to be in some danger of letting slip knowledge and experience so hardly won. The Thomas splint with fixed extension from the boot—best obtained by driving a long nail or pin through transversely between sole and upper, attaching cords or tapes to its ends and tying them round the end of the splint—should be the standard method for transport.

Fractures of Bones of Leg.

The oblique fracture through one or other of the tuberosities of the tibia into the knee-joint is one of those for which I think operation with nailing is indicated. The fracture of both bones in the lower third of the leg is one requiring considerable care, both in deciding the line and watching the course of treatment. We all know the tendency both to mal-union and non-union in this situation. So much is this the case that many surgeons now treat all these cases by operation, with or without the application of some internal splint. In this fracture reduction under an anaesthetic with temporary fixation in plaster has much to commend it. If treated by splints—as, for example, by the widely used box splint—elevation of the limb *without* flexion of the knee will be found a useful aid in preventing the forward projection of the lower end of the upper fragment of the tibia which is often so troublesome. Where there is considerable comminution of the tibia an accurate reposition of fragments is seldom possible. Union with good function will usually be secured, however, if the true alignment of the limb is preserved. At all costs a posterior sagging at the seat of fracture must be prevented.

CONCLUSION.

I desire to lay emphasis on the following points:

1. In the case of most fractures it is necessary to *reduce* the fracture under a general anaesthetic.
2. In upper limb fractures early active movement is desirable. (Fractures in the immediate vicinity of the elbow form an exception to this rule.)
3. In fracture of the lower limb restoration of the correct alignment and length of the limb take precedence over all other considerations.
4. In certain fractures, notably Pott's fracture with partial dislocation, immediate fixation in plaster gives the safest assurance of a good result.
5. In compound fractures excision of the wound with primary suture should be attempted whenever possible.

THE EARLY TREATMENT OF FRACTURES.*

BY

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THE fracture of any bone results in damage to many small blood vessels and lymphatics, frequently to muscle fibres, muscle sheaths and tendons, not seldom to joint capsules; also many small nervules and end-organs are involved, either directly from the original trauma, or indirectly from pressure.

The bruising of the muscles and tearing of the blood vessels and lymphatics result in painful muscular spasm and rapid infiltration of the tissues with blood and lymph. This is usually so extensive that the normal circulation of the limb, below the injured part, is more or less affected, with consequent swelling and oedema; and it is undoubtedly the tension in the tissues that causes much of the pain. Indeed, when a fracture has occurred a vicious circle is set up in which one can see the injury giving rise to effusion, effusion causing pain and spasm of all contractile tissues voluntary or involuntary; spasm of blood vessels, etc., preventing adequate drainage; engorgement causing further irritation, and this again in its turn causing further muscular spasm.

It is here that the teaching and results of physiology are

invaluable, as they show that certain electrical currents should help (1) to accelerate the removal of the excess of fluid accumulated; (2) to secure more rapid reduction of the hypersensitivity of the nerve endings; (3) to bring about abolition of spasm, whether in muscles, blood vessels, or lymphatics.

Physiological Considerations.

With the passage of a direct current through the body, certain effects take place known technically as cataphoresis, anelectrotonus, catelectrotonus, polarization, etc., and a brief consideration of these effects is necessary in order to realize the rationale of the treatment I am about to describe. It will also be necessary to consider the changes that occur in the normal electrical condition of muscle when this is injured. I will endeavour to do this as non-technically as possible.

Cataphoresis.—When a current passes through a conducting medium which is fluid or semi-fluid, a movement of the fluid takes place from the positive towards the negative pole. Experimentally this can be easily demonstrated by placing a porous partition in an electrolytic cell; then after the passage of a current, the fluid will be seen to be higher on the side of the cathode, thus indicating a definite transportation of fluid. In this well known phenomenon we have, then, an electrical means of assisting in the removal of the accumulated excess of fluid present in any injury; and, on this ground alone, it would be justifiable to employ the direct current in the treatment of fractures or other injuries.

