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A Case of Transposition of Viscera—Chronic Gastric Ulcer—Partial Gastrectomy With Partial Duodenectomy—Recovery; With Comments on Bilateral Asymmetry and Transposition.

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This patient L—K—(Surgical Clinic Report 84/28) was a female domestic servant, age 41 years, who had suffered from bouts of left sided pain and discomfort after food with occasional vomiting for five years. Latterly the periods of dyspepsia had become much more frequent and severe. She was admitted to the Medical Wards under the care of Professor Anderson who diagnosed organic disease of the stomach and advised operation. One of the X-ray pictures (see Fig. 1) seemed to show a filling defect characteristic of carcinoma. The pain required morphia injections.

She was transfered to the Surgical Wards under our care and on 3rd March, 1928 the abdomen was explored through a left paramedian incision. The pyloric end of the stomach and the first part of the duodenum were found to be involved in extensive ulceration, eating into adjacent structures—the free edge of the gastro-hepatic or lesser omentum, the much thickened falciform ligament, the liver and, posteriorly, the pancreas.

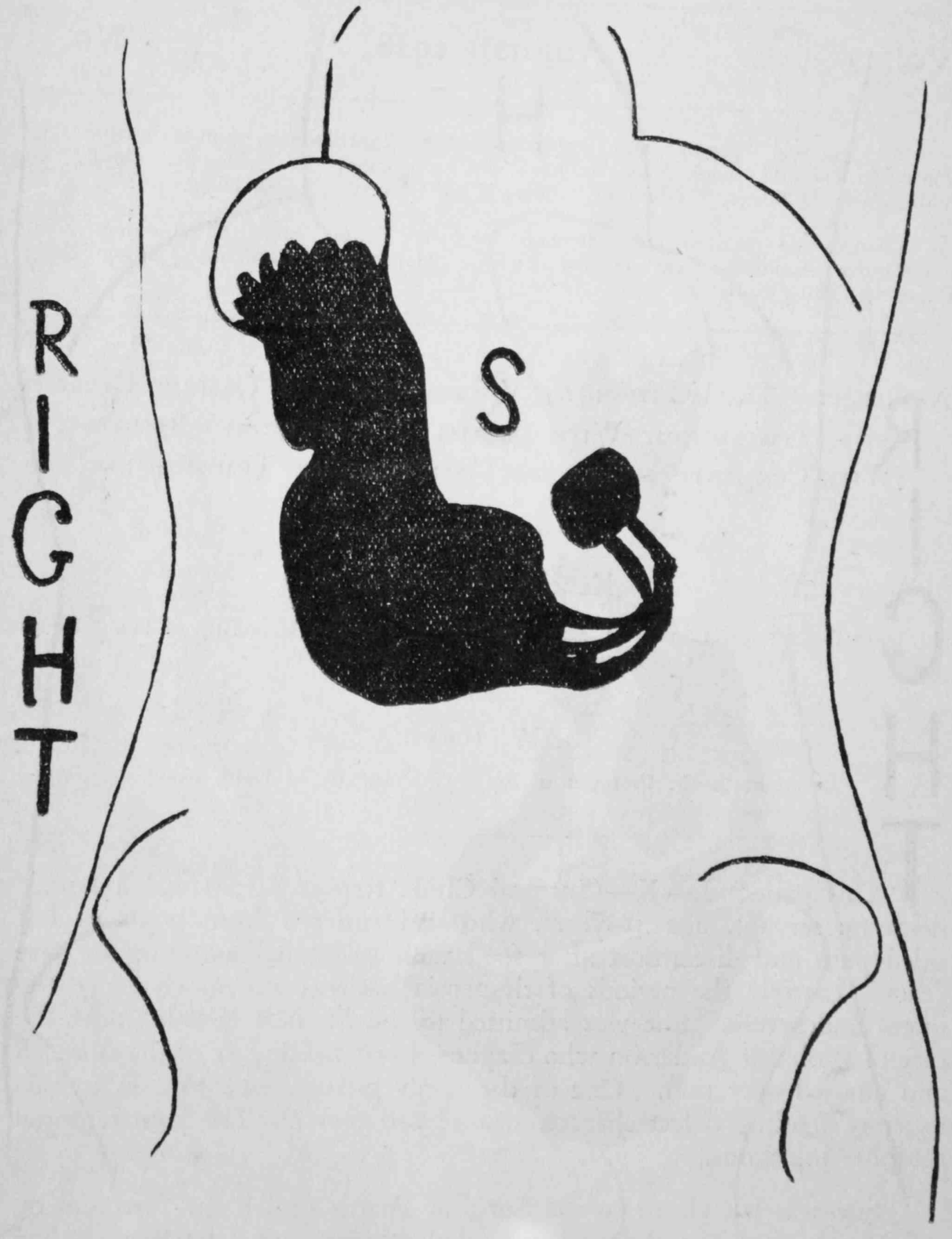


Fig. 1. Tracing of X-ray of Stomach a few minutes after a barium meal taken some days before operation. Note the right sided stomach and the abnormal appearances about the pylorus.

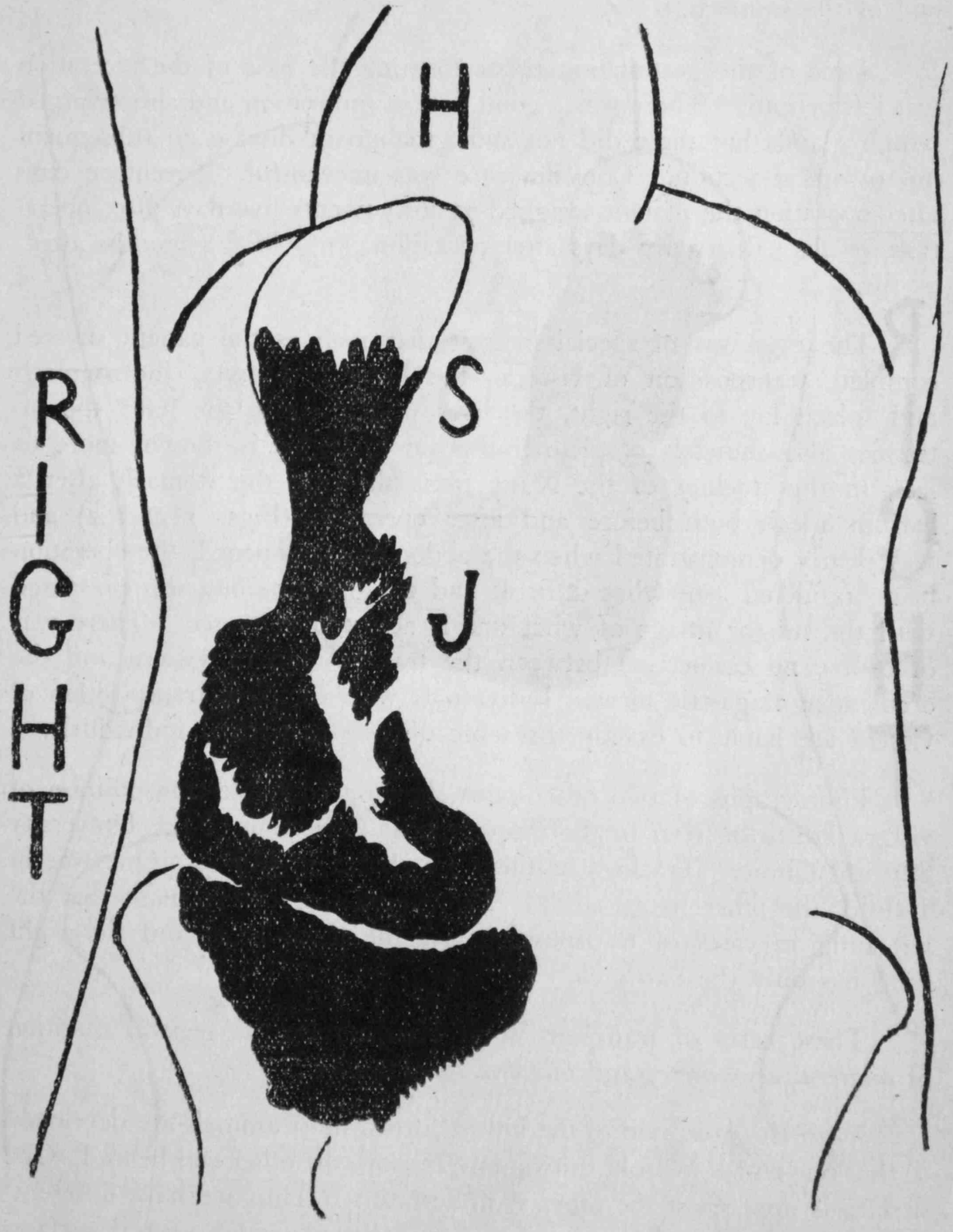


Fig. 2. Tracing of X-ray of Stomach a few minutes after a barium meal taken some weeks after operation. Note the right sided stomach remnant and the gastro-jejunal stoma.

A partial gastrectomy with partial duodenectomy was performed by the Polya-Mayo method, the jejunum over one foot from the flexure being brought in front of the transverse colon to be united to the cut end of the stomach.

Some of the granulation tissue forming the base of the ulceration was left behind. There was a good deal of induration and also enlarged lymph glands but these did not show malignant disease on subsequent microscopical section. Convalescence was uneventful. Seventeen days after operation the patient weighed 71 lbs.: twenty-five days after operation, 78 lbs.; thirty-two days after operation, 81½ lbs.; 4 months after 95 lbs.

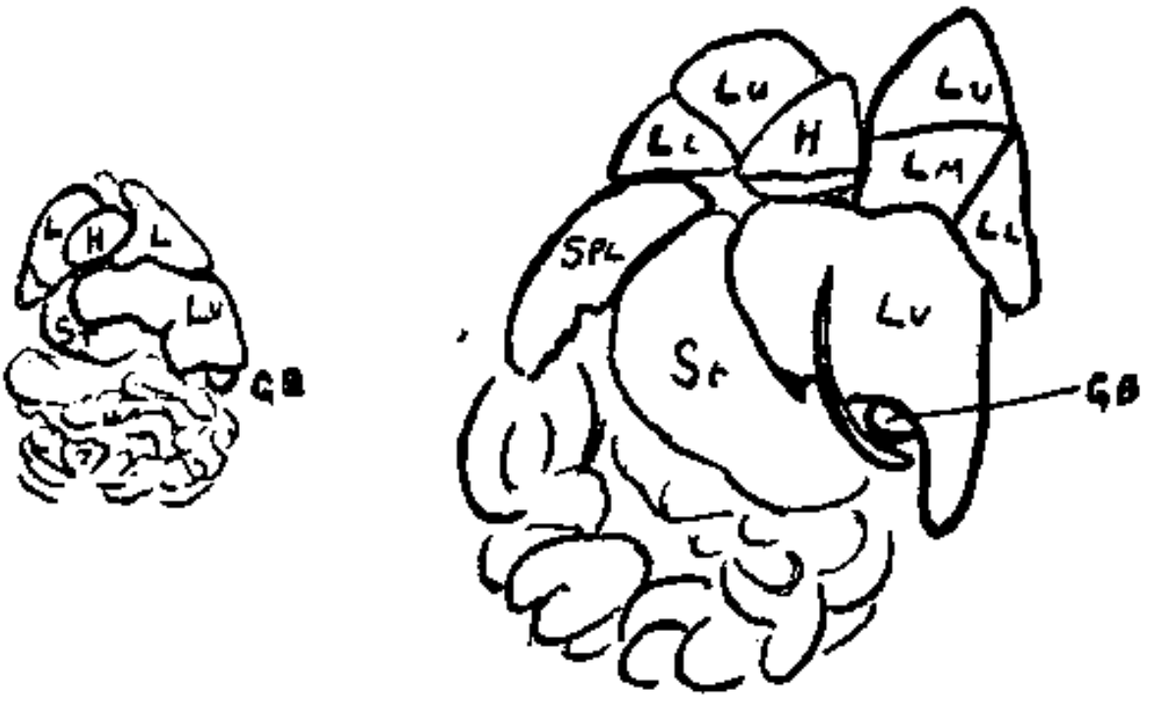
The case was of special interest inasmuch as the patient showed complete transposition of viscera—the heart and aorta, the stomach and spleen lay to the right, the liver principally to the left: the intestines also showed complete transposition. This is shown, more or less, in the tracings of the X-ray films showing the stomach after a barium meal, both before and after operation (Figs. 1 and 2) and was clearly demonstrated when the abdomen was opened, the operation being rendered somewhat difficult and confusing as one was presented with the mirror image of what one is accustomed to see. There was of course no connection between the transposition of viscera and the occurrance of gastric ulcer. Individuals with complete transposition of viscera are liable to exactly the same diseases as normal individuals.

Photographs of two other cases showing complete transposition of viscera are to be seen in the Photographic Collection of the University Surgical Clinic. Tracings of these are shown in Fig. 3. One was in a child, the other in an adult. They show the further point that the left lung in cases of transposition has the three lobes and the right lung has only the two.

These cases of transposition of viscera raise the general question of *bilateral asymmetry* and *bilateral transposition*.

With the exception of the lowest forms, most animals are developed so that one end is in front during progression, the other end behind. One surface is uppermost the other is underneath. Thus we have differentiated a head-end and a tail-end, a dorsal surface and a ventral surface. The two sides with their respective organs and limbs are not differentiated for the most part though, of course, each side is the mirror image of the other. If there is absolutely no differentiation between the two sides the animal is bilaterally symmetrical.

Fig. 3.



A. A child.

H heart.
L lung.
Lv liver.
St stomach.
Gb gall bladder.

B. An adult

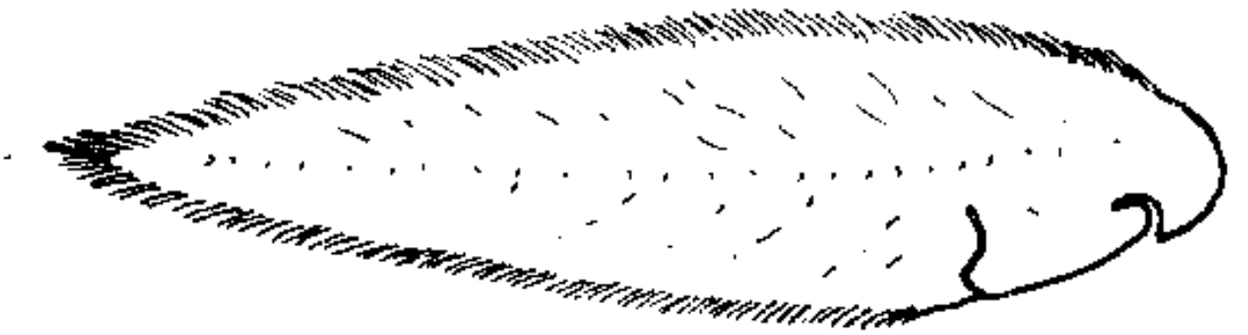
H heart.
Lu upper lobe of lung.
Lm middle lobe of lung.
Ll lower lobe of lung.
Lv liver.
St stomach.
Gb gall bladder.

Sometimes there is a difference between the two sides. The snails (or gastropods) provide a good example of such bilateral asymmetry. The snail's calcareous shell presents a spiral arrangement - generally a dextral or clockwise rotation (Fig. 4a). And this also is shared by the visceral hump contained in the shell, one side of the animal is shorter than the other with suppression of the gill, kidney and other organs on that side and a general resulting asymmetry of the viscera.

In early life the snail is symmetrical, but the weight of the shell and its contents causes the shell to tilt to one side favouring growth on one side and retarding it on the other. The result is a spiral shell. A high conical untwisted shell would be heavy and awkward to a moving animal and uneconomical in material. The advantages of a spiral twist are therefore obvious. The spiral twist is dextral or clockwise in most families or species of gastropods but in a few it is sinistral or counterclockwise (Fig. 4b); whilst dextral forms occur exceptionally in sinistral families and vice versa. The great majority of marine shells such as are seen on the beaches of Hong Kong are

Fig. 5. Asymmetry in Flat Fish.

A. Sinistral type. Left side (upper).



B. Sinistral type. Right side (lower).

C. Dextral type. Right side (upper).

D. Dextral type. Left side (lower).

of the dextral variety, but some land snails in the University Compound show a sinistral turn.

The snails then show both bilateral asymmetry and occasional bilateral transposition.

Fig. 4.

Snail Shell. A. Dextrally twisted (common).

B. Sinistrally twisted (rare).

In the *flat fish (or pleuronectidæ)* such as the Macao sole, a curious form of asymmetry occurs. These fishes are enormously compressed from side to side. They spend much time resting on the bottom of the sea and they always swim with one side uppermost. In some species the right side is uppermost, in others the left side. In others again it is either the right or left side in the same species. The side which has become uppermost is darkly pigmented, the lower side remaining pale. But more remarkable, the eye from the lower side wanders round the top of the head to the upper side thus providing considerable distortion of the skull. (Fig. 5). The advantages to a fish lying on ocean bottoms of having the uppermost side protectively pigmented and provided with the eyes of both sides are clear. The flat fish thus exhibit both bilateral asymmetry and bilatered transposition.

The human body shows two main groups of asymmetry :—

Group A—Thoraco-abdominal Asymmetry: (Fig. 6). (This is shared in some measure by other mammals, birds and reptiles, though in birds the right 4th aortic arch has persisted instead of the left. It is phylogenetically far more primitive than the cerebral asymmetry in group B). The heart and the aorta are chiefly on the left, the superior and inferior vena cava on the right. The right lung has three lobes, the left only two. The liver is predominantly right sided. The gall bladder is on the right, the stomach and spleen on the left; the jejunal coils chiefly left, the ileal more to the right; the appendix and cæcum are right sided, the iliac colon left sided. The pancreas lies transversely across the spine but is quite asymmetrical in structure. The position

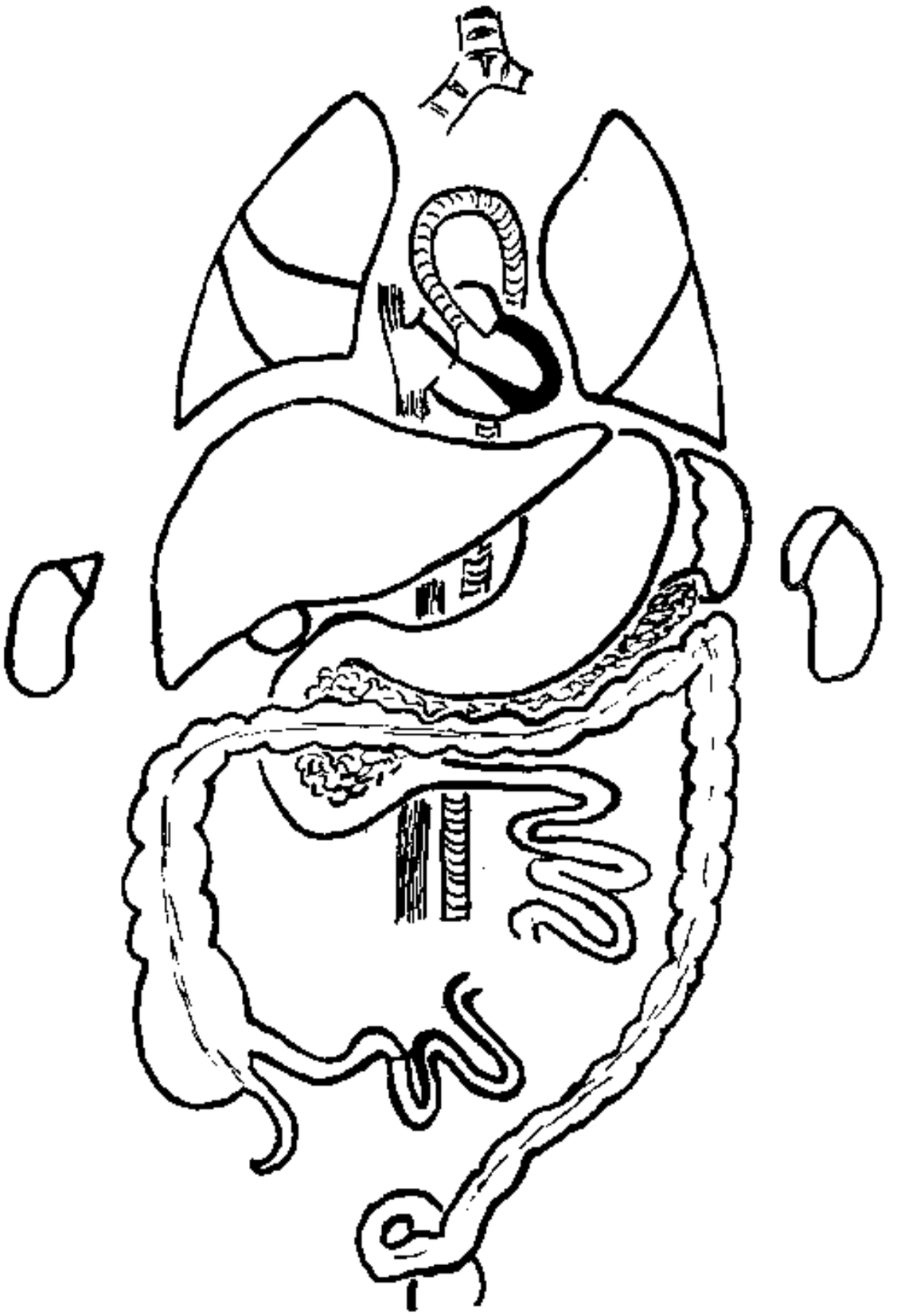
and the shape of the two kidneys and of the two suprarenals is different on the two sides.*

Let us seek the causes of thoraco-abdominal asymmetry. It is easy to see how the various asymmetries enable the viscera to be packed together conveniently. The heart on the left, on the one hand limits the left lung to two lobes, and on the other hand leaves room for the liver on the right, and this leaves room again for the stomach and spleen on the left. But why asymmetry at all? In the case of the heart we can see that the right ventricle is differentiated so as to pump blood through the lungs, the left ventricle so as to distribute blood to the whole body. The latter has three times as much work to do and its wall is three times as thick, and tends to bulge to the left. At birth however, the two ventricles have walls of equal thickness.

