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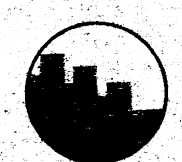

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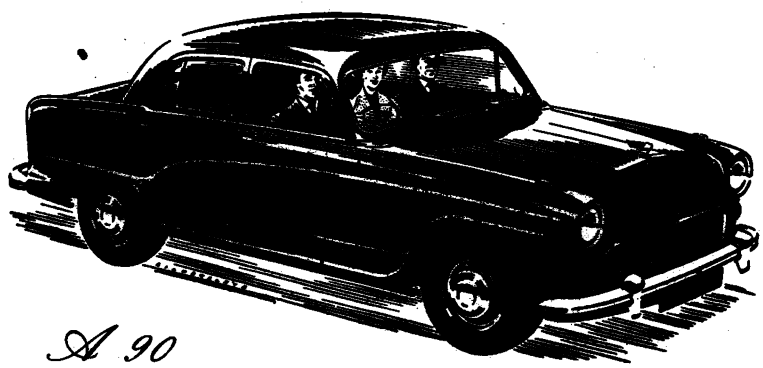

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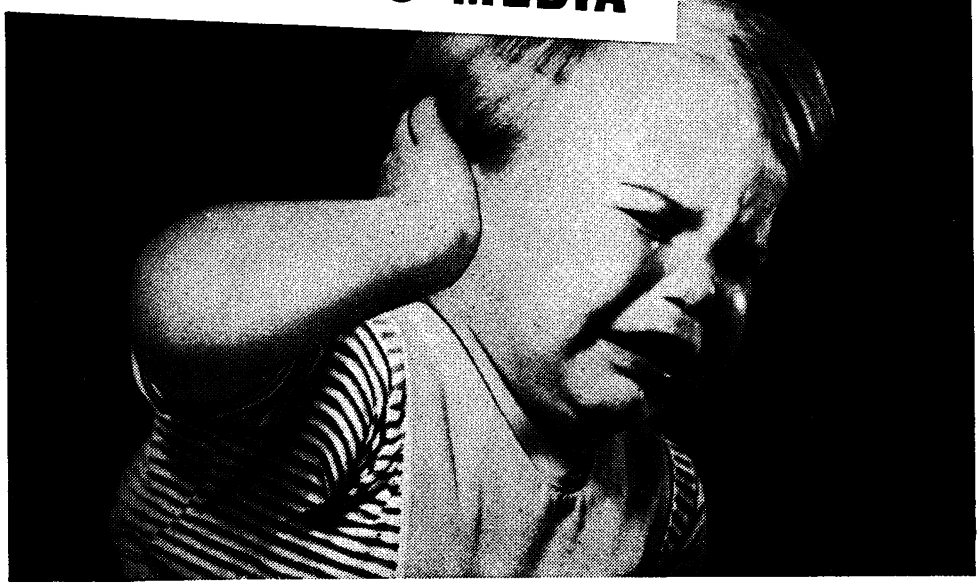

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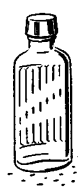

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1. LANCET, 1954, *2*, 942. 3. B.M.J., 1954, *2*, 1255.
2. B.M.J., 1954, *2*, 1257. 4. LANCET, 1954, *2*, 1245.

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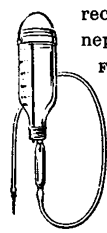

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1. ACTA OBST. YNEC. SCAND.; 1950, *30*, Suppl. 6.
2. BRIT. MED. J., 1954. *1*, 893.

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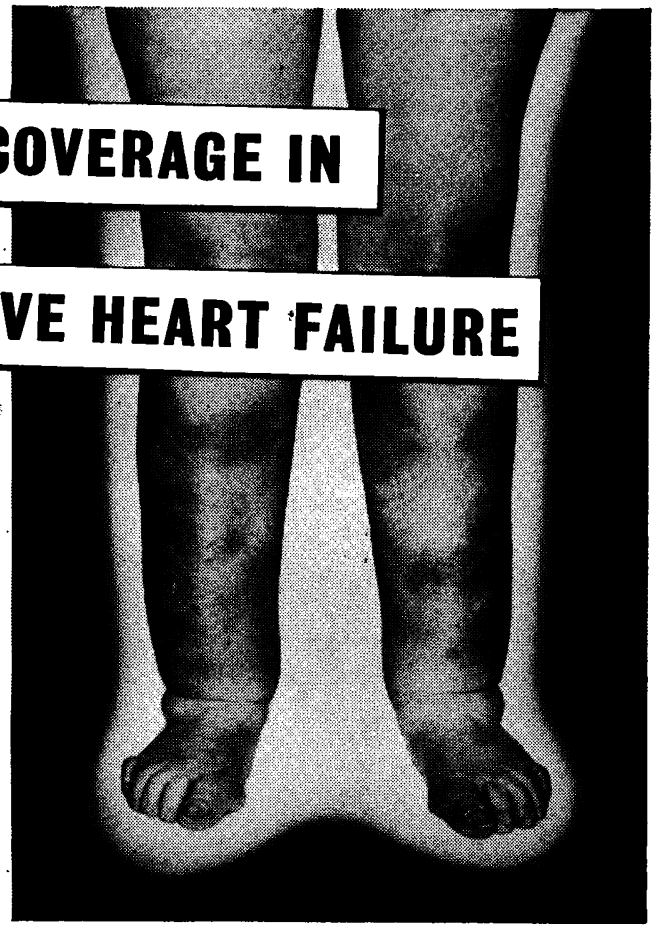

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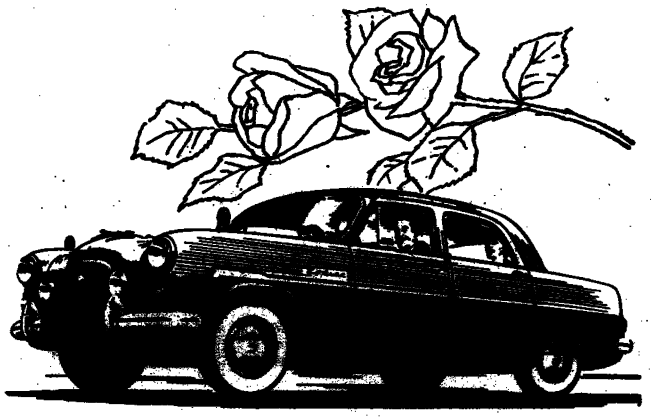

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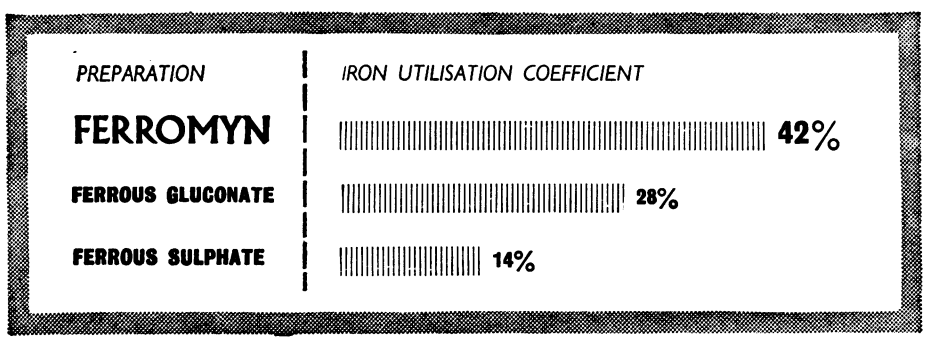

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THE
ULSTER MEDICAL JOURNAL

PUBLISHED ON BEHALF OF THE ULSTER MEDICAL SOCIETY

Vol. XXIV 1st MAY, 1955 No. 1

Pediatric Surgery : in Retrospect and Prospect

By T. TWISTINGTON HIGGINS, O.B.E., F.R.C.S.,
Consulting Surgeon to the Hospital for Sick Children, Great Ormond Street, London

The Robert Campbell Memorial Oration, delivered 24th March, 1955

COMING as I do of Ulster stock, it is for me a signal honour to be called upon to pay tribute, on your behalf as well as my own, to the memory of a great Ulster surgeon, Robert Campbell. Some of you, I know, knew personally this tall, genial, sandy-haired Irishman of the commanding presence, the quiet voice, the alert mind, the boyish enthusiasm, and the gentle, capable hands. But many had not that privilege.

Robert Campbell loved children. He understood their ways and he studied their needs. His work at the Children's Hospital here came to be not only a great joy to himself, and an inspiration, as I well know, to his successors in Belfast, but also a matter of no small significance to children's surgery everywhere. Robert Campbell was, in fact, one of the pioneers who, in the earlier years of this century, laid the foundations of modern pediatric surgery. Many of his views, particularly about the nursing and care of children, were far in advance of his time. To-day they are orthodox practice. In 1920 Campbell handed on the torch to us, and it has seemed to me appropriate to take a look at how we have tended it and how it may fare in the future.

Surgery, in all branches, has made astounding advances since Campbell's day, and the surgery of childhood has in no way lagged behind. Let us begin by considering some of the things which have signified most to children in this tale of progress.

1. SOCIAL CHANGE.

When I first went to Great Ormond Street in 1912 a large proportion of our patients were still barefooted, ragged, and often homeless little waifs. We were sadly cluttered with the surgery of dirt and malnutrition, and with the appalling sepsis, abscesses, cellulitis, acute bone and joint disease, rickets, tuberculosis, congenital syphilis. By 1920 this was, of course, already passing, and to-day these

cruder features of poverty have happily disappeared. But our modern society poses us plenty of fresh problems, as we are all aware. A child does not live by bread alone, and there is still much ignorance, stupidity, and even neglect in the upbringing of children. The children's surgeon still sees far too much surgery which is preventable. Some is obvious enough : the accidents in the home, on the roads, and even occasionally during birth. But preventability covers much more than this. We may hope that, as our knowledge and wisdom grow, more and more of our children will be saved from surgery. We can already welcome, e.g., fewer tonsillectomies and circumcisions.

Genetics. Perhaps the most significant preventive contribution of all may be looked for from genetics in which the surgeon has a vital interest. I need not tell an Ulster audience that if we bred our horses and our cattle in the same "happy-go-lucky" way in which, for the most part, we breed our children, it would be disastrous for our farming interests. This is brought home to the children's surgeon almost daily; so much of his work is concerned with congenital deformities of one sort or another. I am convinced that, in my lifetime, the incidence of these has increased very considerably. No statistical proof can be given, since there is no official registration of congenital deformities. But we know well enough that any parent with an existing or familial blemish may well pass it on to the offspring. And surgeons are always busy saving lives and thereby increasing the risk. A sobering thought.

Carter and Powell (1954) have recently recorded important figures in the pyloric stenosis of infants. Since 1920 the mortality among these infants has been virtually wiped out. They, in their turn, have become parents, and of their babies we now know that one in ten will have pyloric stenosis. This is an important factor in the increasing incidence of this disorder. There are similar figures for other conditions. For example, the chance of the malformation appearing in any later child in the family (Carter, 1954)—

In spina bifida is about 1 in 40.

In congenital dislocation of the hip :

Both parents normal - - -	1 in 20
One parent affected - - - -	1 in 10

In hare-lip :

Both parents normal - - -	1 in 20
One parent affected - - - -	1 in 7

In cleft palate :

Both parents normal - - -	1 in 50
One parent affected - - - -	1 in 5

May we not also look to genetics to take all this one step further back, to the point where a congenital taint, not necessarily a gross deformity, is introduced into pure stock, not by interbreeding, but *ab initio* by some extraneous influence? There is e.g., the cleft palate which results from the mother's German measles in the early weeks of her pregnancy. When we reflect upon the revolutionary changes which our world has experienced, upon their complexity and, above all, upon the

rapidity with which they have come upon us, we realise that our adaptability to environment is being subjected to stresses and strains that are without precedent. Who can doubt that the tensions and anxieties of modern life must have in many instances a profound influence upon the supreme function of reproduction? Perhaps that is sociology and not genetics, but the challenge is clear enough.

2. Control of Infection.

The next factor which has meant so much for children's surgery is the control of infection in our wards. Robert Campbell, in his day, was profoundly right when he used to say that "the best nurse for a child was its mother and the safest place for it to be ill was at home." We who endured the old days with their heartrending outbreaks of cross-infection know what modern isolation facilities have meant to children's surgery. In recent years the antibiotics and chemotherapeutic drugs have also come to our aid, both in prevention as the protective "umbrella" and in the treatment of established infections. The sting has been taken from so many diseases. Think of the rarity to-day of an empyema, a pneumococcal peritonitis or a brain abscess. Most dramatic is the change in the picture of acute bone and joint disease. In many cases of acute osteomyelitis the diagnosis has to be accepted on clinical grounds alone, for there may be no confirmation by blood culture, pus formation or detectable radiological bone change.

3. Maintenance of Vitality.

Under this heading go all those striking improvements in the care of our patients. We have only to recall how rare an event was a blood-transfusion in 1920 and contrast to-day's routine of "drips" and transfusions. Surgery has indeed become almost alarmingly safe. All this has special significance for the child because here the biochemical and technical problems demand specialised skill and dexterity.

4. Establishment.

The modern children's surgeon requires a very expert "team"—in fact, a very expert overall establishment. A contrast indeed to 1920. Particular tribute must be paid, first and foremost, to our nurses, for there could have been no progress unless they had kept step. We are for ever asking more and more of them, and we never ask in vain. No branch of nursing could be more exacting than that which is concerned with pediatric surgery, for nowhere can any weakness in nursing technique have more devastating consequences. We must safeguard their training as the very "king-pin" of children's surgery.

Similarly, tribute must be paid to our anæsthetists who have made the children's surgeon's dream come true. Premedication has abolished the terrors of induction, and for the rest the wizardry of modern anæsthesia is a very significant factor in recent progress. And, finally, to all the other specialists and research workers who have contributed so much to give the "team" of 1955 the "new look." It would astonish Robert Campbell and his fellow-pioneers. They would be staggered at the size of the chicken they had hatched and not least at the cost of its sustenance. They might wonder if we were not making too "heavy weather" of pediatric surgery. Well, are we? It is true that much of children's surgery presents no great technical difficulties, though it is equally true that much of it does. But the surgery

of childhood is unique in one compelling respect; it is surgery in a special age-group, with requirements which are very highly specialised. So long as those requirements are assured—a very necessary proviso—a good deal of the surgery of childhood can, and I think should be done outside the special centres; if only for reasons of economy. It is wasteful to use a steam-hammer to crack nuts.

But the special centre, staffed by a limited number of purely pediatric surgeons with associated specialists if need be, has its own vital place as the essential focus for the training of nurses and young surgeons, as the source of authoritative education of profession and public and as the hub of research and progress.

And now from the general to the particular.

Abdominal.

The acute emergencies.

The death roll from these is still tragic (Table I).

TABLE I.

Deaths, England and Wales.

(Registrar General).

	1920		1952	
	Under 5	5-15	Under 5	5-15
Acute appendicitis - -	135 ...	651 ...	156 ...	226
Intestinal obstruction - (including intussusception).	601 ...	108 ...	713 ...	43

I am indebted to Mr. Wallace Dennison for some relevant figures from the records of the Royal Hospital for Sick Children, Glasgow (Table II). These indicate that there has been no decline in incidence. They demonstrate an improvement in results, which is a tribute to the special teaching of surgical pediatrics in that school. The disaster of delayed diagnosis is manifest in the five-year period analysis of their cases of acute appendicitis.

TABLE II.

Glasgow R.H.S.C.

Acute appendicitis.

1935. 181 cases mortality = 3.8%

1954. 235 cases mortality = 1.2%

Analysis of cases, 1946-50:

Total, 717. Mortality, 2.5%.

Type at Operation.	Cases.	Deaths.	Mortality.
Unruptured - - - - - -	275 ...	— ...	—
Ruptured with local peritonitis -	113 ...	— ...	—
Ruptured with abscess - - -	184 ...	— ...	—
Ruptured with diffuse peritonitis -	145 ...	17 ...	11.7%

Intussusception.

1935 ...	27 cases ...	4 deaths
1953 ...	59 ,, ...	1 death
1954 ...	38 ,, ...	1 ,,

In these emergencies early diagnosis remains the essential safeguard. However better equipped we may be to retrieve the desperate case we can never entirely avert the disaster of delay. The incipient "acute abdomen" in the child is always a severe test for any of us, and the doctor is often handicapped at the outset by not being summoned in time. But it is not always like that. May one venture one or two simple observations? In all these grave emergencies pain is the initial symptom, and upon its correct assessment everything depends. In the all-important early phase only one decision requires to be made; is this child's pain severe? If it is, it is a matter for a surgeon, and he who hesitates may well be lost. It is so easy to be misled by other considerations—to wait for localised tenderness, rigidity, lumps, blood in the stool and so on. From the practical point of view, all these interesting phenomena are relatively late signs. The pain is the yellow light and the wise driver reacts promptly in anticipation of the red.

Recognition of severity requires just plain old-fashioned clinical observation and instinct—still the hallmark of good doctoring. There are difficulties, of course; there would be no fun without them, but no child, however temperamental or non-co-operative, can hide the true tell-tale signs—the vomiting, the wan, grey, drawn look, and the quickening pulse. These are the things that tell us this is no ordinary stomach ache. The disquieting feature in these figures concerns the emergencies of infancy, intussusception and the neo-natal obstructions. In intussusception this is paradoxical, for here the pain is usually so diagnostic. May I venture three observations?

1. The infant will tell us his tale—if we look and listen; but it takes time and patience.

2. The "sausage-shaped tumour" has a lot to answer for. In the most important group of all, the "enteric," it is only a late sign.

3. While operation for intussusception is urgent, it should not be "rushed." A little time spent on resuscitation may save much needless anxiety.

Finally, in the irreducible case an ileo-colostomy is a valuable alternative to resection.

Neo-natal obstructions.

This special group has its own problems in recognition and treatment. Promptitude is vital and the family doctor holds the baby. He may have something obvious to guide him, e.g., a missing anus, but in the internal lesions there may only be a vomiting infant with a suspicious lack of stools. Some distension, usually in the upper abdomen, may be apparent and even visible peristalsis. The only wise course is, on the slightest suspicion, to assume the worst and shift the responsibility. It is important to realise that if surgery is called for, it is likely to be of a most intricate nature, and these infants should be sent to a special centre, even at the risk of a journey which they seem to stand very well. Though not all the following are necessarily neo-natal emergencies, all have to be in mind for diagnostic purposes.

1. Ano-rectal malformations.
2. Intestinal atresia and stenosis.
3. Meconium ileus.
4. Malrotation.
5. Hirschsprung's disease.
6. Reduplication and cysts.
7. Meckel's diverticulum.
8. Strangulated hernia.

1. Ano-rectal malformations.

Improved methods of repair aim at better prospects of continence. In the totally imperforate anus with a high-lying terminal pouch, preliminary laparotomy and mobilisation of the bowel so as to facilitate its perineal replacement is indicated, and with this in view, a temporary colostomy may be the wisest emergency measure.

2. Intestinal atresia and stenosis.

Here obstruction is complete and operation urgent. The defect is all too often too extensive to be amenable to surgery, but not always. Experience has taught us that the bulbous proximal end must be excised and that anastamosis must be oblique and roomy. Stenosis mostly occurs in the duodenum, though septa and diaphragms have been met with at lower levels. The symptoms are usually less urgent, and indeed the condition may not be recognised for some years. An appropriate anastamosis is very successful.

3. Meconium ileus.

Obstruction is complete and this is a grave emergency. The small bowel is completely blocked through varying lengths by sticky inspissated meconium, extremely difficult to dislodge. By enterostomy, saline lavage through a catheter and milking the gut, clearance is attempted, a very wearisome procedure. Bodian has shown that in all these babies there is an associated fibro-cystic disease of the pancreas. If the obstruction has been successfully relieved, prolonged after-care with dieting, administration of pancreatin, etc., is necessary. But despite all these difficulties the outlook for these infants is not so gloomy as it was once thought to be.

4. Malrotation.

For our understanding of this we owe much to the classical contribution of Dott (1923) and for guidance in treatment to Ladd and Gross of Boston (1941). In very simple terms the malformation results from an arrest in the normal rotation of the mid-gut (duodenum to mid-transverse colon). As a result, the cæcum and proximal colon come to lie to the left and high in the abdomen and the small intestine fails to acquire a proper mesenteric attachment. A twofold complication is likely to ensue—(1) Duodenal obstruction caused by abnormal peritoneal bands anchoring the cæcum in its false position; (2) volvulus of the entire small intestine on its narrow stalk around the superior mesenteric vessels.

The urgent symptoms may appear in the neo-natal period, or they may not do so until later childhood, and may then be intermittent and puzzling. The distended stomach fills the epigastrium possibly with visible peristalsis and can be demonstrated radiologically. At operation, the surgeon's task is—(1) To realise the condition promptly; (2) if a volvulus is present, to eviscerate the entire small

intestine and untwist it in an anti-clockwise direction, turn by turn, until reduction is complete; (3) to divide thoroughly all bands anchoring the cæcum so as to free the duodenum and allow the cæcum to lie freely in the left abdomen.

5. Hirschsprung's disease.

This must always be in mind when vomiting, scanty or absent stools and abdominal distension indicate a serious obstruction. The diagnosis is confirmed by demonstrating the narrowed recto-sigmoid radiologically. Temporary relief may be given by the passage of a good-sized rectal catheter, but radical surgery can seldom be long postponed.

6, 7, and 8. Reduplication, cysts, and Meckel's diverticulum.

The complications of these mostly come to light in older children. Strangulated hernia only merits mention because, in a young infant, the little lump in the groin may be easily missed or mistaken for a gland.

Hirschsprung's disease.

