84	0.14	0.80>P>0.70
9. Newcastle	40	1.36	0.82	0.50>P>0.30
10. Glasgow	62	0.85	0.33	0.70>P>0.50
11. Belfast	119	0.85	0.57	0.50>P>0.30
Mean weighted relative incidence		1.18		
χ^2 Total			20.93	
χ^2 Diff. from unity d. of f.= 1			4.39	0.50>P>0.02
χ^2 Heterogeneity d. of f.=10			16.54	0.10>P>0.05

Sources of material: 1-10 (Aird et al., 1960).

In London, Liverpool, and Sheffield the estimated incidence of carcinoma of the pancreas in persons of blood group A is significantly greater than in those of blood group O. There is no evidence of significant heterogeneity between the areas and the difference from unity is just significant at the 5 per cent. level. The Belfast data does not support the suggested association between blood group A and carcinoma of the pancreas. There is, in fact, a deficiency of blood group A as compared with blood group O and an excess of blood group B.

Summary.

The ABO blood group distribution in 119 patients with carcinoma of the pancreas showed a deficiency of blood group A and an excess of blood group B when compared with the controls.

I wish to acknowledge the help and encouragement of Professor J. H. Biggart, who initially suggested the investigation of this problem. Dr. J. D. Merritt kindly gave me advice on the statistics and Dr. M. C. Huth very kindly provided the control data.

Reference.

Aird, I., Lee, D. R., Roberts, J. A. Fraser (1960). *Brit. med. J.*, **1**, 1,163.
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INFERIOR VENA CAVAL LIGATION

By W. S. HANNA, F.R.C.S.(E.)

and R. J. KERNOHAN, M.D., F.R.C.P.(I.), M.R.C.P.

Waveney Hospital, Ballymena, N. Ireland

PULMONARY embolism, which is usually a complication of venous thrombosis in the lower limbs, is responsible for approximately 3 per cent. of hospital deaths. It is a common cause of morbidity and mortality in various medical and surgical conditions.

It is generally accepted that anticoagulant therapy has an important place as a prophylactic measure in venous thrombosis and, when efficient, reduces the risk of pulmonary embolism by 80-95 per cent. The following case demonstrates that anticoagulant therapy may not be sufficient to prevent episodes of pulmonary embolism and would indicate that inferior caval ligation may be a life-saving procedure in selected cases.

CASE REPORT.

The patient was a man aged 51. Six weeks before admission to hospital he developed thrombophlebitis of the right leg and the following day he had an attack of left-sided chest pain which persisted for four days. He had two further episodes of chest pain and a frank hæmoptysis on the day preceding admission.

On admission he was moderately distressed with chest pain and dyspnœa. The blood pressure was 90/60 mm. Hg., the pulse was 96 per minute, the temperature 99.6° F., and the jugular venous pressure normal. He had signs of consolidation of the right lower lobe. There was evidence of thrombophlebitis of the right leg.

A chest radiograph showed patchy consolidation at the right base. The electrocardiogram showed sinus rhythm, a P-R interval of 0.16 sec. The P waves were of normal amplitude, ST segments isœlectric, T waves of low amplitude in V.5 and V.6, and axis deviation of +10°. There was no evidence of acute right ventricular embarrassment.

He was treated with intravenous heparin and phenylindanedione ("dindevan"). The prothrombin activity level was maintained between 7 and 15 per cent. of normal. Six weeks later he sustained a further attack of severe chest pain, shock, dyspnœa, and hæmoptysis.

As anticoagulant therapy had failed to prevent a further episode of pulmonary embolism, it was decided to recommend ligation of the inferior vena cava. Anticoagulant therapy was discontinued on the day of operation and was not recommenced subsequently. The post-operative course was uneventful. He was allowed up after one week and was discharged from hospital at the end of three weeks.

Four months after operation he is very well. There is slight dilatation of the superficial veins on the dorsum of the feet and minimal pitting œdema over the ankles. This is not severe enough to interfere with his normal activities and he is now performing his ordinary work as a farmer without difficulty.