In the case of the stomach the asymmetry is necessitated by the anteroposterior gowth of the stomach exceeding the antero-posterior growth of the body cavity. The greater curvature has to swing to to one side, though why the left rather than the right is an unsolved problem. Possibly it depends on the lie of the embryo, the force of gravity determining to which side the stomach is to fall. This rotation of the stomach to the lefr is visible in the human fœtus at the end of the 4th week and is common to mammals, birds and raptiles. It may perhaps therefore be recognised as the key change or the initiator of the thoraco-abdominal visceral asymmetries. At birth the right and left lobes of the liver are nearly equal in size, but as the stomach becomes distended intermittently with food the left lobe grows more slowly than the right.

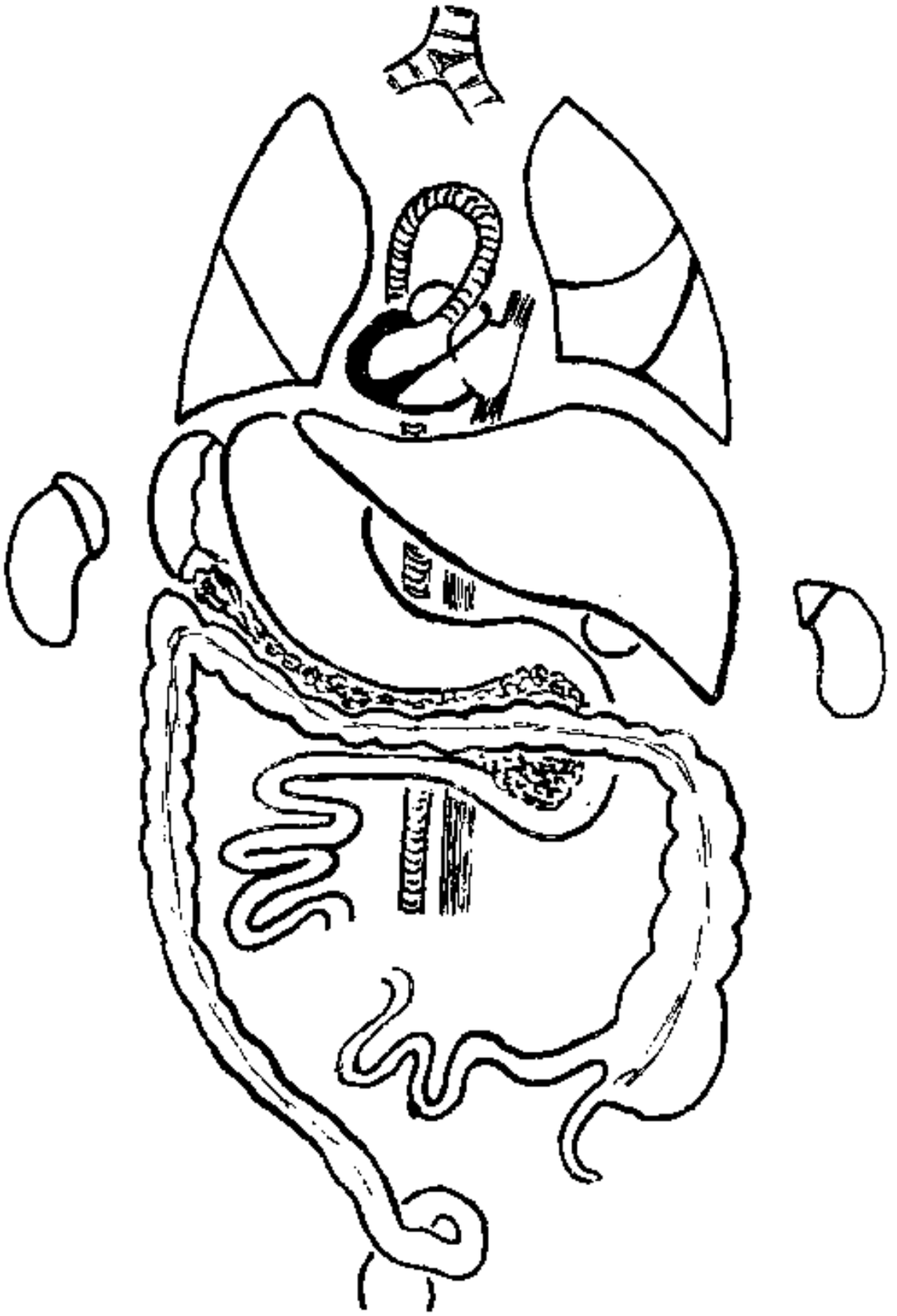
Two distinct abnormalities may occur in connection with human asymmetry:—(*1*) *imperfect developement of the normal asymmetry and* (*2*) *complete reversal of the asymmetry*. Cases of the former affecting thoraco-abdominal asymmetry usually are accompanied by other developmental defects in the heart and have such grave functional disabilities that adult life is rarely attained; (It is hoped to publish

* Other smaller asymmetries occur outside the chest and abdomen:—In the scrotum the left testis hangs lower. In the neck the right lobe of the thyreoid is larger than the left but this may be due to the deviation of œsophagus to the left associated with a left stomach. So, too, the different courses of the two recurrent laryngeal nerves is the result of the asymmetry of the great vessels.



A

Fig. 6. Diagram of Normal Thoraco Abdominal Asymmetry.



B

Fig. 7. Diagram of Complete Transposition of Viscera

an analysis of such incomplete transposition* in a subsequent issue). But complete reversal (Fig. 7), that is, complete transposition of viscera is not harmful and is quite compatible with long life. Confusion in diagnosis may however arise in case of certain illness. Thus appendicitis would produce a left sided tumour, and in some cases the apparent displacement of the heart might lead to the false diagnosis of an empyema. The condition is not extremely rare. In the National Medical Journal of China for February 1928, Drs. Chang and Hsieh in reporting two cases under the title of "Situs Inversus" quote Le Wald as giving the frequency of transposition of viscera as high as 1 in 1,400 as shown by X-ray examination, but as some of the cases were sent to him on account of the transposition having been discovered already, the frequency is more likely to be one in several—or perhaps many—thousand individuals.

It has been suggested that transposition of viscera will occur in one of twin pregnancy derived from the longitudinal division of a single ovum (Adami-Pathology). In our case the patient was not one of twins; nor was there any history of birth abnormality, such as a fetus papyraceus. Of 152 cases of transposition Kuchenmeister (quoted by Adami), found only one twin.

The question of whether transposition of viscera tends to run in particular families has not so far as we know, been investigated.

Group B—Cerebral Asymmetry: This occurs only in man. It consists primarily in greater ability with the right upper limb especially the hand, due to higher development of the left cerebral hemisphere. With this is associated the location of the speech centre in the left cerebral hemisphere, also possibly the development of the right master eye, and, further, greater ability with the right lower limb. As a consequence the right limbs may show greater muscular and bony developement than the left. The presence of the confluens sinuum (or torcular Herophili) on the right has been thought to be associated in some way, but this is not certain. Probably many of the intellectual faculties are asymmetrically situated. The gross structure of the cerebral cortex differs profoundly on the two sides (Fig. 8). This brain asymmetry is likely to become more pronounced in the future evolution of the human race.

These two groups seem quite independent. Thus a left handed man will not be more liable than others to transposition of the viscera; nor will a case of transposition of viscera have more than the normal liability to be left handed. In the case we have reported above the patient was right handed. The matter requires statistical investigations to be firmly established, however.

* Dr. M. K. Yue recorded such a case in *The Caduceus* 1st April, 1922.

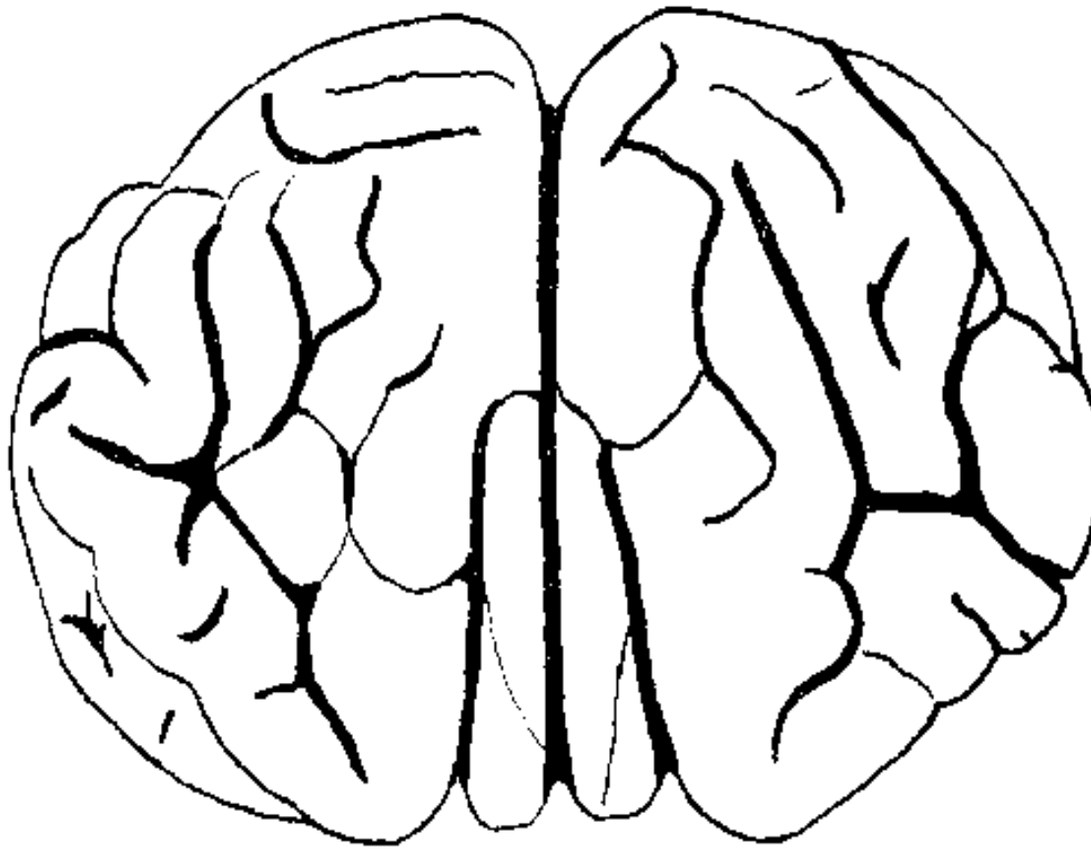


Fig. 8. Cerebral Asymmetry. The orbital surfaces of the frontal lobes of the cerebral hemispheres of an adult Chinese, showing the profound differences in the arrangement of sulci and gyri on the left and right sides.

What is the cause of cerebral asymmetry? The advantages are obivious. It is an economy of effort to specialise one hand for the movements required in the manipulation of tools. As gesture accompanies speech the cerebral centre for speech grows up in association with the hand centre on the more skilful side. Moreover to have higher mental concepts (which are entirely independent of dextro- or lævo-lateral movement) duplicated in each half of the cerebral cortex would be a waste of cerebral substance, a great demand on the intercommunicating fibres of the corpus callosum and would be liable to lead to confusion. (It has been suggested that stammering is due to the interference of some such dual control). As the intellectual developement of the race proceeds, this asymmetry is bound to increase, and the structure of the two halves of the cerebral cortex to become still more differentiated in the future.

It is also easy to see that once the asymmetry is established subsequent generations will tend to repeat it as a direct result of heredity, from the method of being carried as a baby, by imitation, and so on. But the initial bias is still to be sought.

SOME SURGICAL DERANGEMENTS OF THE KNEE JOINT.

by

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The title of the paper that you have been told I would read today is, I fear, a misnomer. On thinking over the subject of surgical derangements of the knee joint, the first type of disability of this area which came to my mind was wounds of the joint. The world war of a few years ago proved in its early days that the methods then in vogue of dealing with such accidents were hopelessly inadequate and did not follow the dictates of the pathology of such injuries. So I thought it better to deal fully with one disability of the joint, more especially as it is a very important one, than to merely touch lightly on several types of derangement; also the treatment of wounds of joints covers a fairly wide area of surgery, for what there is to say about the correct procedure in dealing with an infected or potentially infected wound of the knee joint applies of course equally well to all other large joints and also in its essentials to all wounds or injuries, especially to the early treatment of compound fractures of long bones.

That we should be fully *au fait* with the appropriate treatment of severe wounds of a limb is highly important, for inappropriate treatment is likely to lead to the death of the patient or at least, is very likely to lead to loss of a limb by amputation.

In this distressful age of world strife, it is, I suppose, unfortunately not improbable that you and I may at any time be called upon to treat a large number of cases suffering from severe wounds of battle, but even without that probability a sufficient number of grave injuries to limbs and joints as the result of accidents in civil life is seen in our general hospitals to warrant a keen knowledge of the treatment we learnt from our war experiences to be the most efficacious.

There were four distinct phases in the development of the methods used in treating wounds of joints.

In the early stages of the war, attention was concentrated on drainage to the exclusion of all other methods of treatment. With the exception of some simple perforating wounds of joints, practically every case suppurated and treatment by incision or by the insertion of large drainage tubes was adopted. In addition, it was usual to irrigate the joint freely at each dressing, often with considerable force, with the result that any protective adhesions that had formed were broken down and consequent spread of infection occurred. To ensure drainage most heroic measures aiming at free opening of the joint cavity were adopted. A good example of this type of treatment was the method in which the ligament patellæ and crucial ligament were divided and the

knee put up in extreme flexion. The results of these methods were lamentable: the death rate for the large joints was very high, the amputation rate was enormous, 60% for uncomplicated cases and 80% for those associated with gross injuries to adjacent bones and in the so called successful cases, the eventual functional result left much to be desired.

So much for the first phase. Early 1915 saw the beginning of the new treatment which with certain important modifications did so much to bring this class of casuality to a successful convalescence. The extreme inefficiency and harmfulness of drainage tubes in a joint cavity were recognised and it was clearly shown that better results were obtained by arthrotomy with drainage down to but not into the joint cavity. The points that were insisted on were as follows:—

1: Early and adequate immobilisation of the joint on a suitable splint with extension.

2: Excision of the infected soft parts.

3: Lavage of the joint.

4: Closure of synovial membrane and capsule by suture.

The third phase appeared in 1916 and was characterised by the introduction of the Carrel-Dakin method of treating wounds. This led to an appreciation of the prime importance of early excision of the infected soft parts as an essential feature in successful wound treatment.

The fourth phase saw the perfection of the methods which I have already briefly outlined. The early and free excision of the injured area had become the standard method of treatment and much work had been done with a view to effecting primary or delayed primary suture in as many cases as possible. The results of this appropriate early treatment quickly showed a large decrease in the mortality from wounds of joints, and similar decrease in the amputation figures, and, with improved devices to allow of early mobilisation, the ultimate disability from a wound of the knee joint was very greatly diminished, and apart from those cases associated with severe bone injury or marked sepsis, very little restriction of movement eventually resulted.

Permit me now to consider the details of the treatment of a wound of the knee joint together with the main features of the pathology of this condition. The knee joint is the largest joint in the body and its large area of synovial membrane renders septic infection especially dangerous owing to the absorption of toxins. The joint is roughly divided into three pouches, namely: the subcrureal pouch, the anterior pouch and the posterior pouch. Of these, the subcrureal pouch may be divided partially by septa or folds of Synovial Membrane, the anterior

pouch forms one irregular cavity and the posterior pouches communicate with one another, so that infections unless limited by the formation of adhesions tend early to become general. Of the many bursæ in the neighbourhood of the joint, that under the semi-membranous muscle communicates freely with the joint; of the others, those that do communicate do so by narrow openings, only which are readily sealed by inflammation. The complexity of arrangement of the Synovial Membrane acts in two ways: first, it tends to limit sepsis to one compartment of a joint in the *early* stages of infection and secondly it makes sterilisation difficult, if not impossible, in the *later* stages when the infection is diffused throughout the joint cavity. Synovial membranes have a greater capacity for overcoming infection than is often imagined and further have a good power of repair. This repair is effected by the formation of plastic adhesions, which, while preserving the limb, tend to cripple joint movements. These adhesions form very rapidly and have in some cases been observed in a fine fibrinous form within twelve hours of the injury. The power of resistance possessed by the Synovial Membrane depends in part on the epithelium lining it and in part on the character of the synovial fluid, and gross changes in the synovial exudate are marked by an exacerbation of symptoms and often by septicæmia. For these reasons any powerful antiseptic likely to injure the epithelium or to inhibit the formation of the synovial exudate is to be avoided in the treatment of injuries to joints.

The articular cartilages are nourished partly through the bone over which they lie and partly through the synovial fluid bathing them. Changes in the synovial fluid may greatly impair the nutrition of the cartilage which becomes thicker and softer. Actual erosion of the softened cartilege is a secondary phenomenon, due in most cases to pressure. It is avoided, or at least much diminished by early and adequate extension. The importance of bruising of the cancellus tissue at the end of the bone forming the joint must not be overlooked. Bruised tissue is especially prone to be attacked by sepsis and, in the case of bone, a spreading osteomyelitis is very apt to occur.

All these pathological features have of course an important bearing on the treatment and ultimate prognosis in the case of injuries to all joints.

The first aid treatment of a wound of the knee joint is simple but highly important, and it consists of sterilisation of the surrounding skin with iodine and the complete immobilisation of the limb by means of a Thomas' splint and extension. A patient thus treated at the scene of the accident will travel with a maximum of comfort in any conveyance which allows of the recumbent position and over any country. Primary shock will be much diminished and secondary shock avoided.

On the arrival of such a patient in hospital, his case should be regarded as urgent and as requiring early operation. There are only two factors which, I think, warrant any delay in dealing with these cases on the operating table. One is the suspected retention or presence of a foreign body in the joint when the patient is at once X-rayed and the F.B., if present, is accurately localised. The other is the presence of marked shock when the usual methods of resuscitation should be urgently administered.