Hirschsprung's disease calls for consideration in our tale of progress. It is happily still rare, though it may well become less so in the future since successful surgery is increasing the number of potential parents. Bodian, Carter, and Ward (1951), from a study of the familial incidence, concluded that "the evidence supported a genetic determination of the disease and further the chances of a male sibling of a known case being affected were 1 in 5." Formerly, many cases died in infancy, mostly unrecognised. This is no longer so. These earlier cases are naturally the most severe; it is usually the milder ones which survive to give the well-known picture in the older child. In Campbell's day these poor children were "jockeyed along" through their short miserable lives with wash-outs, aperients, and so forth. Occasionally the huge colon was excised; in the odd case which survived this heroic performance the dilatation recurred, this time in the small gut. We were long in realising that the megacolon was in fact the result of an obstruction in the recto-sigmoid; another of those puzzling lesions in which the lumen of the tube remains patent, but there is dysfunction of the propelling mechanism. To Bodian must be given the credit of confirming the fact that in all genuine cases of Hirschsprung's disease there is "absence of the intramural ganglion cells and the presence of abnormal nerve bundles in the terminal undilated segment of bowel." The length of the segment involved is variable, but most often the abnormality includes the whole of the rectum and part or all of the sigmoid colon; in rare instances it may be even more extensive. Svenson and others initiated excision of this entire segment, recto-sigmoidectomy, with or without a preliminary transverse colostomy, and this is now the accepted procedure. The results have proved excellent. Mortality from this formidable operation is surprisingly low, averaging 6 to 10 per cent., though naturally higher in infants (Svenson, 25 per cent.).

Idiopathic megacolon ("pseudo-Hirschsprung").

Where such radical surgery is involved accurate diagnosis is manifestly of the utmost importance, and this is by no means always easy. Children are prone to a

very severe form of constipation in which the colon may become so loaded and dilated as to mimic closely true Hirschsprung's disease. These cases have led to much confusion in the past in evaluating treatment. In them sympathectomy, spinal anæsthetics and so on can give remarkable results, whereas in true Hirschsprung cases such measures are of no value whatever. Stephens, Ward, and Bodian (1949) have helped to clarify the differential diagnosis. In these simpler "pseudo" cases the constipation does not date from birth; there has been a period, usually some years, during which bowel actions were normal. The onset often follows upon some local painful lesion, e.g., an anal fissure which started a "fear of the pot." Sometimes the symptoms date from an illness or a nervous crisis. From whatever cause, increasingly obstinate constipation follows until ultimately the abdomen becomes very distended and the colon grossly dilated and loaded with "rocks." The child's general health becomes seriously depressed and physical development may even be retarded. The radiological picture is characteristic; the rectum being dilated right down to the anus, the "terminal reservoir." Stephens, Ward, and Bodian emphasise that these children can all be cured by simple medical measures, though it may take months and require much concentration and co-operation. This is certainly true, for many are extremely obstinate. Could it not be that some are, in fact, instances of genuine Hirschsprung's disease of low degree, a link between the false and the true? May we not one day understand why the development of the vital nerve elements in the bowel wall has failed and even how it can be induced to catch up? That would save a lot of trouble.

Pyloric Stenosis.

Reviewing the Great Ormond Street cases in 1914—a total of 120, and all treated medically—the mortality was 84 per cent.; 17 out of every 20 babies perished. To-day the mortality is 1-2 per cent., and cure is speedy and complete. No mean achievement for surgery. One might feel disposed to leave it at that, but the last word is not likely to remain with surgery. Pyloric stenosis is one of those neuromuscular disorders so common in childhood, disorders of function which are as yet imperfectly understood. We shall be wiser one day and then control and cure will be simpler. Already here we have an established alternative to operation in the relaxant drug atropine metho-nitrate, "Eumydrin." It should still be used with discretion; the case selected should be relatively mild, the vomiting less exaggerated, the stools showing some milk passing and the baby's weight not dropping catastrophically. But the main hope surely is in prophylaxis. Should we not give "Eumydrin" in prophylactic doses from the day of birth to all likely victims, i.e., first boy babies, especially the lusty ones? We should certainly do so, as suggested by Carter and Powell, in every case in which one parent is known to have been affected.

The Imperfectly Descended Testis.

This is still a vexed question, but there has been some clarification. Distinction is now made between the ectopic and the retained testis. In ectopia the gland has emerged from the external ring and then missed its way; most commonly it is found lying in the subcutaneous tissues of the groin. In true retention the gland is still within the inguinal canal, where it can rarely be felt, or within the abdomen.

For the ectopic testis the modern orchidopexy gives very satisfactory results, both cosmetic and functional—it is gratifying to operate on the sons of their fathers. The retained testis is a more difficult matter. In some instances the gland may be brought down successfully, but certainly not in all. The potentialities of hormone therapy are still *sub judice*. It is not without its risks, but in careful hands successes are being claimed. The whole subject is complicated by the fact that in a proportion of these boys with retained testis—it may be in a third or more—descent may occur naturally around puberty. The relation of it all to function is uncertain.

The increased risk of malignant disease in the retained testis is well known. Orchidopexy does not always save the boy from this risk. Torsion is, of course, another risk and, incidentally, this can occur in the normally descended gland, and may even be bilateral. I venture to mention it because of its importance, even though it is extremely rare. Atrophy inevitably follows unless reduction is prompt. The moral is that testicular pain in a boy of unexplained origin should galvanise the doctor to refer the boy and the surgeon to explore the groin. Better to be wrong than late.

Urology.

Urology has always had an honoured place in pediatric surgery. Up to one hundred years ago the great hospitals refused to admit children, with two notable exceptions—"such as required amputation or cutting for the stone."

The Great Ormond Street operation book for 1864 records an annual output of thirty operations.

15 amputations or excisions of joints.
10 tracheotomies.
1 removal of a fibrous scalp tumour (death from meningitis).
4 cuttings for the stone.

The stones were in the bladder and were removed by lateral lithotomy, from which, surprisingly, all four children survived—a flying start for the urological service. I do not know whether Robert Campbell possessed a cystoscope, but since his day urology can claim its own contribution to progress. Thanks to the skill of the instrument maker, aided perhaps a little by the toil of the inquisitive surgeon and his colleagues, the urinary tract can now be investigated very adequately in any child at any age. Many obscure lesions have thus been revealed, their nature clarified and their treatment rationalised. There is, of course, still a good deal to be learnt; even child-urology would lose much of its charm if we knew all the answers. Perhaps the greatest need at the moment is for a wider appreciation of the knowledge already gained. Many of the lesions concerned lead to progressive deterioration from obstruction and infection and many are congenital anomalies which give clinical evidence of their existence quite early in life. Early recognition is obviously to everyone's advantage. In some, the only outward and visible sign may be excessive wetting, and this, in an infant, and indeed in an older child, may be so easily misconstrued. I suppose that, for many, "child-urology" can still be summed up in the one word, "enuresis"—a sorry term in every sense. Bad terminology makes for "woolly" thinking, and, in this case, for the mishandling

of many children. By "enuresis" we really mean a derangement of function, resulting in a degree of incontinence. And this can apply at any age. Derangement of function from an accepted normal demands an exhaustive search for the cause before treatment is instituted. In an infant, the "accepted normal" is liable to very quaint interpretation. But it is reasonable enough and it should certainly not include the infant who is soaked all the time. So far as the older, so-called "enuretic," children are concerned, the urologist, while certainly claiming no monopoly, would emphasise that the cause is more often to be found in the urinary tract than is commonly supposed (more than the 10 per cent. usually given), and that it requires far more than a cursory examination to find let alone to treat it.

(Slides were shown to illustrate some urological problems.)

Time permits only a brief reference to other fields—thoracic, cardio-vascular, neuro-surgical, plastic, orthopedic. Everywhere the modern achievements would seem miraculous to Robert Campbell, as indeed they often do to us.

Thoracic Surgery.

Lobectomies are effectively done for tubercle, bronchiectasis, localised cystic disease, and neoplasms. We may hope to see fewer needed in the future. Tuberculosis ought to pass and bronchiectasis is surely an end-result which should one day become only an historic disease. When we get down to understanding the ætiology, know more of correct breathing in children and of the management of their respiratory infections and of the neuro-muscular arrangement of the bronchioles in relation to asthma and so on, our children will be saved from many of these indignities.

Œsophageal Surgery.

The modern accessibility of the thorax has enabled surgery to deal with a variety of œsophageal lesions formerly intractable. Foreign bodies can, in the last resort, be sought by this route. Localised strictures can be excised and the congenital tracheo-œsophageal fistula at last becomes a practical possibility. Restoration of the œsophageal tube has brought many successes. Even the longer gaps have been bridged by ingeniously contrived grafts of intestine.

Hiatus hernia (the short œsophagus).

The unfolding of this particular story is fascinating to those of us who used to see (dimly through our primitive œsophagoscopes) the mysterious "idiopathic œsophagitis," with its granulating, bleeding surface and inexorable constricting tendency. We now know the explanation—a diaphragmatic defect at the œsophageal hiatus, a partial hernia of the stomach and secondary ulceration and fibrosis. The symptoms often begin in infancy with swallowing difficulties and vomiting, and can be alleviated by keeping the infant in the upright posture. Some seem to be cured that way; but undue persistence can now be very effectively dealt with by phrenic crush or open repair of the hiatal defect.

Cardiovascular Surgery.

Here we touch the heights and the public Press keeps us up to date. We can indeed rejoice in the better prospect offered to so many of these unlucky children.

We can only admire with bated breath the nonchalance with which the patent ductus is ligated and the exquisite skill of the valvotomies, and of the complex arterial shuntings in the famous "blue babies."

Neuro-surgery.

Here again the atmosphere has become too rarified for ordinary mortals. We can only bow in reverence. Perhaps we ought to blush—and Robert Campbell might blush with us—to recall our own puny efforts of former days in pursuit of the brain abscess, or the struggle with hydrocephalus or the odd tumour, which did occasionally turn out to be a tuberculoma or a cyst and give us a heartening success. But let us salute the modern triumphs.

Orthopædics.

Orthopædics have always been with us, and here we need not blush. We did not do so badly in Campbell's day with our fractures, congenital hips and what not. But, of course, it is all more orderly and scientific now.

Plastic Surgery.

Two wars and the internal combustion engine have put plastic surgery on a pinnacle of its own and provided it with a priesthood of peculiar sanctity.

The child has greatly benefited. Every children's surgeon has to be something of a plastic surgeon. Happily, the child brings to us all one priceless asset—the adaptability of growth. Perhaps this, more than anything, gives to children's surgery in general its peculiar fascination.

Mr. President, I must conclude, very conscious that this oration, like the wandering minstrel's repertoire in Gilbert's masterpiece, has been a "thing of shreds and patches, of ballad songs and snatches." But if, as I believe, the spirit of Robert Campbell has been with us to-night, I hope that he will rest content that the candle which he lit has not flickered too badly. I know that he, and I, can both be assured that it never burned more brightly than it does to-day.

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The Surgeon and Environment

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SURGICALLY speaking, we live in exciting times, and unlike Erickson, Moynihan, Murphy, and others in the past, the modern leader of surgical thought wisely refrains from declaring that surgery has achieved its final victories; indeed, rather do we anticipate with confidence further triumphs. On the other hand, as Ogilvie rightly points out, it is not manual dexterity or skill that improves, for who to-day could match in precision and speed Cheseldon in lithotomy for bladder stone, or Liston in amputation through the hip joint; it is the tools that scientific progress puts into our hands that make for this leap forward we are witnessing. Fluid and crystalloid balance, the more accurate matching and safer storage of blood for transfusion, blood substitutes, anticoagulants, intravenous feeding, all these, bringing us ever nearer to the molecular level, have rendered safer all surgical procedures and have made possible the most recent advances in the surgical treatment of diseases of the œsophagus, heart, pancreas, great vessels and of portal hypertension. Newer developments are moving towards a better understanding of the metabolic response of the body to trauma, and from the technical point of view we seem to be in a phase of replacement and substitution surgery—the making of a new œsophagus, or new stomach reservoir, or new bladder, or replacing a length of damaged or diseased artery by a frozen or freeze-dried homograft, or, more recently, by an artificial one of orlon or a mixture of orlon and nylon. Only two months ago my colleague, A. L. d'Abreu, in operating for a mixed salivary tumour of the left bronchus encroaching on the carina, had to remove these parts, and replaced them by tantalum fabric and orlon, and the patient is alive and well: it was also a feat of clever anæsthesia.

All this requires skilled assistance, first-class nursing, complicated apparatus, and generous laboratory services, and whatever objections there may be to the Health Service, one cannot deny that, so far as hospitals are concerned, it is easier to get skilled help and material equipment to-day than ever before. The teaching hospitals have special responsibilities, well summed up by Nathaniel Faxon as:—

(1) An example of practice.
(2) The teaching of students.
(3) The training of future specialists.
(4) Research,

one part of the latter being to work at the growing edge of surgery.

What is the best environment for such work, and what would one like to see in one's own hospital? I should like to see all the newer specialities, i.e., neuro-surgery, thoracic surgery, and plastic surgery, represented by token-units of sufficient size, say, of about twenty beds each, to accommodate a fair cross-section of the diseases dealt with by each, together with about two hundred beds for general surgery. This would help to counteract the unfortunate fragmentation of surgery we see to-day, as well as being a stimulus to general medicine and surgery, since it would mean that under the common roof of the teaching hospital all would meet and rub shoulders with each other, general and special surgeons alike, exchanging ideas and so preventing isolation. This presupposes the conference habit, which the Americans foster so much better than we do and which is one of the features in their schools which I really envy—grand-rounds, clinico-pathological conferences, seminars—they are the very life-blood of a living organisation. I should like to see research laboratories for the clinicians adjacent to the wards, with certain special amenities, such as a workshop and a hot and cold isotope laboratory, communal to all. These research laboratories would be used mainly by the whole-time group because they are spared the distractions of private practice, but they would be available to any part-time consultant wishing to investigate any problem of his own. The real and lasting benefit to be gained, however, is that the younger men, the registrar group, would grow up in an atmosphere of enquiry and with facilities for experiment. The other feature of American medical training that I greatly admire is that a young man, picked out as of great promise, may stop off and spend a year in some such laboratory without losing seniority, security or salary, and anyone who has visited Warren Cole in Chicago, Wangensteen in Minneapolis, Churchill in Boston or Janes in Toronto will know what educative value such a year offers. The British schools are now developing these facilities in increasing degree: several already possess them, as do you, and can afford fair exchange of young men as between themselves and centres abroad.

The environment for modern surgery, however, is not confined to the wards, laboratories, and theatres; many of the cases need convalescent homes, district nursing, follow-up supervision, special diets and drugs, maybe continued treatment at home or at the local hospital. Indeed, many of the newer operations should never be undertaken unless such facilities are available and the patient's home conditions are adequate, e.g., internal sanitation is essential for victims of ileostomy, and highly desirable for people with colostomy.

Students, and junior and senior residents trained in the British schools grow up in an environment such as we have just portrayed. Not all surgeons, however, are destined to work in such an environment. Some may go to sparsely populated areas; some where home conditions are poor because of unemployment and hard times; some may serve in outposts of the Commonwealth where public services are still incomplete, communications poor and distances great, the population primitive, illiterate, superstitious and riddled with tropical diseases. It is important to remember these things when training surgeons who are going to work in backward countries; and the compelling influence of environment as it concerns the doctor, and especially the surgeon, is worthy of study.

During my own professional career I have had the opportunity of seeing surgery under very different conditions—two world wars, in the first as a combatant, in the second as a surgeon; in West Africa for two years; twice in America for extended tours; and lecture tours in Iraq, Cyprus, and the Sudan; latterly, I have made a special point of asking our British Council and other postgraduate students working in Birmingham about the social pattern and medical organisation of their own countries; and these experiences have shown me that environment is fundamental.

The most extreme example of the influence of environment is, of course, war, during which the environmental circumstances of the moment may dictate absolutely to the surgeon in the field the whole management of wounds. The important fact to grasp is that, in war, such circumstances vary from time to time so that the refinement of treatment which it is safe to employ varies too, and it is by watching carefully for these changing conditions—delays in collecting wounded; road blocks due to weather conditions, enemy action or operational activity; whether the terrain is barren sandy soil or highly cultivated country—and advising accordingly, that the Army consultant can add greatly to the efficacy of the medical services.

Unfortunately, in the comfortable surroundings of a modern hospital, these lessons are easily forgotten—or more correctly, never come one's way. Thus, in September, 1939, the Official History of the Army Medical Services of the First World War, in which is contained the best and most complete account of the fight against sepsis, was out of print, and there was nothing to guide the young surgeons preparing for work in the field. Only a few of us who had committed ourselves to the Reserve of Officers or Territorial Army some six months previously were lucky enough to be able to buy one of the last copies. However, about this time Trueta published the first edition of his book describing his experiences in the Spanish Civil War, and in it advocated the application to gunshot wounds of Winnet Orr's principles for the treatment of osteomyelitis, namely, closed and unpadded plaster of paris splinting. His results were excellent; and to those who had not read our own Official History the method seemed an advance, yet to those who have absorbed the lessons of the Official History, or talked to those who took part therein, it seemed dangerous. What the younger men could not appreciate was that Trueta's cases were picked up off the streets of Barcelona and were in hospital within half to one hour after wounding, whereas many of those whom they would soon be called on to treat would not be rescued for from twelve to twenty-four hours, and only after much wound contamination. Referring back to the First War, the surgeons, bacteriologists, and pathologists of the day—and without sulphonamides, penicillin, or readily available blood—discovered that excision of wounds was the surest way of preventing gas gangrene, spreading cellulitis and smouldering osteomyelitis; they learnt that dead muscle bred gas gangrene and that pieces of indriven clothing and equipment were more dangerous than metallic fragments; they discovered the possibility and value of delayed primary suture; they realized that a stitched wound subjected to the trauma of an ambulance journey over rough roads became inflamed. Why did these wounds behave so differently from those of civilian trauma? It was the whole environmental circumstances of trench warfare

in cold, wet weather, when men wore many thicknesses of clothing soaked in the liquid mud of a highly cultivated soil; missiles of jagged pieces of metal carrying in with them highly infected pieces of clothing; exposure; continued hazard; delay in getting patients to surgical centres.

In 1942 I was appointed Consultant to Western Command, and as such attended the monthly Consultants' Committee at the War Office. It was a puzzling experience since, at about this time, memoranda were arriving from the Middle East declaring that experience there had proved that excision of wounds as understood in the 1914-18 War was unnecessary and, therefore, mutilating, and that it should cease; and this satisfactory behaviour of wounds was attributed, not unnaturally, to the new weapon, the sulphonamides. These memoranda were all the more disconcerting since they coincided with reports coming from Sicily that wounds were behaving as they had done in North Africa, and before that in France during the brief fighting in 1940 and, therefore, as described during the First War : and that without adequate excision spreading cellulitis and septicæmia were occurring.

Indeed, in these happenings were the makings of high drama, for in Sicily there met the surgeons of the Eighth Army, with their three years' experience of war surgery, though of desert warfare, and the surgeons of the much younger First Army who had formed their ideas regarding wound treatment in the wet, cold, and mud of North Africa, and at first there was violent disagreement. As things turned out, for Sicily and, subsequently, for Italy, bold wound toilet proved best in spite of sulphonamides, and the early, and meagre, supplies of penicillin. These new drugs were wonderful adjuncts to surgery, but they were no substitute.

How could all these contradictory experiences and reports be reconciled? There is no doubt that it was a matter of different and changing environments of which the dominating factors were climate, terrain, and communications. In other words, the management of wounds is not rigidly standardized for all circumstances; it can be modified. Warfare over cultivated soil, especially in the cold, wet season, particularly if there is delay in getting casualties to a surgical centre, demands thorough excision of wounds : in desert warfare, where contamination is relatively slight because the men wear a minimum of clothing, and the soil is not cultivated, a technique of the snip and trim variety is sufficient.

In spite of the kaleidoscopic environment of war, science may still add to our armamentarium, and just as to the Second War surgeons were given sulphonamides, penicillin, and blood, so to those in Korea was provided freeze-dried arterial grafts for vascular injuries and a better understanding of the treatment of anuria.

Let us now look at peace-time surgery in other parts of the world. The characteristics of environment of backward countries are profoundly different from our own. The nature of the people is all important, and having spent two years in West Africa, I read with delight and understanding Schweitzer's book, "On the Edge of the Primeval Forest," describing his attempts to bring medical and surgical aid to the primitive natives, for which work, together with his philosophic writing and studies of Bach, he was, of course, recently awarded the Nobel Prize. I give a few revealing quotations—"An ordinary negro will touch nothing that is defiled with blood or pus, because it would make him unclean in the religious sense."

"The negro, then, under certain circumstances, works well but only so long as circumstances require it. He is not idle, but he is a free man; hence he is always a casual worker." "The negro is a child and with children nothing can be done without the use of authority." Schweitzer used to say—"I am your brother, it is true, but your elder brother." And again—"The indifference of primitive man towards persons he does not know is beyond anything we can conceive. They refuse all help to anyone of a different tribe." Finally, "In the tropics a man can do at most half of what he can manage in a temperate climate," a fact that is true of all intensely humid parts throughout the world. Such remarks refer, of course, to up-country stations, but even in the large towns things are difficult. No wonder then that it is difficult to organise a blood transfusion service or to persuade the few educated native women to take up nursing as an honourable and rewarding profession. In general, there are small groups of European women who act as sisters and the remainder consist of illiterate native women and orderlies so that it is impossible to get accurate records; and to keep fluid charts in any number would be impossible. Quite often the patient has to tip the orderlies, especially if of a different tribe, before getting his medicine, or even a bedpan. A great many operations are done under local or spinal anæsthesia simply because there are insufficient doctors to give general anæsthetics. Quite often, the native pharmacist administers simple inhalational anæsthetics, and I have seen it done very well too. But in very few centres would there be a specialist available to give the advanced anæsthetics necessary for thoracic or brain cases, and any surgeon going out to these parts should first make himself expert in local and spinal anæsthesia. Malaria, too, may play tricks, for often an attack is precipitated by trauma such as a fracture or an operation, and the unexplained malaise and fever may puzzle the surgeon when he first encounters it. Incidentally, during the Sicily landings in 1943 some confusion was caused because wounded men, having previously served in malarious parts, were developing disconcerting pyrexia; and unconsciousness associated with head injuries sometimes proved to be due to cerebral malaria rather than to concussion or brain damage.