Discussion.

Anticoagulant therapy is the treatment of choice for thrombophlebitis complicated by pulmonary embolism. It has become obvious, however, that anticoagulant therapy does not provide absolute protection from emboli. Anticoagulant therapy is of value as a prophylactic measure in a large number of susceptible patients, and it is often sufficient in the treatment of patients who have sustained one episode of pulmonary embolism. If a patient develops a second or subsequent attack of pulmonary embolism when on properly controlled anticoagulant therapy then vein ligation is the only certain way of preventing further embolic episodes.

The choice of the level of ligation is between the superficial femoral vein and the inferior vena cava. Superficial femoral ligation might result in less sequelæ but it affords less protection. Fresh emboli may occur after femoral ligation. Unilateral femoral ligation does not prevent detachment of a silent thrombus from the other limb, whilst bilateral femoral ligation cannot protect against detachment of a thrombus from the iliac veins.

Because thrombophlebitis in the lower venous tree is frequently bilateral and may be associated with concomitant external iliac vein thrombosis, ligation of the inferior vena cava is therefore the operation of choice and the sequelæ are no more troublesome.

Vein ligation has not been received with enthusiasm in the United Kingdom. The opposition has been that it may cause disabling sequelæ. Nevertheless, inferior caval ligation can be a life-saving procedure when anticoagulants have either failed to prevent pulmonary embolism or are contraindicated, and particularly when the attacks are repeated. In the majority of patients late sequelæ are not disabling.

Summary.

A case of recurrent pulmonary embolism is described. An episode of pulmonary embolism developed in spite of adequate anticoagulant therapy.

Inferior caval ligation prevented any further embolic episodes and was not followed by any unpleasant sequelæ.

It is suggested that inferior caval ligation is indicated when pulmonary embolism is not prevented by adequate anticoagulant therapy.

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REVIEWS

AN INTRODUCTION TO NEUROSURGERY. By W. Brian Jennett, M.D., F.R.C.S. (Pp. xiii+326; figs. 64. 45s.) London: Heinemann Medical Books, 1964.

THIS is an excellent compendium of modern neurosurgical practice. Its only misfortune is that it appears in the same year as two similar textbooks with the same declared aims from the pens of Northfield of the London Hospital and Mullan of Chicago University. Its aims are described on the dust cover—it is for all the neurosurgeons' specialist colleagues and general practitioners, for the junior staff and ancillary personnel in neurosurgical units, as well as for postgraduates. As this embraces practically everyone engaged in medical practice, one is bound to ask how many of them will read a book as comprehensive as this in order to understand modern neurosurgical principles, and discover to what extent the neurosurgeon can now help them to treat their patients.

Given a satisfactory answer to this question, one can say unhesitatingly that it is a good book. It is completely up to date and deals simply and systematically with almost every problem familiar to the neurosurgeon of 1964. Because it is so comprehensive, it is didactic and uncompromising in style. Each problem admits of only one solution. This leads inevitably to over-simplification and it is easy to quarrel with some unequivocal statements—for example, that where a localized carotid stenosis is discovered it should be operated on, that the sac of a spina bifida cystica should be excised within forty-eight hours of birth whenever it is technically feasible. These are both statements partially true and requiring careful qualification if presented to "specialist colleagues and general practitioners."

It is probably unfair to cavil about dogma being too dogmatic in a short book. What the reviewer found more difficult to accept in an Introduction to Neurosurgery is a certain lack of balance in the relative importance of major topics. Although the author introduces the book with the statement that brain tumours no longer take up most of his attention, exactly half the manuscript is devoted to them, and intracranial infection, which becomes progressively more rare, takes up almost as much space as surgery for vascular lesions which is now a constant neurosurgical preoccupation. Head injuries cover one-quarter the number of pages devoted to tumours, although they are of much greater importance to the doctor on the fringes of neurosurgery for whom the book is written.