The patient is then taken to the theatre and anæsthetised. It is my practice in these and all similar cases to take the patient to the theatre direct from the ambulance in his ordinary clothes, and with the splint *in situ* if one has been applied and to remove these only when the patient is fully under the anæsthetic. As regards the latter, in those cases where shock is a marked feature gas and O. is the ideal anæsthetic, stovaine and spinal anæsthesia are also useful, while in all straight forward cases ether is as good as anything. At operation the most careful aseptic technique is essential. A wide area of skin must be prepared and two sets of instruments are necessary, one for the preliminary excision of the infected tissues and the other for the toilet and closure of the joint. A tourniquet is of value in wounds involving the joint alone as its use of course gives an undobscured view and prevents blood flowing over infected tissue into the joint cavity. Tourniquets, however, may cause harm when there are associated muscle injuries, and are especially contraindicated if there is the least sign of incipient gas gangrene. The wound itself is treated by excision, *en masse* if possible, down to and including the injured S.M. Bruised and lacerated tissues are all freely removed and all blood clot lying in and around the wound is lifted out with forceps. The excisions must be performed clearly and freely with a sharp scalpel and never with scissors which tend to cause bruising. The ideal instrument to use is the safety razor blade scalpel. The next stage is the irrigation of the joint. A non-irritating fluid is essential, one that will not injure the epithelium nor influence the normal formation of synovial fluid. Normal saline, flavine (1—2,000), or eusol and saline in equal parts are all suitable. During irrigation the joint should be moved so as to ensure that the fluid reaches all parts of it; free irrigation will often dislodge a retained or unlocalised F.B. and is especially useful for the removal of fragments of clothing and other material which may have been driven into the wound at the original injury. Bruised and therefore potentially infected bone, visible in the operation area, should be gouged away until free general oozing occurs. The resulting cavity is dried with spirit, lightly smeared with B.I.P. and if possible is excluded from the joint by a flap of Synovial Membrane. The joint cavity has now been completely cleaned. The next step is the accurate closure of the joint. A clean set of instruments and towels is taken and Synovial Membrane and capsule are sutured with

catgut so as to close the joint cavity completely. For extensive wounds, where complete excision of infected tissue has left a large cavity, this may be difficult, but undercutting the Synovial Membrane of the subcrureal pouch will cause usually sufficient mobilisation of the membrane to ensure adequate closure. If complete closure is impossible, the wound should be packed with gauze soaked in sterile liquid paraffin which prevents oozing and promotes closure of the joint by adhesions. A bulky dressing is then applied and is fixed by firm bandaging. The skin and fasciæ are of course also sutured completely, though some advocate, the use of a small "glove" drawn down to the capsule.

The Thomas' splint with extension is then applied and a full prophylactic dose of antitetanic serum given subcutaneously.

The above procedure applies to all cases seen within 18 hours of the accident. Cases coming under treatment after this period of time has elapsed should be treated by this method up to a certain point, *i.e.* the wound is excised as soon as possible and Carrel-Dakin tubes are inserted. It may be necessary to make additional openings into the joint so as to ensure that the fluid reaches every recess. The Carrel tubes should be changed on the second day and removed on or about the sixth day, provided that the general condition is satisfactory. Secondary suture may be performed two to three days later and this should be done, if possible, without removing the splint as any excessive movement is liable to light up infection.

Now to go on to the after treatment. In those cases that have been thoroughly treated within a few hours of the injury, we expect a primary union and no alarming symptoms. As soon as the wounds are healed, generally about the eighth day, movements of the joints are commenced. They should at first be very gentle and one daily movement of flexion and extension only should be performed for the first few days. During this time a careful watch is kept to see that these movements are not lighting up infection, and if no resultant reaction occurs, free manipulation is permissible, followed by massage, active movements and electrical stimulation of the muscles, so that in from three to six weeks free normal use of the joint is established.

So much for the patient who makes a normal convalescence. In spite of all we can do, we must meet cases which exhibit serious symptoms a day or two after operation. Here the general condition of the patient is noted as shown by the tongue, pulse, temperature, appetite and sleep. Insomnia, anorexia and a rapid pulse are all bad signs though the local condition may appear good. Examine the joint. A red angry margin to the sutured wound, effusion into the joint with pain and œdema of the limb below the knee are all signs that all is far from well inside the joint. Next examine your splint, and readjustment of it and of the extension should

if necessary be done at once. Very often pain pyrexia and exudation abate with complete rest and immobilisation.

When persistant effusion is present and does not abate as a result of immobilisation and extension, aspiration of the joint is indicated. This should be done very carefully and preferably under nitrous oxide or general anæsthetic. The needle is inserted at some convenient spot well away from the wound and as much fluid as possible is withdrawn. This fluid must be examined bacteriologically and cytologically but naked eye examination also often gives a rough indication of the degree of infection.

A straw coloured fluid with flakes of lymph in it indicates normally a mild infection only. Turbidity of the fluid is a grave sign showing more advanced infection and the formation of pus. Unhæmolysed blood, except that it is a good pabulum for organisms, is not of very grave import; the presence of hæmolysed blood on the other hand is a distinct danger sign and is almost always due to an infection by the streptococcus hæmolyticus.

The cytological examination of the fluid gives information as to the nature, numbers and relative proportion of the cells in the exudate. Stained films should also be made so as to determine the relative proportion of organisms to cells and the action of the cells in the fluid. Preponderance of mononuclear cells indicates a mild degree of infection, while excess of polymorpho-nuclear cells is of grave significance. A large number of organisms in each field gives evidence of a severe infection; a relatively small number, especially if staining badly or partly intracellular, shows that the infection is mild or has been overcome. Identification of the organism by bacteriological examination is of great importance as the prognosis and line of treatment depend largely on the nature of the infection. Those most commonly found are staphylococci and streptococci, the latter being by far the more dangerous.

If in spite of immobilisation, aspiration and so on, there is persistant pain with pyrexia and rapid pulse, and especially if bacteriological results show the presence of streptococci, there must be no delay in freely opening the joint and instituting Carrel Dakin treatment. Many cases show prompt abatement of symptoms, but if this does not occur within 36 hours, amputation is indicated before the patient's condition has deteriorated too far.

When aspiration and subsequent examinations of the exudate prove the infection to be a severe one, I have said that the only method likely to save the limb is free arthrotomy and the introduction of Carrel tubes. To open the joint freely, both anterior and posterior incisions are necessary. The anterior incisions are made ¾ to ½ an inch from the margin of the patella and extend from the upper part of the

subcrureal pouch to the upper surface of the tibia. The posterior incisions are made by thrusting a pair of sinus forceps backwards into the popliteal space: on the inner side the point is just external to the inner head of the gastrocnemius, and on the outer side just internal to the outer head of that muscle. The skin is divided freely over the point of the forceps in each case and the incision in the soft parts is cautiously extended up and down. Carrel tubes are then inserted as follows: two into the upper part of the subcrureal pouch, one on either side of the patella, one beneath the ligament patellæ and two on either side leading down to the posterior incisions. Regular instillations of Dakin's solution are then commenced, the limb being carefully immobilised on a Thomas' splint with extension. The tubes are changed every second or third day. It is impossible to lay down a time when they can be dispensed with: it all depends on the symptoms of the patient. But if the infection yields at all to this treatment, it is usually feasible to remove them altogether at the end of a week. There is a great liability for secondary abscesses to form outside the joint. These should be freely opened and drained as soon as detected.

Failure of symptoms to resolve means an urgent consideration of amputation. The decision to take this drastic step requires a very fine judgement and the only really positive indication for it is the onset of septicæmia. Every other case must be judged and dealt with on its merits. Disarticulation at the knee joint by the guillotine method is the amputation associated with least shock, but there is a great liability to secondary hæmorrhage from an unprotected popliteal artery and in any case a secondary amputation is necessary in all cases treated in this way. A supracondylar amputation is therefore to be preferred when the patient's general condition permits.

In conclusion, gentlemen, let me give you the details of a case which was under my care shortly before I left England. A soldier riding a motor bicycle collided with a motor car in a "head on" collision, and it would appear from the injuries he received that his right knee was forcibly struck by the radiator of the car. I saw him two and a half hours after the accident. The limb had been put up in a Thomas' splint with extension and I was told that he had a severe wound on the anterior aspect of the knee joint with a comminuted fracture of the patella and also a compound fracture of the femur at the junction of the middle and lower third on the same side. These wounds had been dressed in the usual first aid way. He had a rapid pulse, a cold clammy skin and was obviously suffering from severe shock. On account of this I did not think it advisable to take him to the theatre at once, so he was put to bed in his ordinary clothes, the extension was adjusted, hot bottles were applied, hot coffee with a dash of brandy was given by the mouth and a hypodermic injection

of morphia was administered. I first saw him at 2 p.m., ordered this treatment and said that I would see him again at 7 p.m. on the same day with a view to immediate operation. By this time his general condition had much improved and he had slept for 2½ hours. This I attribute to the careful readjustment of the extension, which was not adequate when the patient first arrived in hospital, rather than to the other resuscitation methods I have mentioned. Pain is a great cause of shock and there is nothing so efficacious as adequate extension in injuries of this kind for its relief. The patient was anæsthetised, clothes and splint were removed and the area round the wounds was shaved and cleansed. A glance showed that there was a very severe degree of comminution of the patella with laceration of the capsule of the knee joint; a portion of the femur was also protruding from the wound in the thigh. The latter wound was first dealt with. The lacerated skin edges were removed, likewise the underlying torn fascia and muscle. The wound was then scrubbed with ether including the two ends of the broken bone. The cut edges of the muscle and fascia lata were then approximated with catgut sutures and the skin wound completely closed also. Turning to the knee joint, it was found that the patella had literally exploded. The capsule on either side was torn and synovial fluid was oozing from the joint. Such was the degree of injury to the patella that it was not thought possible to attempt to preserve it and its many broken fragments were completely removed. The lacerated edges of skin, capsule and Synovial Membrane were then excised, the wound and joint were irrigated, with hot saline and primary sutures of all layers was performed. Owing to the extent of the opening after excision, it was found difficult to bring the cut edges of the capsule into apposition but by undercutting the Synovial Membrane of the suberureal pouch, this was eventually effected. The wound was then dressed and the Thomas' splint applied with full extension. He did well for 48 hours and then began to exhibit a slowly rising pulse and evening temperature. The wounds were exposed. The thigh wound was healthy, as was also the wound over the knee, but there was a severe degree of effusion into the joint and the patient would not allow it to be touched by any pressure. The joint was at once aspirated under N_2O and 30 c.c. of blood stained fluid was withdrawn. This was examined in the way I have previously explained. The organism was found to be a staphylococcus and an autogenous vaccine was made and given. He was much more comfortable after the aspiration and no further operative treatment was necessary. Both wounds healed by first intention and passive movements were commenced on the 14th day after operation. He was up and wearing a caliper splint on the 34th day. The results after complete removal of the patella seem to be surprisingly good, the joint movements being but slightly affected. This patient had to be eventually invalided from

the army, but the Medical Board and Ministry of Pensions assessed his disability from a wage earning point of view as less than 20/-.

I have purposely throughout this paper mentioned the word amputation as little as possible, because a large number of cases, in fact the great majority, should be given a chance by the use of more conservative methods. There are of course certain definite indications for primary amputation, *i.e.* amputation when the patient is first seen, old age, general debility, and multiplicity of wounds are contra-indications to conservative methods, as too great a risk to life may be run in attempting to save a severely damaged limb. Extreme comminution of a long bone, associated injury to main vessels and hopeless destruction to nerves are also indications for primary amputation.

In conclusion, gentlemen, let me recapitulate and emphasise the most important points in the treatment of these cases and I would especially again point out that these remarks are applicable not only to wounds of the knee joint or to wounds of any other joint, but to all severe wounds of limbs and with slight modifications to all severe wounds of any part of the human frame. Wounds received in any accident are all potentially infected and once this infection is established, the least one can say is that the convalescence of the patient must be very appreciably lengthened. Therefore our great aim and object in the modern treatment of wounds is the eradication of potential sepsis and the securing of a primary union of the lacerated tissues.

Therefore, gentlemen, treat all and cases as emergencies, i.e. operate at once on the lines laid down previously. Be thoroughly aseptic in your technique; be thorough in your excision; and finally in wounds of limbs associated with joint injuries or with fractures be sure that your splint is properly applied especially with regard to adequate extension, for I repeat, there is nothing like properly applied extension for the relief of pain in these cases.

RADIUM.

ITS PROPERTIES AND ITS PLACE IN TREATMENT.

S. W. Phoon.

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Despite the increase of knowledge among the laity and the profession, the incidence of cancer and the rate of cancer mortality are seemingly on the increase. A study of the statistics from various sources is both illuminating and disquieting *see Table I.*

Working with the statistics of hospitals in Sumatra, Dr. Snijders is of the opinion that the cancer incidence and mortality rate are no less among those Tropical races than they are in Europe. In other words, there seems to be a gradual increase of cancer in all parts of the world.

It is fair to point out, however, that most of these statistics are taken after every ten years or so when possibly the population too will have increased correspondingly. As long ago as 1893 King and Newsholme asserted that the increase was due to better certification of the causes of death and a more recent paper by Wilcox contends that the apparent increase is due to more correct diagnosis which modern methods of examination permit in regions hitherto inaccessible for clear diagnosis. That there is some truth in this cannot be denied. Hitherto it has been thought that the cancer incidence was greater in the female simply because the two common sites of its occurrence—the breast and the uterus readily attract the attention of the patients themselves and permit of more exact diagnosis by surgeons. But a detailed study of the statistics seems to show that the number of cancer cases are being increased by figures of the disease occurring in regions which hitherto have been difficult for clear diagnosis—to wit the stomach and liver which head the list of nearly all the statistics. The increase must therefore, in part at least, be due to this better and more exact diagnosis which the finer modern methods permit. The following table *see Table II* will perhaps bear out these points more clearly.

On the other hand, the opinion of the majority of experts seems to be that the cancer incidence is actually, insidiously and alarmingly increasing. Between these extremes of views, the truth will probably be found. The evidences of both views are carefully weighed by Prof. Greenwood in his admirable paper on "A review of recent statistical studies of cancer problems."

Be that as it may, it is safe to assert that while cancer may not be increasing, it certainly is not diminishing, and any discussion on this important subject—(important because yearly so many die such unpleasant deaths from it)—must be of interest both to the laity and

TABLE I.

Statistics of Cancer Mortality.

Sources	Year	Total of Cancer Deaths	Male	Female	Percentage of all deaths	Deaths per 100,000 of population
Switzerland.	1914	4,735				
	1924	5,421				
	1925	5,319				
	1926	5,358	..	..	11.5	137.7
Germany.	1921	55,056	24,109	30,947	..	163
	1925	63,564	27,977	35,587	8.5	203
Russia.	1886	..	..	..	..	76.5 (Petrograd only)
(Moscow and Petrograd.)	1894	..	..	..	..	179.4
	1904	..	..	..	..	198.0
	1914	..	..	..	..	177.8
	1924	..	..	..	..	201.3
Austria.	1924	8,784				
	1925	9,146				150.7
Denmark.	1923	4,636				
	1924	4,690				
	1925	4,708	..	..	12.7	137.6
England and Wales.	1923	48,668	22,065	26,603		
	1924	50,389 (highest on record) in that country	23,099	27,290		118.5

TABLE II.

Distribution of the Cancer Mortality.

Sources	Year	Total of Cancer Mortality	Sites	Males & Females	Females only	Percentage of all cancer deaths
England and Wales.	1923	48,668				
	1924	50,389	Stomach and Alimentary Canal	26,607	..	52.9
Maryland (U.S.A.)	1924	1,208	Stomach & Liver	559	..	46.2
			Female Genitalia	..	238	19.7
			Intestines	186	..	15.3
			Female Breast	..	164	13.5
Lisbon.	1920	417	Stomach	124	..	29.7
			Female Genitalia	..	77	18.4
			Female Breast	..	34	8.1
South Ireland.	1925	2,801				
	1926	3,021	Stomach	686	..	22.7
			Rectum	119	..	3.9
			Breast	..	252	8.3
			Uterus	..	146	4.8
Victoria (Australia)	1925	1,635	Stomach & Liver	593	..	36.2
			Female Genitalia	..	153	9.3
			Female Breast	..	150	9.1
			Intestines & Rectum	117	..	7.1

the profession. To my younger readers of the Medical Society too I trust the discussion will not be unprofitable, and for that reason I shall go more into the elementary aspects of the subject than I need perhaps have done.

WHAT RADIUM IS.

It is curious how one discovery will often lead on to another. In 1895, Prof. Rontgen of Munich, discovered the Rontgen Rays—so

named in honour of the discoverer. These rays are better known as X-Rays—so called because their properties were little understood. His discovery led Prof. Becquerrel of Paris to find uranium which was announced to the world in 1896. This in turn attracted much attention and study, and among those whose interest was thus awakened were Prof. Curie and his equally brilliant wife. They noticed that pure uranium was less radio-active than in the crude form. They rightly surmised that there were other minerals in the crude form which were responsible for this difference of radio-activity. With a ton of uranium, they patiently toiled for six months and in the end were rewarded with the discovery of two other minerals from uranium—one they called Radium and the other Polonium—in honour of Madame Curie whose home was in Poland. To-day we know of at least five radio-active elements—Uranium, Thorium, Radium, Polonium and Actinium. Of these Radium will principally interest us.

It is a mineral of fabulous price, many times dearer than gold, and out of a whole ton of uranium or pitchblende not more than two or three grains of Radium can be obtained after six months of hard work. It is said that there are about 150 grammes of pure Radium in the whole world and the cost of 1 gramme is £11,500! Radium is present in many mineral springs and in the sea, but commercially, it is obtained from Austria, Belgium Congo, Cornwall in Great Britain, and other parts of the world.

Its Physical Properties.

If a piece of Radium is placed in a dark room, it is seen to give off light and is spontaneously phosphorescent acting on a photographic plate. This property it can induce in others placed near it and the radio-activity thus induced and acquired remain for some days even when the Radium is removed. The radio-activity of Radium is due to 3 chief varieties of rays.

1. *Alpha Rays*—which constitute 91 per cent. of all the rays of Radium. According to Prof. Rutherford they are readily absorbed by an aluminium plate $\frac{6}{1,000}$ inch or by a piece of mica, or even by a sheet of paper. Except for the treatment of superficial skin conditions these rays are little utilised because of their poor power of penetration:

2. *Beta Rays.*—Constitute about 7 per cent. They have a range of 6 or 8 m.m. and within that limit are very effective. They are absorbed by an aluminium plate 5 m.m. thick or by a piece of lead 1 m.m. thick or by 2 c.m. of tissues. When used as unfiltered radium, they are filtered out by the surrounding tissues which undergo destructive changes from the proximity of the rays.

The Beta rays and the secondary rays only are capable of producing inflammatory changes, and can be entirely filtered out by half an inch thick of felt.

3. *Gamma Rays.*—Constitute 2 per cent. and in many ways resemble the X-Rays. They can penetrate an aluminium plate 5 m.m. thick or a piece of lead 1 m.m. thick, and are frequently used in treatment. When passing through a metallic screen they produce secondary rays known as the "rayons de Sagnac," which have low penetration and may produce an erythema. In practice, therefore these harmful rays are filtered off by wrapping layers of papers around the screens. The experiments of Wood and Prime have shown that the gamma rays when used alone—(by interposing 2 c.m. lead screen or 1 m.m. platinum screen)—are very much less effective than when combined with the Beta rays. Bumm of Berlin points out that the effective radius of gamma rays extends only to about 4 c.m. of tissues, but this point is not universally accepted.

Physicists tell us that the Radium rays are the result of the decay of the element, but they have tremendous energy and selective destructive action which is utilised in the treatment of malignant growths.

EFFECTS OF RADIUM IN TREATMENT.