In backward countries, however, even more fundamental social factors may dictate what a surgeon ought or ought not to do for the best of its people. Language can be a great difficulty, and it may be all but impossible to get a coherent history of any kind when the patient is from a small tribe, using a rare language, so that communication has to be through four or five different interpreters, all themselves illiterate. It is obviously useless to apply a treatment requiring frequent hospital supervision if the patient lives some 300-400 miles up-country in the bush: and, of course, follow-up, or to put it in a more important way—keeping a score of the value of this or that treatment having regard to the home environment of the patient—becomes impossible. It is no good performing a seven-eighths gastrectomy for ulcer if the man is a rice-eater requiring a large stomach reservoir. Colostomy must be quite insupportable if the patient lives in a palm and bamboo hut, where no sanitation exists: even amputation of a limb is of doubtful value where a man's community demands that he either work for his living or take the consequences. Quite apart from this, there may be a great

shortage of hospital accommodation, so that a recent student of ours, working with the Zulus in South Africa, told me that they were treating cases of T.B. meningitis as out-patients; and by the same token a thesis for the Mastership in Surgery of another university was submitted recently on the subject of "The conservative treatment of fractures of the skull," a general policy that would be frowned on in this country, but which the environmental circumstances of the community in which he worked forced on the surgeon concerned and gained for him considerable praise.

The surgeon working in such an environment must be a jack-of-all-trades, able to treat all straightforward fractures, genito-urinary conditions, gynæcological states, abdominal and other emergencies, together with other simple things, but there is no useful purpose served by performing exotic surgical procedures. A surgeon, about to return after several years of post-graduate study to his native tropics, told me that he was very anxious to try some of the operations for portal hypertension; yet I knew that where he was going there was no adequate nursing or laboratory services, and no anæsthetic skill for such operations; and, in any case, it would probably be impossible to follow-up the patients. Another surgeon from abroad rather proudly informed me that he had performed nearly thirty total gastrectomies for cancer; but unfortunately distances in the country were too great to follow them up. We know only too well the devastating metabolic disturbances that follow most of these operations.

One of my best house surgeons, possessing the primary fellowship, thought he would like to do surgery with the Colonial Medical Service in West Africa, and so went to the Colonial Office for interview. There he was welcomed in a very friendly manner, but when he came to his ambitions *vis-à-vis* surgery, he was told, greatly to his disappointment, that he would save far more lives on the public health side than by functioning as a surgeon—how true!

I have concentrated on Africa because I know something about it, but these restrictions on surgical activities are by no means confined to that continent. In travels in the Sudan and Iraq and in talking to medical men from large countries like India, Turkey, and Iran, one finds that three-quarters of the doctors and nearly all the surgeons are in the big cities, meaning inevitably that the smaller towns up-country are poorly looked after, and the surgeons working there almost certainly with poor amenities. On the day I arrived in Khartoum the hospitals were being emptied because the nurses had gone on strike due to some political disagreement. In Iran, Iraq, and the Sudan there was difficulty in persuading the educated women of the country to take up nursing; but that is common wherever there are only two social classes—the very rich and the very poor. Just outside Baghdad I saw a slum of about twenty thousand, the like of which to-day I would not have thought possible, living cheek by jowl in hovels built of sandbags, kerosene tins, rags and sacking, with no running water anywhere, and children eating bits of offal found on the floor of the local market, washed in nearby mud puddles lying between their shacks. It was obvious that in Iraq, too, public health activities seemed likely to save more lives than surgery.

Yet hospitals there are, where adequate and even daring surgery is carried out. I saw two diaphragmatic herniæ, admittedly both from stab wounds, and a brain tumour case recovering satisfactorily from operation : but perhaps not surprisingly the best work is done in the nursing homes.

Surgery in all these countries is about fifty years behind the times, yet in all there is a growing awareness of the need to improve their medical services, and the medical schools are being expanded and their hospitals enlarged. They are increasing their staffs and sending their young surgeons abroad for training, and already the standard of work is rising. But until the social pattern changes, squalid slums are eliminated, housing and communications improved, up-country hospitals built and doctors attracted there, and a really good nursing service provided, the environment for surgery, as we understand it, is just not there.

In India there is a great upsurge and a real determination and enthusiasm for improving their medical services, yet, at the moment, even in the big city hospitals, there is only one nurse to every eight patients. Just before Christmas two Russian surgeons visited Birmingham, and I was surprised to find that in Russia they were badly short of doctors. There are not enough of them to have specialist anæsthetists and in consequence most operations are done under local or spinal anæsthesia. We were told that the main object of medical schools is to produce doctors, and they are no longer under the universities but under the Ministry of Health.

What I have said is not meant to discourage young surgeons from venturing abroad. These countries offer a fascinating and stimulating career of useful work in the widest possible sense under circumstances where ingenuity, courage, and pertinacity are valuable assets, and being a jack-of-all-trades in all well-tried surgical procedures is not without attraction. They would, moreover, be able to embark on some useful, practical clinical research, the following being but a few problems that come to mind :—

1. Hypoproteinæmia, which is very common in all wasting and chronic infective diseases, and widespread in undernourished races.
2. The study of fluid and electrolyte needs in the tropics and their variations in wet and dry seasons.
3. Observations on the healing of wounds in the tropics at various seasons, and a study of the best dressings, particularly in humid climates.
4. The use of antibiotics in such diseases as yaws, pyomyositis, tropical sore, lymphogranuloma inguinale, bilharzia, filariasis, etc.

If there be any Senior Surgical Registrars in this audience, let me suggest to them that the offer by the Ministry of Health of reciprocity with such centres as Makerere and Ibadan, whereby they can go for two to three years as the first assistant to the professor of surgery, with a guarantee of being able to return without loss of seniority, is a way of spending two or three years well worth considering.

Everywhere there is a determination to advance : everywhere things are on the move.

Anæmias of Pregnancy

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Clinical Pathological Laboratory, Royal Victoria Hospital, Belfast

ANÆMIA in pregnancy is a problem of considerable interest both to the family doctor and to the obstetrician. It is a problem with two main practical aspects. One is that anæmic women are a poor obstetric risk and tolerate badly the loss of blood during normal delivery. The other is that inadequate treatment of anæmia during pregnancy or the puerperium may result in a woman in a lowered state of health being returned, not only to the burden of child rearing but also to her ordinary domestic duties. Briscoe stated in 1952 that "the post-partum anæmic patient who must resume caring for her family needs fast restoration of her strength." Whether we are engaged in general or hospital practice, we should face up to both aspects of this problem and do our best to solve them. I have been invited to contribute this short paper in order to assist those engaged in the management of anæmias of pregnancy and to present the current views on this subject.

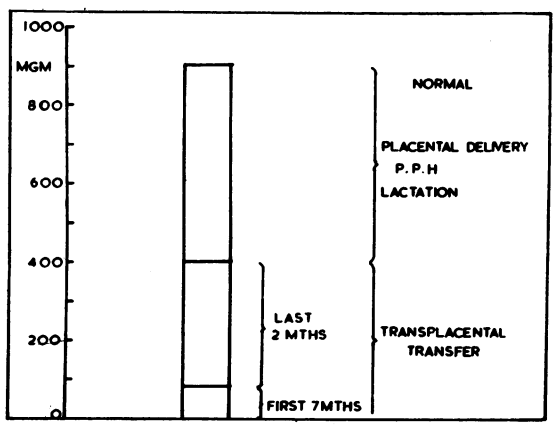

FIG. 1
The drain on maternal iron reserves during normal pregnancy.

It has been said that "the anæmias primarily due to pregnancy are essentially nutritional anæmias caused by the drain on the maternal reserves created by the demands of the fœtus." Such a demand results in a depletion of the maternal reserves of iron or folic acid, thus producing respectively either iron-deficiency or megaloblastic anæmia of pregnancy.

IRON-DEFICIENCY ANÆMIA.

The most frequent type of anæmia of pregnancy is iron-deficiency anæmia. This is characterised by a microcytic hypochromic picture in the peripheral blood, a low colour index, a low M.C.H.C. (i.e., less than 30 per cent.) and a normoblastic

hyperplasia in the bone marrow. The main causes of iron deficiency anæmia in pregnancy are the fœtal demands for iron; the loss of blood during placental delivery and post-partum hæmorrhage, together with further transfer of iron from the mother during lactation (Fig. 1).

The total amount of iron lost to the mother during pregnancy, parturition and lactation is of the order of 900 mgms. (Davidson and Fullerton, 1938.) Further factors which may contribute to iron deficiency in the mother are a poor appetite, low acid content in the stomach and possibly bleeding from hæmorrhoids. The effect of these losses of iron during pregnancy may be enhanced because of an

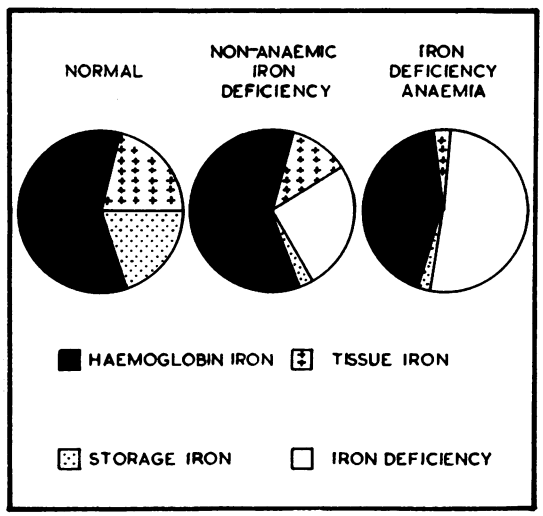

FIG. 2

The distribution and deficiency of body iron in various states.

already low maternal iron reserve. The constant menstrual losses of iron which are incompletely replaced due to dietary deficiency leads to depletion of iron in the tissues and the body stores, although anæmia may not always be present (Fig. 2). The importance of "masked iron deficiency" (i.e., depleted iron reserves with normal hæmoglobin and erythrocyte levels) has been stressed by continental workers. The presence of "masked" iron deficiency may be suspected from the presence of vague symptoms of lassitude and weakness dating from a previous pregnancy or incomplete abortion. The technique at present used to detect a "masked" deficiency is to determine the serum iron levels after a test dose of oral iron (Jasinski, 1952). In the normal individual with well-filled iron stores little or no iron is absorbed from the gut and the serum iron levels do not rise significantly. In "masked" iron deficiency the biological need for iron to fill the depleted stores results in iron absorption, and high serum iron levels are obtained after oral ingestion of a test dose of a readily absorbed iron preparation. A similar curve is also found in iron-deficiency anæmia (Fig. 3). Using this test, Jasinski and Dierner (1952) considered that some 40 per cent. of pregnant or recently delivered women showed evidence of "masked" iron deficiency.

The diagnosis of iron-deficiency anæmia in pregnancy can be readily made on examination of the peripheral blood. The presence of a disproportionate fall of the hæmoglobin level compared with the erythrocyte count resulting in a low colour index is suggestive. The determination of the M.C.H.C. will provide more reliable proof, and if the M.C.H.C. is 30 per cent. or less then iron-deficiency anæmia is present. Once a diagnosis of either iron-deficiency anæmia or "masked" iron deficiency has been made, the best treatment is the oral administration of a

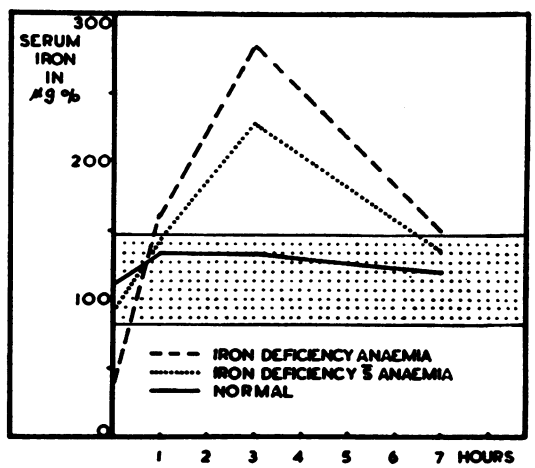

FIG. 3

The serum iron level after an oral test dose of absorbable iron salt.

satisfactory oral iron preparation. By satisfactory is meant an iron preparation which not only produces little gastro-intestinal upset but also one which is both readily absorbed and readily utilised for hæmoglobin synthesis. It is already well known that ferrous salts of iron are therapeutically more effective than ferric salts, but the utilisation co-efficient of the various ferrous salts is probably less well known. A histogram has been constructed to show graphically the utilisation of iron from the common iron salts employed in the manufacture of various pharmaceutical preparations of iron for oral use (Fig. 4). The utilisation co-efficient factor used for comparative purposes in this diagram is the percentage of iron expressed as metal which is utilised for the synthesis of hæmoglobin during an observed period. The figure used for each preparation was the average utilisation percentage as reported in the literature. In the case of ferrous succinate the figure of 41 per cent. was obtained from a therapeutic trial of twenty-five patients carried out elsewhere and not, as yet, reported in the literature. Clinical trials with ferrous succinate carried out in this centre on a small number of patients have resulted in a most satisfactory clinical and hæmatological response, although the utilisation co-efficient obtained has not been as high as 41 per cent. However, the trial is not yet sufficiently extensive to allow of any definite conclusions beyond the fact that ferrous succinate is at least as therapeutically effective as ferrous gluconate and is

very well tolerated. The advantages of using ferrous instead of ferric salts is readily apparent from the histogram; also, the more satisfactory utilisation of iron from ferrous gluconate and succinate than from ferrous sulphate.

In the case of oral iron preparations, the question of patient tolerance or absence from side effects must be carefully considered. Preparations containing ferrous sulphate are particularly prone to produce intestinal disturbances, even when given in gradually increasing dosage and with meals. It was largely because of this that

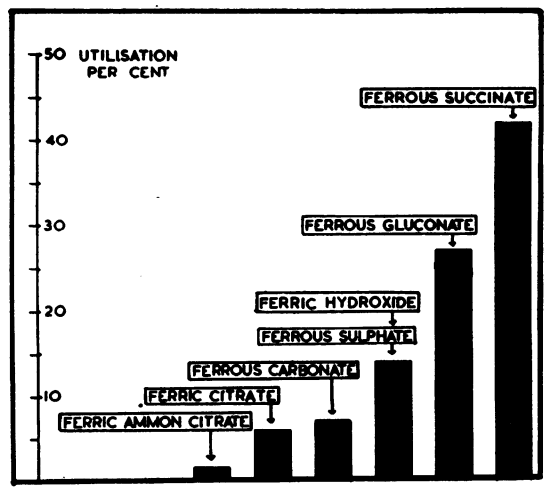

FIG. 4

The utilisation co-efficient of iron for various iron salts used therapeutically.

Benstead and Theobald (1952) stated that "ferrous sulphate is not a suitable preparation for the routine administration of iron in ante-natal clinics." On the other hand, ferrous gluconate and ferrous succinate are well tolerated, readily absorbed and rapidly utilised.

In the treatment of iron-deficiency anæmia it is essential not only to raise the hæmoglobin as rapidly as possible to normal but also to restore the body reserves of iron. This twofold objective can only be achieved if treatment is adequate and maintained for much longer than has been the practice in the past. The dose and duration of treatment will depend on the degree of iron deficiency but, once the anæmia has been corrected, treatment should be continued for a further six weeks in order to fill the depleted body stores of iron. A similar period of six weeks' treatment is necessary for "masked" iron deficiency without anæmia.

The use of intravenous iron therapy has come greatly into vogue in obstetric practice where this form of treatment is used much more widely than in general practice. While it may be necessary in some cases of severe iron-deficiency anæmia detected shortly before delivery to attempt to improve the peripheral blood rapidly, in general, the indications for the use of intravenous iron therapy are limited. It should never be resorted to unless the presence of iron-deficiency anæmia has been

proven or unless adequate oral iron therapy has already been tried. It should never be given in a total dose greater than that calculated to be necessary or in a single dose greater than 5 mls., i.e., 100 mgms. The practice of massive dose intravenous iron therapy is strongly to be condemned and the danger has already been stressed (Ramsey, 1950). Only if patients are unable to tolerate oral iron therapy, or are proved to be completely resistant to it, should intravenous therapy be used.

One of the toxic effects of intravenous iron therapy is a syncopal-like attack followed by rigors, pyrexia, headache, pain in the back and limbs. This may prove

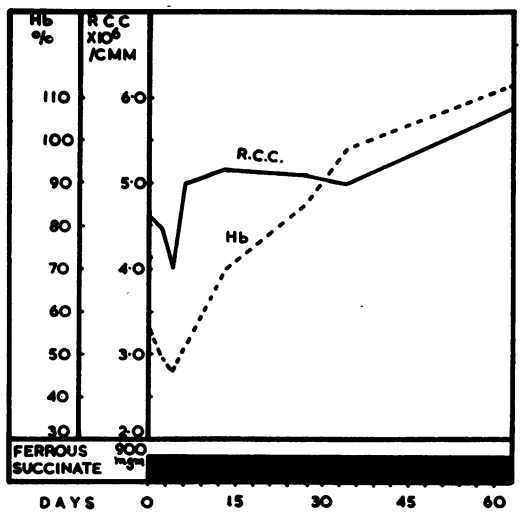

FIG. 5

The response in a case of iron deficiency anæmia to oral ferrous succinate.

dangerous not only to the mother but also to the fœtus in utero. This toxic effect is probably caused by an over-saturation of the normal iron transport mechanism in the plasma, and is much more likely to occur if intravenous iron treatment is given to patients who are not primarily iron deficient. Normally, iron is transported in the blood in the globulin fraction of the plasma protein which is usually one-third saturated with iron. However, the degree of iron saturation of the globulin is much less in iron-deficiency anæmia. Consequently, the unsaturated globulin can, as it were, mop up more of the iron injected directly into the circulation than the already more saturated globulin of normal blood. Over-saturation of the iron transport mechanism will result in iron saccharate circulating freely throughout the body with the risk of cell damage and venospasm.

In some cases of iron-deficiency anæmia resistant to oral iron therapy parenteral administration of iron by the intravenous route may not be possible either because of absence of suitable veins or because of repeated reactions to the intravenous injections. For such patients a preparation suitable for intramuscular injection is now available. This is a dextran-iron solution which is isotonic with tissue fluid

and contains 5 per cent. of iron as metal. It has been estimated that each 2 ml. of this preparation injected intramuscularly will cause a rise of 0.34 g. of hæmoglobin per 100 ml. of blood. The technique of injection requires care if local pain or skin staining are to be avoided. The injection should be made into the gluteal muscles through an Z-shaped track. For these and other reasons intramuscular iron should not be given as a routine treatment to all cases of iron-deficiency anæmia, the majority of which will respond satisfactorily to an adequate oral iron preparation.

Intensive iron treatment should, in most instances, result in a rapid response and early recovery, but it may on occasions be necessary to increase the oxygen-carrying capacity of blood more rapidly. Transfusions of sedimented or packed red cells are most satisfactory for this purpose.

Megaloblastic Anæmia of Pregnancy.

This condition is produced by a temporary deficiency of folic acid. It is likely to occur when the maternal diet is low in protein and folic acid (Spies, 1949) and therefore inadequate to meet both maternal needs and the growing fœtal demands. The term pernicious anæmia of pregnancy is frequently used for this syndrome, but it has little resemblance to Addisonian pernicious anæmia either in the ætiology, peripheral blood picture or therapeutic requirements, although in both the bone marrow is megaloblastic. For these reasons the non-specific title of "megaloblastic anæmia of pregnancy" is preferable and is now widely used.

The condition is probably much more common than is generally realised. A gradual awakening of clinical awareness to the possibility of this condition has resulted in the diagnosis of many more cases. Of the last four cases of anæmia in pregnancy which I was asked to see in the Royal Maternity Hospital, three were megaloblastic anæmias of pregnancy.

Common in young multipara, the onset is usually in the last trimester or even delayed until the puerperium and may be precipitated by some infection. Gastro-intestinal symptoms are frequent with anorexia, nausea, and vomiting. The tongue is often sore and on examination raw, red, and beefy. The facies, in my experience, resemble pre-eclamptic toxæmia with which it is often confused. The face is pallid but not icteric, and the contours are obliterated. There may even be peripheral œdema and proteinuria. The presence of a histamine-fast achlorhydria is merely coincidental and not essential for the diagnosis.

Examination of the peripheral blood rarely shows the presence of a macrocytic anæmia—the blood picture being far more often normocytic in type. The cells are well filled with hæmoglobin and the M.C.H.C. within the normal range. It may be said that, in the absence of recent hæmorrhage, any severe anæmia of pregnancy or the puerperium which is not of the iron-deficiency type should be suspected as megaloblastic anæmia of pregnancy until proven otherwise.

Because the findings in the peripheral blood are seldom of themselves diagnostic, it can be inferred that the diagnosis can only be made on examination of an aspiration sample of bone marrow. This has now become such a routine procedure in most clinical pathological laboratories that it presents no difficulties. The presence

in the bone marrow of the typical megaloblasts with basophilic cytoplasm and a nucleus with a scroll-like chromatin pattern of primitive appearance is too well known to need repetition.

It has already been established that megaloblastic anæmia of pregnancy does not respond satisfactorily to parenteral therapy with vitamin B_{12} or purified liver extract. It does respond, however, to treatment with parenteral crude liver extract or folic acid. The treatment of choice is folic acid, preferably given by injection for rapid and maximal effect, in doses of the order of 20-40 mgm./day. As the deficiency is temporary, the treatment need not be maintained, once the anæmia is cured, the body stores replaced and the patient restored to a normal diet.

In some cases, the deficiency of folic acid may be associated with a deficiency of iron and, consequently, treatment with folic acid alone may be followed by a suboptimal response. The addition of oral iron supplement will result in rapid restoration of the peripheral blood to normal (Fig. 6).