These objections apart, the reviewer was impressed with the amount of solid, accurate information compressed into 300 pages, and found the illustrations well chosen and clear.

This is an easily read "Introduction" for those who feel they wish to be introduced.

A. R. T.

INJURIES OF THE SPINE. By M. Beckett Howorth, M.D., Med.Sc.D., and J. Gordon Petrie, M.D. (Pp. 343; figs. 221. 120s.) London: Baillière, Tindall & Cox, 1964.

THIS is a well-illustrated North American monograph on a most important subject. The various types of fracture in the different parts of the spinal column are described fully, as is treatment. Anterior spinal fusion is gone into in detail, though other operative measures are given their proper place.

The chapter on cervical spinal injuries is the "pièce de résistance" with eight pages of bibliography bringing up the rear in this section. In this connection there are some twenty pages of reference in various parts of the book, the reading of which would be a monumental effort if one ever embarked on it.

A good book of reference for an orthopædic surgeon, to be read slowly and carefully as the set-out and style are difficult to get into without effort and deliberation.

The book contains an historical chapter by George Bennett, M.D., Sc.D. This is of academic interest, but does nothing to increase the practical value of the other chapters. R. J. W. W.

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OPERATIVE NEUROSURGERY. By E. Stephens Gurdjian, M.D., Ph.D. Second Edition. (Pp. 577; figs. 130. 136s.) London: Baillière, Tindall & Cox, 1964.

THE name of Gurdjian, associated as it is with five assistant authors from Wayne State University College of Medicine, in particular the now retired John E. Webster, is a guarantee that this book has been carefully and completely compiled, and carries the hallmark of long experience in the theatre and the research laboratory.

Beginning with a review of modern diagnostic aids, it goes on to describe methods and neurosurgical means in general. After an over-short description of post-operative care, cerebral topography and blood supply are described, and the rest of the book is devoted to operative indications and techniques.

Each procedure is described in detail and illustrated with line drawings, and, although inevitably every individual surgeon will disagree with certain minutiæ in procedure which he has modified in his own practice, everything that the neurosurgeon in training requires to know is there.

It is for him that this book has been written, together with general surgeons who have to treat neurosurgical problems. It is certain that it will occupy an important place in American departmental libraries, particularly in the many hospitals where interns may have to rely on their own judgements and techniques at an earlier stage in their training, and in smaller hospitals where the trained intern is doing two years' practice before doing his boards, often without the help of a more mature colleague.

In this country the trainee is seldom without an experienced mentor, and one is tempted to make the smug and timeworn remark that surgeons who can operate on the nervous system do not require a book like this, and those who do require it should not operate on the nervous system. This would, however, be unfair criticism and, although it may not be widely used in this country under present conditions, it will be an invaluable standby for any surgeon in the many countries where neurosurgical procedures, particularly emergency ones, have to be carried out in areas geographically removed from a neurosurgical centre.

The book has been lavishly illustrated by a splendid medical artist, and every step in each procedure is carefully described and delineated. A. R. T.

CONGENITAL HIP PATHOLOGY IN THE NEWBORN. By Stanko Stanisavljevic, M.D. (Pp. 94; figs. 133. 52s.) London: Baillière, Tindall & Cox, 1964.

DURING the period 1958 to 1962 Dr. Stanisavljevic personally examined the hips of 6,000 newborn babies. He also examined and then dissected 300 hips in 150 stillborn and newborn babies who died within 24 hours.

Dr. Stanisavljevic is in agreement with other authors on the value of the Ortolani test. Any delay in commencing treatment led to greater difficulty and a longer period before the X-ray appearance of the hip returned to normal.

In his post mortem material he discovered three hips with a negative Ortolani test, but positive telescoping. Dissection revealed marked deformity of the acetabulum and of the head of the femur. It is reassuring that two clinical cases with similar findings responded to conservative treatment.

Four children with stable hips at birth developed a dislocation or subluxation within three months. This finding is at variance with the work of von Rosen and Barlow, who did not have any cases where a hip which was stable at birth later dislocated.