To know the possibilities and limitations of Radium it is important to understand how it acts in living organisms. On this point unfortunately, our knowledge at present is imperfect, but it may be said to have two main actions—a general and by far the most important a local action on cancer cells. It is said to have a selective action because it seems to act more effectively on certain cells than on others. In their work with X-Rays, two French radiologists observed that young growing cells in a state of active division are more sensitive to radiation than mature ones and this observation is often referred to as the law of Bergonié and Tribondeau. Perhaps in view of this observation, it would be more correct to interpret the term "selective action" as meaning the varying degrees of resistance offered by different types of cells —the mature ones being more resistant than the immature ones. Handford suggests the term "selective absorption" of radium by the cells, as Radium acts on all tissues alike.

When these are exposed to the Radium rays they react according to the intensity of radiation: With small doses, growth of cells are stimulated, although this stage may be preceded by one of inhibition. With large doses, sloughing of tissues may take place. With properly adjusted doses, there is a stage of inflammation on the subsidence

of which a barrier of fibrous tissue forms. This fibrous tissue is more readily formed with X-Rays than with Radium. It helps to limit the spread of a growth, and if the contraction of the fibrous tissue occurs quickly, the cells within the barrier are rapidly deprived of their blood supply and die. When the process is slower, atrophy occurs. In laboratory experiments, it has also been observed that with small doses acting on embryonic tissues, their growth may be interfered with and abnormalities result. In this way, monsters have been produced in laboratories (Greenough).

The histopathological changes have been studied by various workers including Haendley and Hansemann. Soon after radiation, the exposed tissues at first show merely a difference in electrical conductivity but no apparent macroscopical changes. The protoplasm of the cells then swells, the cell nuclei degenerate and are replaced by pigmented particles—(hyperchromatosis). This occurs from seven to fourteen days after irradiation. The nuclei are then destroyed—(karyolysis) and the cells share their fate (cytolysis). Their remains are removed by leucocytes, and their places are taken by the proliferation of connective tissues and scars.

Conclusive proofs are not yet forthcoming that radium, has any specific constitutional effects in man but Levin's experiments with animals are very suggestive. He exposed turtles to the influence of radium and found that the blood count changed from the usual of 3—10 per cent. of polymorphs and 90—97 per cent. of lymphocytes to a reverse of 80 per cent. polymorphs and only 20 per cent. lymphocytes. This result was also obtained in experiments with frogs. Into a normal frog he then injected an emulsion of yeast, and the result was similar to that obtained by radiation alone, and remained so for a few days. This result was in no way altered by radiation of the frog 24 hours after.

The yeast apparently had similar action as Radiation. From these experiments, Levin concludes that lymphoid tissues, especially diseased ones, are more highly susceptible to radiation—whether by Radium or the rontgen rays and that the lymphocytes thus disintegrated liberate specific enzymes. Radium irradiation, therefore does not merely act locally but also produces general or constitutional effects.

Moriarta found that following on the use of Radium, there is an increase of red blood corpuscles, haemoglobin, and the power of elimination, and Levin claims to have seen many cases in whom after exposure of the growth in one axilla, that on the other side also subsided.

I can hardly believe that the effect of Radium is purely local, because one often meets with cases that look hopeless at the beginning and yet respond really to treatment, while others that look more hopeful may end disappointingly. Again, two patients may even present

clinically similar growths and yet react unequally. This individual variation is undoubtedly one factor which explains the conflicting views as to the efficacy of Radium as a therapeutic agent. The explanation seems to be that it needs something more than local reaction to bring on favourable results, and that "something" is the general or constitutional reaction.. It is interesting to note also that from a report which just came to hand of the recent International Cancer Conference held in London, it is stated that the work of Prof. Leitch on the Rous tumour tended to confirm the enzymic character of cancer. At the same conference also, Dr. Knox said that in the past little attention had been paid to the indirect (general) action of Radium. Systematic blood counts in his cases, had been a valuable guide to him in gauging the dosage—a drop in the lymphocytic count being a warning that the treatment has been too vigorous.

As a rule, following on radiation, the patient suffers little or no discomfort. What discomfort if any, consists of mild nausea lasting for about 24 hours and general weakness lasting for a few days. If the reaction is severer, the patient has also vomiting and loss of appetite. These symptoms, being disturbances of the gastro-intestinal tract, may also appear with X-Ray irradiation, and are treated by doses of Sodium Bicarbonate by mouth, free saline purgatives and copious imbibition of fluids to promote elimination; while happily, it is only in 25% of cases that these mild symptoms do occur at all, I have seen at least one advanced case in whom the reaction was pretty severe. In such cases, treatment is stopped for a few days until the reaction is over. Codeine in one grain doses by mouth has given good results.

With insufficient screening or overdose, a Radium burn may be produced. This may take one of two forms. First, it may appear as an acute dermatitis—varying in degree from a mere erythema to deep ulceration, and necrosis of skin. Secondly, the Radium burn may become a chronic dermatitis and end in malignancy. Such a burn is more likely to be produced with X-Rays than with Radium, and when ulceration occurs, it is both troublesome and obstinate.

While the majority of workers disagree, Hunter believes that in some cases Radium lowers the patient's resistance and produces a condition of carcinomatosis with widespread dissemination.

To the radiologists too Radium is not without risks. Sterility, from insufficient protection of the workers is not an unknown danger, while malignancy supervening on a chronic Radium burn, has translated many into martyrdom. To these dangers must now be added the new and insidious effect of Radium, in the causation of aplastic anæmia —from which Dr. William Bruce and three workers at the London Radium Institute have since succumbed.

In homilectical language, therefore, it may be said, that Radium treatment like matrimony "is not by any to be enterprised, nor taken in hand unadvisedly or lightly . . . . . but discreetly advisedly and soberly, . . ."

In speaking of the effects of Radium in treatment it should be remembered that soon after irradiation there is a variable latent period, in which no macroscopical changes are noticeable, but as has been mentioned before there is a difference in the electrical conductivity of the tissues. This latent period usually lasts two weeks, but may be as as long as three weeks. The variability of this period depends on many factors, including the type of Radium rays used, the duration and strength of the applicator and the unknown personal factor. Finzi believes that this period is important for studying the mode of action of irradiation.

FORMS AND METHODS OF APPLICATION OF RADIUM.

In treatment, pure Radium is not used, but instead one of its salts—e.g. Radium Bromide, chloride or Sulphate. The salt, may be kept in an applicator in the form of a glass tube encased in a thin envelope of platinum 0.4 m.m. thick and over all this is a small rubber bag 3 m.m. thick.

The salt may also be kept in hollow needles 0.2 to 0.3 c.m.s. long and threaded so as to facilitate their recovery. It is more convenient, however, to use Radium in the form of a gas or emanations as Rutherford calls it. The salt is dissolved in weak acid and the emanations are pumped off daily by a mercury pump into thin glass capillaries which are then hermetically sealed to prevent the escape of the gas. The dissolved salt will then become the stock solution from which emanations can be drawn off daily, but will not appreciably diminish in quantity. In other words there will always be the same amount of Radium as at the beginning. One great advantage in using radium in this form is that the applicator can be made into any size and shape as desired. Thus frequently the fine glass capillaries containing the emanations are buried and left for varying periods of times in the depths of a growth. They may be so arranged as to produce what radiumlogists call a cross fire which makes them more effective but the emanations being of a gaseous nature gradually fade and wane until in about five days they pass off altogether.

For the treatment of skin conditions, Radium is applied through a flat applicator one side of which has been varnished with a mixture of lacquer and Radium salt. The alpha and beta rays are filtered off by another disc of metal 1 to 2 m.m. thick and the whole is covered over with rubber to cut off the secondary rays.

It has also been observed that Radium is present in the waters of Bath (England) and Saratoga (U.S.A.) and in many mineral springs

and health resorts of a similar nature on the Continent and elsewhere, and undoubtedly some at least of the virtues of these places, are due to the presence of Radium. Dautwitz was the first to treat diseases such as gout and myalgia with baths to which varying amounts of uranium pitch—ore containing Radium have been added. Since then with better knowledge of the properties of Radium and finer methods of giving it many including Prof. William His of Berlin have followed along similar lines. Löwenthal, of Brunswick, however points out that the virtues of these baths are not due so much to the contact of the radium-activated water with the patient's skin as to the emanations which as Prof. His maintains, being gaseous in nature are absorbed by the alimentary canal and still more readily inhaled by the lungs. On this principle, therefore emanators have been constructed by Löwenthal and Gudzent.

In cases of gout, arthritis deformans and intermittent claudication, Moriata subjected his patients to a course of treatment lasting six weeks, and comprising of daily inhalation for two hours of Radium in an emanatorium the atmosphere of which contained 270 Maché units of Radium to 1 litre of air. In addition to this, patients are encouraged to drink copious quantities of radio-activated water, one-litre of which usually contains 113,000 Maché units of Radium. As a rule they imbibed about half a litre, and in certain cases where necessary, salts of radium have been injected intravenously. These are some forms in which Radium have been used.

Dosage of Radium.

For the purposes of treatment, it is important to be able to modify and regulate the radium to suit each type of disease and patient. There are five usual ways by which Radtium can be thus adjusted.

1. *By the quantity or amount used*—whether in the form of needles, tubes or flat applicators. When the salts are used, the measurement is in terms of grammes or milligrammes; where the gas or emanations are used, they are measured in terms of curies or millicuries. On an average, it may be said that one gramme of Radium element will yield about one curie of emanations daily; while one milligram will yield one millicurie. It is obvious therefore that the more the radium salt or emanations are used the greater is the dose. Sometimes by a judicious arrangement of the applicators, needles or glass capillaries, a cross fire effect may be produced and this gives a maximum of intensity with a minimum of radium. For cancer cases, it is necessary to have at least 50 milligrammes of radium (Finzi).

2. *By filtration* or screening the effect can be further controlled or modified. It is necessary to protect the skin, to prevent secondary radiations, and to permit or obstruct the passage of one or the other types of radium rays. For this purpose, gold, silver, lead, aluminium, brass, leather, rubber, and felt have been used—half inch of the latter being said to be a perfect filter for the Beta and secondary rays. Wickham uses cushions of hydrophillum, one centimetre thick, "sheathed by 2 plates of Hamilton gold-beater's skin," and obtained much success in treating cases of cancer of the skin without any attendant inflammation. As a general rule, it may be stated that for superficial skin conditions little or no filtration need be used: but for deeper effects, where duration of application is necessarily longer, screening will need to be heavier.

In this connexion, it is interesting to note from the researches of Beck and Warner that the tissues act very effectively as filters more than is credited them. They exposed skin (fat-free), fat, and muscle to X-Ray plates and beside them varying thicknesses of aluminium 1.5, 2/5, 3/5 m.m. thick and so on. The density of the shadows thus formed were compared and it was found that the skin (fat free) absorbed as much of the X Rays as is absorbed by an aluminium sheet 3,5 m.m. thick; fat ½ inch thick, had a shadow equal in density to that obtained with an aluminium plate 2/5 m.m. thick: while muscle ¾ inch, had a shadow as dense as that of an aluminium plate 1 m.m. thick. On the ground that so much of the rays of Radium are absorbed by tissues, the experimenters suggested in deep seated cancer removal of as much of the growth as possible and allowing the remainder to be exposed to the full effects of radiation. They claim better results in this way.

3. *By distance.* The rays of Radium, like the rays of light obey—certain laws as regards their intensity which varies inversely as the square of the distance from the surface of radiation. The Radium, properly filtered and adjusted are fixed at varying distances as required. At the famous Mayo Clinic, where through the courtesy of Dr. Desjardins and his colleagues, I had the privilege of studying their methods, I noticed that Balza word is used to ensure a uniform distance of application. The wood is made into blocks measuring 2.5 c.m. by 3 c.m. by 4 c.m. and contain 50—100 milligrammes

of Radium kept in silver tubes and further filtered by lead and rubber. The blocks are then kept in place by adhesive strappings.

4. *By duration* of irradiation, the amount of Radium given can also be regulated. This must depend on the type of cancer and the extent of the disease. In certain cases, the glass capillaries containing the emanations are left in the tumour mass to slough away with the necrotic tissues. This procedure, however, is condemned by Mansell Moullin and others because they believe that implantation of tubes and other such disturbances of a cancerous growth can only disseminate the disease especially when it is a soft one. How long should the radium be applied depends on the nature and extent of the disease, but as a rule the time varies from a few minutes to a few days. In certain cases they may be left in permanently.

5. *By intervals between each treatment* or course of treatment, the amount of Radium received can also be regulated. Sometimes the interval between treatments may be months—in which case the patient should by kept under monthly observation.

THE PLACE OF RADIUM IN TREATMENT.

With such a powerful therapeutic agent as Radium the temptation to try its effect on every conceivable disease is proving too strong for many, and this indiscriminate use of a powerful remedy is largely responsible for the divergent views as to the place of Radium in treatment.

In studying the literature on the subject, one gets the impression that American surgeons are more optimistic while British surgeons are more cautious and guarded in their opinions.

There are many reasons for this. The rays are powerful, their properties are not fully understood; the screens too are not standardised. Except in the early cases, there is no guide as to how each patient will respond to treatment. In the cases that one usually meets with the growths are seldom too early, and in them success with radium does not depend (up to a certain point) on the size of growth nor the general health of the patient as some promising cases have ended in disappointment, and some hopeless ones have responded surprisingly wall, beyond all expectations. To a large extent therefore, success in the giving of Radium treatment depends on how far or rather how near a radium-logist can duplicate the conditions, dosage, etc. which by previous experience he has found to be successful. Such clinical experience cannot be passed on to another nor adequately described. It

varies with individuals their temperaments and their power of observation. With so many variable factors, it is not surprising that opinions must differ.

Speaking generally, there are seven methods by which Radium may be given.

1. Radium alone—
2. Radium combined with the knife or electro-dessication—either as a pre-operative or post operative measure or both.
3. Radium combined with X-Rays.
4. Radium given by mouth.
5. Radium given as a bath.
6. Radium given in an emanatorium.
7. Radium given intravenously.

Of the last four methods, little need be said. As mentioned previously, they are used in the treatment of gout, myalgia, arthritis deformans, etc.—conditions which as every one knows are notorious for their chronicity and variability, factors on which many a patent drug has made and lost a reputation. Indeed, there are periods in these conditions when they do well with or without or even in spite of treatment, so that one is apt to be sceptical about any particular method applied to them. To put it mildly, convincing proofs are not yet forthcoming that Radium given by those methods are decidedly more superior than the usual form of treatment.

There remain the three recognised methods by which the merits and demerits of Radium are judged.

1. RADIUM USED ALONE IN TREATMENT.

The following conditions seem to justify the use of Radium alonge.

1. Rodent ulcers—which commonly attack the face.
2. Cancer of the lips—early stage, before involvement of glands.
3. Epithelioma of the Nose and other superficial cancerous conditions.

   In these cases, since Radium is as effective as the knife, it is to be preferred, because it leaves no scars.
4. Hodgkin's disease.
5. Mediastinal tumours.

6. Lymphosarcoma.
7. Massive sarcoma of abdomen.
8. Myelogenous leukæmia.

The great argument for preferring treatment by irradiation in these cases is because they are inaccessible to the knife.

10. *Cancer of tongue*—in early cases, before involvement of the glands. Mr. Stanford Cade is eloquent in his praise of Radium in the treatment of this condition. The immediate result is superior to that obtained with the knife, and for cosmetic reasons it will be no less welcome to the patient. One difficulty is the avoidance of radio-necrosis, which in some cases may not be easy.

11. *In cases where operation is refused or contra-indicated* by old age, heart disease, Bright's disease, etc. treatment by irradiation offers the only hope.

12. *In borderline cases*—where the surgeon is doubtful if complete removal of the growth is possible the chances are Radium will be more suitable.

13. *In inoperable cases or recurrent carcinomas*—where the knife is hardly likely to do good, surprising results have been obtained with treatment by irradiation.

Hanford mentions a case of recurrent carcinoma of the lip with a dirty bleeding ulcer two inches in diameter, and foul discharge—obviously a hopeless case, with bilateral involvement of the cervical glands. In six weeks under treatment with Radium the ulcer had healed, the glands were subsiding, and the general condition of the patient was good—the improvement remained although evidences of mediastinal extension of the disease were present. Such a patient will of course, eventually succumb, but what a difference in point of comfort and in the clinical picture? Instead of slowly dying with unceasing pain, with a bleeding ulcer and foul discharge, an object of pity and repulse, his end comes cleanly and in comparative comfort.

14. *In pituitary tumour*—Prof. Gask has obtained immediate relief of the symptoms of giddiness, blindness and headache.

15. *In cases of Myeloma*—Radium saves resection of the bone.

2. WHERE RADIUM IS COMBINED WITH OTHER METHODS.

As a pre-operative measure, Radium treatment has many points in its favour, and is practised in many clinics including the Mayos. It reduces the size of a tumour and renders operation easier. In some cases it even converts an inoperable growth into one with a justifiable surgical risk. Thus Stoeckel was able to reduce the operative mortality of his cases to under 5 per cent. In cancer of the uterus and its adnexa Mayer, with pre-operative irradiation, was able to reduce the incidence of peritonitis from 10.9 to 4.4 per cent. Finzi points out that in a great many of the larger hospitals, there are long waiting lists of cancer cases who could have been treated with advantage by pre-operative irradiation while waiting. If the latter course is decided on, it should be remembered that operation should not be delayed for longer than a month, as the subsequent fibrosis following on irradiation may make removal with the knife difficult.

As a post-operative procedure, I know of no reason (except the one of economy) why it should not be employed as a routine. Where the operation has been complete, the prophylactic measure of post-operative irradiation will make the chances of recurrence still more remote. Thus Warnecros in a series of cases of uterine cancer was able to reduce the incidence of metastases from 55 to 18 per cent.—a striking proof indeed! and Lehoezky-Semmelweis reporting on an even larger series of cases in 1926, had only 19 per cent. of metastases. Similar good results are obtained, wherever post-operative irradiation is employed.

Where, from the nature of a case, complete removal has not been possible, irradiation will check the growth if not complete what surgery has begun. Beck and Warner whose classical experiments on the relative absorptive power of Radium by the tissues, skin, etc. (of which mention has been made supra) find that even in recurrent and inoperable cases, the mere removal of everything removable, and then exposure of the unclosed wound to the full effects of Radium is followed by many happy results.

As to whether Radium combined with the knife is equal to or better than Radium combined with electro- dessication, there are not many statistics available from which one can draw conclusions. But I should imagine that speaking generally the latter combination or some modifications of it is preferable. It has the advantage, especially in cases where complete removal is not possible that the cancer cells are instantly killed by the heat of the electric knife, and what lymphatics or vessels opened are instantly sealed by the heat congulation. The chances of a rapid spread of the cancer following on an incomplete removal are reduced to a minimum. There is of course, the danger

of secondary hæmonhage, and for that reason one has to be careful. Another objection is that heat congulated tissues do not favour early healing, but such considerations do not seem to be so weighty as to outweigh the advantages.

3. RADIUM COMBINED WITH X-RAYS.

Reference has been made to Bumm's assertion that Radium rays can only act on cells within a range of 4 c.m.s., and elsewhere in this paper it was pointed out that small does have a stimulating effect on cell growth. To obviate these dangers in deep-seated cancer, e.g. cancer of uterus, it is customary to apply Radium from within the uterus, and from without—at the lower part of the abdomen. Such a porcedure would involve a larger supply of Radium than most hospitals can afford, and for economical reasons, it has been abandoned. But when combined with X-Rays such a drawback no longer exists. By mathematical calculations the intensity of X-Rays at each point in the pelvis can be established, and by a judicious disposal of the radium tubes the maximum effect of combined irradiation is obtained. In Hodgkin's disease, for example, striking results have followed with Radium application for the superficial glands and X-Rays for the deep ones. This, at any rate, is one reason for using Radium and X-Rays together, but one objection to the combination is that fibrosis following on X Ray treatment is both extensive and rapid and this may prevent the radium acting.

From a survey of the literature, it is apparem that a saner and truer appreciation of Radium is gaining ground. That it has an undoubted value cannot be denied but like every new remedy, in the first flush of its newness, its supporters were mote carried away by enthusiasm than by judgment, and the popular accounts of it in the press and among the public did not help to promote a clear conception of its power and limitations. Chéron and Rubens-Duval had an inoperable case of carcinoma of the cervix which was treated by radium. Clinically she appeared cured, but 15 months after treatment, she died from an intercurrent disease (brain softening). A complete post-mortem examination was made, and every tissue in her body was subjected to a serial histological examination—but not a single carcinomatous cell was seen! The cure has been thorough, a truly complete anatomic cure, and the power of Radium is thus convincingly demonstrated.