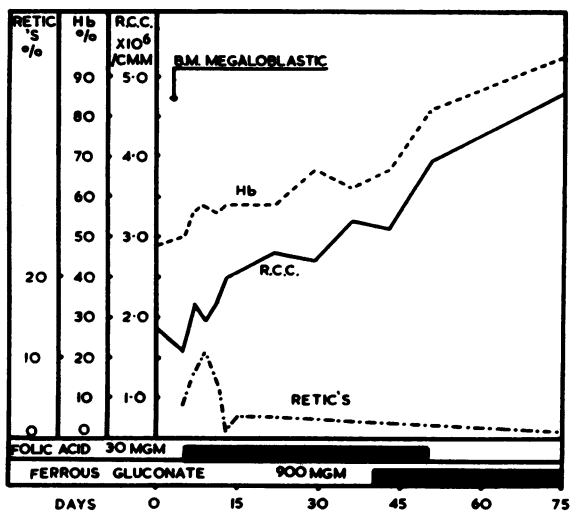

FIG. 6

The response in a case of megaloblastic anæmia of pregnancy to oral folic acid later combined with oral iron.

In the past a tendency to spontaneous remission of megaloblastic anæmia of pregnancy after delivery had been noted. This was produced by a reduction in the maternal loss of folic acid to the fœtus after delivery and a return to a more normal diet, presumably rich in folic acid. A partial or complete remission may also be produced by transfusion with whole blood. It was these facts which led obstetricians to believe that megaloblastic anæmia of pregnancy would always recover spontaneously after delivery and that this recovery would be hastened by blood transfusion. Under such circumstances, however, restoration to normal health was slow and often incomplete, whereas recovery can be hastened and made complete by folic acid treatment.

The effect of whole blood transfusion on megaloblastic anæmia of pregnancy is probably identical with its effect on megaloblastic anæmia of infancy which is also a condition produced by a temporary deficiency of folic acid. Occasional cases of this syndrome have been cured by whole blood transfusion alone (Zuelzer and Ogden, 1946; Nelson and Creery, 1955). It has been shown by transfusion with plasma and plasma-free erythrocytes that the curative effect resides in the normal donor plasma which is considered to provide enough anti-megaloblastic substances to induce a remission.

There is an unexplained tendency for megaloblastic anæmia to relapse in subsequent pregnancies or even in the absence of pregnancy if an intercurrent infection supervenes to increase the body needs for folic acid. Thus, it would appear that these patients live on a very precarious folic acid balance. For this reason, all patients who have suffered from megaloblastic anæmia of pregnancy should in all subsequent pregnancies have prophylactic oral folic acid therapy particularly in the later months.

In megaloblastic anæmia of pregnancy there is a possibility of the development of a folic acid deficiency in the child. This may lead to the subsequent development of megaloblastic anæmia in the infant (Zetterstrom and Franzen, 1954). It would seem logical, therefore, to supplement with folic acid the diet of all infants born of mothers suffering from untreated megaloblastic anæmia of pregnancy.

Summary.

The anæmias of pregnancy caused by increased fœtal demands on the maternal reserve are presented.

The causes of iron-deficiency anæmia are discussed and oral treatment with a well-tolerated, readily absorbed and rapidly utilised preparation of a ferrous salt stressed. The indications and contraindications to intravenous iron therapy are briefly mentioned.

It is probable that megaloblastic anæmia of pregnancy is more common than realised, largely due to the fact that the diagnosis can only be made on examination of the bone marrow. Treatment with folic acid is curative.

In megaloblastic anæmia of pregnancy the need for prophylactic treatment of the mother in a subsequent pregnancy and of the infant born of a woman suffering from untreated megaloblastic anæmia of pregnancy is mentioned.

I wish to thank my senior laboratory technician, Mr. A. Lamont, F.I.M.L.T., for the graphs and histograms which he produced to illustrate this paper.

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Testicular Tumours: a Clinico-Pathological Survey

By A. JONES, M.B., D.P.H.

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IN 1906 Clevasseau classified tumours of the testis as teratomata, seminomata, interstitial cell tumours and adenomata. He noted the similarity between the seminoma and the epithelium of the seminal tubules, and considered that this type of tumour had its origin in the seminal epithelium. Nicholson (1907), Dew (1925), and Bell (1926) were in agreement with this theory. Since then numerous publications have dealt with the diagnosis, classification, treatment and prognosis of testicular tumours. Ferguson (1933), in a large series of tumours, showed a correlation between the quantitative estimation of prolan-A in the urine, and the histological diagnosis. He found a reduction in prolan-A excretion following regression of the tumour due to radiotherapy, and a further elevation if there was a recurrence of the tumour or metastasis. He considered that a substance secreted by the tumour stimulated the pituitary to produce gonadotropin, which in turn further stimulated tumour growth. This attractive and simple, though poorly explained, theory failed to consider the work of Evans and Simpson (1929), and also of Engle in the same year. These authors demonstrated two distinct types of urinary gonadotropin in association with tumours of the testis, a chorionic gonadotropin, similar to that found in the urine of pregnancy, and a pituitary gonadotropin which exists in the urine of the normal human, but in large amounts in the castrate state. Leonard (1933) was able to confirm these findings. Further research by Jones, Gey & Gey (1943), using in vitro material, showed conclusively that cells from the human placenta, and also cells from a chorionic carcinoma, produced chorionic gonadotropin. Brewer (1946) reported two cases of testicular tumour which were diagnosed histologically, on removal, as seminoma and teratoma respectively. Both patients showed a high level of urinary chorionic gonadotropin, and at post-mortem examination both had massive metastatic deposits of chorionic carcinoma. Considering this finding, Brewer stressed the necessity to differentiate between chorionic and pituitary gonadotropin, both of which might occur in these patients.

The classification suggested by Hamburger and Neilson (1935) did not improve on that of Ferguson. These authors gave pride of place to connective tissue tumours, with little emphasis on testicular tumours proper. They tried to base their classification on the degree of radiosensitivity of the various tumours. Ewing (1911) simplified the classification by saying that all common testicular tumours originated as teratomata, the histologically uniform tumours being a unilateral development of this variety. This theory was not generally accepted. Other classifications were advanced by Friedman and Moore (1946), Anderson (1948), and Moore (1951), none of which gave any clarity to the subject.

The present trend is to classify testicular tumours as germinal or non-germinal in origin. Some workers classify all germinal tumours as teratomata. Scully and Parkam (1948) defined a teratoma as a tumour arising from a cell which had the capacity to form structures normally derived from the three germ layers, but more conservative writers prefer to see well-differentiated elements of the different germ layers before they accept the diagnosis of teratoma. Dixon and Moore (1953), in a review of 1,032 cases of testicular tumour, found that 96.5 per cent. arose from germinal epithelium. They postulated that the germ cell must be the precursor because these tumours showed a multipotentiality approaching that of the germ cell. The high incidence of germinal, or teratoid tumours, in the gonads of either sex would support this contention. These authors also found a striking similarity between the seminoma and spermatogonia. This tumour, they said, showed no transformation, either from or toward the other types of tumour. They thought that the embryonal cell carcinoma was derived from the multipotential cell, which tumour could undergo somatic or trophoblastic differentiation, and, depending on which trend was followed a teratoma or a choriocarcinoma would result. Thus, they advanced a classification as follows :—

A. Germinal	(1)	seminoma
	(2)	embryonal carcinoma
	(3)	chorion-epithelioma
	(4)	adult teratoma
B. Non-germinal	(1)	interstitial cell tumour
	(2)	any other type.

This appears to be a sound classification and it has been adopted in general detail for this review.

Methods and Material.

The records of this department, going back to 1933, were examined and a total of 85 cases of testicular tumour was found. As these were drawn from Belfast and the provinces, the actual incidence could not be estimated. Dixon and Moore (1953) stated that testicular tumours formed 1.5 to 2.0 per cent. of all malignant tumours of the male genito-urinary tract, and Scully and Parkham (1948) found that 0.562 per cent. of all cancers in males were testicular. From the 85 cases recorded, full clinical and survival data could only be obtained in 58 patients, i.e., 68.2 per cent. The age distribution and diagnosis of the cases are given in Table 1. The group incidence conforms in general detail to those reported by Kimbrought and Denslow (1951) and Willis (1953). Of the total number of tumours recorded, 85.9 per cent. are of the germinal variety, while 79.3 per cent. of the follow-up group are in this category.

Seminoma.

The typical seminoma is described as a tumour composed of large sheets of uniform round and polyhedral cells, with a distinct densely staining nucleus, and weakly eosinophilic cytoplasm. The cells may be small or large, but they are of a uniform size in each tumour. The stroma is usually fine and branching, giving the tumour a lobulated appearance, and lymphocytic infiltration may be present or absent. Frequently areas of necrosis and hæmorrhage are found (Figs. 1 and 2).

TABLE 1.

Testicular Tumours.

Type of tumour and age incidence.

Age in Follow-up Series	Seminoma	Embryonal Carcinoma	Teratoma	Chorion-Epithelioma	Miscellaneous
0- 9 - -	0	1	2	0	0
10-19 - -	0	0	2	2	1
20-29 - -	2	2	1	2	1
30-39 - -	14	2	1	2	0
40-49 - -	5	2	1	0	2
50-59 - -	2	0	1	0	6
60-69 - -	2	0	0	0	2
Other tumours in records -	12	5	2	8	0
All tumours -	37	12	10	14	12

Total—85.

Twenty-five of the followed-up group of 58 patients had produced tumours diagnosed as seminoma. In this collection there were many variants of the typical tumour. In no case was vascular or lymphatic invasion noted. Trauma has been suggested as an ætiological factor in testicular tumours, and examination of the clinical details revealed that only five gave a history of trauma. Another clinical impression is that a painful testicular tumour has a worse prognosis than has a painless one. Only six in this group gave a history of pain, two of these succumbed within 16 months, the others surviving for 4, 5, 5 and 10 years respectively, after removal of the tumour. In the clinical examinations enlarged inguinal lymph nodes were present in only one of the twenty-two cases suitable for treatment. This patient survived for five years and died of metastases. In two cases this tumour occurred in an abdominal testis, and they survived for 4 and 12 years respectively, and died of metastatic deposits. The incidence of tumours was 9 (36 per cent.) in the right and 16 (64 per cent.) in the left testis, compared with 54 per cent. and 46 per cent. recorded by Dixon and Moore (1953).

TABLE 2.

Seminomata.

Results of follow-up of 20 cases.

	Years. 0-1	-2	-4	-6	-8	-10	-12	-14	-16	Total
Dead -	3	3	1	1	0	0	1	0	0	9
Alive -	2	0	1	3	1	3	0	0	1	11

Of the 25 cases of seminoma, three presented in a moribund state, due to massive secondary deposits. Death took place before any treatment was given. These cases were confirmed at autopsy. One of the primary testicular tumours was extremely small, only being found on careful sectioning of the testis. The routine treatment was removal of the affected testis with section of the spermatic cord at the level of the internal ring. In no instance was dissection of the para-aortic lymph nodes recorded. The survival periods for 20 patients are recorded in Table 2. The three patients who died before treatment with two others who were treated but died from unrelated causes have been omitted from this analysis. The success of treatment is examined in Table 3. This shows that in the group which did not receive radiotherapy three deaths are recorded in the first year, whereas in the treated group no deaths are found in this period. Apart from favouring radiotherapy, no strong argument could be based on these figures. Before the advent

TABLE 3.

SEMINOMATA—TREATMENT AND RESULTS IN 20 CASES.

Orchidectomy with and without radiotherapy.

	YEARS									
	0-1	-2	-4	-6	-8	-10	-12	-14	-16	TOTAL
	With radiotherapy									
Dead -	0	2	1	1	0	0	1	0	0	5
Alive -	2	0	1	2	1	1	0	0	0	7
	Without radiotherapy									
Dead -	3	0	0	0	0	0	0	0	0	3
Alive -	0	1	1	0	0	2	0	0	1	5

of radiotherapy this group showed a reasonable survival level in any case. That so many cases did not receive radiotherapy and that the results in treated cases are poor is no doubt due to the fact that this survey covers a period since 1933, during most of which time radiotherapy was not so readily available, nor was it so efficient, as at present. An attempt to correlate the length of history before operation, with post-operative survival, though not conclusive, did suggest that a long history was not compatible with a good prognosis.

Teratoma.

In this survey a teratoma is accepted as a tumour showing fully developed elements of the different germ layers. In some cases this picture was complicated by the presence of other tumours, e.g., seminoma, chorion-epithelioma or embryonal carcinoma (Figs. 3 and 4). In a total of eight tumours, three were diagnosed as simple adult teratomata, and two of these patients are in good health, having survived for five and nine years. These were removed from children of 7 days and 2½ years respectively. The third specimen from a man aged 20 years, after repeated sectioning revealed no evidence of malignancy, but the patient is

recorded as dying due to metastases from a testicular tumour. It is just possible that a very small chorion-epithelioma may have existed in this teratoma which would explain the early and lethal metastases. As no autopsy was carried out, the certification of the cause of death may also be at fault. Of the remaining tumours, one appeared benign, but an area of malignancy appeared after repeated sectioning. This patient had early metastases and a short survival. Another example showed a rhabdomyosarcoma in a teratoma. He survived two years. Finally, three examples were complicated by the presence of various germinal tumours. One was a typical teratoma partly overgrown by a well-differentiated embryonal carcinoma. This patient died due to metastases ten months later. A second teratoma showed the development of a seminoma with a few areas of chorion-epithelioma. This patient has survived four months, but is receiving radiotherapy for obvious metastases. The third specimen showed overgrowth by well-developed areas of embryonal carcinoma and chorion-epithelioma. This patient received radiotherapy, but succumbed nine months after operation, due to metastatic deposits. These cases demonstrate that a teratoma may be the seat of many other types of tumour. The presence of the various germinal tumours is a point in favour of the classification and theory of Dixon and Moore (1953). In this group the value of radiotherapy is naturally dependent on the presence of complicating tumours, and the survival rate will reflect the sensitivity of these tumours to this form of treatment. Out of these eight cases, two who complained of pain had a very short survival. In no case was there a history of trauma. Right and left testes were involved equally and no correlation was shown between duration of symptoms and post-operative survival.

Embryonal carcinoma.

This type of tumour usually has a papillary, glandular structure, with fine branching stroma (Fig. 4), but it is capable of a great deal of variety and may differ very little from the atypical seminoma or chorion-epithelioma. Areas of necrosis and hæmorrhage are common. Seven tumours were classified as of the embryonal variety, and follow-up shows a survival ranging from 10 months to 8 years. The patient dying after 10 months showed obvious secondary spread at operation. Five of this group eventually died of metastases; only one of these received radiotherapy, and he survived for 8 years. Of the two remaining patients, one survived at least 2 years, but he is now untraceable, and the other is alive, with no evidence of metastases one year after operation. He has received a course of radiotherapy. In this group two showed histological invasion of blood vessels by tumour, and these had the shortest periods of survival. A history of pain was recorded in five cases, but none gave any history of trauma. That pain did not alter the prognosis is shown by the survival of two of these cases for over 5 years. Four out of seven showed involvement of the right testis, and the duration of symptoms was so irregular that no significance could be attached to it.

Chorion-epithelioma.

The typical example of this variety shows areas of syncytial cells, intermingled with sheets of epithelial-like cells, often arranged in an acinar pattern, or in large sheets (Fig. 6). This is usually a rapidly growing tumour, and frequently shows

necrosis and hæmorrhage. Six tumours were in this group, and of these five died within 8 months of operation. Only two of the five had radiotherapy, but there is no reason to believe that it was of any help in these cases. There is one survival after 3 years. He received radiotherapy after surgery, and at present is free from metastases. This patient had a history of 5 weeks' duration on first presentation, which was the shortest, the others varied up to 4 months. One patient gave a history of pain and trauma, but his prognosis was not noticeably altered by this. In the five fatal cases, obvious invasion of vascular channels was seen histologically in four. Only one chorion-epithelioma was found in the left testis and no patient had palpable inguinal lymph nodes.

Miscellaneous.

Twelve tumours were placed in this category, ten of which arose from non-testicular elements. The remaining tumours were of interest from an endocrinological point of view; these were an interstitial cell tumour, arising from the interstitial cells of the testis, while the other was believed to have arisen from an island of heterotopic adrenal tissue in the testis. These two cases, with two other non-malignant tumours survive. The remainder had a survival ranging from 2 months to 4½ years after initial surgery. As these tumours, the endocrine examples excepted, occur and behave similarly in other parts of the body, there is no indication for their further discussion. The endocrine tumours will be reported elsewhere and in more detail.

Discussion.

Relevant literature on the subject of testicular tumours underlines the difficulties in diagnosis and classification of the various types. The classification used, and the ætiological theory on which it is based, was suggested by Dixon and Moore (1953). It takes these difficulties into consideration, and goes a long way toward their solution. Most authors recognise the seminoma as a distinct entity, both ætiologically and histologically (Clevasseau, 1906; Nicholson, 1907, and others), but an anaplastic variant may easily simulate any atypical germinal tumour. This difficulty, together with the presence of germinal tumours in teratomata, induced Dixon and Moore (1953) to classify testicular tumours in combinations of tumours rather than singly.

Willis (1953) was sceptical about the possibility of two tumours arising from a single origin, and he quoted examples to show that where two tumours were found in one testis, they had distinctly separate sites of origin. He admitted, however, that some cases did not fit his explanation. The theory advanced by Dixon and Moore (1953) has already been discussed. It appears reasonable to accept that the totipotential germ cell could be the precursor of the embryonal carcinoma, chorion-epithelioma and teratoma, each tumour showing differentiation along a special line. The injection of zinc chloride into the fowl testis by Carlton, Friedman, and Bomze (1953) produced teratoid tumours. The mechanism followed was that of necrosis, then neoplastic changes in the surrounding tubules. This process took the form of a monocellular proliferation, with a pattern resembling an embryonal carcinoma, which spread as a carcinoma, underwent teratoid differentiation and ultimately showed the formation of a typical adult teratoma. The experimental

work and the presence of other germinal varieties in the examples of human teratomata described here would support the theory of Dixon and Moore (1953).

In a survey of 125 testicular tumours (Moon and Nullinghorst, 1948), interstitial cell hyperplasia was a common finding. In the cases where this was absent prognosis was improved. A similar finding in this series would have supported some personal experimental findings, and further indicate pituitary stimulation as a possible ætiological factor; but no such hyperplasia could be demonstrated. It was thought that the interstitial cells were always atrophic, and in those cases where there was a slight degree of hyperplasia it was considered that this was only apparent, following on gross tubular atrophy.

Some further observations are now compared with the findings in previously recorded series. The patients in this survey showed great age variation, from birth to 70 years old, but 60 per cent. were in the 30-50 age group. Moon and Nullinghorst (1948) found this age range to be 1½ to 53 years, with the average at 29 years. The frequency distribution of the various tumours was fairly typical, seminoma being most common, and more than equal to the sum of the other germinal tumours. The high incidence of tumours in undescended testes has been noted by Gordon-Taylor and Till (1938). Two cases, both seminomata, were found in this collection, an incidence of 3.5 per cent. which is not greatly different from that of 2.4 per cent. in the large series reported by Dixon and Moore (1953). According to Pierson (1932), bilateral testicular tumours are not rare. He quoted 46 cases from the literature and added a further example from his personal experience. No case was recorded in this series.

The history of pain in a testicular tumour has often been discussed. Leucutia, Evans, and Cook (1948) found it an unfavourable symptom. In the case histories analysed only 17 (29.3 per cent.) gave a history of pain in the affected testis, and of these one is untraceable, and five are alive, two of the latter having innocent non-germinal tumours and the other three seminomata. This finding is thus in agreement with that of Leucutia *et al.* A further question asked by the clinician when confronted with a testicular tumour is the history of trauma. This was recorded in 10 (17.4 per cent.) of the present group. It showed no correlation with the history of survival.

Treatment and Prognosis.

In the group of patients investigated the usual mode of treatment was the removal of the affected testis, with section of the spermatic cord at the level of the internal ring. In no case was a dissection of the para-aortic lymph nodes undertaken. This treatment was generally followed by radiotherapy, but in the earlier cases, the latter treatment was sometimes omitted. Lewis (1948), in a review of 250 cases of testicular tumour, thought that the treatment should vary with the pathological diagnosis, and in general this procedure has been followed here. He showed good results with surgery and radiotherapy, but did not consider the latter necessary in the absence of secondary deposits. Leucutia, Evans, and Cook (1948), in a series of 110 cases, treated by surgery and radiotherapy, were able to compare results with cases having surgery alone. They found that the combined treatment gave a much better prognosis. Gordon-Taylor and Till (1938) advocated similar

treatment. They, in conjunction with most authors, found the seminoma to be the most radiosensitive type of testicular tumour.

Lewis (1948) strongly advocated surgical removal of the tumour, with retroperitoneal dissection of the regional lymph nodes. He considered that when these were involved they were more satisfactorily treated by this method. He condemned radiotherapy in cases without obvious metastases, mainly because of the occurrence of severe reactions and some deaths in his series, when thus treated. Lowsley (1949) also found that retroperitoneal dissection of the regional lymph nodes gave a much longer survival.

The prognosis in testicular tumours generally is not good, but naturally the actual diagnosis will alter the outlook in each instance. Moon and Nullinghorst (1948) found that 50 per cent. died within 10 years of operation, and of the total deaths, 95 per cent. were in the first 2 years. Leucutia, Evans, and Cook (1948) considered that metastases present at operation need not be taken as indicative of a hopeless prognosis, as they had some reasonably long survivals in such cases. Without exception, the cases in this group, with metastases at operation, did worse than those without this complication.

TABLE 4.

ALL GERMINAL TUMOURS—TREATMENT AND RESULTS.

Orchidectomy with and without radiotherapy.

	Years									
	0-1	-2	-4	-6	-8	-10	-12	-14	-16	Total
	With radiotherapy									
Dead -	3	3	1	1	1	1	1	0	0	11
Alive -	4	1	1	3	1	0	0	0	0	10
	Without radiotherapy									
Dead -	10	2	0	2	0	1	0	0	0	15
Alive -	0	0	1	1	0	2	0	0	1	5

In Table 4 the germinal tumours are analysed with emphasis on treatment and survival. A total of 41 patients in this category was treated and followed up satisfactorily. Of these, 21 had radiotherapy post-operatively, 10 (48 per cent. approximately) of which died within 10 years, 6 (60 per cent.) being dead within 2 years. The group of 20 where no radiotherapy was given shows 15 deaths (75 per cent.) within 10 years, and 12 of these (80 per cent.) died within 2 years. It can be seen from the tabulated data that the two-year survival is 62.5 per cent. in those given radiotherapy following surgery and 40 per cent. in those not receiving this form of treatment. From these results it is reasonable to say that radiotherapy, following on surgical treatment, improves the prognosis. The highest incidence of deaths was in the first two years, which is a common and expected finding. The group without radiotherapy shows five survivals, and it is believed that these are patients who were fortunate enough to be seen before metastases had occurred.