The author has attempted the difficult task of distinguishing between normal and abnormal in the radiography of the hip in the newborn. Unfortunately, the prints are too small for accurate examination.

This is a helpful study to anyone attempting to diagnose and treat congenital dislocation of the hip in the newborn. However, the diagnosis will continue to be made on clinical rather than radiographic findings. J. P.

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DISORDERS OF VOLUNTARY MUSCLE. Edited by John N. Walton, M.D., F.R.C.P.

(Pp. ix + 628; illustrated. 100s.) London: Churchill, 1964.

DUCHENNE of Boulogne nearly one hundred years ago realised that in order to understand and treat muscle disease the clinician must himself be conversant with pathology and electrodiagnosis. Many of the diseases of muscle classified by the nineteenth-century neurologists remain mysterious in all but the name, similar then as now. Yet exciting advances in the basic problems of muscle disorders have accumulated in the past ten years. The electron microscope has uncovered the hitherto hidden ultrastructure of the muscle cell. Enzyme studies have led to the diagnosis of muscular dystrophy before it is clinically apparent. A biochemical defect in one rare muscle disease is now well established. Electromyography is a tool for the clinician and recent biopsy techniques have brought the pathologist and the physician in close co-operation.

This book edited by Dr. John Walton attempts to bring to the clinician, be he general physician, paediatrician or neurologist, a concise, authoritative and critical view of all these aspects. There are four sections (on anatomy and physiology, pathology, clinical problems in muscle disease and electrodiagnosis) to which twenty-four experts, including the editor, have contributed chapters. The book is an unqualified success. Despite the varying styles to be expected when contributors differ in discipline, there is a delicate balance between the scientific and the clinical, the proven and the speculative. It is a well-produced book with very clear illustrations and the bibliography is numerous and well chosen.

For many it will be a good book for reference. To the clinician who has the care of patients it will give invaluable information. The postgraduate student will find some of the chapters on clinical problems well worthy of study. To all who believe that the next ten years will bring a real break-through in the treatment of muscle diseases the book will be a guide to the manner in which this may be brought about. L. J. H.

BASIC PRINCIPLES OF ACCIDENT SURGERY. By M. C. T. Morrison, F.R.C.S.

(Pp. 116; figs. 29. 21s.) London: Lewis, 1964.

THE author has had experience both as a general surgical registrar and as an orthopaedic registrar at two London teaching hospitals.

He points out that teaching hospitals in the centre of big cities receive relatively few major casualties from road accidents.

Medical students can qualify with little teaching in traumatic work and yet may find themselves in a casualty department confronted with a severely injured patient, when they have to act promptly on their own initiative.

While the information in this small book can all be gleaned from any surgical textbook, it is here set out in a clear didactic way, that relates basic principles to the problem in hand, in a way that will lead to clear thinking and action; such as Copes' "Early Diagnoses of The Acute Abdomen" has done for innumerable house-surgeons through the years.

The Osmond-Clarke Committee on accident services put forward a "three tier" system. This book would be too elementary to find a place in the first tier or major accident centre. While it would be desirable in the second tier general hospital accident department it would be essential equipment in the third tier cottage hospital department staffed by general practitioners.

All writing on accident services deplore the many small struggling departments; this book is an excellent guide as to how the struggle can be made more effective. W. H. E.

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This book edited by Dr. John Walton attempts to bring to the clinician, be he general physician, paediatrician or neurologist, a concise, authoritative and critical view of all these aspects. There are four sections (on anatomy and physiology, pathology, clinical problems in muscle disease and electrodiagnosis) to which twenty-four experts, including the editor, have contributed chapters. The book is an unqualified success. Despite the varying styles to be expected when contributors differ in discipline, there is a delicate balance between the scientific and the clinical, the proven and the speculative. It is a well-produced book with very clear illustrations and the bibliography is numerous and well chosen.