But the problem is how to apply such a powerful remedy that will kill cancer cells without hurting the normal tissues or cells of the body and bringing on a violent reaction? Schauta, in the early days of his experience with Radium, applied heavy doses, and the results were disastrous. Some of his patients died, others had fistulæ, and sloughs and various discomforts, but at the autopsies not a single case showed signs of carcinoma! The power of Radium then is there, but

it needs control, and with progressive improvements in technique, it will in time no doubt come to occupy a very important position in treatment, especially of cancer. For the present its place is a humble one --merely an aid to surgery.

In benign conditions, for examples, tuberculous cervical adenitis, keloids, etc., it matters little if Radium treatment is tried first. Many excellent results have been obtained, but its use is not unattended with some danger. The treatment, doubtless, will appeal to the patient too, because of its cosmetic effects, because the immediate risk to life is small, and in any case one can always fall back on surgery.

There is another field too, where Radium holds undoubted sway, and that is in regions inaccessible to the knife--e.g. the severe anaemias, the enlarged spleens and mediastinal growths, etc.

In early cases of malignancy too, Radium is said to compete favourably with the knife, but on this point opinions differ. It probably depends among other reasons on the type and region of the malignant growth. Lane-Claypon, in a study of 80,000 cases, scattered in 16 different countries, has found that comparing the results of Carcinoma Uteri treated by the knife and by Radium, the percentages of survivors at 5 years were 37.6 for the former method and 35.8 for the latter—a slight advantage for the knife. It is in the borderline, recurrent and inoperable cases that Radium is at its best. In these cases, it seems where surgery ends, and confesses defeat, Radium begins and asserts its superiority. This table, modified from Lane Claypon is again instructive.

TABLE III. A COMPARISON OF METHODS.

Percentages of Survivals at 5 Years After Treatment.

Carcinoma Uteri	Operative Treatment	Radium	Radium + X-Rays
Early cases	52.7 per cent.	41.25 per cent.	45.7 per cent.
No longer local	33.3 ,,	41.25 ,,	45.7 ,,
Barely operable	21.7 ,,	28.4 ,,	26.2 ,,
Inoperable	6.0 ,,	12.2 ,,	11.7 ,,

It will be noticed from this table that in the early cases operative methods take the lead but in the inoperable cases, the despair of surgery, Radium comes into its own. The same striking results were obtained by other workers.

Kelly and Burnham had a series of 199 inoperable cases—of which 53 have been cured, 109 improved and 37 unchanged. Miller had six hopeless cases of recurrent carcinoma after hysterectomy and 4 readily responded to Radium. Dr. Louis Ransohof reported 3 cases of inoperable sarcoma—all clinically cured by Radium. Surgery has not been very successful in malignant growths of the larynx and œsophagus—yet Herriman in 8 surgically hopeless cases had very encouraging results. In cases of carcinoma of the tongue, the results of surgery have not been too brilliant, but Evans and Cade reported 17 cases in 16 of whom the growths disappeared altogether. How many of these cases, and for how long they will live are not the main issues. The fact that out of this inoperable group, for whom surgery can do nothing, and to whom in pre-radium days, no better prospect remained than that of a slow lingering and painful death, there are cases on record of survivals after 4 or 5 years and more is enough. Hope springs eternal and every applicant for Radium treatment comes buoyant with hope fondly wishing that he or she may be just the few lucky ones who will yet cheat Death of its prey. Few can realise how to the despairing patient, this is indeed a ray of light "amidst the encircling gloom"—and the immediate effect on the moral of the patient is often so good that they actually put on weight; the ulcers if present cease their discharges, and the foul odour all disappear. Even if most of them must ultimately die of the disease, yet death will come in a more merciful and less hideous form. Radium may therefore well be called, the hope of the hopeless.

Selected Bibliography.

Annual Report of the Registrar General for Saorstát Eireann, Dublin, 1926.

Annual Report of the State Board of Health of Maryland, U.S.A., 1924.

Beck and Warner ..... *Surg. Gynec. and Obstet.* Oct. 1910.

Bowing ..... *Journ. of Radiology* 1922.

Boggs ..... *American Journ. of Roentgenology* 1919.

Estatistica do Movimento Fisiologico da População de Portugal 1920.

Evans and Cade ..... *Brit. Journ. of Surgery* 1927.

..... *Brit. Med. Journ.* 1927.

Finzi ..... *Cancer Review* Vol. III No. 3, 1928.

Greenwood ..... *Rhode Island Medical Journal* May 1921.

Greenough ..... *Bull. de l'Association pour l'Etude du Cancer* 1917.

Gauducheau ..... *Med. Rev. of Reviews* 1919.

Handford ..... *Berl. Klin. Wchnschr* 1914.

Hansemann ..... *Berl. Klin. Wchnschr* 1914.

Handley ..... *Laryngoscope* 1927.

Herriman ..... *Acta Radiologica* 1927.

Heyman ..... *Brit. Med. Journ.* Feb. 4, 1911.

His Wm. ..... *Journ. of American Med. Assoc.* 1915.

Kelly and Burnham ..... *X-Ray therapeutic and Radium therapy* 1919.

Knox ..... *Repts. on Public Health and Med. Subjects* 1927.

Lane-Claypon ..... *Journ. of American Med. Assoc.* Vol. 77, 1921.

Levin ..... *Journ of American Med. Assoc.* Vol. 77, 1921.

London Letter .....

Lowenthal and Edelstein ..... *Zeitschr. f. Biochem.* 1908.
Moriata ..... *Med. Record* 1918.
Miller ..... *Surg. Gyn. and Obst.* April 1916.
Ransohof ..... *Lancet Clinic* 1915.
Regaud et alia ..... *Arch. d'electric, Med.* 1912.
Roussy ..... *Journ. de Radiol et d'Electrol* 1927.
Statistisches Jahrbuch der Schweiz 1926.
Statistisches Jahrbuch für das deutsche Reich. Berlin, 1927.
Schmitz ..... *American Journ. of Radiol.* 1922.
Schwarz ..... *Arch. f. physiol.* 1903.
Todd ..... *Med. Jour. of Australia* 1916.
Vogel ..... *Office International d'Hygiene Publique Bulletin Mensuel* 1927.
Wickens ..... *Australian Demography Bulletin* 1927.
Wyard, S. ..... *Brit. Med. Journ.* 1925.
Wickham et Degrais ..... *La Rad-therapie* 1912.
Zweifel ..... *Brit. Jour. of Radiol* 1927.

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CONCOMITANT SQUINT OR STRABYSMUS.

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Squint is that condition in which the visual axes of the eyes fail to meet at the point of fixation. In other words there is an abnormal deviation of the axis of one eye in relation to that of the other.

There are two main types of squint:—

1.—Latent Squint or Heterophoria.

2.—Manifest Squint.

A latent squint or heterophoria is one which is not apparent to the observer, but which may be rendered patent by special tests. It is due to an imbalance of the extrinsic muscles of the eye. Like the other forms of squint it may be subdivided into various types according to the direction in which the visual axes deviates. Thus we have esophoria, exophoria, hyperphoria, and hypophoria, signifying a deviation inwards, outwards, upwards, and downwards respectively.

Manifest Squints are of two types: —

1.—Paralytic, due to a paralysis or paresis of an ocular muscle or group of muscles.

2.—Concomitant (from Lat. "cum" together and "comes" companion), so called because it can only exist in the presence of the other eye. The closure or loss of one eye eliminates the squint at once. It is characterised by the fact that "the visual axes though abnormally directed retain their relative position in all movements of the eye." The deviation may be convergent, divergent, sursumvergent, or deorsumvergent according as to whether the axes are deviated inwards, outwards, upwards or downwards respectively. When it is the same eye that squints all the time the squint is said to be monocular or unilateral: when the eyes squint in turn it is termed alternating.

Investigation of a case of squint:—

When confronted with a case of squint our first step would be to eliminate the possibility of its being paralytic in origin. This we do "*grosso modo*" by proceeding as follows:—

Hold up a finger before the patient's eye and ask him to "fix" it. The surgeon then moves his finger from side to side and also in a vertical direction, meanwhile keeping a steady watch on the patient's eyes to see whether all the movements are properly performed. If we are dealing with a squint which is already apparent, it will be

made more so if we direct the patient's gaze in the direction of action of the paralysed muscle. If the squint were not apparent, this manœuvre will cause it to be made so. Furthermore, diplopia or double vision will be elicited or emphasised as the case may be.

Having excluded the presence of a paralytic squint by this rough method we next perform the "covering test." Observe first, which is the "squinting" and which the "fixing" eye by making the patient gaze at a finger held up at a distance of about a foot from his face. With the other hand or by means of a card, screen off one of the eyes, say the "fixing" one. The deviating eye will now take up fixation by a sudden movement, the direction of which will depend on the type of the squint present. If it was previously divergent it will now turn in, and if convergent it will turn out. If we are now to turn our attention to the sound eye and look at it behind the screening hand, we shall see that it has now assumed a squinting position. The angle through which the sound eye deviated in taking up this position is equal to the angle through which the affected eye travelled in assuming the "fixing" posture. The fact that the eyes can take up the "fixation" vicariously moving through angles of the same degree, proves that the squint is concomitant.

Some individuals appear to have a squint, but on examination the tests for paralytic and concomitant squints are both negative. The squint is only apparent, there being no deviation of the visual axes.

Etiology of Concomitant Squints.

We now come to a very interesting aspect of the subject, and that is the causative factor in the production of a concomitant squint. Like the etiology of all functional diseases, this will have to be somewhat hypothetical. Nevertheless, it is profitable to enter this discussion, for through it light is thrown on the rationale of the treatment.

Under normal conditions the eye is emmetropic, which means that the images of all distant objects seen by the individual fall on the retina. When however the images come to a focus in front of the retina, then short-sightedness or myopia results, and when they are focussed at a point behind the retina then the individual is far-sighted and is said to suffer from hypermetropia.

The two eyes under normal circumstances move in conjunction with each other. There exists what is known as conjugate movements, so that under normal circumstances the images of an object we see, fall not only on the retina but on the corresponding points of each retina—the maculæ. If by some reason or other the images focussed on the retina do not fall on these corresponding points then "diplopia" or double vision results.

Now, in the focussing of an object to which we wish to direct

our attention two factors come into play, viz:—Convergence and Accommodation. By the latter the images of the object are made to fall on the retinæ, and by the former they are made to fall on the "corresponding points" of each retina. There is thus a constant relationship between accommodation and convergence in binocular vision. A discrepancy existing between these two functions is supposed to be the main underlying cause of concomitant squints. Take for instance the case of a hypermetropic individual. He has under ordinary circumstances to accommodate more than the distance of the object demands, in order that he may bring the image to a focus on his retina. A certain amount of accommodation demands an equivalent amount of convergence, but in his case he requires to accommodate more than he needs to converge. He is therefore in a dilemma. In order to overcome this difficulty, Nature to solve the problem suspends the use of one eye—the worse one - by causing it to deviate.

The direction of the deviation will depend on the type of the refractive error present. In hypermetropia the eye will deviate inwards, in myopia it will deviate outwards. As we have seen, it is the eye with the greater refractive error that deviates, and the higher the difference between their refractive errors (i.e. the greater the anisometropia) the more unilateral the squint will be. If the difference is nil or insignificant the squint is more likely to be alternating.

In the presence of an unilateral or monocular squint, the eye through want of use, looses its seeing power and may become almost blind (amblyopia ex anopsia). It is on this account that children with defective eyesight should receive the early attention of an oculist and not of an optician as is usually the case. School children, and particularly those about to prepare for the higher grade examinations, should whenever possible undergo a test in order that they may be qualified for the strain to which their eyes will have to be subjected.

It is well herewith to refute a common statement made to parents in that the squint of their child requires no attention, and that there need not be any cause for apprehension as "the child would grow out of it." Unfortunately there is half a truth in the statement, as the squint does in fact disappear with age, but the affected eye as we have seen becomes amblyopic. The explanation of the disappearance of the squint lies in the fact that as the child grows the axes of orbits tend to diverge, and the previously convergent eye-ball in accommodating itself to the orbital axis, also diverges thus neutralising the convergent defect. It will be seen therefore that it is only the convergent squints that tend to disappear with the development of the eye-sockets, the divergent ones becoming more pronounced as the child

Treatment of Squint.

In the more civilised countries it is quite unusual to see in the streets people affected with strabysmus; this is particularly the case with women, for so disfiguring is the condition and so simple the treatment that it is seldom that a member of the fairer sex will allow herself to be handicapped by such an anomaly.

Concomitant squints when seen early are very amenable to treatment and the results are very gratifying. The early cases can be cured simply by the wearing of correcting glasses aided by a course of visual exercises. The importance of treating a squint lies not so much in the curing of the deformity as in endeavouring to save the vision of the affected eye.

In the adult, the sight in the amblyopic eye cannot be expected to respond so favourably to treatment, but the eye itself may be made straight by the simple operation of tenotomy or tenomy and advancement.

The treatment of an early case may be divided into three parts:—

1. Correction of the Refractive Error.
2. Restoration of Vision.
3. Development of the Fusion Faculty.

1.—Correction of the Refractive Error.

Atropine ointment is smeared into the eyes twice daily for three consecutive days and the refraction is estimated by retinoscopy. Any astigmatism present is carefully corrected and advancement. The glasses are recommended to be worn constantly.

2.—Restoration of Vision by Exercise.

We have seen that anisometropia or inequality of the refractive power of the eyes is a common condition in squint. The patient prefers to use one eye more than the other. Our efforts must be directed therefore to improving the vision of the amblyopic eye by forcing the child to use it. This we do by throwing the sound eye "hors concours" by covering it with a pad or by the use of a cycloplegic. When the child has been taught to use the affected eye, he may then be allowed the use of both eyes again.

3.—Development of the Fusion Faculty.

We have seen that on looking at an object two images of it are focussed on our retinæ—one on each side. We would therefore expect to see everything double. But this is not the case. Our brain has learnt from the very beginning to fuse these two images into one, so that we obtain a single impression of the object seen. It is owing to this that we possess what is known as stereoscopic vision: that is,

the power of appreciating the solidity of objects—a cube for instance. Now, if a person has been used to seeing things with one eye, his stereoscoptic sense is undeveloped. Even although he be given sight in the other eye, he will continue to use his eyes alternately but not simultaneously. He has thus binocular vision but not simultaneous macular perception. Our object would be to develop this fusion faculty by orthoptic exercises, for which purpose some form of stereoscopic apparatus is employed and the child is encouraged to try to fuse the images of the pictures seen.

ANALYSIS OF TWENTY-FIVE CASES OF FATAL BRONCHO-PNEUMONIA IN INFANTS, HONG KONG.

by

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At the suggestion of Dr. Alexander Cannon, a brief pathological investigation was carried out into the actual cause of death in twenty-five cases of fatal broncho-pneumonia in infants in Hong Kong. In Manson's "Tropical Diseases" the following provided the basis of the desire for the investigation: "Stewart's experiments on the life history of Ascaris Lumbricoides have shown that migrations of the larvæ through the pulmonary vessels cause an acute fatal pneumonia in pigs. It is possible that future research may show that fatal pneumonia may be produced in man also in this way." The number of cases investigated is small. The work was carried out at the Command Pathological Laboratory, (Military Hospital), Hong Kong. A greater number of cases would have been investigated but for the lack of the necessary reagents, a large expenditure of which is unavoidable in this type of work.

The following figures for mortality from pulmonary diseases in infants under three years are supplied:—

Acute bronchitis	66
Broncho-pneumonia	1,095
Tuberculous broncho-pneumonia	489
Lobar pneumonia	4
Pulmonary tuberculosis	247
Empyema	87
Acute miliary tuberculosis	32
Pneumococceal septicæmia	36
Total	2,056

The above cover the period for the year 1927.

Twenty-five cases of non-tuberculous pulmonary disease were selected by Dr. Cannon in February and March of this year. In each case the lungs and the liver were forwarded by him to the Command Laboratory for microscopic investigation. The details of the methods employed in fixation, cutting and staining will be mentioned below.

The purpose of the investigation, as indicated above, was to find out if any of these cases were due to pulmonary involvement from A. Lumbricoides, and also to ascertain, if possible, any cause for the high fatal incidence of broncho-pneumonia in these cases.

As regards infection with A. Lumbricoides, the cases were all negative, and in spite of the small number of cases examined, the opinion that ascaris infection is *not* the cause of the broncho-pneumonia is suggested, but final conclusions should not be made until a much larger number of cases has been investigated.

Analysis:—Examination of the lungs.

Simple broncho-pneumonia	15
Influenzal type broncho-pneumoina	2
Acute bronchitis	4
Pulmonary tuberculosis	1
Lobar pneumonia	2
Broncho-pneumonia (B. Typhosus)	1
Pulmonary Malaria	0
Total	25

Examination of the Liver.

Fatty Degeneration	20
Malarial pigmentation	5
Total	25

Towards the end of the series it was decided to make sections of spleen and brain. This was done in six cases with the following results.

Examination of the Spleen, and Brain.

Normal	5
Malarial pigmentation	1
Total	6

It is not proposed to give details of the pathological reports on each of the cases, but only a short summary. The main pathological lesion appears to have been a broncho-pneumonia. A toxin of some severity was probably present.

Summary of the Findings.—The sections in the cases of simple broncho-pneumonia showed by the degree of liver degeneration that the infection was very toxic in type. In the lungs the broncho-pneumonia was intense with patchy consolidation. There was marked desquamation of the linings of the bronchioles with excessive mucus secretion as a common feature.

The cases of fatal acute bronchitis presented the common feature of a severe phlegmonous infection of the bronchioles. The remaining cases

were broncho-pneumonia due to a specific infection viz. typhoid, influenza, tubercle, but which clinically probably did not present any definite pathognomonic features.

As previously stated there was no evidence of ascariasis nor invasion by any other helminth.

The six cases in which the brain and spleen were examined showed little of interest.

One case did show malarial pigment in the spleen. Malaria in this case, however was likely to have been merely coincident.

It would be of interest at a future time to go more exhaustively into the question of malaria as a possible cause of the pulmonary conditions in view of the fact that we have recently met with cases of pulmonary malaria at the military hospital.

Method Employed.

In all cases 2 or 3 specimens were cut from each one and fixed for 24 hours in 10% formal saline. A Cambridge rocking microtome was used and the sections were cut at 3 to 5 micros. After dehydrating and clearing they were stained with hæmatoxylin and eosin, and Gram in certain cases.

A SURVEY OF THE CANCER PROBLEM.

by

Alexander Cannon.

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To Viscount Lascelles, President of the Yorkshire Council, and member of the National Council of the British Empire Cancer Campaign, and especially to it's Chairman, Sir Berkeley Moynihan Bart., who has so kindly helped the "Caduceus" in the past by forwarding to me, papers for publication, we are indebted for most of the information which I have compiled in this article.

The data have been corroborated by the Medical and the Scientific Committee of the Campaign, including the President (Lord Lascelles), The Chairman (Sir Berkeley Moynihan), Doctors Edgecombe, Jamieson, Kaye, Macdonald, Stewart, Maxwell Telling, and Wynne, and about one hundred members of Council, including Lieutenant-General Sir Charles Harington, of the Northern Command, York.

The problem:

The questions which this Council have attempted to answer are:—

1. Why are we so interested in Cancer?
2. Why are we making or planning to make, a mass attack on this enemy?

The answers include the following: cancer is far more to be feared; more dangerous; and far more relentless, than any other disease that we know of. Whilst other diseases are yielding to investigation and treatment, based upon our increased knowledge, cancer is not only resisting well-planned and far more successful attacks, but is actually gaining ground. Sir Berkeley Moynihan describes Cancer as the "Captain of the Men of Death," and I should well like to substantiate his statement by the memorable words of the late Lord Gladstone: "The Angel of Death is abroad in the Land; you can (almost) *feel* the beating of his wings." Figures given for the last twenty years show that:—

1. The general death rate has fallen by 32%.
2. The infant mortality rate has fallen by 45%.
3. The tuberculosis death-rate has fallen by 38%.