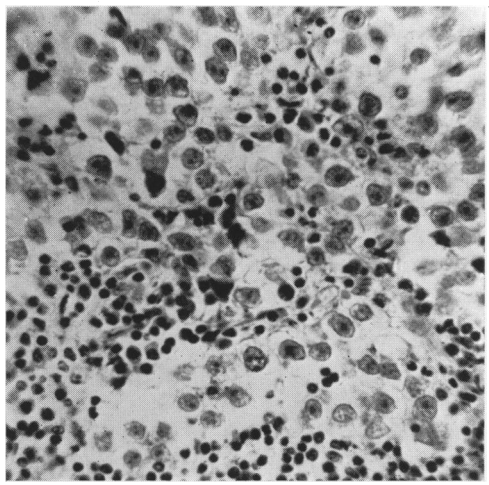

Fig. 1.
A seminoma, with dense lymphocytic infiltration of the stroma. (× 400)

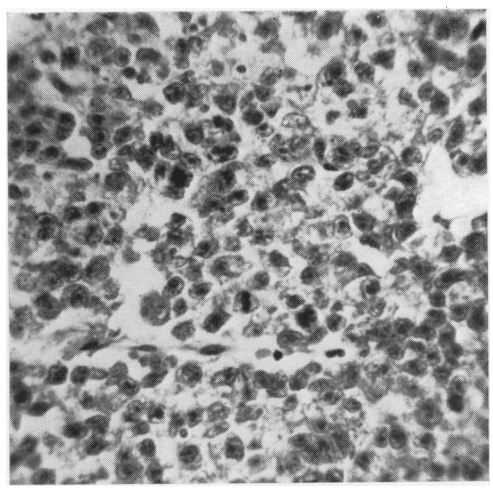

Fig. 2.
A seminoma, with numerous mitotic cells. (× 400)

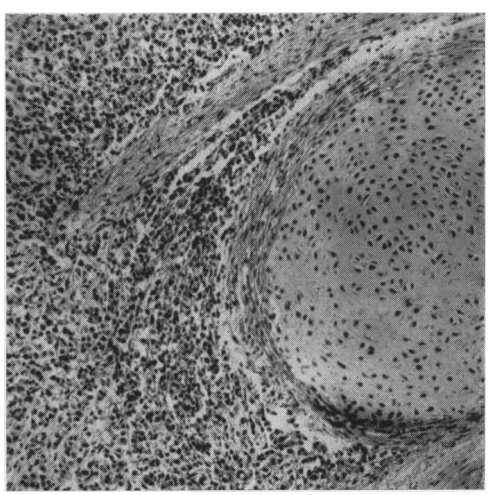

Fig. 3.
A teratoma, showing an area of cartilage and overgrowth by a seminoma. (× 80)

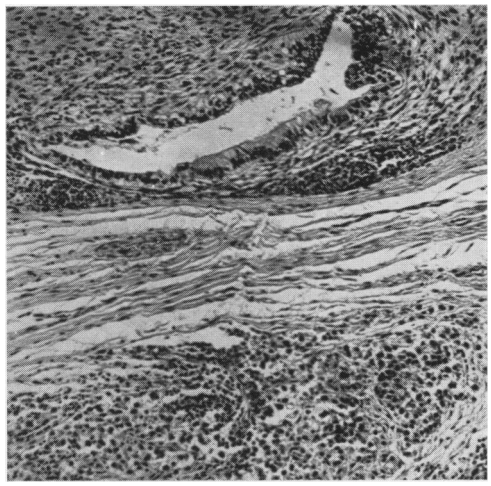

Fig. 4.

Showing another area of the tumour shown in Fig. 3. Well-formed columnar epithelium is evident. (× 80)

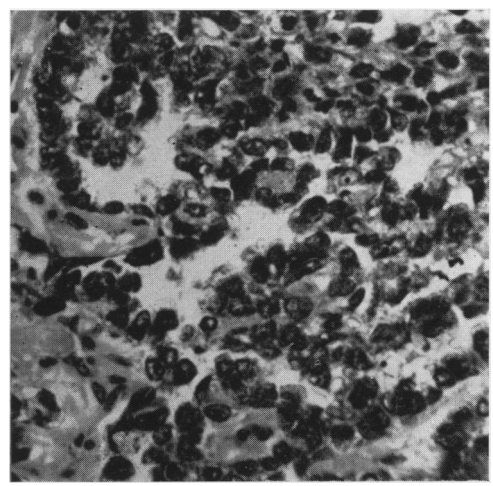

Fig. 5.

An embryonal carcinoma, showing papillary structure, with large densely staining cells. (× 400)

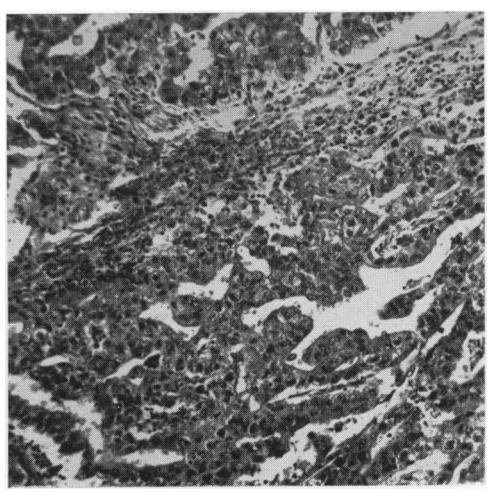

Fig. 6.

A chorion-epithelioma, showing sheets and columns of large epithelioid cells. (× 230)

TABLE 5.

FOLLOW-UP DATA FOR DIFFERENT TYPES OF GERMINAL TUMOURS.

	Seminoma	Teratoma	Embryonal Carcinoma	Chorion-Epithelioma
2 years				
Alive	12	2	4	1
Dead	6	5	2	5
4 years				
Alive	10	2	3	–
Dead	7	5	2	5
6 years				
Alive	6	1	1	–
Dead	8	5	4	–
8 years				
Alive	5	1	0	–
Dead	8	5	5	–
10 years				
Alive	2	–	–	–
Dead	8	5	–	–

This table demonstrates the incidence of survivals and deaths at two-year intervals.

Table 5 shows that in the seminomata 8 deaths (40 per cent.) occurred from metastases within 6 years, of the teratomata 80 per cent. died within 2 years, while over a similar period the chorion-epitheliomata showed 83.3 per cent., all of the latter died in less than one year after surgical treatment. The embryonal carcinoma group shows only 33.3 per cent. deaths in the two-year period.

When the total of 58 patients is considered it is found that 26 (44.8 per cent.) are known to have died, due to metastases within 10 years. Of these, 20 (77 per cent.) died in the first 2 years. These figures correspond to those of Moon and Nullinghorst (1948) and they emphasise the poor prognosis in the chorion-epithelioma and teratoma groups; the latter, no doubt, has a bad prognosis because of the frequent occurrence of elements of the former as a complication. The chorion-epithelioma is the least responsive to radiotherapy, so that early radical surgery is the best hope for survival.

It is clear that early diagnosis increases the survival rate. In the presence of metastases early and adequate radiotherapy is essential. The need to explain the importance of this treatment to the patient is emphasised by at least one patient in the series. He failed to attend for completion of his course, not realising its importance, and no doubt this contributed to his early demise. Dissection of the regional lymph nodes, in selected cases, would appear to have definite advantages. The institution of routine chest X-ray for all patients with testicular tumours is a necessity, but was often lacking in the cases analysed.

SUMMARY.

A total of 85 testicular tumours has been analysed, and a comprehensive study carried out on 58 of these, in whom an adequate clinical history and follow-up was

available. Recent views on ætiology and classification are presented. Factors which may help in prognosis, the general lines of treatment and their indications are described and discussed.

I take this opportunity of thanking the following :—

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The Significance of an Absent Radial Pulse in Supracondylar Fracture of the Humerus

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THE correct method of treatment of a supracondylar fracture of the humerus with no palpable radial pulse still presents a problem. There is obviously still some doubt as to whether the absent radial pulse should give rise to any alarm, provided the hand is a reasonable colour, and the circulation in it seems to be quite satisfactory. The author feels that it should, and it is the purpose of this paper to encourage others to undertake early exploration and exposure of the brachial artery at the fracture site in these cases.

Griffiths (1940) has already made it quite clear that in Volkmann's ischæmic contracture the basic pathology is a necrosis of muscle due to an insufficient supply of arterial blood. This necrosis is an irreversible change, and occurs when the blood supply has been absent for six to eight hours. After that time nothing can prevent the necrotic muscle from being replaced by fibrous tissue and an ischæmic contracture developing. It is therefore clear that if there is a likelihood of such necrosis occurring, and I believe this to be so in all cases where there is no palpable radial pulse, then something must be done within eight hours of the injury. The first step is, of course, to reduce the fracture, as this alone may restore an absent pulse. If this fails, the arm should be extended, if necessary until it is quite straight. If there is still no pulse, then, no matter how good the circulation in the hand appears, the brachial artery should be explored.

Three cases of supracondylar fracture with no radial pulse have been seen in the last two years.

> **Case 1.**—A 7-year-old boy was admitted to hospital six hours after sustaining a supracondylar fracture of the right humerus with backward displacement of the lower fragment. On admission, there was no radial pulse and the hand was a little dusky but quite warm. The fracture was satisfactorily reduced about eight hours after injury, the arm being held in full flexion as is necessary to maintain reduction. The pulse did not return, and so the arm was slowly lowered until it was fully extended, but the pulse remained absent. The circulation in the hand was reasonably good, however, and it was decided to leave the arm fully extended in a light P.O.P. back slab in order not in any way to impede the collateral circulation. When I first saw him some forty hours after the injury, a weak pulse was palpable and the circulation in the hand was fair. The collaterals were now functioning well. Already, however, the fingers could not be fully extended with the wrist dorsi-flexed, and he went on to develop a full and severe Volkmann's ischæmic contracture.

In this case the blood supply during that crucial eight hours had been insufficient to prevent necrosis of the muscle fibres occurring. When the pulse is absent, but the hand circulation appears adequate, it is clear that the brachial artery itself is

no longer patent, but that the collaterals are supplying enough arterial blood to satisfy the skin of the hand. The essential point, however, is that the muscles of the forearm should be adequately supplied with arterial blood within six to eight hours of the injury, and this does not seem to be the case if no radial pulse is palpable.

Case 2.—The patient, a girl aged 6, was admitted and seen by me four hours after having sustained a supracondylar fracture of the left humerus, with marked backward displacement of the lower fragment (Figs. 1 and 2). The radial pulse was absent, the left hand was cooler than the right and a little paler, but there was a reasonable capillary return. A good reduction was obtained under a general anæsthetic, by strong traction on the extended arm, followed by flexion of the elbow with forward pressure on the lower fragment. The pulse, however, was still absent. The arm was therefore slowly extended, but the pulse did not return. At this stage 4 c.c. of 1 per cent. procaine was given intravenously without effect. Exposure of the brachial artery was then undertaken.

The skin incision was in all about six inches long, being longitudinal above and and below and transverse at the skin crease of the anticubital fossa. No veins were encountered, and there was practically no bleeding. The deep and bicipital fascia were divided, and some blood clot removed. This was small in amount, and could not have been occluding the artery by pressure. The tendon of the biceps was identified, and medial to this what was taken to be the median nerve was clearly seen. The brachial artery should lie between these two structures, but a careful search failed to reveal it. It was then thought that possibly it was not the median nerve that had been found, but the artery in spasm. Fully two inches of it could be seen proximal to the fracture, and it all had the appearance of nerve, and there were no pulsations. However, it was decided to clear it fully and dissect it free, and almost as soon as this was begun, it dilated markedly and began to pulsate. It was soon pulsating strongly, but the anæsthetist was unable to report any pulse at the wrist. It was then seen that the pulsations ceased where the artery ran over the jagged lower edge of the upper fragment, and it soon became apparent that the artery, or its adventitia, was actually impaled on this jagged bone edge. It could not be freed by blunt dissection, and there was a tight band round the artery at this point, exactly as if it had been tied with a piece of thread. Presumably this was a band of adventitia pulled tight by being firmly impaled on the bone edge behind. It was only when a knife was used to cut between the bone and the artery that the artery could be freed. The tight ring was now no longer present and the whole artery was pulsating, with a palpable pulse at the wrist. The arterial wall itself, on inspection, appeared quite uninjured, although it is hard to see how it escaped being nipped during reduction of the fracture. The wound was then closed, skin only being sutured, and the arm kept extended in a back slab. The operation ended exactly eight hours after the injury had been sustained.

An X-ray on the following day showed that the reduction had not been maintained. This is only to be expected, as the arm is necessarily extended during and after the operation. Reduction was at once attempted, but was not successful, as one was not prepared to use much force for fear of damaging the all-important brachial artery, and also, every time the arm was flexed, the pulse vanished completely. Accordingly, the arm was left extended with marked backward displacement of the lower fragment, but with a good pulse.

This position was maintained for one week, by which time much of the swelling had subsided, and it was judged safe to make a proper attempt at reduction. Closed reduction was attempted, but the fragments could not be moved due to early callus formation. A small longitudinal incision was made posteriorly down to bone over the lower end of the humerus, and using a bone lever like a shoe horn, the lower fragment was levered forward into good position. (This is not a difficult procedure, and has subsequently been used on other cases where closed reduction had failed.) The pulse,

however, still became very weak if a position of extreme flexion was adopted, and so the arm was put up in a sling with the elbow flexed to a right angle only. Even at this angle the pulse was appreciably weaker than the good side, but in half an hour it had completely recovered. An X-ray showed good position. Two days later a further X-ray showed that the deformity had recurred, proving that such a fracture is only stable in extreme flexion. Closed reduction was at once attempted, and was successful, as the fragments could now be easily moved. A position of full flexion was maintained this time with elastoplast and a collar and cuff sling. The pulse was at first very weak, but in two hours was back to normal. There were no further mishaps, and union occurred in good position. As can be seen from the photographs taken about a year later, a normal arm and hand was the end result (Figs. 3, 4, 5, and 6).

Case 3.—A boy, aged 5, was admitted to hospital suffering from a supracondylar fracture of the humerus, with backward displacement of the lower fragment. The fracture was immediately reduced, a very satisfactory position being obtained. The hand was noted to be warm, a little dusky, but with a good capillary return. There was no palpable radial pulse either before or after reduction. I first saw the child about twenty hours later, and even at that time ischæmic contracture of the flexor muscles could be easily demonstrated, and it was clear that the irreversible necrosis of the muscle fibres had already taken place. The child has since developed a Volkmann's ischæmic contracture.

Discussion.

It is the aim of this paper to show that in cases of supracondylar fracture of the humerus it is the state of the radial pulse and that alone which indicates whether or not a Volkmann's contracture is likely to develop later. In Cases 1 and 3 the fact that there was no radial pulse was fully appreciated at the first examination, and the possibility of a subsequent contracture developing was considered. In both cases, however, the circulation in the hand and fingers was such that the surgeons felt confident that there must be an adequate circulation to satisfy the needs of the forearm muscles. In both cases this assumption was proved wrong, and one must assume therefore that the state of the circulation in the skin of the hand is no guide to the state of the circulation in the forearm muscles. The only guide to this is the state of the radial pulse, and it seems clear that where this is completely absent, muscle circulation will be inadequate. No conclusion can be drawn from these cases as to what should be done if the pulse is present but appreciably weaker than the good side. Griffiths gives as his indication for exploring the artery an absent or a very weak pulse, but also states that the presence of the radial pulse at all in the immediate post reduction period is a definite assurance that a severe Volkmann will not occur. One feels therefore that a weak pulse should only be taken as an indication for operation if it is so weak that there is, in fact, some doubt as to its presence at all.

Another important aspect of the prevention of contracture is the urgency with which operation on the artery must be undertaken. The irreversible change in the muscles is thought to occur about six to eight hours after the blood supply has been cut off. In the second case the blood supply was restored eight hours after the injury, and there were no ill effects. In Case 3, however, actual contracture was beginning twenty hours after the injury, and it is clearly useless at this stage to try and improve the blood supply. Somewhere between eight and twenty hours

after the injury the "point of no return" is reached. Exactly when it is reached is not known, and will certainly vary from case to case. Griffiths had success up to seven hours after injury, and failure at twenty-three hours. We have had success at eight hours, and failure at twenty. Undoubtedly, therefore, this is an operation which must be performed at the earliest possible moment, and certainly within the first eight hours. As to the value of operation after this time one is only guessing, but provided there is no contracture already present, it would seem to be worth while exploring the artery up to say twelve or fifteen hours after the injury.

Finally, there are some definite facts which can be learned from a consideration of the findings in the second case.

First. That apart from laceration or complete tearing of the brachial artery, about which little can be done, there are at least three causes for an absent radial pulse after a supracondylar fracture, all of which can be overcome and relieved.

(a) The maintenance of too much flexion at the elbow joint in the presence of swelling. This is especially dangerous when the reduction has been carried out very soon after the injury and before the swelling is maximal. While this is the ideal time to do the reduction, further swelling will occur and may obliterate later a pulse that was normal immediately after reduction. If, on the other hand, reduction is being carried out some days after the injury, as it was in this case, it was found that while extreme flexion might greatly weaken the pulse for a time, it always recovered in about an hour.

(b) The artery may be mechanically obstructed by the sharp lower edge of the upper fragment.

(c) The artery may be in spasm.

Second. That a supracondylar fracture is unstable and the deformity will recur unless the elbow is in a position of full and extreme flexion. Plaster of paris back slabs seem to be of little value if the elbow is only flexed to a right angle, whereas if the elbow is flexed to its fullest extent, the triceps tendon holds the fracture stable, and no plaster is needed.

Summary.

Three cases are described illustrating the danger of Volkmann's contracture developing after a supracondylar fracture of the humerus in all cases where the radial pulse is not palpable, even though the circulation in the hand appears good. Operative exposure of the artery has been successful in preventing this, the operation being performed within eight hours of injury. Developing contracture has been seen within twenty hours of injury.

I wish to thank Mr. H. P. Hall, M.Ch., for his permission to publish these cases, and for his advice and support in the treatment of the second one.

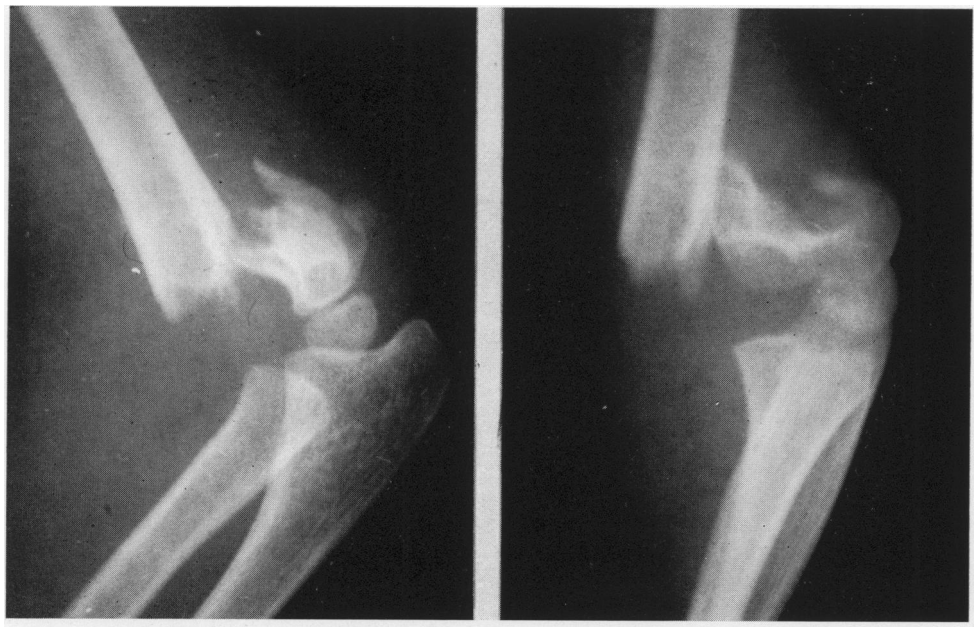

Fig. 1. Fig. 2.

Lateral and A.P. views to show the original deformity in Case 2.

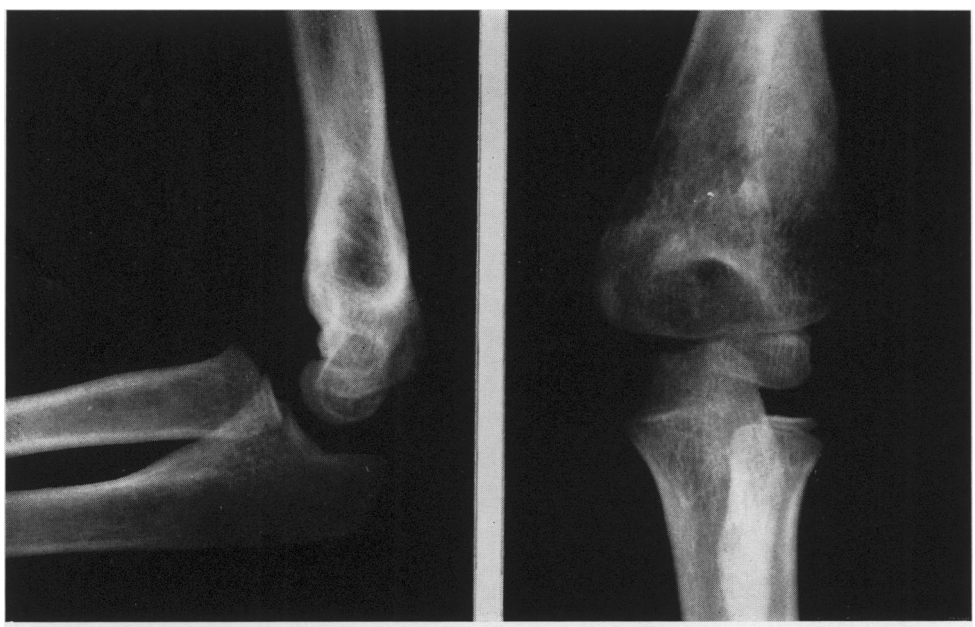

Fig. 3. Fig. 4.