Anelectrotonus and Catelectrotonus.—It will be remembered from physiological days that if a constant current is passed through a portion of the nerve of a muscle nerve preparation, and then a second exciting current is applied as a stimulus to the nerve, there is a considerable reduction of muscular response when the stimulus is applied in the neighbourhood of the anode, and a considerable increase in the response when near the cathode. The reduction of response when the stimulus is applied in the neighbourhood of the anode is due to a lowering of the excitability of the nerve below the normal, and is maintained the whole time the current is running. Here, then, we have a well known effect which can be made of use in reducing the hyperexcitability of injured nerve endings, provided we take pains to prevent sudden increase or fall of the strength of the current, provided also the current used is small and made to enter over a wide area. Without these precautions, false cathodes will be formed, and undesirable ionic concentrations take place. With the reduction of excitability of nerve endings, and the transportation of fluid away from the injury, we shall have successfully taken the first steps in breaking the vicious circle referred to above.

Demarcation Currents of Injury.—Hermann has shown that when a muscle is injured the injured portion is electro-positive to the uninjured parts—that is, there is a current *within* the muscle from the injured area to the uninjured area. If now we consider a muscle such as the biceps, injured near its insertion, say, as the result of a fracture of the lower third of the humerus, this portion of the muscle—namely, the injured or excited portion—is electro-positive to parts of the muscle nearer the origin. Now it must be remembered that this condition is the exact electrical condition that takes place when a normal muscle commences to contract, and from such a condition the wave of contraction proceeds. It is therefore easy to understand why in fractures muscular spasm is such a prominent feature. If we apply the positive pole of a direct current over, or just below, such an injury, we should tend to increase this electro-positivity, and thereby increase, or at any rate not diminish, the muscular spasm present as the result of the original injury. If, on the other hand, the area of application of the current includes the whole of the muscle, we shall tend to *make* the condition in the muscle iso-electric; and, with this, not unreasonably expect diminution of excitability and a tendency to the disappearance of spasm. This is, I believe, what actually occurs during the treatment I am about to describe to you.

Polarization, Temperature, and other Effects.—When strong currents are employed, polarization occurs between the sheath and the conducting fibre in a medullated nerve, resulting in hyperexcitability instead of the desired hypoexcitability, and it should be guarded against by the use of very weak currents. The passage of any electrical current through a conducting medium results in the production of heat. Now Gotch has shown that, within physiological limits, both in skeletal muscle and nerve, excitability is diminished by raising the temperature and increased by lowering it. Any increase, therefore, of temperature occasioned by the passage of the direct current is likely to act in a direction which is useful and certainly not prejudicial. It is doubtless due in part, at any rate, to this

* A paper read before the Guildford Division of the British Medical Association on January 17th, 1924. (Abridged.)

effect, that the beneficial results of diathermy in recent injuries, as pointed out by Turrell, occur. I do not consider that ionization of the inter-polar path plays an important part; I prefer to lay more weight upon the other reasons I have given.

On physiological grounds, therefore, benefit should be obtained from the direct current if used (a) with very weak anodal currents, (b) with a distant cathode, (c) with a wide surface of even entry, such as provided by water, (d) with the positive pole more than covering the whole of any muscles involved in the original injury.

Comparative clinical experiments were made with the use of warm baths only, with diathermy only, and with the cathode instead of the anode, and the results of these experiments afford confirmation of the true beneficial physiological effects of the anodal current—the most striking being a case of a man who injured one ankle, which rapidly recovered with anodal galvanism, and who, a few days later, injured his other ankle, which was in its turn treated with the anode and the cathode applied to the recovered ankle; this latter rapidly became painful and swollen again. Similar results were obtained in many other cases, clearly indicating that *different results are obtained with different polarities*, and that the effects obtained are not merely counter-irritation effects due to the effect of the hydrogen or hydroxyl ions; and that the anodal current is definitely more sedative and soothing than the cathodal. Indeed, the clinical experience of the various methods tried are in striking conformity with the simple physiological facts, and it has been found that, unless the four criteria set out above are complied with, unsatisfactory results are obtained. One exception should be made in the case of diathermy. This current is, up to a certain point, as successful as the direct current; but after this point is reached, there appears to be a weight of clinical evidence in favour of the direct current.

Clinical Results.

It is unnecessary, I think, to emphasize the fact that the daily application of a particular electrical current can only form one part of the treatment of any injury. Rest, position, splinting, movement, remain of prime importance, and if not properly carried out, easily counter-balance the beneficial effects of early electrical treatment. I hope, however, to show that, by the use of the anodal galvanic current, the whole course of treatment of a fracture becomes easier and more satisfactory.