BUT

4. The CANCER death rate has *increased* by 20%.

Some attempts have been made to explain these facts:—

1. It is known that the average expectation of life has increased, and hence a larger number of people live to reach the "cancer age"

(45 to 65 years). The argument against this is that although it is to some extent true, the average duration of life is mathematically longer chiefly because of the lower infantile death rate. Leonard Hill states, "The expectation of life has gone up for infancy, but not for the period of late middle life. There is no problem of what we are to do with our Grandfathers; they are living scarcely any longer than they did 50 years ago."

2. Some state that our diagnosis is now more accurate and therefore the increase is only apparent. There is an element of truth in this, but if we pay regard to those cases in which diagnosis can never have been found difficult, because the cancer was near the surface, and easily felt or seen, it is shewn that this argument is not sustained. We are told that "in cancer of the tongue there has been an increase of 39%, and in cancer of the breast 28%, in the last 20 years." But there is also the other side of the question, for it must not be forgotten that some few diseases "called cancerous in other days, are now known to be simple." Diverticulitis of the colon was thought to be cancer, as were some chronic gastric ulcers with much induration, and frequently chronic pancreatitis was diagnosed as a carcinomatous growth.

Note that the increased death rate from cancer occurs despite the fact that more people than ever are being cured of cancer. It is true that *cancer can be cured* permanently. The Council say, "We are apt to hear of the failures of surgery, as well as of its successes. Montaigne thought the doctor to be among the most fortunate of beings, because the sun shone upon his successes, while his failures were buried in the tomb. But this is not altogether true. We hear of deaths from operations, of recurrences of cancer after its removal; we hear little even from the rescued of their freedom from this disease." This is probably because the "rescued" regard it as a sort of moral blemish; as something equivalent to epilepsy, etc., in the family. The reason why more cures are not brought about, is because the public hesitate. The old saying that "he who hesitates is lost," is a more forceful truth here than in any other sphere.

What is the patient's point of view, who notices a lump on her body, say a lump in the breast? She at once says that there is something wrong, and it may be cancer: if it is cancer she must then undergo an operation: if she does she may die: if she survives, the cancer may return: if it returns, she must submit once more to surgical interference, with all its risks: even then the cancer may reoccur. The whole prospect is depressing and hopeless: she had better say nothing about the lump . . . . . that is the *wrong* attitude which is repeatedly taken by the public at large.

Time passes; the lump grows larger, and finally, almost in despair, the Surgeon is called into the rescue. Woe to those who believe not in a good Surgeon, for he is also a good Physician, in the first place.

Quacks with their "cancer cures" court the patient's assured disaster: beware of them, for they are as a snake in the grass. Sir Berkeley Moynihan says, "The desire for methods other than those which authority advises is as old as the days of Naamen, Captain of the hosts of the King of Syria. When Elisha advised him to wash seven times in Jordan and so be cleared of his leprosy, his wounded chauvinism made him cry out, 'Are not Abana, and Pharpar, rivers of Damascus better than all the waters (little insignificant pools of water) of Isreal?"' It does not pay to ignore the obvious.

A man's life has three stages: —

1. The stage of growth.
2. The stage of accomplishment.
3. The stage of decline.

Cancer seizes man usually in the later half of this second stage, when he is at his best, giving to the World the harvest of a long spent season of sowing. Surely it was not meant that man should die before his work was completed according to plan?

We must conquer cancer by:—

1. So instructing the public and educating ourselves, that those cases of cancer in which complete eradicating of the disease is surgically possible, shall be recognised and treated at the very first opportunity.

2. Next we must conduct all kinds of research to disclose the most baffling and elusive secret of the cause and the prevention of cancer.

The important points we can teach the public in connection with cancer, are eight in number.

1. *At first cancer is a local disease.* It is *not* a disease of the blood. Moreover it remains local for periods that vary in length, according to circumstances; it may prove fatal whilst still localized, as for instance, when the colon is attacked and obstruction brought about, etc.

2. Cancer chooses to attack a diseased rather than a healthy organ. My old, and highly respected teacher, from whom it was a great honour to sit at his feet and learn of the great truths which he unveiled to his followers in his Clinic (the Moynihan Clinic), went always a step further and would reiterate this great truth: "*Cancer NEVER developes on healthy tissue:* no diseased tissue—no cancer." Here is a stimulus to Health Authorities: was it not in the investigations of tuberculosis that the value of fresh air and oxygen, and cleanliness in everything generally was introduced, and so healthier tissue was brought into being and hence other diseases which were then prevalent, now lie silent in the grave, from which we hope there will be no resurrection.

3. *Antecedent conditions influence cancer.* Sir Jonathan Hutchinson once described the "precancerous conditions" as conditions which may become, but were not then, cancerous. Cancer never developes on a healthy tongue: chronic irritation is a definite precursor of this Angel of Death. Virchow was the pioneer in stating that repeated injuries, amounting to almost unceasing irritation, spread over many months, or even years, might provoke cancer.

4. Certain factors, sometimes regarded as "causes," are said to influence its occurrence.

They are three in number:—

(*a*) Heredity is said to be one factor, but statistics don't uphold the statement. The fact that *one person in seven over the age of thirty dies of cancer*, must be remembered.

(*b*) Diet has been blamed: only in so far as they may lower resistance or produce disease, can their factor as a "cause" be considered. The Memorandum on Cancer issued by the Ministry of Health (page 3) state that "it cannot be asserted with scientific authority, that the use of any particular article of food increases the liability to cancer or prevents it from appearing."

(*c*) That "cancer houses" and "cancer districts" exist, there is no proof. Striking examples of individual exceptions are given—"Dr. Sambon discovered in the village of San Michele, in the Italian Tyrol, that almost every case of cancer that had occurred there for years past, had been located to a single street." "Dr. Cinncertaler of Villa Lagaria said that practically every case of cancer for the past 40 years had occurred in one street, the Via Damians Chiesa."

5. *Cancer is neither contageous, nor infectious.* Up to the present all research carefully done on this subject by reliable authorities, proves this to the satisfaction of the Council.

6. *Cancer spreads from its local origin by direct extension, and by the invasion of lymphatic vessels,* when they convey cancer cells to neighbouring glands and thence to distant parts; and rarely by invasion of the blood vessels, and the transmission of the cancer cells in the blood stream. The rate of spreading and the rate of dissemination vary greatly in different individuals, and in different parts of the body. The disease has sometimes become generalised before the patient has had the chance to realize that he is attacked; as for example cancer of the rectum, and in certain cases of cancer of the stomach.

7. *Cancer rarely causes pain in its early stages* of development. It is pitiful to hear the patient frequently eroneously protest that a growth cannot be of a serious nature because no pain results from it.

Pain in the tongue is conspicuous by its absence until late in the disease; and when pain is present, it is the EAR rather than the mouth of which complaint is made. This is correct in 95% of cases. In tumours of the breast, as a rule, no pain is caused until the skin is involved; the great importance of this is emphasised by Moynihan, Crile, and Mayo, for *in women over 35 years of age, a lump in the breast is malignant in 3 out of 4 cases.*

It should be remembered that the existence of carcinoma is compatible with perfect health, and in a few cases there may even be a gain in weight and a remarkable feeling of vigour, and strength, and well-being. That ill-health, anæmia, lassitude, distaste for food and loss of weight are to be regarded as the symptoms without which a diagnosis can hardly be made, is a piece of knowledge which should now be buried in the dust. Such a view would be as hopeless as a non-diagnosis of tuberculosis of the lungs until an hæmoptysis occurred.

8. Last, but by no means least, it should be written in letters of gold, that *while the cancer is local and the growth accessible, cancer is curable.* The Most accessible are those of the colon, and then the breast; the least accessible are œsophageal growths, cancer of the pancreas, lung, and prostate: in these latter large group of cases, surgery will probably never be able to offer hope of substantial relief. Don't we urgently need research on cancer, if only because of these latter cases alone.

The resistance of the patient to the inroads of cancer varies very much: this is well illustrated in regard to tuberculosis by the late Sir William Osler, in his famous parable of the soil; which is printed in full in the earlier (but not in the later) editions of his "Principles and Practice of Medicine," and is well worth reading.

It depends on the *humain soil* as to whether it takes root at all, and if it does, whether it spreads slowly or rapidly. Therefore watch the "soil!" It has been recorded that one remarkable case, an atrophic scirrhus carcinoma of the breast was under observation for over twenty years, and did not in the end prove fatal, hence was "spontaneously cured;" that is, a growth definitely recognised as carcinomatous by the one infallible test, microscopy, has shrunk, and at last disappeared. The only method which offers an assured hope in early cases of accessible cancer, to the method of surgery. The method of surgery, however, is not always available, for if the growth is inaccessible, or if a growth at one time accessible has by delay become disseminated, then no operation can eradicate the disease and recourse must be had to other methods: of these X-rays and Blair Bell's injections of colloidal lead are by far the most valuable. It is interesting to learn that *X-rays seem to be more effective when preceded by an intravenous injection*

of 10 c.c. of a 30% solution of glucose as first suggested by E. G. Mayer.

Radium also has its uses, and also very remarkable temporary results have been obtained. To reliably compare results we must be sure that in every case the disease was cancer, and nothing else will do than the test by the microscope and the opinion of a competent histologist. Hippocrates says that *judgment may be fallacious:* therefore two opinions are better than one.

It is admitted that a well-considered dietary for a case of cancer may do much to improve the general health, and to increase perhaps the patient's defence and so to bring about a temporary amelioration of his lot, but beyond that, nothing. Greater success in the treatment of accessible cancer by operation can only come about by

1. Earlier diagnosis and treatment.

2. More extensive operations, attended by lower immediate mortality.

3. *Earlier access of the doctor to the patient*, which is essential to both 1 and 2.

This latter is therefore probably the greatest problem of all.

There is a day when cancer is still local, and therefore, if accessible, is curable; there is a day when dissemination first occurs; THE ONE DAY IMMEDIATELY FOLLOWS THE OTHER. *The first day is the day for action: the second day is* ONE DAY TOO LATE.

As regards the more extensive operations—never practise a Thomas operation, when an Halstead should be done in cancer of the breast, and Sir Berkeley Moynihan says, " never do a Halsted when you well know that a Rodman is the safest of all:" that is where the rectus sheath is also removed to prevent dissemination to the liver.

The facts:

Now, let us review some important facts about cancer, chiefly from the statistical side of the question.

Referring to cancer of the breast, taken as a general example, the Registrar General's report of statistics of death from cancer in England and Wales in 1924, shows that of a total of 50,389 death from cancer, 5,181 (10.3%) were from cancer of the breast.

The Report on the 1923 enquiry made by Jane E. Lane Claypon of the Ministry of Health at the instance of the Departmental Committee on Cancer, into available literature at Home and Abroad on the treatment of cancer of the breast by surgical operation, and

published in August 1924, it is stated therein that "the practical conclusions which may be drawn from an analysis of about 20,000 operated cases of cancer of the breast, as studied in the report are: —

1. After performance of the older or incomplete operation, out of a net total of 7,029 patients, 2,056 (29.2%) were alive at the end of three years after operation.

2. After performance of the modern or complete operation, out of a net total of 8,921 patients, 3,857 (43.2%) were alive at the end of three years after operation.

3. With the complete operation, the prognosis is intensively affected by the stage of the disease at which the patient is operated up on. Thus——

(*a*) when the disease is still local and no secondary growth has occurred, the percentage of survivors at three or more years after operation is from 65—80%.

(*b*) When secondary growths have already occurred the percentage of survivors at 3 years after operation falls to 30% or less;

(c) when the disease is very advanced, some 8-9% only survive as long as three years after operation.

4. The expectation of life after the onset of cancer of the breast where the disease runs its own course may be taken as being on an average not more than 3½ years.

5. In the aggregate, that is without reference to the stage of the disease at operation, the effect of complete operation, is to prolong life from the onset of the disease by two or three years.

6. In patients operated upon by the complete operation while the disease is still local, the expectation of life from the onset of the disease may be on the average as much as ten years more than in unoperated persons."

A very important "Report on the late Results of operation for Cancer of the Breast (Leeds)" has been published by the Ministry of Health (Reports on Public Health and Medical Subjects No. 34 of 1926). This deals with a series of 357 cases operated upon in the general infirmary and in the Hospital for Women and Children, Leeds, during the two periods 1910—1913, and 1919—1921. In every case the tumour was submitted to microscopic examination. Jane Lane Claypon has analysed the cases as classified on the following basis:—

Class I.—Cases in which, so far as could be ascertained, the growth was entirely confined to the breast, the axillary glands not being invaded.

Class II.—Cases in which the axillary glands were already

invaded, but in which there was no evidence of involvement of any neighbouring or distant organ or tissue.

Class III.—Cases in which either the adjacent or distant organs or tissues were involved as for example the pectoral muscles, the skin when ulcerated, the cervical glands, the opposite breast and so forth.

Excluding cases unclassified on account of insufficient clinical and pathological data, the following are the results of operation after 3, 5, and 10 years respectively.

	Percentage Alive at		
	3 years.	5 years.	10 years.
Class I	89.6	85.1	71.4
Class II	36.3	18.5	5.2
Class III	28.0	13.5	5.6

If the cases which died from the operation and those which died from other causes than recurrence of cancer be excluded, the after results are as under:—

	Percentage Alive at		
	3 years.	5 years.	10 years.
Class I	94.0	91.3	87.5
Class II	38.1	20.0	5.8
Class III	31.1	15.1	5.5

The results of the complete operation of removal of the breast pectoral muscles axillary contents, and rectus sheath (Rodmans Operation) may be shewn thus:—

Class I growth still local: 91.1% ALIVE at 10 years after operation.

Class II axillary glands involved: 91.3% DEAD within 10 years after operation.

Class III more advanced cases: 94.4% DEAD within 10 years of operation.

The reason why the breast has been taken as an example of cancer statistics generally, is that it is recognised that malignant disease in the breast in the most frequent site in the female, and can be taken as a reliable average of results, by the treatment of the various stages of the disease.

The Classfied data:

These are now given in the order stated by the British Empire Cancer Campaign.

1. Chronic irritation and malignant disease.
2. Carcinoma of the breast.
3. Carcinoma of the lips.

4. Carcinoma of the tongue.
5. Carcinoma of the stomach.
6. Carcinoma of the colon.
7. Carcinoma of the rectum.
8. Carcinoma of the uterus.
9. Carcinoma of the bladder.
10. Carcinoma of the thyroid gland.
11. Carcinoma of the bones.

1. *Chronic irritation and malignant disease.*

The study of malignant disease shews that chronic irritation is undoubtedly a factor in the production of certain types of carcinoma. This is true of cancer of the skin, lips, and mouth.

(*a*) Carcinoma of the *skin* is of the squamous celled type, and of two varieties—1. the warty, and 2. the ulcerative form: the former resembles a simple papilloma, from which it is distinguished by the greater irregularity of the surface and the hard indurated base: and the latter is distinguished from a simple ulcer by its hard indurated base and later by its raised and nodular margins.

Some of the *causes* are:—

1. Burn scars (Kangri cancer of Kashmir).
2. Chronic ulceration (Johnson and Laurence in Choyce's Surgery).
3. Arsenic irritation (Hutchinson).
4. Tar irritation (Moynihan).
5. Soot irritation (Moynihan).
6. Pitch, paraffin, petroleum, and lubricating oils (Southam and Wilson).
7. X-ray irritation (Rowntree B.M.J. 4 Dec. 1920 p. 1171).

(*b*) Carcinoma of the *lips*: the lower lip of men is usually affected. It is due to the chronic irritation of the tobacco pipe, especially the rough hot stem of the labourer's clay pipe (warty growth . . . fissure . . . or ulcer).

(*c*) Carcinoma of the *tongue*: usually follows chronic superficial glossitis: constant irritation of a carious tooth.

The above are examples of the relation of chronic irritation to cancer of squamous epithelial surfaces.

2. *Carcinoma of the breast*: Many interesting statistics concerning this have been given under "facts."

Owing to the superficial position of the mammæ, the cancer becomes palpable in its earliest stages (except in large breasts) and often visible, manifesting itself as follows:—

(1) Altered contour of breast: slight flattening due to contraction of the fibrosed lymphatics.

(2) Axis of nipple deviates from normal e.g. it may be directed upwards.

(3) When a lump, however small, is palpable with the *flat* of the hand, cancer should be diagnosed until proved otherwise. Moynihan states that for all practical purposes all tumours of the breast in women over 35 years of age are malignant.

(4) Prolonged chronic mastitis is often a precursor of cancer.

(5) Blood stained discharge from the nipple. At the Johns Hopkins Hospital cases of cancer of the breast are divided into 3 groups:—

(*a*) Early operable cases in which no glands are involved.

(*b*) More advanced but still operable.

(*c*) Inoperable. It is shewn that recovery is permanent in 70% of group one and in less than 20% of group two.

Cancer of the breast spreads by:—

1. Penetration of the surrounding tissues.

2. Permeation of the lymphatics (Sampson Handley).

3. Lymphatic embolism, though this is less common.

4. The ducts of the breast, replacing the normal epithelial lining by cancerous tissue.

5. Blood dissemination usually late in the disease and uncommon. Metastatic deposits usually in the glands, liver, lungs, and bones (spontaneous fracture).

3. *Carcinoma of the lips:* as previously stated it is due to clay pipe usually in men. There is definite induration which can be felt beneath the surface at an early stage of the disease. Later we find irregular ulcers forming. First the submental or submaxillary and the maxillary lymphatic glands are affected. Complete removal with a wide margin of healthy tissue and all infected glands usually is satisfactory.

4. *Carcinoma of the tongue:* this is common forming about 2.5% of all cases of cancer in the male. The relative frequency for both sexes is 85% male, and 15% female. Butlin states that although it is easily accessible and recognised, it is one of the most fatal of cancers, with an average mortality of 82%.

The causes are: -

(1) *Syphilis 75%* (glossitis: 4 stages).

(2) Smoking.

(3) Burning of tongue due to heated clay pipes.

(4) Carious tooth or broken denture.

Butlin describes four precancerous conditions of the tongue. They are:

(*a*) A flat slightly raised smooth and glazed plaque, feeling like a thin piece of gristle in the surface of the tongue, and closely resembling a primary syphilitic lesion.

(*b*) A white warty growth which is scarcely indurated at the base, and not ulcerated.

(*c*) An old leucoplakic area which is slightly thickened and hardened.

(*d*) A nodular plaque red in colour and commencing to ulcerate with drawing in of the surrounding tissue.

Ulceration does not invariably accompany the development of cancer. Remove any obvious source of irritation and apply occasional touches of chromic acid and regular applications of mild antiseptics but the cancer must be removed at once, because unless a lingual cancer is operated upon, the patient is doomed to a lingering death. Butlin says 30% of cases on the average are cured by operation, but 50% under favourable circumstances, whilst the Johns Hopkins Hospital figures show 62% of cures when operation is performed before the glands are palpably enlarged.

5. *Carcinoma of the stomach:* accounted for 18.2% of all the deaths from Cancer in England and Wales during 1924.

The signs and symptoms are classified under 3 groups as: —

(*a*) The acute type: a healthy person suddenly has a copious haemorrhage or insidious and progressive loss of appetite and vigor. The haemorrhage is followed by a persistent anæmia, and meat or fat especially become distasteful. Weight is lost and sense of uneasiness is felt in the epigastrium, and soon there is a palpable tumour which may rapidly develop in the stomach wall.

(*b*) The chronic type: is characterised by anorexia, pain, flatulence and eructation, anæmia, and loss of weight. The anorexia is positive even to the extent of repugnance towards all food, whereas with a simple ulcer, there is usually a desire for food, but a fear of taking it because of the subsequent pain. Also the pain is rarely severe as in gastric ulcer, and is rather more of a sense of uneasiness or sinking feeling in the epigastrium than anything else.