Lateral and A.P. views to show the final result in Case 2.

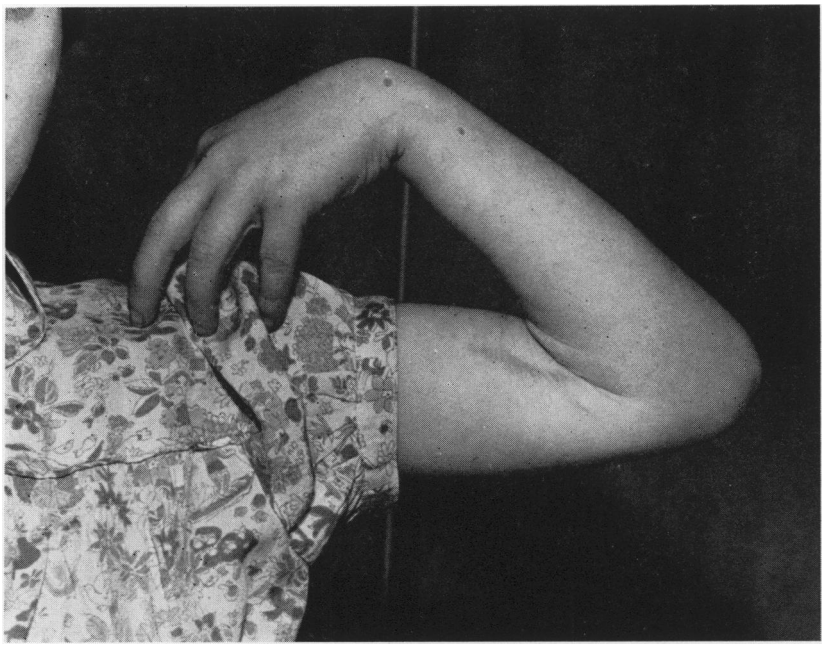

Fig. 5.

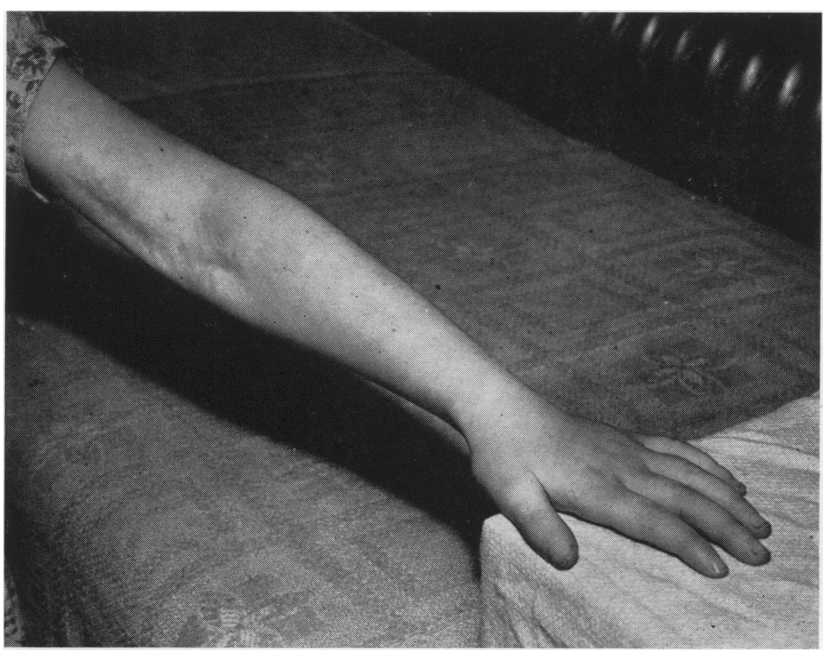

Fig. 6.

These pictures show the normal range of movement at the elbow joint, one year after the injury. Notice also the normal hand, and the incision used to expose the brachial artery.

Observations on 300 Consecutive Thyroidectomies

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From a Paper read before The Ulster Medical Society on 17th February, 1955.

The place for thyroidectomy in the treatment of disease of the thyroid gland is now well established. It has for long been practised by surgeons to relieve the pressure symptoms caused by simple non-toxic goitres, but it was not until the end of the first decade of this century that its use in the treatment of thyrotoxicosis was first described.

Mayo, in 1907, reported on 110 operations for thyrotoxicosis with nine deaths. Dunhill, in 1910, published a remarkable series of 199 operations for severe thyrotoxicosis with only three deaths. Up until after the First World War the majority of physicians in this country looked upon operation with disfavour, a view supported by the high mortality at that time.

From a study of the Royal Victoria Hospital records the earliest surgical procedure described in the treatment of thyrotoxicosis was carried out by Mr. Kirk. On 11th July, 1904 (i.e., in the first year of the Royal Victoria Hospital's existence on its present site), he operated on a young woman for serious exophthalmic goitre and tied the right inferior thyroid artery; six weeks later he tied both superior thyroid arteries, but no thyroid tissue was removed. One thyroidectomy for simple non-toxic goitre was performed in the same year by Mr. A. B. Mitchell. On the 23rd November, 1907, Mr. Robert Campbell performed what I believe was the first thyroidectomy for thyrotoxicosis. The operation performed was a partial right lobectomy, the patient a young woman with severe exophthalmus, a pulse rate of 110 and with so much loss of flesh that she weighed only five stones. She was discharged improved three weeks later.

In the year ending 31st December, 1954, 99 thyroidectomies are recorded by the surgeons of the Royal Victoria Hospital.

This paper is a review of 300 consecutive operations carried out by myself between 1st July, 1948, and 30th June, 1954. With the exception of 13 cases who could not be traced, all have been re-examined in the past few months, representing a follow-up of 96 per cent.

Selection of Cases for Operation.

Of all the patients with disease of the thyroid presenting at hospital, I have estimated that surgery will be recommended in two-thirds. The figure given at the New End Goitre Clinic in London is 60 per cent. If, then, the surgeon is to play such a major rôle in the management of these cases, he ought to see them either

separately or in joint consultation with his medical colleagues when the patients first come to hospital. Much has to be decided at this first interview and a treatment plan adopted which, in the light of modern knowledge, offers the best chance of success and safety for the patient. Is the goitre simple, toxic, malignant or otherwise? If toxic, the age and sex of the patient, the site of the goitre, the presence or absence of nodularity, the severity of the presenting symptoms, the presence or absence of auricular fibrillation or exophthalmos, all influence the line of attack taken in treatment. Too often the surgeon only sees the case after a long course of medical treatment, where relapse has taken place or the patient failed to respond or where some complications have set in during treatment.

Classification.

A satisfactory classification of disease of the thyroid gland on ætiological, pathological or clinical grounds is difficult to devise, and for the purpose of this paper I have merely grouped the 300 cases as follows :—

Simple non-toxic nodular goitre	97
Toxic primary and secondary goitre	180
Malignant goitre	12
Chronic thyroiditis	11
Total	300

There is no case of simple diffuse non-toxic goitre in the series as thyroidectomy is not recommended in these patients. Of these probably 50 per cent. will resolve with or without iodine treatment; the rest will eventually either become nodular or toxic and so fall into one of the aforementioned groups.

Simple Non-Toxic Nodular Goitre.

In this group there were 97 cases, i.e., roughly one-third of the series; 88 were females and 9 males—a ratio of roughly 10 females to 1 male. Their ages ranged from 19 to 73.

I have not advocated surgery in every simple nodular goitre, but I would say this, that there is less risk for the patient in undergoing operation than in keeping the goitre.

These cases present with a wide variety of symptoms; most want to know whether the lump in the neck is dangerous; others are distressed because of sudden increase in size of the swelling or by symptoms arising from pressure in the narrow thoracic inlet with cough, choking, lump in the throat, breathlessness, dyspnœa on exertion, change in voice; some are distressed only by the disfiguring swelling.

Malignant Change in Simple Nodular Goitre.

That malignant change in a simple goitre is anything but rare has been emphasised mainly by American authors. Cole, Slaughter and Rossiter (1944) reviewed 192 cases of non-toxic nodular goitre: 17.2 per cent. of the total were carcinomata; 11 per cent. of the multinodular cases and 24 per cent. of the solitary nodules were malignant.

INCIDENCE OF CARCINOMA IN NODULAR GOITRES.

(a) Cole, Slaughter and Rossiter—
Of 192 nodular goitres - - - 17.2 per cent. cancers.
Of 100 multinodular goitres - - 11.0 per cent. cancers.
Of 92 solitary nodules - - - 24.0 per cent. cancers.

(b) Present series—
Of 109 nodular goitres - - - 11.0 per cent. cancers.
Of 52 multinodular goitres - - 5.8 per cent. cancers.
Of 57 unilateral nodular - - 15.8 per cent. cancers.

In my experience single nodules in the thyroid are a rare finding either clinically or at operation. Unilateral nodularity, however, is common, and 48 of this series, i.e., 50 per cent., showed unilateral nodularity. Substituting unilateral nodularity for the American authors' single nodule, my own figures bear out the present teaching that a single nodule in the thyroid must be treated as a pre-malignant condition. Lahey has also emphasised this fact and states that neither age of the patient nor size of the goitre seems to matter.

Toxic Change in Simple Nodular Goitre.

It is difficult to foretell whether a simple goitre will become toxic. Wetherell (1941) has looked into this question very thoroughly and has estimated that 50 per cent. of patients with non-toxic nodular goitre will ultimately become toxic if left untreated, and this is the view held at most thyroid clinics in this country. Linnell, Keynes and Piercy (1946) suggest that goitres at middle life without toxic manifestations are rare. Symptoms of toxicity develop so insidiously in these cases that the patients delay consulting their doctor; again, the doctor often fails to recognise the milder symptoms and signs of thyrotoxicosis, with the result that damage to the cardio-vascular system may have occurred before proper treatment is instituted.

Next to acute rheumatism, thyrotoxicosis is the most fruitful cause of auricular fibrillation so that early detection, or better still, steps taken to prevent the onset of thyrotoxicosis, is recommended.

Hæmorrhage into the Gland.

Hæmorrhage into the substance of a goitre is not uncommon. In two cases the sudden increase in size warranted immediate admission to hospital. Acute severe hæmorrhage into a cyst is reported as rare. Details of one case in this series is worth recording.

A male, aged 35, with a five-year history of goitre, was admitted because of sudden increase in size of the lump, local pain, and dyspnœa. On examination, his breathing was obviously distressed and he was cyanosed, the thyroid was tense and painful to touch, the trachea deviated to the left, and on X-ray grossly narrowed. His condition demanded an emergency operation, at which a large cyst, filled with recent hæmorrhage, was found.

Pressure Symptoms.

It has been my practice to have the vocal cords of all goitre cases examined prior to and after operation. In this non-toxic, non-maligant group no less than

five patients, i.e., 5 per cent., were found to have unilateral recurrent laryngeal nerve paralysis. Cough and hoarseness of variable degree were common in all, and in each case the goitre was partially intra-thoracic, with deviation and narrowing of the trachea. Recovery of the nerve did not occur in any case following operation, and in none of these five cases was there any suspicion of malignancy on pathological examination.

Dysphagia and Dyspnœa.

Dysphagia is a rare symptom of thyroid disease except in malignancy. It was distressing in one of these simple cases.

Dyspnœa on exertion with cyanosis was seen in three cases; one young woman subject to fainting attacks was relieved by removing a large partially intra-tracheal goitre.

In 23 cases the gland was partially intra-thoracic.

Eight cases showed calcification of the gland on X-ray examination. Clinically, it is difficult to differentiate these from malignant disease, but none of these cases showed any malignant change pathologically.

Toxic Cases.

In the diagnosis of thyrotoxicosis most value is placed on a careful clinical examination. B.M.R. and blood cholestrol estimations are unnecessary in the obvious case and of little value in the doubtful. A therapeutic trial with thiouracil is sometimes helpful. Studies with radio-active iodine, its uptake in the gland, its rate of excretion in the urine, etc., offer a more accurate measure for the future.

In this series there were 180 cases of thyrotoxicosis, 165 females and 15 males—a ratio of 11 females to 1 male, roughly the same as in the non-toxic group. Their ages ranged from 18 to 70 years.

Fifty-three patients or 30 per cent. of the thyrotoxic cases had had a goitre for a variable number of years prior to the onset of symptoms—so called secondary toxic goitre. In these the onset of toxic symptoms is often insidious, and its presence may for a long time escape the notice of the doctor. Myocardial damage is therefore not uncommon, and 70 per cent. of the cases with auricular fibrillation fell into this group.

One is reluctant to diagnose thyrotoxicosis in the absence of goitre, yet three cases with undoubted toxicity had no clinical enlargement of the gland. The findings at operation often reveal a gland many times larger than clinically suspected, particularly in the patient with a short thick neck.

Toxic Symptoms.

In 93 patients the symptoms were severe. Auricular fibrillation was present in 36 cases, or 21 per cent. of the toxic group. All but five of these patients quickly reverted to normal cardiac rhythm following operation. The five in which auricular fibrillation persists gave histories of symptoms of 5-12 years' duration, and I suggest that in these, irreversible cardiac damage was established before thyroidectomy. Early surgery is, therefore, recommended in these toxic nodular cases.

Exophthalmos was present in 65 cases, or 30 per cent. of the series. Two of these cases were unilateral. In most cases the eye signs have improved one month after operation, and in all cases, no matter how severe the symptoms, the eyes have improved on their pre-operative condition one year following operation.

All the male patients had severe symptoms. Ten of the 15 suffered from auricular fibrillation and all but 4 had exophthalmos. Loss of weight was also a marked feature, one man losing 8½ stone in six months. The thyrotoxicosis in these male patients was more difficult to control than in the females.

One patient was 17 weeks pregnant at the time of operation. Convalescence was uneventful, and she gave rise to no anxiety as regards her pregnancy.

Treatment.

Up until the introduction of radio-active iodine, most goitres with thyrotoxicosis have been recommended for surgical treatment. I believe that a fair trial of medical treatment ought to be offered to those young female patients with a short history, moderate toxicity and a small smooth gland. Thyroidectomy is essential in the toxic nodular goitre in all male patients and all patients suffering from valvular heart disease.

Thiouracil and more recently 'neo mercazole' and iodine are extremely useful in preparing these patients for operation, but with medical treatment alone the relapse rate is too high (probably not less than 65 per cent.) and complications such as leucopenia, agranulocytosis, skin rash, nausea and lymphadenopathy are not uncommon.

Although many of the goitres become smaller, the majority are enlarged and, if intra-thoracic, disturbing obstructive symptoms are induced; besides, treatment is prolonged and careful supervision absolutely essential.

It is well known that agranulocytosis may set in at any time in the course of thiouracil treatment. In two cases in this series, one was diagnosed one week after the commencement of treatment; in the second only after a second course was instituted following a relapse of symptoms. As well as these two cases, thiouracil therapy was stopped in 6 cases with leucopenia; 3 with nausea and vomiting; in 4 who developed an erythematous rash and 11 cases where the goitre was intra-thoracic with disturbing pressure symptoms. The thiouracil leads to increased vascularity and friability in the gland and makes the operation more difficult for the surgeon. Preparation with iodine alone is therefore recommended in the mild toxic cases.

Previous Treatment.

One patient had had deep X-ray therapy at the age of 18 for thyrotoxicosis with apparently good result, but relapsed twenty years later; another was treated with a radium collar with similar result; six had had previous operations, and in two cases two operations had been performed.

Chronic Thyroiditis.

This group of 11 patients included 9 reported on by the pathologist as lymphadenoid goitre and two as Riedl's thyroiditis. All were females, the average age being 45 years, the youngest 31; only three were over 50 years.

Surgical treatment is generally only advised in chronic thyroiditis when the goitre is giving rise to pressure symptoms, but as many are associated with thyrotoxicosis in the early stages, others because the very firm nature of the goitre may closely simulate malignant disease, operation is often performed because of mistaken diagnosis.

Presenting Symptoms.

One patient, aged 31, had a three-year history of goitre with typical toxic symptoms. She was treated with thiouracil and submitted to subtotal thyroidectomy. Two cases presented with mild toxic symptoms; in three a pre-operative diagnosis of cancer was made, and four presented with simple goitre with a recent history of increase in size of the gland. In only one case was there myxœdema. Her story is worth recording because of the rapid onset of symptoms.

> Mrs. M., aged 40, admitted to hospital on 8th June, 1954, was perfectly well until six weeks before admission, when she had an influenza-like illness associated with a sudden and somewhat painful enlargement of the thyroid gland. On admission she was obviously myxœdematous. Her hair and skin had become dry, her voice thick and swallowing difficult. On examination the thyroid gland was uniformly enlarged and very firm; the B.M.R. was −20, and her vocal cords were œdematous. The histological appearances resembled Riedl's struma rather than lymphadenoid goitre.

All these patients are well and leading perfectly normal lives on replacement therapy. Of the 3 presenting with toxic symptoms, 2 have not as yet developed signs of hypothyroidism, but it is only twelve and nine months respectively since their operations.

The ætiology of chronic thyroiditis is not as yet understood. Much has been written about the relation between lymphadenoid goitre and Riedl's struma. Many authors claim that they are separate entities with separate clinical and pathological findings, a view for which I find no support in practice; others that Riedl's struma is merely the late manifestation of the other. But surely if this were so, then we ought to see at least as many cases of Riedl's struma as lymphadenoid goitre, but in actual fact the former is a rare condition in most centres. My own feeling is that the precipitating factor, whatever it may be, is the same in both, but that the local reaction differs; in some the lymphoid infiltration predominates; in others there is mainly fibrous tissue replacement, the clinical picture depending on the extent of the degenerative changes present in the epithelial elements.

Malignant Cases.

Of the malignant cases seen during the period under review, 12 were submitted to operation; of these 10 were females and 2 males, a ratio of 5 : 1 compared with 10 : 1 in the non-malignant series. The average age was 54, the youngest 24, and the oldest 73.

Nine of these malignant tumours arose in a pre-existing goitre and 3 de novo; 8 were anaplastic adeno-carcinoma; 4 were papillary adeno-carcinoma. From a study of the clinical history, clinical and operation findings, it is suggested that

at least 8 of these, i.e., 67 per cent., had their origin in a single nodule. This adds strength to what I have already said about the potential dangers of a single nodule in the thyroid gland.

Diagnosis.

The diagnosis was clinically obvious in 9, made at operation in 2 cases, and in 1 by the pathologist. Regrettably, modern standard textbooks of surgery still state that carcinoma of the thyroid is a rare disease; diagnosis is, therefore, often delayed because the doctor or consultant fails to consider the thyroid as potentially dangerous. In 4 cases, i.e., one-third of the total with clinically obvious carcinoma of the thyroid, the diagnosis was missed until special investigations, e.g., in 3 cases biopsy of cervical gland; in another X-ray chest suggested the correct diagnosis. One patient was treated for pleurisy for one year; 2 were thought to have tuberculous glands of neck; 1 was considered thyrotoxic, the B.M.R. in this case being +22.

Unfortunately it is only too true to say that carcinoma of the thyroid, advanced far enough to give rise to symptoms, is often beyond hope of cure.

Treatment.

Radical surgery, if feasible, is still the best treatment for malignant goitre.

Operation to-day has a dual purpose. In the first instance, an attempt is made to completely eradicate the disease, and this may necessitate unilateral or bilateral radical dissection of the gland of the neck. In the second, both malignant and normal thyroid tissue is removed so that the remaining maligant cells, whether local or distal, may be encouraged to take up radio-active iodine and so help to effect a cure.

Survival.

Of the 8 anaplastic tumours, none survived twelve months after operation; only 1 was benefited, and that temporarily by deep X-ray therapy, and of the 2 cases sent for radio-active iodine, neither would take up the iodine. Of the papillary adeno-carcinoma cases, 2 are alive and well, 4 and 2 years respectively after operation. In both of these there was no apparent spread outside the gland at operation; in the third the tumour had already spread to glands which could only be partially removed. This patient is alive, eighteen months following operation, but with secondaries in the lungs and mediastinal glands, and is being treated with radio-active iodine.

Papillary adeno-carcinoma of the thyroid is, as a rule, a slowly growing tumour, usually metastasing to glands locally and often curable by radical surgery. Details of the fourth case are worth recording.

> A female, aged 48, had in December, 1945, a partial lobectomy performed elsewhere for an apparently simple nodular goitre. Six months later she noticed a small lump in the scar, and when she presented herself at the "Royal" three and a half years after the first operation the lump was 2 cms. in diameter and in the skin of the scar, the thyroid itself was obviously malignant. The pathologist reported on the gland and skin nodule as papillary adeno-carcinoma.

The original thyroid tissue was not submitted for pathological examination, but one must assume that it was already the seat of a carcinoma and at operation a malignant seedling had been planted in the wound.

I need not stress the value of submitting all operation specimens for pathological examination, no matter how simple they appear to be. This patient's life could have been saved, as the tumour was obviously of low malignancy and amenable to surgery. The occurrence of a secondary nodule in the scar is of considerable interest.

The Operation.

The operation was described in detail and illustrated with slides. The technique adopted is very much the same as that described by Piercey (1950). A radical subtotal resection, including the pyramidal lobe, is advocated in the toxic cases, and the importance of tying both inferior thyroid arteries in the prevention of recurrence is stressed.

In all nodular cases it is recommended that the gland once removed should be immediately sectioned by the surgeon. By doing so routinely, in two cases I have been able to diagnose carcinoma of the thyroid at this stage and proceed immediately to a more radical operation. Drainage of the wound is only carried out where there is any doubt about the hæmostasis and where a very large 'dead space' exists after removing the thyroid. This was necessary in 10 per cent. of the series.