For many it will be a good book for reference. To the clinician who has the care of patients it will give invaluable information. The postgraduate student will find some of the chapters on clinical problems well worthy of study. To all who believe that the next ten years will bring a real break-through in the treatment of muscle diseases the book will be a guide to the manner in which this may be brought about. L. J. H.

BASIC PRINCIPLES OF ACCIDENT SURGERY. By M. C. T. Morrison, F.R.C.S.

(Pp. 116; figs. 29. 21s.) London: Lewis, 1964.

THE author has had experience both as a general surgical registrar and as an orthopaedic registrar at two London teaching hospitals.

He points out that teaching hospitals in the centre of big cities receive relatively few major casualties from road accidents.

Medical students can qualify with little teaching in traumatic work and yet may find themselves in a casualty department confronted with a severely injured patient, when they have to act promptly on their own initiative.

While the information in this small book can all be gleaned from any surgical textbook, it is here set out in a clear didactic way, that relates basic principles to the problem in hand, in a way that will lead to clear thinking and action; such as Copes' "Early Diagnoses of The Acute Abdomen" has done for innumerable house-surgeons through the years.

The Osmond-Clarke Committee on accident services put forward a "three tier" system. This book would be too elementary to find a place in the first tier or major accident centre. While it would be desirable in the second tier general hospital accident department it would be essential equipment in the third tier cottage hospital department staffed by general practitioners.

All writing on accident services deplore the many small struggling departments; this book is an excellent guide as to how the struggle can be made more effective. W. H. E.

THE DEAF CHILD. By Edith Whetnall, M.S., F.R.C.S., and D. B. Fry, Ph.D. (Pp. vii+237; figs. 62. 42s.) London: Heinemann Medical Books, 1964.

THE authors emphasise that the early diagnosis and intensive training of the residual hearing of the deaf infant gives the best possible results. Four to six months is the ideal age to start auditory training and a period of three years or more may be required before a final assessment of hearing is possible. The great problem of the deaf child is the interference with the learning of speech, the inability to communicate with others and consequent isolation and psychological upset.

The mechanism of normal speech production, reception and development is described in detail. The types, causes and pathology of deafness are set out clearly.

The section on the clinical examination and investigation of the deaf child describes the "free-field" tests of various age groups of infants and the audiometric tests of the older child, but warns of the danger of the amateur tests of hearing.

The final chapter explains the treatment and training of the deaf child. The different types of hearing aid and the fallacies in their use are explained, and mention is made of the special requirements of children with special types of hearing loss

This excellent book, which is primarily written for doctors, will be of great help to otologists, paediatricians, Medical Officers of Health, and the many others who are concerned in the welfare of young children. N. M. S.

MEDICAL SURVEYS AND CLINICAL TRIALS. Edited by L. J. Witts, M.A., M.D., D.Sc. Second Edition. (Pp. xi + 367; figs. 19. 42s.) London: Oxford University Press, 1964.

THE study of the mass aspects of disease and the exacting disciplines of epidemiological and biometric method applied to clinical research provides the stuff of this excellent book. Much that has been written from clinical, social, and laboratory observations of the natural history of disease provides hints of possible associations between illness and factors that are operative in the patient's background and experience. After the first indication of an association between two factors, the search for clues to causation becomes systematic. The accumulation of evidence from the medical survey is the first vital step in uncovering factors that significantly influence the prevalence of diseases in our populations. Professor Witts achieves well the aim of this book in displaying the common factors in several forms of clinical research in which the population, rather than the individual, is studied.

For this new edition much of the text and the bibliographics have been revised and brought up to date. The book is set out in two parts. The first part describes the methods appropriate for use in group research. This comprises not only the techniques of on-going and follow-up studies but covers the disciplines of prophylactic and therapeutic trials, and there is also a section concerned with operational research in medical care. The second part deals with the application of these methods in different areas of clinical medicine. In this it is illustrative rather than comprehensive and the book gains strength and interest from the way in which many of the contributors have drawn examples from their own research.