There are two main types of case found when the pyloric half of the stomach is the seat of disease: the pyloric group, and the prepyloric group. In the former the symptoms are often alarming, but in the latter they are not. The average age incidence is 52 years: the sex incidence shows a male preponderance of more than 2 to 1. The parts of the stomach attacked are in order of frequency:—

1. Pylorus and prepyloric inch = 67%.
2. Cardiac end .... 16.5%.
3. Lesser curvature region .. 11.5%.
4. Remainder of the stomach.. 5%.

Perforation and severe hæmorrhage are rare in carcinoma ventriculi and most frequently occur when there is a carcinoma supervening upon a chronic ulcer, the latter being often the site of the perforation. There has been much controversy as to the frequency with which carcinoma of the stomach arises in a chronic gastric ulcer. Moynihan and Stewart analysed 216 clinical specimens of gastric ulcer and gastric cancer and state that 9.5% of the cases of chronic ulcer had become cancerous: or approaching from the other point of view, 17% of the cases of cancer had originated in a chronic ulcer. X-ray examination should always be made.

6. *Carcinoma of the colon* accounted for 12.6% of all deaths from cancer in 1924. The order of frequency of the chief sites are:—

(1) rectum (2) sigmoid (3) splenic and (4) hepatic flexures.

The columnar celled type of carcinoma is the slowest of growths and does not disseminate rapidly. Moynihan says that it is the safest place to have a cancer, as in the colon, there is the greatest chance of recovery.

It tends to encircle the gut, causing first chronic, and later acute obstruction, whilst dissemination takes place to the associated lymph glands and sometimes reaches the liver or peritoneum or both. Metastasis to distant organs such as the lungs and brain are rare.

Most patients ask advice because of a lump in the abdomen or because of some form of intestinal obstruction, but there is usually a definite syndrome as follows:—

1. Abdominal pain and discomfort: the pain being colicky in character, and borborygmi, often so extremely loud that they can be easily heard in an adjoining room.

2. Intestinal irregularity, its character varying with the site of the growth. Remember Sir Berkeley Moynihan's epigram: "We eat with our small intestine, and drink with the large intestine." The contents of the small intestine are fluid and the large intestine containing more or less solid faeces because the former bowel eats the food and leaves the fluid, whilst the latter bowel drinks the fluid and passes on the debris. Therefore whether the symptoms be of constipation or diarrhœa largely depends on the location of growth, and in a familiar situation for this growth it may be either, and therefore the patient may complain of periods of constipation and of diarrhœa alternately.

3. There are also changes in the constituents of the faeces, mucous, due to inflamed bowel, and/or blood due to irritated vessels, may be present.

The above are the three early cardinal groups or syndrome of cancer of the colon.

4. Anæmia and 5 tumour also figure.

The result of 112 autopsies by Professor Matthew Stewart of Leeds, England, on cases of cancer of the bowel, shewed that the growth remains long restricted to the intestinal wall, and does not spread either rapidly or largely in the primary glands: even in fatal cases it does not cause metastasis. The prognosis is good therefore in early and even in some late cases after operation.

7. *Carcinoma of the rectum:* this is the fourth commonest type of cancer in the body, only the breast, uterus, and stomach exceeding it: this accounts for 8.1% of all cases of cancer. Cripps states that about 60 years of age is the time of heaviest incidence.

It occurs in the rectum:—

(a) Low down near the anus, within reach of the examining finger.

(b) At the junction of the rectum and pelvic colon.

To Ernest Miles we are indebted with the natural history of this disease, including its earliest stages, its methods of spread and its results. The usual type is a columnar celled adenocarcinoma, originating in the glands of the mucosa: although it may be of the gelatinous or mucoid type, and a few of the contracting types are of the spheroidal celled variety.

The growth spreads in all directions, but mostly around the rectum itself.

There are 4 types of tumour:—

(1) A slightly raised flat plaque of growth.

(2) A deeply ulcerated area with thick raised everted margins.

(3) An annular constricting tumour of densely scirrhus type.

(4) A polypoid mass of varying size.

Dukes states that a large area of the gut is infected by the cancer producing agent, and becomes the seat of a multiple papillomatous growth: it is on one or more of these simple tumours that cancer occurs, whilst the remaining growth retrogresses and may entirely disappear. The great danger about carcinoma recti is that its symptoms are much delayed even as much as 18 months.

All cases of piles should be examined for a possible carcinomatous cause. A common symptom is that of an unemptied rectum after defaecation. The spread of the disease from the rectum is by direct extension and by lymphatic invasion. The intramural spread is slight but the extramural spread is by three routes:—

(1) From the anal canal region to the internal iliac glands.

(2) From the lower part of the ampulla to a gland near the obturator vessels, and thence to the internal iliac glands.

(3) From the upper part of the ampulla accompanying the superior hæmorrhoidal vessels, to the retrorectal glands and from thence along the origin of the pelvic mesocolon to the glands at the bifurcation of the left common iliac artery.

Cancer of the rectum must be differentiated from chronic septic and tuberculous ulceration, especially when associated with polypoidal masses, of swollen and œdematous mucosa or simple tumour. The history of the case and the comparatively superficial and flat ulcer and absence of induration will usually serve to differentiate the first two conditions from cancer.

8. *Carcinoma of the uterus:* the Registrar General's report for England and Wales for 1924 shews that 16.1% of the total deaths from cancer in women are due to this disease. The two places of origin are the *cervix* and the *body*. That cancer of the cervix accounts for 97% of the cases is stated in the Middlesex Hospital Cancer Charity Statistics, made by ten hospital teachers. It is 20 times more common in married than in single people. Carcinoma of the body occurs in 3% of cases, and also occurs in 75% of cases in married women. The average age of onset is 50 years of age. Cancer of the body is rare before the menopause. Those who have worked in the great English Hospitals must have been horrified at the huge numbers of hopeless cases which come up for medical examination for the first time. If these poor unfortunate people only realized the importance of *irregular bleeding* at this period of life, and would then immediately seek advice, many a life could be saved: they should also know the importance of a *slight brownish odourless intermenstrual discharge*, during or after the menopause which signals danger. The two early signs are therefore 1 bleeding and 2 discharge.

Vaginal examination is the key to early diagnosis of cancer of the cervix: an "erosion" which bleeds when touched and is friable is cancerous.

As regards carcinoma of the *body of the uterus*, there is an apparently uniform enlargement of the uterus on bimanual examination, but a diagnosis can only be confirmed on dilation and curettage under an anæsthetic. (A uterine sound should NEVER be passed in a suspected case of malignant disease of the body of the uterus, as the wall of this organ may be very soft near the growth and perforate). The cancer, both of the cervix and body, spreads by infiltration and permeation.

The results of operation are as follows:—

1. In cancer of the cervix: 30% complete recoveries.

2. In cancer of the body: 55% complete recoveries.

Victor Bonney published a report in the B.M.J. 15 Aug. 1925 p. 283 on a series of cases of 192 operable cases of cancer of the cervix, which he classified as (1) early cases with no gland involvement and (2) later cases with gland involvement. The cures in early cases was recorded as 50% alive and well and free from recurrence after 5 years; the later cases showed only 25.6% alive and well after 5 years: a big difference.

9. *Carcinoma of the bladder:* occurs in 2.1% of all cases of cancer. In a few only is vesical calculus associated with carcinoma of the bladder. Aniline dyes and bilharzia hæmatobium are said to be causes. Ferguson states that he has no hesitation in affirming that cancer of the urinary bladder is THE irritation cancer of Egypt. The two varieties are the (1) malignant papilloma, and (2) the squamous carcinoma in which the average duration of life after the first appearance of symptoms is less than 3 years.

The signs and symptoms are (1) hæmaturia towards the end of micturition, first intermittent, and later constant, in 90% of cases; (2) frequent micturition in 68% of cases; (3) pain; (4) excess of epithelial cells and portion of growth in the urine, found on microscopic examination; (5) emaciation. The diagnosis, if it be correct and early must involve cystoscopy. Of the two clinical types the (1) cystic (40%) and (2) the hæmaturic (60%), the former may be mistaken for a vesical calculus, or enlargement of the prostate, but rectal examination, cystoscopy and X-rays will clear up the diagnosis. Again the hæmaturic type might be mistaken for a simple papilloma or tuberculous disease, but cystoscopy together with examination of the urine will make a clear diagnosis. The immediate mortality of operation is 10%. Kümmel found in 47 cases so treated, that 10 were well at periods of from 6 to 16 years after operation. Cystoscopy is the preferred operation, but cystectomy after transplantation of the ureters may be necessary: and for cystectomy the results of 30 cases collected from literature show the operative mortality was 46%.

10. *Cancer of the thyroid gland:* this is a most unfavourable location for malignant disease, owing to the early penetration of the capsule and the involvement of the very important neighbouring structures. Glands which are already the seat of simple enlargement such as simple adenoma or parenchymatous goitre are often the seat of commencing cancer.

Both carcinoma and sarcoma occur, the latter being usually of the round or spindle celled variety; but carcinoma is more common, and may be either spheroidal celled or of cubical or columnar epithelium formation surrounding a definite lumen. Colloid formation may occur even in its secondary deposits. Early diagnosis may be difficult, but malignancy is determined by (1) the rate of growth (2) the consistency, and (3) the involvement of surrounding structures.

As regards the rate of growth, sarcoma is the most rapid, but usually confines itself to one lobe. Cancer is usually harder than other forms of thyroid tumour formation, but a calcified adenoma must be excluded by X-ray examination.

With regard to the structures involved, these include the large vessels of the neck, the trachea, œsophagus (later), and the nerves, especially the recurrent laryngeal nerves, producing paralysis of the vocal cords, cardiac irregularities, pain down the arm, and wasting of the muscles of the shoulder girdle and arm.

Dissemination occurs via the lymphatics and the blood stream. After operation, the continued administration of thyroid gland will be necessary.

11. *Bone cancer:* is of five main types:—

1. Osteosarcoma: from osteogenic tissue.
2. Fibro-sarcoma: from the fibrous periosteum or endostium.
3. Osteoclastoma (The name given by Stewart to the myeloid sarcoma): from supporting framework of bone.
4. Chondrosarcoma: derived from and differentiating into cartilage.
5. Malignant endothelioma: from blood vessels.

Endosteal, and periosteal, or subperiosteal tumours are also recognised topographically and may belong to any group.

A parosteal tumour is not really a bone tumour: it is derived from the aponeuroses of the part.

The so-called multiple myeloma is a tumour of the marrow chiefly: the Bence-Jones proteinuria is frequently found in this.

The extremely malignant bone tumours are usually the osteosarcoma, and endothelioma. The osteoclastoma (myeloid sarcoma) is usually locally malignant only.

Spontaneous fractures are usually, if not always, due to the more malignant forms of central sarcoma. Sarcoma most commonly occurs in the long bones of the skeleton, and tends to occur at the epiphyseal ends of the shafts, the upper end of the tibia and humerus and the lower end of the femur being the usual sites.

It is extremely rare to find glandular invasion and the visceral dissemination is usual.

In the early stages the signs and symptoms are dull aching pain, and swelling, both of which are usually referred or found in a joint, veins stretched beneath the skin which may be shiny, egg-shell crackling, pulsation, and then spontaneous fracture.

It is often extremely difficult to diagnose: chronic osteomyelitis, periostitis, gumma, Brodies' abscess (deep abscess of bone), and aneurysm have all to be excluded. X-rays is essential for correct and certain diagnosis.

X-ray shows in. . . . . .

1. Cancer: rarefaction at site of growth.
2. Chronic abscess: rarefaction surrounded by a layer of densely sclerosed bone.
3. Chronic periostitis: thickening of bone by deposition of new subperiosteal layers, parallel to the long axis of the bone.
4. Tuberculosis: loss of detail in structure and later rarefaction due to necrosis and abscess formation.
5. Osteoclastoma (myeloid sarcoma): ovoid rarefaction limited by a well defined thin shell of normal bone. The "transparent" area may be traversed by bony trabeculæ producing irregular shadow lines.
6. Osteo-sarcoma: numerous delicate bony spicules radiating outwards at right angles from the surfaces whilst the interior of the bone is shown as a dense shadow.
7. Fibro-sarcoma: irregular areas of rarefaction whether deep or superficial, where bone is being replaced by growth.
8. Chondro-sarcoma: some calcification indicated by the blurred outline of the bone, with irregular mottling where calcification is occurring.

The best treatment in bone cancer is LOCAL excision followed by treatment with radium, X-rays, Coley's fluid* *as used by Coley*

* B.M.J. June 30th, 1925, p. 1134, in which McNamara shows how prejudice and lack of accurate and detailed knowledge by experimenters has disfavoured both Coley's fluid treatment of sarcoma and Blair Bell's colloidal lead treatment of cancer, both of which he has seen to produce miraculous results. He refers also to B.M.J. November 20th, 1926. Both these references are well worth reading *in extenso*.

himself (I have seen Coley use his streptococcal and pyocyanus preparation with miraculous results). Coley says "of 93 cases of inoperable sarcoma, treated before 1898 and published in the Johns Hopkins Bulletin, I find 14 or 15% were alive and well from 10 to 33 years after."

So ends the story of cancer.

We are told that cancer is a disease of civilization: then remember that China is rapidly awakening to a greater civilization, and also is the disease of cancer advancing too; this "Angel of Death" is already boring its roots into the heart of China. Dr. E. W. Kirk, informs me that also to his knowledge cancer is prevalent in inland China, especially attacking the breast, liver, neck, and ? superior maxilla.

When I toured through Indo-China, & Inland China including Lungchow, Nanning, and Wuchow, I found this to be the case.

See to it that this deadly enemy is defeated: use your researches, your brains, and ingenuity to discover the cause (the enemy fortifications and tactics) and so slay this great formidable menace to mankind, and so prevent the day when it might well be said, "The Angel of Death is abroad in the Land; you can *feel* the *beating* of his wings."

Harken to the last word of warning, which should ring in the ears of all again, and again: *THERE IS a day when cancer is still local, and therefore, if accessible, CURABLE; there is a day, when dissemination FIRST occurs, the one day follows the other; THE FIRST DAY IS THE DAY FOR ACTION; the second day is just ONE DAY too late.*

POSTSCRIPT.

Since writing the above survey in June, I have followed closely the literature dealing with the Cancer Problem.

I was extremely interested in reading Dr. J. B. Murphy's recent work tending to disprove the virus theory and putting forth a chemical theory. I remember once "curing" a case of carcinoma recti by treating a patient with Insulin for diabetes and in six months two of my colleagues who examined the patient both before and after treatment were equally amazed, but on one case alone nothing can be formulated.

Also Drs. Jacquemart & Pfeiffer's book on "Tréponème et Néoplasmes,"(1) is extremely interesting in which it is stated that cancer is a quarternary stage of syphilis - the older the syphilis becomes the more it develops the power of generating cancer.

Striking examples are given: the frequency of syphilis (ulcers) of the stomach and cancer are discussed. Cancer of the stomach always succeeds ulcer of the stomach.

Their theory explains many things which were uncertain or obscure. Syphilis explains cancer families, cancer houses, cancer districts and cancer epidemics. The authors make plain their ideas: they say, "une jolie femme spécifique dans ce coin de village et toute s'explique le plus simplement du monde."

There may be some truth in this interesting book. We must however wait and see what the future brings forth in research and seek after the truth as revealed in this science we are now studying until we have reached our goal.

A. C.

(1) Tréponème et Néoplasmes Par les Docteurs Jacquemart et Ch. Pfeiffer, Paris, N. Maloine 1928. (168 pages. Price 15 francs).

Editorial

THE MEDICAL FACULTY.

O it's Tommy this, an' Tommy that, an' Tommy, go away;
But it's "Thank you, Mister Atkins," when the band begins to play.

(Kipling).

The position of the medical profession throughout the Empire could be improved with very considerable advantage to the general public. Take, for example, the small number of medical men who are members of parliament, compared with other professions, such as the law. As a profession we are slowly becoming more influential, as the scientific education of the public increases.

The services provide an instructive guide to the progress of Medicine, throughout the country, when we compare what is known of the R.A.M.C. at the time of the Crimea, and the position occupied by this service during the late war.

For the first time the Report of the Medical Department of Hong Kong contains an account of the work of the University Clinic, and the Faculty owe a deep debt of gratitude to Dr. Moore for being the first to give us any recognition. Owing to the existence of the University, patients are able to avail themselves of special advice and treatment. During the last year, the staff of the Clinics were responsible for upwards of 4,000 patients who were treated in hospital, and for the performance of 700 operations, while the attendance at the out-patients clinics numbered 14,000 approximately. The University pathological department issued 1502 reports, each involving the examination of tissue or blood.

It must be borne in mind that the University has been obliged so far to run its Medical School on a skeleton staff. There are eight full-time professors (including chemistry and physics), eight part-time lecturers, and five full-time assistants.

In the Medical Faculty, there are approximately 160 students. A rival medical college in another port, although its total students number only 110, has twelve chairs, eleven lecturers, three readers.

The Medical Faculty, in the form of the Hong Kong College of Medicine (having existed by itself for many years), led to the founda-

tion of the University. The Faculty now contains just about half the students of the University and indeed it is difficult to realise what would become of the University if were it to fail. Competition is increasing, the income at the Faculty's disposal is small and the members of the faculty have a serious problem before them if they are to compete successfully with other colleges.

In tropical countries, the mortality rate is liable to be high with the ever present dread of a serious outbreak of disease. It is for this reason that medical science is worthy of support, it is an insurance policy against disease, just as the Navy is the nation's insurance against war.

Review of Books

RECENT ADDITIONS TO THE SURGICAL SECTION OF THE LIBRARY.

Among the new surgical books we notice a new text book "*The Science & Practice of Surgery*" in 2 volumes by Romanis and Mitchiner of St. Thomas's Hospital. No text book will satisfy everyone in all its details, but these two volumes are a change from the text books in common use, the printing is so pleasantly readable and the illustrations so clear that they are sure to be welcomed. The work is up to date. There are paragraphs on rectal ether and paraldehyde (which were first introduced into Hong Kong by Professor Tottenham). We are in no sort of agreement with the authors upon the treatment of empyema.

Two books should be read by every ward clerk and dresser. The first is Hamilton Bailey's "*Physical Signs in Clinical Surgery*" which is well illustrated though perhaps a little patchy in places. The diagram of Paget's disease on page 192 is a light touch! The second is "*Infections of the Hand*" by Lionel Fifield. Due acknowledgment is made to Kanavels book of the same name from which so much is derived. The correct treatment of an infected hand means such a great deal to the future livelihood of the patient, that examiners are right in pressing such questions on the candidate as "What incision would you make for thecal suppuration?" "What is Parona's space?" and "Where is the (badly named) thenar space?" "*Practical Local Anæsthesia*" by Farr is likely to be looked through by many nowadays when all are making efforts to extend the range of local anæsthesia. It will be invaluable as a work of reference.

The 1927 edition of Cumberbatch's "*Diathermy*" is larger than the first edition. For long it has been almost the only work on the subject. In this district where nasopharyngeal carcinoma is so terribly prevalent and diathermy is the only practicable method of treating it with any success it is well to have the latest teaching by so experienced an authority.

Two books on diseases of the breast have arrived:—"*Cancer of the Breast*" by Sampson Handley (2nd edition) and "*On the Breast*" by Fitzwilliams. The former gives an accoutnt of Handley's researches which led to his discovery of "permeation" and also deals wtih other aspects including the use of radium and X-rays. The latter covers the whole subjects of diseases of the breast. At a recent staff round at the Civil Hospital there was a discussion on the secretion of milk apart from pregnancy. Several anecdotes of this condition are recorded by Fitzwilliams.

On the subject of fractures are "*The Thomas Splint*" by Sinclair, describing in careful detail the wonderful technique developed by the

author, and "*The Treatment of Fractures and Dislocations in General Practice*" by Max Page and Rowley Bristow which, if somewhat undistinguished, yet gives a number of useful hints.

A. K. Henry's essays on "*Exposures of Long Bones*" have been generally accepted as describing correct principles since they were first published a few years ago, and they should be studied by any who are not familiar with them.