I have now had experience of 758 cases of fractures and injuries treated by this method. I propose, however, to present a somewhat detailed study of 150 of these cases. I have selected this group in order to be able to compare them with the grouping made by the Special Committee of the British Medical Association. Although I shall confine myself to this special group, I desire to emphasize that this method is equally applicable to cases of bruising, sprains, etc.

The distribution of these 150 cases is as follows:

Fractures*	...	...	...	...	...	112
Compound fractures	...	...	...	...	...	7
Greenstick fractures (severe)	...	...	...	...	...	23
Fractures into joint	...	...	...	...	...	8
Total	...	...	...	...	...	150

* This group includes simple, comminuted, fissured, and impacted fractures.

Before any fracture can be classified as a complete recovery, there should be (1) complete freedom from pain, (2) full power, (3) full movement, (4) good cosmetic result, (5) full working ability—namely, endurance. With this as a standard, it is possible to classify and allocate the cases according to the degree to which they approach complete recovery. Of the 150 cases, 108 could be considered as complete recoveries, and 33 with only one of the above five points defective. The remaining 9 showed less satisfactory results, usually as regards power and endurance.

If the effect of the electrical current is really more beneficial the sooner it is made use of after an injury, then it would be reasonable to expect that the longer the time between the injury and the first electrical treatment, the longer the case would take before discharge. It has been

possible, owing to the recent inauguration of this treatment, to include in the list a number of cases whose electrical treatment did not commence until some considerable time after the injury, and the accompanying graph illustrates the rapid rise in time before discharge is possible when more immobilizing methods are employed.

In the report of the Fractures Committee of the British Medical Association tables are given showing the average number of days of incapacity for various types of fractures. The Committee divided the cases into two groups—one under 15; the other over 15. I have therefore grouped my cases in a similar way for the purpose of comparison.

In the following table the average number of days of incapacity of the over 15 group are shown in comparison with similar figures for the Royal Air Force and from the British Medical Association's Fractures Committee's report.

Type of Fracture.	Cases treated by Electrical Method.		R.A.F. 1920-1922.		B.M.A. Fractures Committee's Report.	
	No. of Cases.	Av. No. Days' Incapacity.	No. of Cases.	Av. No. Days' Incapacity.	No. of Cases.	Av. No. Days' Incapacity.
Humerus ...	10	55	35	64.4	92	116
Radius and ulna	24	41	33	64.0	64	114
Colles's fracture	25	38	157	34.3	34	120
Tibia and fibula (shafts)	15	51	30	135.2	673	187
Lower epiphysis (Pott's fracture)	11	49	85	47.9	209	166
Total ...	85	45	340	69.3	1,072	172

I am somewhat at a loss to explain the much higher average duration of incapacity shown in the British Medical Association report than in the R.A.F. experience or in my series, and feel that, in part at any rate, it must be due to some factor not operating in the other two series. Even making every allowance for the much larger numbers of the Fractures Committee, since my average is based upon the functional ability of the patient to do his work, often a heavy manual labourer, and includes many old people of both sexes, it will be agreed that my figures are at least as much below the usual experience as those of the Fractures Committee are probably above it, and compare favourably with those of the R.A.F., which are derived from a young and healthy male population.*

Relief of Pain.—Any statistical inquiry as to relief from pain after a particular treatment is obviously open to objection, as one is entirely dependent upon the patient's own statement. But the value of the patient's statement may be enhanced by carefully worded questions which avoid any suggestion of relief. To ensure this all cases were asked, "Were you worse after the electrical bath?" or similar questions. One hundred and forty-three claimed definite relief after the first treatment; four had two or three treatments before any relief; three had no relief.

Technique.

Electrical Treatment.—In the physiological section of this paper, reference was made to certain essentials if the direct current was to be successfully employed. It is necessary to

* The Medical Department, R.A.F., states: "Possible factors which may have an influence on the average duration per case are: (1) For code purposes Pott's fracture is included with fracture of fibula. (2) We discharge cases to light duty to attend for treatment. This shortens the duration per case. (3) Fractures of tibia and fibula combined are usually of a severe nature in the R.A.F.—result of crashes, etc.—and possibly tend to take longer than cases in civil life."

repeat these criteria, as they largely determine the success of the treatment:

- (a) Weak currents.
- (b) The indifferent electrode far from the seat of injury.
- (c) A wide and even surface of entry for the current.
- (d) The entry of the current to extend to healthy tissue on the central side of the injury.