Complications of Operation.

A few patients complain of some hoarseness and sore throat, with difficulty in swallowing, for the first 24-48 hours, but as a rule a full diet is enjoyed and the patient allowed out of bed the day following operation. Painful throat is commoner in those in whom the infra thyroid muscles have been divided and repaired.

Effusion under the Skin Flaps.

By far the commonest complication was a sero-sanginous effusion underneath the skin flaps. This is usually noticed a few days after operation and is not a serious condition, but early recognition and adequate treatment is advocated, for, if neglected, the wound may break down, secondary infection occur, and a broad adherent scar result. The fluid may be aspirated by pushing a needle through the skin of the lower flap or through the lateral aspect of the wound and applying a pressure bandage.

Hæmorrhage.

Distressing hæmorrhage occurred in two cases, and in each the symptoms came on suddenly after a bout of vomiting eight and twenty hours respectively after operation, suggesting that a ligature, probably on a vein, had been "blown off." The onset of swelling in the neck with stridor and cyanosis was quickly recognised by the nursing staff. Both patients were taken to the theatre, all clips removed, and under local anæsthetic the wound laid wide open, the blood clot evacuated, and the wound lightly packed with sterile gauze and left open. Secondary suture

was carried out in twenty-four hours. Neither of these cases was considered an acute emergency, but if such did occur, the treatment outlined could well be carried out in the ward without anæsthesia by the house surgeon.

Infection.

Acute pyogenic infection occurred in one patient, causing local pain and high fever, and in spite of vigorous treatment with penicillin and streptomycin, the wound had to be opened and drained, and an ugly adherent scar resulted. In six cases mild infection in one or two of the catgut sutures in the platysma muscle resulted in small localised subcutaneous abscesses, which either burst through the scar discharging the catgut or when recognised were incised. These cases occurred usually after the patient left hospital, the six-day catgut used was sterilised locally, and since we have given up this practice no such cases have been seen.

Tetany.

There were seven cases of tetany. In six of these the symptoms were transient, coming on forty-eight hours after operation and lasting for a few days, and were easily controlled with calcium gluconate. In these cases the blood supply to the parathyroid glands, which come from the anastamosing channels between the superior and inferior thyroid vessels, is temporarily embarrassed after tying these vessels. One lady who had a subtotal thyroidectomy for nodular toxic goitre is still on treatment nine months after her operation. At operation both superior and inferior thyroid arteries were tied, and I can only presume that all the parathyroid tissue was removed or its blood supply permanently damaged. She may have had only one or two parathyroid glands or they may have been abnormally situated. Heinbach (1933) suggests that the common textbook teaching that "there are two pairs of parathyroid glands, superior and inferior, and with a typical location" is misleading. He made a special study of 25 human bodies and found 86 parathyroid glands, i.e., an average of 3.2 per specimen, and in a review of the subject he states that no investigator in this field has found four parathyroid glands per person in more than 50 per cent. of specimens.

Recurrent Laryngeal Nerve Paralysis.

There were three cases of permanent damage to the recurrent laryngeal nerve and in each the lesion was unilateral. In the first case, the nerve was divided in attempting a complete thyroidectomy for cancer. The second case had already undergone elsewhere two operations for thyrotoxicosis. At operation on the third case, the left lobe of the thyroid was very nodular and its lower pole extended into the thorax as far as the arch of the aorta, and in mobilising this infra-thoracic portion, the nerve must have been damaged deep in the thorax. In straightforward uncomplicated cases, I believe that this complication should occur but rarely.

Hypothyroidism.

Apart from those cases of chronic thydroiditis in which one naturally expects hypothyroidism to develop, hypothyroidism has developed in four cases following on subtotal thyroidectomy for non-toxic nodular goitre. In these cases, both superior and inferior thyroid arteries were ligatured. It is suggested that one

inferior thyroid artery should be left intact in non-toxic cases to ensure an adequate blood supply to the remnant and to the parathyroid gland, and so avoid the possibility of hypothyroidism and tetany. These patients are maintained on dry extract of thyroid and suffer no disability as the result of this complication.

Aggravation of the Exophthalmos.

Of the 63 cases of exophthalmos, the eye symptoms and signs were slightly worse in three in the immediate post-operative period. There was no case of corneal ulceration; one developed diplopia, but in none did the symptoms or signs warrant a decompression operation of the Nephzieger type. These cases appear to go on improving for a year to eighteen months after operation and many then remain stationary, suggesting irreversible changes in the peri-ocular tissues. It is very difficult to tell in what cases operation is likely to aggravate the exophthalmos. Generally speaking, if there is rapid onset of the condition with tense and painful eyeballs, operation should be withheld. I have not as yet denied any patient the benefit of operation because of this fear of ophthalmoplegia.

It is claimed by those who have had experience with radio-active iodine that malignant exophthalmos is less likely to develop using this method of treatment. My only experience in this field is of one patient with severe exophthalmos, who had two operations for thyrotoxicosis and recurred. She was referred for radio-active iodine with alleviation of her symptoms and marked improvement in the eyes.

Recurrence of Toxicity.

The follow-up in this series is, of course, far too short to be of any value in this respect. Two cases have so far recurred; each has had two operations, the primary operation being performed elsewhere. I have attributed the recurrence in these to failure to tie both inferior thyroid arteries, a point which Piercey has emphasised in lowering the recurrence rate following operation. Both of these cases have been successfully treated with radio-active iodine.

Mortality.

One patient died six hours post-operatively, a mortaltiy of 0.3 per cent. The patient had moderately severe thyrotoxicosis. She had been treated medically in hospital the year before, but relapsed and was readmitted and prepared in the usual way for surgery. No pre-operative cardiac lesion was noted. At operation the gland was uniformly enlarged, firm and vascular, and a subtotal thyroidectomy carried out without difficulty. She was seen at 7.30 the same evening, sitting up in bed and apparently perfectly well. Her husband visited her and left her bedside at 9 p.m. She died suddenly some ten minutes later. No post-mortem was allowed, but I was able to open the wound and found no local cause for the sudden death.

Results.

Apart from the malignant cases where we can only claim a 16 per cent. cure rate, the results in the toxic and non-toxic cases are very satisfactory. Over 97 per cent. of these patients are living normal useful lives.

Radio-Active Iodine.

Radio-active iodine has been mentioned in the diagnosis and treatment of thyrotoxicosis and in the treatment of thyroid cancer. It is advised in thyrotoxic cases with recurrence of symptoms following operation, particularly if a recurrent laryngeal nerve has been damaged; in cases unfit for major surgery; and in those refusing operation. In the treatment of thyroid cancer, the results have been very disappointing, as only a very small percentage of cases can be made to take up the iodine.

Summary.

1. Three hundred consecutive thyroidectomies are reviewed, and a mortality of 0.3 per cent. reported.
2. Operation in simple nodular goitre is recommended because of the danger of malignant change, the onset of toxic and pressure symptoms, hæmorrhage into the goitre, and recurrent laryngeal nerve paralysis.
3. Operation is advised in most cases of primary thyrotoxicosis; it is essential and urgent in toxic nodular goitre, in male toxic patients, and in toxic patients with valvular heart disease. Toxic cases recurring after surgery and the very bad risk cases are selected for treatment with radio-active iodine.
4. Radical surgery offers the best results in the treatment of thyroid cancer. The results with deep X-ray therapy and radio-active iodine are disappointing.
5. The vocal cords should be examined in all cases before and after operation.
6. A radical operation in thyrotoxic cases is advised. The importance of tying both inferior thyroid arteries is stressed in preventing recurrence of symptoms following operation.
7. Immediate section at operation of all nodular goitres is recommended.

I am indebted to the physicians of the Royal Victoria Hospital for their help in the management of these cases; to the anæsthetists for their skilled anæsthesia; and to Mr. Kennedy Hunter for examination of the vocal cords. I am especially indebted to my old chief, Mr. R. J. McConnell, whose guidance and assistance in the early cases has been invaluable.

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Chronic Appendicitis

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A STUDY of the literature suggests that few authorities are in agreement about the entity "chronic appendicitis" and the way in which it manifests itself. A number of authors deny that it exists. Alvarez (1940), after a review of 385 patients who had been subjected to appendicectomy for non-acute symptoms, concluded that "chronic appendicitis is the rarest of intra-abdominal diseases." McClure (1931) and Cohen (1950) would limit the diagnosis of chronic appendicitis to those who have had recurring attacks of acute or sub-acute appendicitis. Shelley (1938) and Warren and Ballantine (1941) would confine the use of the term "chronic appendicitis" to those with persistent or recurrent right-sided pain. Warren and Ballantine believe that persistent or recurrent right-sided pain is unrelated to past or present pathology in the appendix. Other authors, notably Ogilvie (1937 and 1948) and Love (1947), believe dyspepsia may be a manifestation of chronic appendicitis. Crymble and Forsythe (1949) recognize two presentations of chronic appendicitis in children, namely, recurrent umbilical pain and recurrent right-sided pain.

A review of 400 consecutive patients who had been operated upon for appendicitis was undertaken in an attempt to clarify our own ideas about chronic appendicitis. It was hoped to determine whether persistent or recurrent symptoms had been cured by operation.

NATURE OF SERIES AND METHOD OF FOLLOW-UP.

There were 400 patients in the series under review. All patients were operated upon in Banbridge Hospital during a 3½-year period, beginning in mid-December, 1946. An attempt was made to trace all surviving patients after an interval of at least one year from the time of operation. In all, 241 patients were interviewed and re-examined. Seventy-five others replied to a questionnaire. The patients' general practitioner sent a report in a further 51 cases. There were three post-operative deaths and 30 patients could not be traced. At the follow-up enquiry was made about the occurrence of chronic or recurrent abdominal symptoms before and after the operation. The case notes were not always explicit about the presence or absence of previous persistent or recurrent abdominal symptoms because, in the excitement of an emergency admission to hospital, patients often forgot all about previous non-acute symptoms. The cases were grouped according to whether previous non-acute symptoms were cured, greatly relieved, only slightly improved, or unchanged by operation. Patients in the last two groups, together with some others who developed post-operative symptoms, have been classified as failures.

In the whole series females outnumber males in the ratio 11 : 9. The preponderance of females is due to the greater frequency of symptoms of non-acute appendicitis in young women and adolescent girls. In 222 cases of acute appendicitis males outnumbered females in the ratio 13 : 9.

Definitions and Classification of Cases.

The diagnosis of acute appendicitis has been reserved for those patients admitted as emergencies, operated upon within 24 hours and in whom the appendix was macroscopically inflamed. A definite colour change in the mucosa of the appendix has been taken as the minimum criterion upon which to base the diagnosis of acute appendicitis. The cases of appendix abscess treated conservatively in the first instance are included in the diagnosis "acute appendicitis." The diagnosis of "non-acute appendicitis" is applied to cases operated upon within 24 hours of admission in which macroscopic evidence of inflammation was lacking. Those patients who were admitted as emergencies and only operated upon after a period of observation and investigation are also included in the diagnosis of "non-acute appendicitis." A few patients who were observed for longer than 24 hours and in whom a purulent appendix was found have been justifiably included with those suffering from acute appendicitis. Patients admitted from the waiting-list for appendicectomy have been arbitrarily added to the group "non-acute appendicitis."

By definition all chronic cases must have had previous symptoms to be recognised as such. In addition, if persistent or recurrent symptoms were cured by appendicectomy it may be assumed that dysfunction of the appendix, in the absence of any other known factor, was responsible for those symptoms. There were 45 patients admitted from the waiting-list and emergency admissions totalled 355. Of the latter, 197 had symptoms before the attack for which they were admitted to hospital. Thus, persistent or recurrent abdominal symptoms were present in 242 patients, but as 20 of these could not be traced, 222 are included in this review. These 222 cases could be easily separated into one of four groups :—

1. Recurrent attacks resembling mild or occasionally severe appendicitis 46 cases
2. Recurrent or persistent right-sided pain - - - - 94 cases
3. Recurrent attacks of abdominal colic - - - - - 45 cases
4. Dyspepsia - - - - - - - - 37 cases

Recurrent symptoms of appendicitis.

It is generally agreed that one attack of appendicitis predisposes to a future attack and the clinical picture of recurrent appendicitis is well recognised. Of the 46 patients in this group 37 were admitted as emergencies and 9 from the waiting-list. In 17 patients the appendix was acutely inflamed. The severity of the ultimate attack bore an interesting relationship to the frequency of previous attacks. The more numerous the attacks, the less frequently was the appendix severely inflamed and in none of those with numerous attacks had the inflammation progressed to the point of pus formation. There were six failures in this group. However, analysis of these shows that the results of appendicectomy in cases of recurrent appendicitis are more favourable than this failure rate of 13 per cent. would

suggest. Two patients who had acutely inflamed appendices still complained of slight central abdominal pain. Two listed as failures had tender grid-iron scars—one, however, recovered spontaneously at the end of two years. Another developed a peptic ulcer and was probably wrongly diagnosed at the outset. The sixth patient, whose abdominal symptoms remained unchanged, had been admitted from the waiting-list.

Recurrent right-sided pain.

There were 94 patients in this group. Of these 87 had had one or more attacks of pain in the right iliac fossa, and 7 had had persistent right-sided pain for periods ranging from one month to one year. This group shows a striking preponderance of females; there were only 20 males in the group, and teenage girls account for over half of the female cases. Seventy-seven patients were admitted as emergencies, but a final diagnosis of acute appendicitis was made in only 25 of these. The ultimate attack in some cases was typical of acute appendicitis, but in 19 cases the patient maintained that symptoms had been localised throughout the attack to the right side. Among these 94 patients with right-sided pain 18 also suffered from dyspepsia. These will be discussed in a later paragraph. Of the 76 patients who did not have associated dyspepsia 6 have been classified as failures.

In two cases symptoms were unchanged and a third has now similar pain on the left side. One patient had recurrence of abdominal pain after an interval of freedom of one year. Another patient required two years' convalescence and still has vague abdominal pain. The sixth patient developed pleurisy in the immediate post-operative period and two years later tuberculous salpingitis. As enlargement of mesenteric glands was noted at the primary operation she was probably suffering from tuberculous mesenteric adenitis and not appendicitis.

Recurrent abdominal colic.

Attacks of central abdominal colic without localising symptoms had occurred in 45 of the patients who were reviewed. In many cases the symptoms had been sufficiently severe for the patient to seek medical advice, and 5 patients had previously been admitted to hospital during an attack. Ten patients presented as acute obstructive appendicitis and all of them had purulent appendicitis. Six, including a man of 65 years who had attacks of severe colic for 20 years, had had numerous attacks of colic, 3 had only had one attack and 1 had had two previous attacks. The post-operative diagnosis was acute appendicitis in 27 cases; non-acute in 12 cases; and 6 cases had been admitted from the waiting-list because of attacks of colic. Operation was not entirely successful in 3 of this group of 45 patients. Two admitted as emergencies with non-acute appendicitis were classified as failures; one on account of a tender scar and the other because of the onset of heartburn one year after operation. The third patient who had been admitted from the waiting-list continued having symptoms following removal of a normal appendix which had been suspected radiologically of containing a fæcalith.

Reflex dyspepsia.

In addition to the 18 patients already mentioned whose predominant complaint was right-sided pain but who also had upper abdominal symptoms of indigestion, heartburn or epigastric discomfort, there were 37 patients with previous symptoms of dyspepsia only. Of those with dyspepsia only, 29 were admitted as emergencies following the onset of symptoms of acute or non-acute appendicitis. In 22 the dyspepsia was relieved by appendicectomy. In only two of these was the dyspepsia, preceding the final attack, sufficiently severe for medical advice to be sought for it alone. Dyspepsia recurred post-operatively in 7 patients, of whom 3 are now known to have peptic ulceration. The 8 patients submitted to operation in an attempt to cure dyspepsia do not show such favourable results. Only four were cured. One has developed typical, but mild symptoms, of a peptic ulcer. Another patient whose symptoms recurred in six weeks has been fully investigated elsewhere and is now content because a definite diagnosis—"dyspepsia"—has been made! The third patient, a hypochondriac, whose symptoms could be reproduced by pressure localised radiologically to the appendix, soon found symptoms to replace those relieved by appendicectomy. The fourth was fully investigated before operation. Tenderness was found at McBurney's point and a barium meal examination was negative. Fifteen months after appendicectomy, her symptoms became more severe. On radiological examination the gastric mucosa was thought to be abnormal and she was referred elsewhere for a further radiological examination at which nothing abnormal was found. Within one year laparotomy at a third hospital revealed an inoperable carcinoma of stomach.

Of the 18 patients with right-sided abdominal pain who also suffered from dyspepsia eight are regarded as failures. Three males continued to have dyspepsia, although they were cured of their right-sided pain. Four females continued to suffer from right-sided pain but were cured of dyspepsia. The eighth patient, a female, had hæmatemesis from a duodenal ulcer two years after appendicectomy.

Discussion.

There is considerable divergence of opinion regarding the conditions which should be embraced by the term "chronic appendicitis." The four groups into which patients in the present series have been divided are all mentioned by at least one of the authors referred to in the opening paragraph. Furthermore, the results in this series show that a large number of patients have been cured by appendicectomy.

Recurrent appendicitis has already been discussed briefly. It is a well-recognised condition which we believe should not be included in the term "chronic appendicitis."

Eighty of 94 patients with right-sided pain were cured by appendicectomy. This does not necessarily prove that the appendix is the cause of chronic or recurrent right-sided pain. The fact that 21 of those "cured" had apparently normal appendices throws great doubt on the appendix being the cause of the symptoms and supports Warren and Ballantine (1941) in their opinion that present or past pathology in the appendix is not the cause of the syndrome. There is no doubt that in the mind of the laity right-sided pain is associated with appendicitis, and when

attacks of right-sided pain occur the conscious or even subconscious fear of appendicitis lowers the pain threshold. After the appendix is removed the pain threshold in the well-adjusted patient is restored and any vague pain will be dismissed as unimportant and a clinical cure will result. However, the cases which developed acute appendicitis and whose symptoms were solely an intensification of previous right-sided pain indicate that the appendix can cause such attacks of right-sided pain and it is best in practice to assume a pathological rather than psychological basis for the syndrome. We are of the opinion that the term "chronic appendicitis" used without qualification should be applied only to cases of chronic or recurrent right-sided pain in which no other cause for the symptoms is found.

The frequency of attacks of abdominal colic preceding an attack of obstructive appendicitis was noted by the late Robert Campbell, who, in a paper delivered to the Ulster Medical Society in the 1912 session, clearly differentiated between acute appendicitis and acute appendicular obstruction which rapidly goes on to perforation of the appendix. Wilkie (1914), because of his supporting experimental work, is rightly given credit for first recognising "acute obstruction of the appendix," although he later (1932) gave pride of place to Van Zwalenburg (1909), who mentioned, but did not describe, the condition. It is easy to realize that, following an attack of acute appendicitis, pre-existing attacks of colic must have been due to a lesion of the appendix; it is more difficult to decide that attacks of colic are of appendicular origin. Crymble and Forsythe (1949) advise appendicectomy in children in whom attacks of umbilical pain are associated with tenderness in the right iliac fossa. In the series under review, only six patients with recurrent colic were admitted as non-acute cases and only one was not relieved by appendicectomy. Despite this, we do not feel competent to give advice as to the diagnosis of non-acute cases unless there is other confirmatory evidence. The history of preceding attacks may be useful evidence in the diagnosis of mild or obscure cases. It is considered reasonable, however, to include non-acute cases with only colic as a symptom in the term "chronic appendicitis." They should be designated "chronic appendicitis—recurrent colic."

The present review supports the long-established opinion that lesions of the appendix can cause dyspepsia but very rarely is the dyspepsia alone sufficiently severe for the patient to seek medical advice. When the dyspepsia follows an illness which was or can in retrospect be diagnosed as appendicitis, then a diagnosis of "chronic appendicitis—reflex dyspepsia" is justified. Such a diagnosis, however, can rarely, if ever, be made with confidence even after thorough investigation of the patient. An association with right-sided pain does not lend much support to this diagnosis, because of 18 such patients only 10 were cured, although the majority of the failures were relieved of one or other of these symptoms.

Of the 55 patients who had "dyspepsia" before appendicectomy 5 probably had peptic ulceration at the time of operation and 1 almost certainly had carcinoma of the stomach. This incidence is high, and indicates the difficulty of diagnosis in these cases.

SUMMARY.

Of 400 consecutive cases of appendicitis 367 were followed-up after an interval of at least one year. Of these 222 had persistent or recurrent abdominal symptoms before the illness for which appendicectomy was performed. Patients with recurrent abdominal symptoms fell into one of four groups, which can best be described as "recurrent appendicitis" (46 cases), "recurrent abdominal colic" (45 cases), "recurrent or persistent right-sided pain" (94 cases), and "dyspepsia" (37 cases).

1. Recurrent appendicitis is a well-recognised condition and should not be referred to as "chronic appendicitis."
2. Recurrent or persistent right-sided pain is undoubtedly due, in many instances, to lesions of the appendix and not infrequently precedes acute appendicitis in which the symptoms may remain right-sided. In some cases, removal of a normal appendix cures the patient, and it is suggested that cure may, at times, be psychological rather than physical. The term "chronic appendicitis" should be applied to cases of right-sided pain for which no other cause is found.
3. Recurrent abdominal colic frequently precedes an attack of acute or sub-acute obstructive appendicitis. Only rarely can the cause of the colic be diagnosed before the onset of localising symptoms or signs. The term "chronic appendicitis—recurrent colic" could be used for this type of case.
4. Dyspepsia alone may precede an attack of appendicitis and sometimes follows an attack of appendicitis treated conservatively. Appendicectomy should never be advised for dyspepsia unless there is other evidence that the appendix is abnormal. These cases could be termed "chronic appendicitis—reflex dyspepsia."