The layout is good and the price is modest. The book is aimed more towards the needs of the postgraduate than to the undergraduate medical student. Yet the issues dealt with in its content spread beyond the interests of the epidemiologist, the statistician or the student of social medicine: its disciplines are basic to medical science and its applications cannot be avoided in good clinical enquiry. This book is commended as essential reading for all postgraduate workers in any area of clinical research.

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PULMONARY TUBERCULOSIS. By Walter Pagel, M D., F.C.Path; F. A. H. Simmonds, M.A., M D., D.P.H.; Norman Macdonald, M.D., F.R C.P.E.; E. Nassau, M.D., D T.M. and H., F.C Path. Fourth Edition. (Pp. x + 520; figs. 229. 105s.) London: Oxford University Press, 1964.

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There is a commonsense account of management and treatment and an interesting chapter on epidemiology and prevention. The principles which are given of surgical treatment are in accordance with current practice in this country, but not all would agree that thoracoplasty and even artificial pneumothorax had no place in treatment in countries less favourably placed than ours.

The remarkable success of efforts in the highly developed countries of the world to control tuberculosis has led to the view that we do not need any longer to know much about it and that with suitable chemotherapy all tuberculous lesions can be healed. This is a dangerous simplification which ignores the pathology of tuberculosis and ignores also the fact that without the support of the thoracic surgeons when chemotherapy first begun, we would now be having the same problem of widespread drug resistance which is obstructing the control of tuberculosis in every country where chemotherapy is the only available weapon.

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GUIDE TO HOUSE SURGEONS IN THE SURGICAL UNIT. By G. J. Fraenkel, F.R.C.S., F.R.A.C.S., and J. Ludbrook, F.R.C.S., F.R.A.C.S. Third Edition. (Pp. 99. 12s. 6d.) London: William Heinemann Medical Books Ltd., 1964.

THIS concise little book of 99 pages can be read without difficulty at a sitting and then slipped into a white coat pocket for further reference. It is written with the house surgeon primarily in view, but it could be read with advantage by members of the entire surgical team.

Attention to its very practical teaching could save the new surgical house officer many of the common embarrassing and often dangerous pitfalls. While each surgical unit differs in minor details of investigation and therapy, the principles outlined by the authors are still applicable.

The new house surgeon will find the sound advice on administration and the practical approach to intravenous therapy particularly useful. The second half of the book deals well with the routine care of all the common admissions to a general surgical unit. Although one might not agree with the "five-day rule" for antibiotics, the rather prolonged drainage of mastectomy wounds or routine emergency prostatectomy, in general this is the finest practical handbook I have seen.

It is a "must" for the side room of each surgical unit and should be handed to each new house surgeon with his first white coat.

G. W. J.

EXFOLIATIVE CYTOLOGY IN GYNÆCOLOGICAL PRACTICE. By Erica G. Wachtel, M.D. (Pp. xiii + 203; figs. 188. 45s.) London: Butterworth, 1964.

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L. J. H.

GUIDE TO HOUSE SURGEONS IN THE SURGICAL UNIT. By G. J. Fraenkel, F.R.C.S., F.R.A.C.S., and J. Ludbrook, F.R.C.S., F.R.A.C.S. Third Edition. (Pp. 99. 12s. 6d.) London: William Heinemann Medical Books Ltd., 1964.

THIS concise little book of 99 pages can be read without difficulty at a sitting and then slipped into a white coat pocket for further reference. It is written with the house surgeon primarily in view, but it could be read with advantage by members of the entire surgical team.

Attention to its very practical teaching could save the new surgical house officer many of the common embarrassing and often dangerous pitfalls. While each surgical unit differs in minor details of investigation and therapy, the principles outlined by the authors are still applicable.

The new house surgeon will find the sound advice on administration and the practical approach to intravenous therapy particularly useful. The second half of the book deals well with the routine care of all the common admissions to a general surgical unit. Although one might not agree with the "five-day rule" for antibiotics, the rather prolonged drainage of mastectomy wounds or routine emergency prostatectomy, in general this is the finest practical handbook I have seen.