Let me take as an example a transverse fracture in the lower third of the humerus. An arm bath (Schnee pattern) with tap-water of about 104° F. is prepared sufficiently deep to cover the whole forearm, and into this the arm is lowered, a piece of jaconet clipped on to the sides of the bath being used, if required, as a cradle of support. A large piece of cotton-wool is now taken of sufficient size to reach from the shoulder down to the water and all round the arm. This should be as wet as possible, and kept wet with warm tap-water during the treatment. As very small currents are to be used, the other hand or foot in a bath can form the other electrode. Two electrodes—the one going into the arm bath, preferably of zinc—are connected to a source of direct current. This current may be obtained either from a pantostat or similar machine, or from one of those apparatus that reduce the main current safely by means of water resistance, such as the ionostat (Watson) or galvanostat (Medical Supply); the galvanic apparatus consisting of a number of dry cells definitely does not work so suitably as the water resistance type, this latter having the advantage of being able to give small currents smoothly. Great care should be taken to test the polarity before turning on the current. The current is now very slowly increased to one milliampère. In cases where there is much bruising, etc., the current should be even less than this. After five or ten minutes the current may be slowly increased to 2 or 3 ma. The rheostat is now left, even if the current slowly increases by itself to 5 ma., but it is not allowed above this amount, and if there is no automatic increase it should be reduced to about 1.5 ma. At the end of half an hour the limb is carefully lifted on to a pillow and dried very gently with hot towels. Then glucokinesis is given. For a full description of this method of "soft strokings," Dr. J. B. Mennell's book should be consulted. The injured limb is now resplinted by an appropriate form of splint that avoids drag or muscular spasm. The electrical treatment should commence as soon after the initial injury as possible, and should be given every day. In severe joint injuries my practice is to give this treatment twice a day for the first few days.

Splinting.—The method of splinting employed is most important, and it will be found that after the electrical treatment it will usually be unnecessary to provide for any strong extension or counter-pressure, as with relief of spasm obtained by the anodal galvanism this is not required. For support I rely mainly on large quantities of cotton-wool, and the necessary rigidity I am often able to obtain by means of corrugated brown paper or poroplastic, but each case must be judged on its condition, and, where necessary, the usual splint employed. I should like once more to emphasize the fact that the early abolition of muscular spasm, pain, and swelling, provides one with much greater freedom of treatment than when any movement is accompanied by severe pain. Also, under these favourable conditions, counter-pressure can be secured in the majority of cases by means of the resiliency of additional pads of cotton-wool.

Reduction under Anaesthetics.—Anaesthetics for fractures are now much less often employed either in the casualty or electrical department of the Royal Free Hospital, unless impaction or some similar indication calls for their administration. When this is necessary, our endeavour is to secure that the patient has an electrical bath both before and after the anaesthetic, and in no single case have I found the benefit obtained by the anaesthetic lost by the subsequent manipulation necessary for the electrical treatment. Further than this, reduction is generally facilitated by the previous electrical treatment.

Subsequent Stages of Treatment.—The anodal baths and glucokinesis are continued daily until all pain and nearly all swelling and discomfort are gone, small doses of passive movements à la Mennell being gradually added. When passive movement is good, and the condition of the limb is satisfactory, it is immersed in a similar way to that used for the anodal current, and a very small sinusoidal current is applied; this must not be sufficient to contract the muscles, and should only give a feeling of "ants running over the skin." After some few treatments, more or less according to each case, the current is then gradually increased to ordinary strength, and again later this current is given surging. During this progress of the electrical treatment the movements are passing from passive to "supported active" and to active; and from active to active with resistance. By suitable arrangement of water resistance, the Morton-Smart (or Bristow) coil can be substituted for the sinusoidal current.

Bony Union.—A number of skiagrams have been taken with a view to studying the effect of the current on regeneration of bone and callus formation, and though it is early yet to claim it, I am left with the impression that reunion, whether of bone with bone or epiphysis with shaft, takes place in a more satisfactory manner than in other procedures. I am indebted to Mr. Ulysses Williams for his assistance in the interpretation of the skiagrams of my series of cases, and he considers that there is strong preliminary evidence that the formation of provisional callus is considerably reduced by this method, and we are making further investigations on these lines.