Our thanks are due to the general practitioners of the area, without whose co-operation in stimulating patients to return for examination and in giving reports this review could not have been undertaken. We would also like to thank Mr. T. S. S. Holmes, M.Ch., F.R.C.S., F.R.C.O.G., to whom we are indebted for information about the late Mr. Robert Campbell.

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A Case of Hydatid Cyst in County Antrim

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HYDATID disease is due to the development in man, acting as an intermediate host, of the cystic larval form of a small tapeworm, *Echinococcus granulosus,* the normal habitat of which is the ileum of the dog. Ova from an infected dog are deposited with its fæces on the ground. By this means grass and vegetables are polluted with ova, and when eaten by sheep, cattle, goats or occasionally by man the ova gain access to the alimentary tract. The alkaline juices of the duodenum dissolve the outer coat and release the embryo. By means of its sharp hooklets, the embryo bores its way through the mucosa of the duodenum and enters the venous channels of the portal system. It is then carried to the liver, and if it passes through the liver, it is carried to the lungs via the right side of the heart. If it is not caught in either the liver or the lungs, it reaches the general circulation by means of the left side of the heart, and can then be carried to lodge anywhere in the body. When the embryo lodges in an organ it forms an hydatid cyst. The cyst consists of an outer layer, the ectocyst, which is formed from the tissues of the host, and an inner layer, the endocyst which produces both the hydatid fluid and the scolices. If a dog eats infected tissues of a sheep or cow each scolex which reaches the intestine of the dog can form an adult tapeworm.

The disease has a definite geographical distribution, and is common in Australia, the Middle East, Algeria, and Iceland. It is rare in the British Isles, and I have found only one reference in the literature to a case in Northern Ireland (Fraser, 1930). It is for that reason that the following case is reported.

> W. A. S., male, aged 61, was admitted to the Smiley Hospital, Larne, on 7th February, 1955. He gave a history of crampy abdominal pain, followed by pain in the R.I.F. for twenty-four hours. He had had a similar attack of pain twenty years ago. There was well-marked tenderness in the R.I.F. and a diagnosis of acute appendicitis was made. At operation a grossly inflamed appendix was removed, but a cyst three inches in diameter was found attached to the mesentry of the terminal ileum, and this was also removed. Dr. J. E. Morison reported that this was an echinococcus cyst. The lining of the cyst had in great part degenerated, but it was possible to make out brood capsules containing scolices, and to recognise clearly-defined hooks. A radiological search for further cysts revealed a large calcified mass in his pelvis, which is probably a dead cyst which has become impregnated with calcium. The Casoni test gave an immediate positive reaction.

The patient has been a farmer all his life, and has always kept a farm dog. While he keeps cattle he has never kept sheep. He has never been outside the British Isles, and his only visits outside Northern Ireland were for holidays to Ayrshire and Leicester one year ago, and to Liverpool ten years ago. While it is just possible that the cysts might be only ten years old, and that he could have been

infected on his visit to Liverpool, it is much more probable that they are much older than this, and that he was infected in Northern Ireland.

I wish to thank Dr. J. E. Morison of the Central Laboratory of the Northern Ireland Hospitals Authority for the pathological report, and Dr. V. D. Allison of the same laboratory for the fluid for the Casoni skin test.

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REVIEW

DIAGNOSIS AND TREATMENT OF THE ACUTE PHASE OF POLIOMYELITIS AND ITS COMPLICATIONS. Edited by Albert G. Bower, M.D. (Pp. 250; illustrations 64. 40s.) London: Ballière, Tindall & Cox, 1955.

THIS book is the product of the staff of the Communicable Disease Unit of the Los Angeles County Hospital, where over 18,000 cases of poliomyelitis have been diagnosed and treated during the past twenty-five years. Experience of such extent in poliomyelitis is blissfully unknown on this side of the Atlantic, and it is a great matter to have the knowledge of this team of workers compressed into a single volume.

The chapter on diagnosis and differential diagnosis is comprehensive and exceedingly good. The chapters on detection, care, and nursing procedures for respiratory paralysis are very good, and contain much valuable help.

The book is produced in first-class fashion, very well illustrated and presented in a style which is easy to absorb. It should be of great acceptance to physicians and hospital staff charged with the care of sufferers from poliomyelitis. F. F. K.

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REVIEWS

MULTIPLE SCLEROSIS. By Douglas McAlpine, M.D., F.R.C.P., Nigel D. Compston, M.A., M.D., and Charles R. Lumsden, M.D. (Pp. viii + 304; plates 32. 35s.) Edinburgh and London: E. and S. Livingstone Ltd., 1955.

This, I believe, is the first book to be published in Great Britain on multiple or disseminated sclerosis, the topic being one upon which the senior author, Dr. McAlpine, is particularly well qualified to write. He has done so in collaboration with a general physician (Dr. Compston—known for his work on the natural history of the disease), and a pathologist (Dr. Lumsden—holder of the Henry Head Fellowship of the Royal Society of London since 1951).

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The book should have an appeal and is recommended to general practitioners who are concerned more with differential diagnosis, management and prognosis. There is a chapter on treatment in which the necessity for adopting a more positive attitude is stressed. Illustrative accounts are given throughout of cases drawn from personal experience and based on the series of 1,072 patients with multiple sclerosis seen in the Department for Nervous Diseases of the Middlesex Hospital between the years 1930-1952. R. S. A.

THE MANAGEMENT OF ACUTE POLIOMYELITIS. By C. P. Stott, S.R.N., C.M.B. (Part 1), and M. Fischer-Williams, M.R.C.P.(Ed.). (Pp. xii + 99; figs. 43. 12s. 6d.) Edinburgh: E. and S. Livingstone, 1955.

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Throughout radiographs are of a high standard, and this feature makes the book valuable and attractive to both dental surgeon and radiologist. In addition to the numerous well-chosen radiographs, line-drawings and photographs are used, where necessary, with useful results.

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D. P.

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It is easy in any book of this kind to find small matters of detail which can be criticised, but one is rather impressed with the wide and practical treatment of the subject. There is a welcome absence of old, out-dated measures, so easily and so often retained in books on treatment. First comes a chapter on sulphonamides and antibiotics (the whole range up to Achromycin, the most recent). This is one of the best sections in the book. Then the usual groupings and systems of diseases are taken in succession. The reader will turn with interest to see how the newer and more controversial subjects are treated. He will not be disappointed. The section on hypertension, for example, gives a balanced view of the present position. That on coronory occlusion is equally rewarding. It is a pity that the psychoneuroses are dealt with so briefly. They form so large a part of medicine, and especially of general practice, that a page is scant measure to devote to them. Nevertheless, nearly always a good balance is struck, and this little book is excellent value, and can be confidently recommended to the general practitioner and (dare we say it?) to the specialist as well.

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THE DISTRIBUTION OF THE HUMAN BLOOD GROUPS. By A. E. Mourant, M.A., D.Phil., D.M.(Oxon.). (Pp. xxi + 438; 9 maps. 42s.) Oxford: Blackwell Scientific Publications, 1954.

No attempt has been made since before World War II to bring together available knowledge of the distribution of human blood groups. The reasons are clear. There has been a continual increase in the number of known blood group systems and the steady accumulation of information about their distribution. The complexities of serology and the mathematical difficulties in interpretation of the data have determined that few men are equipped to present the problem. Such men tend to be busy, and it is a most remarkable tribute to Dr. Mourant's industry that he has managed by work over several years to produce this fine book, especially as there has been a torrent of new information through the period.

The plan of the book is that the genetical basis of each of the blood group systems is briefly explained in five chapters. Some other sharply segregating traits in man are similarly discussed and thereafter the available knowledge on the distribution of these characteristics is considered, in successive chapters in North and Central Europe, the Mediterranean area, Africa South of the Sahara, Asia, Indonesia, Australia, and the aborigines of America. In each chapter the frequencies of the various genes is considered against the background of history and external "social" characteristics. The information surveyed is tabulated in a series of appendices which are quite invaluable as a source of reference.

There follows an excellent review of the techniques of discovering the blood groups in tissue and bone specimens and an account, particularly valuable in that the sources of information are so scattered, of the available knowledge of blood groups in the lower animals and their relationships to human groups.

There is much practical information in later chapters on techniques of taking and preserving specimens and on the methods of calculation of gene frequency which are relevant to all the evolutions and anthropological implications of blood grouping. There are over 1,700 references.

Although the information considered and interpreted in this book is enormous, skilful and discriminating writing have avoided this being a ponderous and monumental type of book, while containing all the information required of it as a standard book of reference.

It is impossible to commend this book too highly to all anthropologists, geneticists, and clinical pathologists.

A. C. S.

THE PRINCIPLES AND PRACTICE OF MEDICINE. By L. S. P. Davidson, B.A.(Cantab.), M.D., P.R.C.P.(Ed.), F.R.C.P.(Lond.), M.D.(Oslo), and the Staff of the Department of Medicine, University of Edinburgh, and Associated Clinical Units. Second Edition. (Pp. xii + 1036; figs. 101. 32s. 6d.) Edinburgh and London: E. and S. Livingstone, 1954.

THIS book of the Edinburgh school is a comprehensive work of general medicine which will admirably meet the requirements of undergraduates in their final years. The subject is dealt with systematically, each contributor dealing with his own speciality. Separate chapters on infectious diseases, chemotherapy and the psychoneurosis help to correlate symptomatology and treatment in general. History taking and the approach to physical examinations of patients is included to remind the student of the importance of procedure in clinical medicine, and stress the importance of physical signs. Adequate medical anatomical illustrations and coloured plates are included to enlighten reading. Just enough mention is made of special measures such as electrocardiography and cardiac catheterision not to confuse the undergraduate. Peculiarly, the venereal diseases receive little attention even in the chapter on infection. The appendices contain useful body standard weights and a range of diets, and there is a good index. The style makes for easy reading, and the teaching is sound. Students will find it a useful adjunct to their ward rounds.

E. F.

THE DISTRIBUTION OF THE HUMAN BLOOD GROUPS. By A. E. Mourant, M.A., D.Phil., D.M.(Oxon.). (Pp. xxi + 438; 9 maps. 42s.) Oxford: Blackwell Scientific Publications, 1954.

No attempt has been made since before World War II to bring together available knowledge of the distribution of human blood groups. The reasons are clear. There has been a continual increase in the number of known blood group systems and the steady accumulation of information about their distribution. The complexities of serology and the mathematical difficulties in interpretation of the data have determined that few men are equipped to present the problem. Such men tend to be busy, and it is a most remarkable tribute to Dr. Mourant's industry that he has managed by work over several years to produce this fine book, especially as there has been a torrent of new information through the period.

The plan of the book is that the genetical basis of each of the blood group systems is briefly explained in five chapters. Some other sharply segregating traits in man are similarly discussed and thereafter the available knowledge on the distribution of these characteristics is considered, in successive chapters in North and Central Europe, the Mediterranean area, Africa South of the Sahara, Asia, Indonesia, Australia, and the aborigines of America. In each chapter the frequencies of the various genes is considered against the background of history and external "social" characteristics. The information surveyed is tabulated in a series of appendices which are quite invaluable as a source of reference.

There follows an excellent review of the techniques of discovering the blood groups in tissue and bone specimens and an account, particularly valuable in that the sources of information are so scattered, of the available knowledge of blood groups in the lower animals and their relationships to human groups.

There is much practical information in later chapters on techniques of taking and preserving specimens and on the methods of calculation of gene frequency which are relevant to all the evolutions and anthropological implications of blood grouping. There are over 1,700 references.

Although the information considered and interpreted in this book is enormous, skilful and discriminating writing have avoided this being a ponderous and monumental type of book, while containing all the information required of it as a standard book of reference.

It is impossible to commend this book too highly to all anthropologists, geneticists, and clinical pathologists.

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AN INTRODUCTION TO PHYSICAL METHODS OF TREATMENT IN PSYCHIATRY. By William Sargant, M.A., M.B.(Cantab.), F.R.C.P., and Eliot Slater, M.A., M.D.(Cantab.), F.R.C.P., with a chapter on Treatment of the Epilepsies by Denis Hill, M.B.(Lond.), F.R.C.P. Third Edition. (Pp. 351 + xiii; illustrated. 20s.) Edinburgh and London: E. and S. Livingstone, 1954.

SINCE first publication in 1944 "Sargant and Slater" has become a household word in psychiatry. The output of writings on physical methods of treatment during the last six years has been so enormous that the practising psychiatrist has been left bewildered. Hence the third edition of this book is particularly welcome. The authors have long experience of organic treatment of the major psychoses and neuroses. They have analysed and assessed the newer techniques; and have constantly subjected the results of the well-established treatments—convulsion, insulin coma, malaria and pre-frontal leucotomy—to a careful scrutiny.

It is evident that the text of the new publication has been extensively revised, and enlarged; and includes a completely new chapter on the treatment of alcoholic addiction, in which the techniques of emetine aversion and apomorphine are clearly and succinctly described. With the advance in knowledge of the functions of the frontal lobes of the brain, many different operative approaches have been made, apart from the standard Freeman and Watts' leucotomy. The newer procedures now being used are described, and their relative merits and disadvantages fairly discussed. The authors stress that, too often, consideration of leucotomy, modified or otherwise, is postponed until the patient's state becomes desperate.

Psychotherapy alone for the neuroses has always presented a problem for the practising psychiatrist, who cannot devote all his energies to a few, select patients. Even then such treatment is time-consuming and improvement slow. The use of excitatory abreaction, narco-analysis, acetylcholine and chlorpromazine speeds the general therapeutic attack. A state of mind is induced in the patient which renders him more susceptible to psychotherapy. The indications and limitations of these drug-aided techniques are clearly set forth. No unwarranted claims for their efficacy are made by the authors.

Nutritional disorders and vitamin deficiencies often follow in the train of psychiatric disorder, or primarily cause a change in the mental state. There is increasing recognition of the part that diet plays in the general physical treatment of the mentally ill. The writers point out that anorexia is commoner in mental hospitals than elsewhere, and it is important to maintain strict supervision of the feeding arrangements, as meals may be unappetisingly served due to mass-production methods.

Dr. Denis Hill's chapter on the treatment of the epilepsies maintains its high standard. A section on temporal lobe epilepsy has been added; and the very useful table of anti-convulsant drugs with dosage and indications has been brought up to date.

The new edition can be strongly recommended to all those interested in psychiatry. A. S. C.

MEDICINE IN ITS HUMAN SETTING. By A. E. Clark-Kennedy, M.D., F.R.C.P. (Pp. 276. 13s. 6d.) London: Faber & Faber, 1954.

THIS book consists of twenty-two short stories, each dealing with a particular disease or group of diseases, and, as the title states, the human setting is the framework for each chapter. The cases are described as part of the practice of a family doctor—the symptoms, the signs, the investigations, the progress of the disease and the treatment, all is very well done. It is just as it occurs in real life. There are numerous line-drawings, all of them very good.

This book should be of great value to medical students and practitioners, as it not only describes the illness, but is a constant reminder of the fact that, as doctors, we are called upon to treat not only the disease, but the patient. R. P. S.

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MOTHERHOOD AND THE SAFE TIME SIMPLIFIED. By J. Lyle Cameron, M.D., F.R.C.S., F.A.C.S., F.R.C.O.G. (Pp. 15. 9d.) Edinburgh and London: E. and S. Livingstone Ltd.

For those who, on grounds of religious dogma or personal preference, wish to avoid mechanical or chemical contraception, this is a brief and lucid pamphlet on the safe period. Nine short pages of print, plus two diagrams, should not be beyond the capacity of the ordinary couple to understand. What may be beyond their powers is the long ordeal of ascertaining any one woman's ovulation time by temperature recordings with two thermometers, one in the mouth and the other in the vagina. A supplementary method is that of watching for "The Time of Discomfort Tenderness and Distention" that in many individuals signalises the period of ovulation. Although this, in general, also constitutes the period of greatest natural desire, the writer is emphatic that the avoidance of this time permits marital relations that are natural and normal in every way. This is claiming too much for at least one member of the sexual partnership.

With these reservations, this leaflet can be recommended unhesitatingly to patients desiring information on this method of birth control. W. R. S.

CHILDBIRTH—THEORY AND PRACTICAL TRAINING. By Marjorie F. Chappell, D.N.(Lond.), S.R.N., C.S.P., S.C.M., H.V.Cert. (Pp. viii + 128; figs. 35. 7s. 6d.) Edinburgh and London: E. and S. Livingstone, 1954.

For some years now the slogan "Natural Childbirth" has been increasingly heard. This began with a movement to "brainwash" expectant mothers with the object of removing fears founded on faulty tradition or education and held by the advocates of natural childbirth to result in mental and physical tension culminating in disordered or painful uterine action. These had created a demand for painless childbirth, hence fashionable obstetric regimes of twilight sleep and other forms of analgesics or amnesia—in other words unnatural childbirth.

We have now reached a time when some feel that the so-called method of natural childbirth has passed into a new and different phase of interference with nature. The method appears to be in danger of becoming the master and not the servant of the practitioner. School-leavers are given talks on the subject. Young couples enquire about it from those to whom they look for premarital instruction. Expectant mothers are instructed in what the title of this book calls the theory of childbirth. They are put through a series of exercises which culminates in a rehearsal of labour. Mother clubs are formed, and prenatal visits to the wards and delivery rooms are organised for their benefit. Fathers, too, are now being introduced to some of this prenatal instruction with, perhaps, more justification. Whatever these activities may accomplish, they are quite incapable of fulfilling all the claims made for them in this book. All this constitutes a current fashion, and assuredly does help the expectant mother, though not always in the manner and degree described, or for the reasons given.

This book is primarily for the instructor, who it is assumed is already familiar with the work and writings of the leading advocates of the method. It breaks up the course of combined instruction and exercises into a graduated series of eight sessions. It should be understandable by the intelligent individual who cannot get group instruction, despite occasional obscurities of verbal construction. The illustrations are few and simple. W. R. S.

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The classification adopted is relatively free from the complexities of terminology applied with apparent relish by some who have written on this subject. The analysis of the careful follow-up is alone a valuable and informative record, and the clinician may find the book of value in assessing the course and prognosis in different disorders. All pathologists will learn something from this book. Some may think the author underestimates the difficulties and pitfalls of diagnosis, and that the reactive changes in lymphoid tissue, and in particular the simulation of Hodgkin's disease by lipomelanic reticulosis and other non-neoplastic conditions, are inadequately discussed. For a subject which has engaged for so long the attention of many eminent pathologists the discussion of the literature, while it cites most of the important papers, is scarcely as detailed as might be expected in a monograph on a relatively restricted subject.

The author's material and his interpretation certainly merit a fairly detailed presentation. The large number of illustrations show much tedious repetition and many are of little or no value to anyone with even slight experience. Some may doubt if their presence, and the relatively brief discussion of this highly specialised subject, really justifies monographic presentation instead of a briefer discussion of the author's own data in a specialised journal. J. E. M.

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THE first edition was published in 1948, and now, with this new and thoroughly revised edition, this standard textbook will be more indispensable than ever to all interested in rheumatic disease. The classification followed in that of the 1936 Committee of the Royal College of Physicians and, as well as chronic arthritis, gout, non-articular rheumatism and rheumatic fever are considered. The collagen diseases are included only in discussion of other conditions.

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TEXTBOOK OF THE RHEUMATIC DISEASES. Edited by W. S. C. Copeman, O.B.E., M.D., F.R.C.P. Second Edition. (Pp. viii + 754; figs. 349, 52s. 6d.) Edinburgh and London: E. and S. Livingstone, 1955.

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The editor, assisted by twenty-five most eminently qualified contributors, has covered every aspect of these diseases from their history, the pain mechanism and the anatomy and physiology of the joints to the psychiatric and social and industrial aspects. The various disease entities are described, the diagnostic, and the pathological and radiological aspects are then discussed, and sections are devoted to physical medicine, hydrotherapy and spa treatment and orthopædic measures and special problems of treatment. A chapter is devoted to the adrenal hormones. There is some overlapping and even conflict of opinion, but in a book of such scope and authority this is inevitable and useful.

A feature is the uniformly high quality of the illustrations and the excellency of reproduction of the X-rays.

THE HEALTH VISITOR AND TUBERCULOSIS. By S. H. Buchanan, S.R.N., S.C.M., H.V.Cert. (Pp. 150. 8s. 6d.) London: National Association for the Prevention of Tuberculosis, 1955.

TUBERCULOSIS affects for a long time the whole life of both the sufferer and his immediate family. The health visitor has an important part to play in handling many social and personal aspects. This book by one of them outlines the work, and many, as well as those in the specialised tuberculosis service, may like to have such a clear account of what the health visitor may accomplish.

THE CASUALTY DEPARTMENT. By T. G. Lowden, M.A., B.M., F.R.C.S., Consultant Surgeon, Sunderland Royal Infirmary. (Pp. 278. 37s. 6d.) Edinburgh and London: E. and S. Livingstone Ltd., 1955.

THIS is an extremely valuable book and should be read by everyone interested in surgery, particularly the young graduate in his first hospital appointment. It is well illustrated, and an extensive bibliography is given at the end of each section.

In the first three-quarters of the book Mr. Lowden deals with the many common problems met with in a busy casualty department. The chapters on sepsis and the use of the antibiotics are full of sound advice. The treatment of fractures is omitted.

The rest of the book is concerned with the casualty department as a "going concern"; one chapter is devoted to the patient's financial and temperamental background; another to his disposal. No casualty surgeon or house surgeon should fail to read the final chapters on legal responsibilities and legal protection.

A book which should prove invaluable in all hospitals. E. M.

CHROMATOGRAPHY: British Medical Bulletin. Vol. 10, No. 3 (1954). Edited by Dr. C. E. Dent. (Pp. 252; plates 2; figs. 50. 15s.) London: Medical Department, The British Council, 1954.

THIS number of the Bulletin consists of sixteen articles by different authorities dealing with the application of chromatographic methods to various classes of substances, most of which are of great importance in clinical medicine.

The subjects dealt with include carbohydrates, proteins, peptides, amino-acids, steroids, porphyrins, nucleotides, thyroid hormones, antibiotics, and vitamins.

The articles constitute an authoritative review of the most recent advances in these different fields, and readers who wish to pursue the details further are provided with abundant references to original papers. S. A.

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