The seventh edition of Rowlands and Turners incomparable "*Operations of Surgery*" in two volumes is better than ever, and the illustrations are an improvement on these in the earlier editions. The work maintains the high surgical traditions of the Guy's school.

Surgery in children presents special difficulties and is in some ways highly specialised. The two volumes of Fraser's "*Surgery in Childhood*" appear to be very thorough and excellent and contain discussions on many difficult surgical problems in children. There is an interesting appendix on the making of celluloid splints.

Two large volumes of "*Young's Practice of Urology*" challenge attention by their excellent "get up" and illustrations. Young is best known to us by his operation of perineal prostatectomy which is here, of course, fully described and figured.

"*The Cerebro Spinal Fluid in Clinical Diagnosis*" by Greenfield and Carmichael is of interest to the surgeon chiefly on account of the diagnosis of spinal tumours. Froin's syndrome is fully dealt with.

K. H. D.

Pharmaceutical Notes.

A COINCIDENCE IN PHARMACEUTICAL HISTORY.

An interesting event in medical progress is the recent synthetic production of Ephedrine by E. Merck, Darmstadt, which is being marketed under the trade name of "Ephetonin."

This recalls the original isolation of the alkaloid (from Ephedra Vulgaris, var. Helvetica) by Merck in 1888, after which this ancient Chinese medicament passed through a period of quiescence until 1925, when fresh examination of its pharmacological properties by Chen awakened world-wide interest and investigation.

A heavy demand was naturally soon created for this drug which suddenly emerged from obscurity into a position of prominence in modern medical practice where it is proving of specific value in the treatment of *Bronchial Asthma, Hay-Fever, Hypotonia, etc.*

Difficulty in obtaining adequate supplies of the correct species of Ephedra led to experiments in the laboratories at Darmstadt with a view to its synthetic preparation, and the result is "Ephetonin," which other than being optically inactive is identical pharmacologically with Ephedrine.

Ephetonin possesses precisely the therapeutic properties of its natural analogue and is distinguished by its constant effect, low toxicity and ease of administration—it may be given orally, and for that purpose is conveniently issued in the compressed form, but it also is supplied in ampoules.

Its superiority over Adrenalin should lead to its supersession of that drug in Asthmatic and allied affections. Ephetonin marks another achievement of the Merck Chemical Works which should prove a valuable addition to Materia Medica. (*Advt.*)

ANTI-GAS-GANGRENE SERUM.

After the Great War it seemed as if the need for anti-gas-gangrene serum was at an end. But, thanks to a brilliant series of experiments continued over two years by an English physician at one of the great London hospitals, a wide field of application has been opened and the importance of this serum is fully recognised. The serum for the original researches was supplied by the Wellcome Physiological Research Laboratories. The product which is now issued for use by the medical profession is described as 'Wellcome' Anti-Gas-Gangrene Serum (W) (*B. Welchii*).

'Wellcome' Anti-Gas-Gangrene Serum has been successfully used in abdominal surgery for the treatment of toxæmia of acute obstruction and peritonitis with ileus; in certain cases of puerperal septicæmia following abortion and as a prophylactic in grossly infected wounds such as may occur in road accidents. From 40 c.c. to 100 c.c. of the unconcentrated serum (containing approximately 100 "W" units of antitoxin per c.c.) are generally given intravenously or intramuscularly for the treatment and 10 c.c. to 20 c.c. for prophylaxis; of concentrated serum from 20 c.c. to 50 c.c. (containing approximately 500 "W 2" units per c.c.) are given intravenously to severe cases and smaller quantities intravenously or intramuscularly to cases of moderate severity. The serum in experiments is found to protect against both toxin and living culture.

The unconcentrated serum hitherto issued has contained 60 "W" units and upwards per c.c. Concentrated serum has now been prepared and shortly will be available in large quantities. A dose of 10 c.c. of the concentrated serum will be equivalent to from 50 c.c. to 80 c.c. of the unconcentrated serum previously used.

'Wellcome' Anti-Gas-Gangrene Serum (W) (B. Welchii) is an All-British Product prepared at the Wellcome Physiological Research Laboratories, Beckenham, England, and issued by Burroughs Wellcome & Co. in 10 c.c. and 25 c.c. hermetically sealed phials. (*Advt.*)

"VAPOROLE" BRAND EPHEDRINE SPRAY COMPOUND.

Messrs. Burrough Wellcome & Co. have issued a useful "Vaporole" preparation of ephedrine for application to the pharynx and nose by means of an atomiser. "Vaporole" Ephedrine Spray Compound consists of Ephedrine 1%, Menthol, Camphor and Oil of Thyme of each 2% in a base of "Paroleine" (a high quality liquid paraffin). Such a spray enables ephedrine to be efficiently applied locally in hay-fever and congested conditions of the pharynx and nasal mucosa. It is stated that clinical trials of this new method are exceedingly satisfactory and promise to provide a very effective weapon for the symptomatic relief of hay-fever and of engorged and catarrhal conditions of the naso-pharynx. The product is supplied in 1-oz. bottles. (*Advt.*)

VALYL (Hoechst).

The natural Valerian preparations which formerly were highly esteemed by physicians as nerve tonics, in later times lost much of their reputation. This is mainly due to their unreliable action, caused by the very varying proportions of active substances in valerian.

The researches carried out by Professor Dr. Kionka in the Pharmacological Institute of the University of Breslau have demonstrated that the active principles in valerian root are very changeable and prone to decomposition, even in drying and storing the drug. Moreover the infusion prepared from the fresh drug may lose its medicinal activity within a few days. Likewise other preparations from the root such as oil, tinctures extracts and the like are extremely liable to alter and are therefore uncertain in their action. These experimental investigations have proved that the statements and complaints made by physicians regarding the unreliability of preparations made from valerian root are justified.

The requirements of modern medicine appear to demand that search should be made for a chemical substance which shall possess all the properties which develop "valerian action," if possible in a still higher degree. A suitable preparation has been discovered by Kionka and Liebrecht in Valeryl-Diethylamide, which is also free from unpleasant by-effects and has been introduced into commerce under the registered name of "Valyl."

Valyl was recommended by Kionka for the therapy of conditions of nervous excitement and has fully answered expectations, as the already published reports of leading physicians show. Investigations have proved that Valyl is a preparation of permanent and constant activity, which even in small doses produces a typical valerian action. In its action on the psyche and on the vasomotoric nerves Valyl is particularly noteworthy. The heart is absolutely unaffected by medium and small doses, which are all that is necessary as a nerve tonic. The blood and the cell protoplasma are also absolutely unaffected by medicinal doses.

Valyl is obtained by the action of valeric anhydride on diethylamine.

The principle advantage of the Valyl Pearls is that, as careful clinical trials have shown, they are resistant to the action of the acid juices of the stomach, and are only dissolved in the intestines, where the liberated Valyl is then easily absorbed. Even patients with stomach troubles tolerate Valyl Pearls excellently and never complain of the troublesome repetitions which frequently follow the administration of other valerian preparations. (*Advt.*)

ASTONIN (*M.B.K.*).

This preparation which is a compound of strychnine, phosphorus, and arsenic has proved particularly valuable in conditions of exhaustion of all kinds, neurasthenia, etc. Fresh confirmation of its efficacy is supplied by a communication by H. Meyer, who used astonin on

himself. Even after the first week, i.e. after six injections, a marked effect was evidet, as shown by an increase in weight. The appetite was considerably improved, and the dull headaches previously present had ceased. Under continued treatment with the injections the weight increased and at the end of four weeks the author felt sufficiently strong to resume his professional activities. As subcutaneous injections produced an unpleasant sensation of tension, owing to the smallness of the subcutaneous fatty cushion present, the author afterwards had the injections made intramuscularly, and was very well satisfied with the result. Astonin is packed in ampoules of ten in a box. (*Advt.*)

Acknowledgments.

We have much pleasure in acknowledging the receipt with thanks of the following contemporaries:—

The Post-Graduate Medical Journal, London.

The Hospital Gazette, London.

The Charing Cross Hospital Gadette, London.

The St. George's Hospital Gazette, London.

The St. Mary's Hospital Gazette, London.

The London Hospital Gazette, London.

The King's College Hospital Gazette, London.

The University College Hospital Magazine, London.

The Prescriber, Edinburgh.

Health and Empire, London.

The Birmingham Medical Review, Birmingham.

Publications from the League of Nations, Health Organization, Geneva.

Monthly Epidemiological Report.

Bulletins et Memoires de la Societe des Chirurgiens de Paris.

Bulletin de la Societe des Sciences Medicales et Biologiques de Montpellier.

The University of Toronto Medical Journal.

Bulletin of the School of Medicine, University of Maryland, Baltimore, MD.

Anales de la Universidad Central, Quito, S.A.

The Malayan Medical Journal, Singapore.

Japanese Journal of Medical Sciences (National Research Council of Japan), Tokyo.

Kyoto Ikadaigaku Zasshi, Kyoto.

Okayama Igakkai Zasshi, Die Universitat Okayama, Japan.

The Taiwan Igakkai Zasshi, Government Medical College Formosa.

Chinesische Zeitschrift fur die Gesamte Medizin, Monkden.

Index Universalis, Moukden.

Dr. Huang's Medicca1 Journal, Shanghai.

Health, Shanghai.

Opium, Shanghai.

The Tsinan Medical Review, Tsinanfu.

The Moukden Medical College Journal, Moukden.

The Australian Journal of Experimental Biology and Medical Science, Adelaide.

The Medical Journal of Australia, Sydney.

Acta Psychiatrica et Neurologica (Karolinska Institutets Bibliotek), Stockholm.

The Tohoku Journal of Experimental Medicine, Sendai, Japan.

University of Durham College of Medicine Gazette, Newcastle-on-Tyne.

The Bristol Medico-Chirurgical Journal, Bristol.

Das System der Hygiene, Universitat Bratislava.

The Journal of Bone and Joint Surgery, Boston.

Porto Rico Review of Public Health and Tropical Medicine, San Juan.

Boletin de la Universidad Nacional de la Plata, Argentina, S.A.

Archives of Medical Hydrology, London.

Fukuoka-Ikwadaigaku-Zashi, Kukuoka, Japan.

Middlesex Hospital Gazette, London.

Endokrinologie, Leipzig.

Transactions of the Japanese Pathological Society, Tokyo.

Bulletin of the New York Academy of Medicine.

Mededeelingen Van Den Dienst Der Volksgezonheid in Nederlanded-Indie.

Polyclinica Dairen.

Medical Conference Addresses in Commemoration of the Opening of the New Dairen Hospital, 1927.

Revista del Instituto Medico Sucre, Bolivia.

Bulletin of the Medical Department of the University of Georgia, Augusta, GA., U.S.A.

Cornell University Medical Bulletin, New York.

Actas Y Trabajos, Buenos Aires, Argentina.

Moukden Medical College, Report.

Reprints from the Institute for Medical Research, Kuala Lumpur, F.M.S.

The Treatment of Asthma and Hay Fever with Ephedrine by Richard Green.

Serum of Convalescent Cases in the Prophylaxis, Diagnosis and Treatment of Measles, by A. Neave Kingsbury.

On Enteric Fevers, by A. Neave Kingsbury, J. E. Lesslar and M. Kandah.

Reprints from Dr. Wells D. Eagleton, Newark, N.J.

"Otologic and Nasal Diseases in Relation to Intracranial Disturbances" (*Archives of Otolaryngology, July 1927*).

"Clinical Classification and Treatment of Fracture of the skull, with guide for detailed neurologic examination, (*Archives of Surgery, July 1921*).

Catalogue of the Faculty of Medicine, University of Montreal.

Catalogue of the Hackett Medical College for Women, Canton.

Notes and Comments.

Our Members.

Dr. Eva Ho Tung:—Since our last issue, we are pleased to record the further success of Miss Ho Tung who had been working at the Rotunda Hospital, Dublin, and was successful in obtaining the Diploma of Gynæcology and Obstetrics.

Dr. A. Cannon:—We have learnt that Dr. Cannon has obtained the degree of Doctor of Medicine of the University of Leeds. Dr. Cannon is well-known to our members and has taken a keen interest in the welfare of our Society. We congratulate him on his sucess.

Sir Eric Stuart Taylor, C.B.E., M.D., M.R.C.P.—It is with regret that we learn of the impending departure of Dr. Stuart Taylor. Sir Eric who possesses the highest medical qualifications has been a very good friend to the University, and has acted on many occasions as the external examiner in Pathology. He will be greatly missed by his patients and friends. We wish Sir Eric a pleasant voyage and every success in the future.

Peking Union Medical College.

The Department of Pathology of P.U.M.C. is inviting applications for a position as assistant resident. The candidate appointed will rotate through the divisions of the department in Bacteriology, Serology and Parasitology. In each division he will take part in the routine work of examining and diagnosing, under the direction of various members of the Department.

From the staff of assistant residents, suitable candidates will be selected for appointments in bacteriology and serology or other subjects. It is hoped that this work will appeal to men going into either medicine or surgery as well as to those interested in bacteriology, etc. These positions are created primarily to give graduates in medicine a practical training in laboratory diagnosis.

The appointee will be a regular member of the hospital staff and will receive a salary of Mex. $600 a year plus maintenance. Travelling expenses (2nd class) to Peking and return to his home at the completion of appointment will be paid.

Applications with references and full particulars should be sent to Dr. C. E. Lim, P.U.M.C.

Our Degree Examinations.

M.B., B.S. Examinations:—The results of the first, second and third medical degree examinations held in May 1928 are published below. It is interesting to note that in the final examination, 42.1% of the total number of candidates passed in part one (Surgery, and

Obstetrics) and 52.6% in part two (Medicine and Pathology). Three candidates succeeded in passing both parts at one sitting.

1st M.B., Part 1, New Regs. (Physics).

Bee Hoat Teck.
Chew Pow Heng.
Miss Hui Luk Yip.
Lam Kow Cheong.
Lai Fook, Wm.
Lew Khoon Shin.

1st M.B., Part 2, New Regs. (Inorganic Chemistry).

Bee Hoat Teck.
Chew Pow Heng.
Miss Hui Luk Yip.
Lam Kow Cheong.
Lai Fook, Wm.
Lew Khoon Shin.
Szeto Eng Kee.
Tay Kum Swan.

1st M.B., Part 3, New Regs. (Biology).

Bee Hoat Heck.
Chew Pow Heng.
Miss Hui Luk Yip.
Lew Khoon Shin.
Lo Chong Fie.
Szeto Eng Kee.
Tay Kum Swan.
Thio Ban Hin.

2nd M.B., Part 1. (Anatomy and Physiology).

Miss Bessie Chen.
Enok, V.
Kho Han Po.
Lim Ek Quee.

2nd M.B., Part 2. (General Pathology and Pharmacology).

Chan Wah.
Guterres, A. P.
Khoo Keng Tay.
Ng Yeok Boon.
Ooi Phee Tuan.
Miss P. Ruttonjee.
Tan Tiong Lam.
Teo Soon Wan.
Tsan Tze Ming.
Woo Kai Fun.

3rd M.B., Part 1. (Surgery and Obstetrics & Gynæcology).

Chan Joo Cheng.
Gourdin, A.
Kawn Kriang Krai.
Kwan Pah Chien.
Sudan, B. N.
Sun, E. W. J.
Tio Swi Lam.
Wu Ta Piao.

3rd M.B., Part 2. (Medicine and Pathology).

Chee Chin Hai.
Chua Boon Teck.
da Roza, C. F. X.
Kawn Kriang Krai.
Ku Hseuh Chin.
Kwan Pah Chien.
Kwok Ying Kong.
Lam Hor Yin.
Sun, E. W. J.
Yang Lin.

The following are recommended for the M.B., B.S. degrees.

Chan Joo Cheng.
Chee Chin Hai.
da Roza, C. F. X.
Kawn Kriang Krai.
Kwan Pah Chien.
Lam Hor Yin.
Sudan, B. N.
Sun, E. W. J.
Tio Swi Lam.

Appointments.

The following have been appointed at the :—

Government Civil Hospital.

July to December 1928.

House Obstetrician.	Dr. D. Laing.
House Physician.	Dr. T. J. Hua.
House Surgeon.	Dr. S. T. Hsiu.
Clinical Assistant to the Obstetrical and Gynæcological Unit.	Dr. S. K. Lam.
Clinical Assistant to the Medical Unit.	Dr. E. W. J. Sun.
Clinical Assistant to the Surgical Unit.	Dr. C. H. Chee.
Clinical Assistant to the Outpatients' Department.	Dr. C. F. X. da Roza.

Government Civil Hospital.

Assistant Medical Officer.	Dr. T. Z. Bau.

Kowloon Hospital.

Assistant Medical Officer.	Dr. A. D. Wong.

Kwong Wah Hospital, Kowloon.

Resident Medical Officer.	Dr. P. C. Kwan.

Chinese Public Dispensaries.

Assistant Medical Officer (to Dr. A. D. Hickling, M.B.E.)	Dr. (Miss) P. C. Lai.

AN OUTL

HYDRO

by

SIR BERKELEY M

President of the Royal Col

Definition A Collection of fluid other than pus or blood in the neighbourhood of the Testis or

Classification as follows:—

1.—Hydrocele of Testis & Epididymis.

- **A. Hydrocele of Proc. Vag.**
  - 1.—Hydrocele of Tunica
  - 2.—Congenital Hydrocel
  - 3.—Infantile Hydrocele
  - 4.—Hydrocele of Funicu
  - 5.—Bilocular Hydrocele
  - 6.—Diverticular Hydroc
  - 7. Inguinal Hydrocele
- **B. Encysted.**
  - **(a) of Epididymis**
  - **(b) of Testis**

2.—Hydrocele of Cord. (Canal of Nuck in female)

- **A. Diffuse.** — Oedema of Cellular Tiss
- **B. Encysted.**
  - 1.—In portion of funicu
  - 2.—Haemorrhage clot a
  - 3.—Organ of Giraldes.

3.—Hydrocele of Hernial Sac. — Neck of Sac plugged by omentum Fluid accumu

Hydrocele of the Tunica Vaginalis forms a fluctuating scrotal tumour separable without impulse on coughing, and translucent.

Transluceney is sometimes present in hernias of children, and absent if hydrocele is "Infantile"; if it communicates with the abdomen it is "Congenital". If fluid occupies the Funicular process".

"Congential"

"Infantile"

"Funicular"

Complications. A.—Hydrocele may undergo
- 1.—Rupture. Spontaneous or Tra
- 2.—Infection. Suppuration "Thie
- 3.—Haemorrhage. Haematocele.

Treatment.
- 1.—Tap. Support. Fluids injected
  - Glycerine and Carbolic A
  - Tinct. of Iodine or Iin.
  - Port Wine.
- 2.—Tap. and Inject. Support.
- 3.—Excise. vide Bergmann's operation.
- 4.—"Bottle" operation of Jaboulay—Eversion of sac.

'LINE OF

DCELE

by

IOYNIHAN, BART.

llege of Surgeons, England.

r Cord.

Vaginalis { acute. chronic.
le.

ılar process.

ele.
—in association with retention of Testis.

- i.—Containing Spermat
  - 1.—Retention Cysts of ducts of epididymis.
  - 2.– Rupture of duct of epididymis.
  - 3.– Serous cyst into which duct ruptures.
  - 4. –Hydatid of Morgagni { Pedunculated / Sessile.
  - 5.– Kobelt's Tubes.
  - 6.—Organ Giraldes.
- ii.—Not Cont. Spermat: Serous cysts.

- 1.—Cyste between T. vag and T. Albuginea. Rare.
- 2.—In Tunica Albuginea.

ue.

lar Process.
bsorbed.

lated in sac. Irreducible.

from the abdomen. It is pear-shaped with the larger end downwards, unattached to skin,

walls are thickened or calcareous. If the hydrocele extends upwards to internal I.A Ring it
a funicular process open to the abdomen, but closed above the testis there is a "Hydrocele of

'Bilocular"

"Diverticular"

"Hydrocele of the Cord"

umatic.
tening of walls. Obliteration of Tunica vag. and cure.

cid pure aa zi.
odi. zii to xiv water.

= drachm(s)