Treatment of Cases not Showing Rapid Response or Smooth Progress to Recovery.—It occasionally happened in the early days of my work with this method that even in cases treated within a few hours of their original injury the anodal bath not only did not bring relief, but increased the pain. These cases belonged to two classes—one with associated acute tenosynovitis or synovitis, and the other with detached splinters of bone. The former class we have now almost abolished by methods of reducing the current strength very considerably, even to less than 1 to 2 ma. The reason is, I think, that the lymphatic channels of the synovial membranes are very small, and if there is a strong cataphoresis movement set up they become choked instead of cleared. The class with pain from detached splinters are not benefited by any change in current or technique of administration, but are definitely relieved if great care is exercised in searching for a position of comfort when re-applying the splint, some almost inappreciable movement being sufficient to banish the pain; and since the banishment of pain is the keystone of this method no effort should be spared to find such a position. Occasionally, in this class, and in those cases showing residual points of discomfort, a single application of diathermy is sufficient. There is another class of patient which responds well to the initial treatment and then makes unusually slow progress. For a long time this group caused me worry. Gradually, however, my attention was forced to consider whether some special factor in their general health might not be responsible, and I began to treat those with pyorrhoea and other sources of sepsis for these conditions as well as for their injury. In many cases, especially those outside the present group, relief was immediate and progress to recovery resumed. The diseases I have found most liable to handicap recovery are pyorrhoea, otitis media, and constipation.

In putting forward this method it is not intended to suggest that operative treatment should be done away with; on the contrary, I am convinced that a series of treatments by this method both before and immediately after operation would materially assist the end-result. I have had the privilege of observing the effects of the anodal current in cases immediately after plastic operations by Mr. Gillies, and we are of opinion that this current tends to reduce post-operative pain and swelling and runs no risk of introducing sepsis through any incision.

Summary.

Time does not permit me to elaborate the technique in any detail further than I have done, nor to discuss the details of the methods I employ for dealing with each type of the more common fractures; but I trust I have given sufficient physiological argument and detail of technique for others to commence tentatively on simple bruises, sprains, etc. (which yield excellent results by this method), and develop later their own ideas as regards detail.

In carrying out this work I have been assisted in no ordinary way by the sister and staff in my department, and to them I can now trust the handling of a fracture with the utmost confidence; but as a matter of precaution a word of warning is necessary to those who may desire to put into practice this very simple method, which will more than repay any time or trouble spent upon it. It is this: satisfactory results will not be obtained if the patient is merely sent to a non-medically qualified medical electrician unless he or she is constantly handling these injuries in close touch with the doctor. I would recommend the doctor to carry out the treatment himself with the masseuse as his assistant. I should also like to take this opportunity of thanking Miss Hower, of the Physiological Department of the School of Medicine for Women, for looking through the physiological arguments I have ventured to bring before you, and giving them her approval.

I am fully aware that it is the contention of some extremely careful orthopaedic surgeons that simple fractures of the bones in children will do perfectly well if simply put

on a splint and left for two or three weeks. I do not doubt this, but even if the method I have explained to you does not accelerate their ultimate recovery or the perfection of this recovery, I do maintain that the time of recovery is more pleasantly spent than if bandaged in a more or less heavy retaining splint.

I think, however, the evidence I have been able to bring before you justifies me in making the following claims for this method—namely, that by the use of the anodal galvanic current for injuries or fractures more rapid relief of pain and swelling is secured, more complete muscular relaxation is obtained, and earlier return to useful function is possible, than by the more usually accepted methods.

[A number of skiagrams and photographs of cases were shown. These illustrated various points, such as the process of reduction without anaesthetic or counter-extension; the early solidity of the bone regeneration with this method despite the formation of a very small quantity of provisional callus; and the safety with which passive movement could be carried out, especially when the injury was in the neighbourhood of a joint.]

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THE VALUE OF FEEDING DURING OPERATIONS UPON THE STOMACH.

BY

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It is well known that patients who are profoundly anaemic from gastric or duodenal haemorrhage stand operations, such as gastro-jejunostomy, very badly. In a recent discussion of the subject at the Royal Society of Medicine, Mr. H. J. Paterson gave the mortality rate for operations for acute haematemesis at 36.8 per cent. He and most of the speakers who followed considered that surgical treatment for acute haematemesis was unjustifiable. It is also recognized that patients in a condition of extreme emaciation from chronic starvation owing to stricture of the pylorus are bad subjects for operation, and the more so when the stricture is due to malignant growth which may have completely occluded the pylorus, causing absolute starvation, and still further reduced the patient's resisting power by the accompanying anaemia and toxin absorption. In cases such as these gastro-jejunostomy, without partial gastrectomy, may lead to rapid and fatal collapse from shock, due, I believe, to inanition of nerve cells, especially of the vasomotor centres.