It is a "must" for the side room of each surgical unit and should be handed to each new house surgeon with his first white coat.

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ATLAS AND MANUAL OF DERMATOLOGY AND VENEREOLOGY. By W. Burckhardt. Translated and edited by S. Epstein. Second Edition. (Pp. 306; figs. 187. 132s.) London: Baillière, Tindall & Cox, 1964.

PROFESSOR BURCKHARDT, who is an eminent dermatologist from Zurich, Switzerland, is the author of this book, which has been translated and prepared for the English-speaking reader by Dr. Stephen Epstein of Minnesota, U.S.A.; furthermore, Dr. P. A. G. Smith of the London Hospital has checked the manuscript from the point of view of the British reader. The result is excellent and indeed this is the best, low-priced skin atlas available in the English language today. The photographs are of an extraordinarily high standard and particularly is this true of the colour illustrations, most of which occupy a full page. Some of the illustrations, for example, Fig. 34 ringworm of the scalp, Fig. 45 carbuncle, Fig. 126 infantile eczema, and Fig. 146 lymphatic leukemia, are so good that one can truly say that if a student could memorise these photographs then he would have little difficulty in diagnosing these conditions as they occur in life. The disadvantage of an atlas is, of course, that the student does tend to memorise a photograph which usually has no depth and, when confronted with a patient with the same condition with slight variations, he fails to recognise the condition. In this atlas the excellence of the photography does in many instances compensate for "lack of depth."

The black and white illustrations are not quite so good, but, nevertheless, they too are of a high standard. In many instances the histology of common skin diseases is included, and this is increasingly important for the student who wishes to understand the subject.

The text is simply and clearly written under standard headings. It would perhaps prove a little uninteresting to a good student since the conditions are dealt with in a rather stereotyped manner as simple descriptions of one reaction or another, and there is no real effort made to show the importance of regarding dermatology as a part of general medicine and not as a subject "out on a limb." It is mainly on recommendations regarding treatment that one might differ from the views expressed by the authors, but for the most part these differences are of emphasis and essentially indicate the differences in treatment used on the Continent and in this country. One would, perhaps, for example, quibble about the recommended use of vaccines for boils, anti-histamine ointment for flea-bites, X-ray therapy for plantar warts, but one would object strongly to systemic aureomycin for molluscum contagiosum, and the statement that "electro-surgical or surgical removal" is necessary for the treatment of anthrax of the skin is certainly incorrect today.

At the end of the book there are several very useful tables giving selected common contact allergens and their patch test concentrations, which are divided conveniently into lists of those required for the identification of industrial contactants, medications, clothing, cosmetics, and dyes, and finally plants. There is a useful bibliography of standard books of dermatology for further reading. Apart from this, there are no references in the text.

There is a short section on venereal diseases which contains some rather horrifying photographs. This section is necessary because in America and on the Continent the two subjects of dermatology and venereology are still kept in juxtaposition. Happily, this is not the case in the United Kingdom.

In conclusion, one can thoroughly recommend this moderately priced and beautifully produced atlas with much praise for the colour photography which alone would make this book worth the price for both undergraduate students and general practitioners. J. M. B.

INTRODUCTION TO DENTAL ANATOMY. By James Henderson Scott, D.Sc., M.D., L.D.S., F.F.D.R.C.S.I., and Norman Barrington Bray Symons, M.Sc., B.D.S., L.D.S. Fourth Edition. (Pp. 406; figs. 257. 50s.) Edinburgh and London: E. & S. Livingstone, 1964.

THE necessity for a fourth edition of this book within twelve years of its first publication testifies to its justifiable popularity and the authors have taken advantage of this new edition to bring the text completely up to date. An introductory chapter has been added to the section on the development and histology of the dental tissues to give the student, before getting immersed in details, a clear understanding of the basic structure of the elements composing these tissues and the chapter dealing with the relationship of structure and function has been considerably enlarged. Some twenty new illustrations have been added and the bibliography brought right up to date—many references being to work published only a few months before the book itself. This new edition strengthens the claim of the work to be a standard text for both under-graduate and post-graduate students.