It has been my practice for many years to feed all such cases during the operation by introducing a pint of peptonized milk with a beaten-up egg and one ounce of brandy into the jejunum; since adopting the practice I cannot remember to have lost a single patient from post-operative shock. An improvement in the patient's condition is immediately manifest, and the pulse gains in volume and tension. It is usual for the patient to leave the table in better condition than he was in before the operation was commenced.

The method is very simple. Before the inner row of catgut sutures surrounding the gastro-jejunostomy opening is quite completed the suturing is stopped, leaving an opening of about a quarter of an inch or less. The jejunal clamp is removed, and stomach and jejunum compressed between the finger and thumb of the left hand to prevent escape of fluid; a No. 10 soft rubber catheter, connected by a short length of tubing to a funnel, is introduced through the opening and passed along the jejunum (the finger and thumb keeping up compression around it), until about eight inches or more have passed along the gut into a coil which is within the abdominal cavity. The food is then poured slowly into the funnel through a gauze strainer.

The funnel should be held about ten inches above the abdominal wall to avoid too rapid entrance of fluid and distension of the intestine. The whole process takes rather less than ten minutes. The catheter is then withdrawn and the operation completed.

Quite recently I operated upon a woman of 37, suffering from cancer of the pylorus. She was very wasted; though her height was 5 feet 5 inches she weighed only 77 lb. She had been vomiting most of her food almost daily for several weeks. She was very anaemic (35 per cent. haemoglobin). There was complete absence of free HCl in a test meal, and after six and a half hours more than a third of a barium meal remained in the stomach. The palpable growth extended for about 2½ inches from the pylorus along the stomach, and there was very considerable glandular infection.

The operation consisted of resection of nearly half the stomach with the first part of the duodenum; posterior gastro-enterostomy was performed, and during it a pint of food was introduced. She stood the operation remarkably well, had little or no signs of shock, and within a week was taking solid food. Feeding by the mouth with peptonized milk was started within eighteen hours of the operation. There was no vomiting, and her condition never gave cause for a moment's anxiety.

I feel sure that if feeding had not been adopted in this case her chance of recovery would have been very small. The case is typical of a good many others, and I feel confident that anyone who adopts this method of feeding cannot help becoming convinced of its great value.

HYDROCELE AMONGST THE LANGO OF UGANDA.

BY

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THE natives of Lango (Uganda) do not appear to be possessed of any surgical skill whatever, and so pathological conditions amongst them tend to become very gross indeed. Hydroceles and, as a consequence, haematoceles are very common; some of these tumours grow to enormous proportions, often reaching nearly to the knee, causing great disability. The scrotal tissues are, as a rule, greatly thickened; and the disappearance of the penis from view is a cause of much grief.

The results of operation by textbook methods are disappointing. The operation herein described endeavours to avoid the worst consequences of more orthodox methods by (a) excision of redundant scrotum, (b) complete deep haemostasis. Oozing from the cut edge of the tunica vaginalis ordinarily takes place along the whole length of the cut, and only the actual cautery can seal the capillaries. When they ooze no longer and the larger vessels are secured by ligature there is no need for drainage. The procedure has been carried out many times at Lija; it has always given good results, and often the patient has left hospital within a fortnight of the operation.

Operation for Large Hydrocele.

The initial incision should be made without previous tapping. Its exact direction varies according to the thickness of scrotal tissue, age of patient, size of tumour, and the presence of ulceration, which is common. In general it should begin at the visible root of the penis, travel downwards and outwards, over the enlargement, and then upwards and inwards to the middle line; any ulcerated patches should if possible be included in the part to be removed. At the perineal side of the scrotum about 1½ inches should be left between the end of the incision and the perineum, otherwise infection is very likely. A second incision begins and ends as above, but passes straight in the middle line. In double hydrocele, where both sides are large, an incision similar to the first described encircles each side of the tumour. The incisions are deepened to the infundibuliform fascia, and the portion of scrotum between them dissected away. A great deal of contraction takes place in the stump, greater in younger than in older subjects, in larger than in smaller tumours, and in thinner than in thicker scrotal tissues. From one-fourth to one-third of the surface of the tumours should be included in the excised portion.