P. J. S.

PATHOLOGY. By J. L. Pinniger, M.A., D.M., F.R.C.P. (Pp. 262. 15s.) Concise Medical Textbooks. London: Baillière, Tindall & Cox, 1964.

PATHOLOGY embraces both general pathology in the whole of the functions and structural changes produced by disease in the various systems of the body. Even the larger textbooks reflect only the varying opinions of their writers on what it is possible to omit. Short books such as this represent very gallant attempts to present as much factual data as possible. This balanced presentation may help the student who already has some understanding of the subject to revise it, but it cannot be adequate as a textbook and it cannot develop the critical judgment of the reader.

HOW TO USE A MEDICAL LIBRARY. By Leslie T. Morton, F.L.A. Fourth Edition. (Pp. 66. 12s. 6d.)

EVERYONE who uses a library as anything other than a reading room, and this should include all students and practitioners as well as a research worker, will need to refer to this little book. It will tell them how to use the catalogue, and will explain how books are classified and arranged. From it they can learn something of how to collect pertinent references and a little of the extensive and comprehensive techniques available to those attempting to keep abreast of published work in even a narrow field. They will also learn how to cite references in scientific papers and will appreciate why something more than the author's surname and a book title is nowadays required.

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THE STREPTOCOCCUS, RHEUMATIC FEVER AND GLOMERULONEPHRITIS. Edited by J. W. Uhr, M.D. (Pp. 429; figs. 180. 60s.) London: Baillière, Tindall & Cox, 1964.

THESE fifteen papers were presented at a symposium held in New York in 1962 and are concerned with group A hæmolytic streptococci and their relation to rheumatic fever and glomerulonephritis, and especially with advances made since an earlier symposium in 1951. All are highly specialised presentations by foremost workers, and, though all scientifically trained readers should be interested, few will fully understand all the work recorded.

The first five papers describe the complex chemistry of the streptococcal cell. The results of the Ouchterlong technique of immune diffusion show that many more antigens are released and responded to by the host than was formerly thought. Six papers deal with the response of the host and include a discussion of the possible role of streptococcal antigens immunologically related to human tissue constituents, reviews of experimental lesions produced by organisms and antigens and resembling rheumatic fever and nephritis, and possible mechanisms of tissue damage. The remaining papers deal with clinical studies on the pathogenesis of glomerulonephritis and epidemiological and clinical aspects of rheumatic fever.

This is an authoritative and informed book on subjects where little is yet established and where the problems are more complex than is sometimes suggested. The book will be of great value in showing the possible contributions from many sources which may soon answer some outstanding problems.

J. E. M.

INCURABLE PHYSICIAN. An Autobiography by Walter C. Alvarez, M.D. (Pp. 274; illustrated. 25s.) Kingswood, Surrey: The World's Work (1913) Ltd., 1964.

THIS interesting book starts with the author's experiences as a hospital intern in the San Francisco earthquake of 1906. It records the author's by no means placid life in the most exciting and formative years of American life and medicine up to the present day. It is an intensely personal account with good stories and strongly expressed, but mostly charitable views, on people and places and trends which have contributed much to American medicine. Though he gained world-wide fame as an investigator in gastro-enterology, Dr. Alvarez was primarily a very shrewd physician and early appreciated the influence of the emotions and anxiety in illness. He is forthright in his criticism of psychoanalysis and its practitioners and has little use for organised religion, but surgeons and other practitioners do not escape occasional anecdotes which expose their foibles and failings, and there is no pretence that all practitioners are devoted to high ideals. At times the author may annoy the reader, but he is a very capable and skilful writer and moves swiftly and easily from subject to subject.

He has written a most readable book for the interested general reader as well as for the physician.