the outer condyle can be seen the head of the fibula—which bone, let me remind you, does not enter into the formation of the knee-joint. The existence of the semilunar fibro-cartilages between the femur and tibia is hardly appreciable in health; but their existence must not be forgotten, as occasionally, in violent wrenches of the knee, one of them becomes displaced, giving rise to extreme pain and inability to use the joint, which are most satisfactorily treated (as also are dislocations of the patella) by a little of that judicious violence for which “bone-setters” have a reputation.

At the ankle, we see at once the prominences of the two malleoli, between which the astragalus fits closely when the foot is at right angles to the leg, less so when the foot is pointed; so that, in this position, some amount of lateral movement of the foot is possible. The fibula is altogether posterior to the tibia, and its malleolus is longer than the internal. The lower third of the fibula is subcutaneous, and its fracture (Pott's fracture) is therefore readily recognised. The tendons of the various muscles surround the ankle-joint; but the only one to which I need call your attention is the *tendo Achillis* at the back, in which, when ruptured, the division is readily both felt and seen. When I flex the knee and point the toes, you can see how completely the muscles of the calf are relaxed; and this is an important point in the treatment of a divided tendon, or of a dislocation of the foot, or oblique fracture of the tibia.

The prominences of the foot are chiefly important as guides to the amputations; thus the tuberosity of the scaphoid on the inner side marks the transverse tarsal joint, or site of Chopart's amputation; whilst the base of the first metatarsal on the inner or prominent fifth metatarsal bone on the outer side, marks the position of Hey's amputation. The metatarso-phalangeal joint of the great toe is not unfrequently diseased through gout or the pressure of boots which have developed a bunion; and other toes are not unfrequently deformed from the same cause. The only surgical point with regard to the toes that I need mention is that the base of the first phalanx is more expanded and more deeply placed than young operators are apt to imagine.

I have thus run briefly through the more salient points on the living body which it is important for you to recognise thoroughly in health before attempting to treat disease; and, in future lectures, I shall have to direct your attention to matters regarding which the knowledge acquired to-day will be of service in enabling you to recognise deviations from the standard of health.

THE TREATMENT OF ANEURISM OF THE ARCH OF THE AORTA BY MEANS OF GALVANO-PUNCTURE.*

By T. M'CALL ANDERSON, M.D.,

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I SHALL, in the first place, read the notes of two cases of aneurism of the arch of the aorta, in which galvano-puncture was employed with success, and afterwards refer shortly to the rules to be observed in carrying it into effect.

James Dunn, aged 36, clothlapper, was admitted into the Glasgow Royal Infirmary on December 19th, 1873, complaining of cough, pains in the shoulders and nape of the neck, and inability to swallow solid food. He had led a very irregular life, admitted having had gonorrhœa several times, and, for the last six years, he had been very intemperate in his habits. For three or four years, he had been more or less troubled with cough; and, for two years, he had complained of pain in the region of the heart, and of gradually increasing dyspnoea, but he never spat blood. About eight weeks prior to admission, as the result of a wetting he thought, the cough became more severe and was accompanied by sore-throat and pains in the shoulders and nape, especially on the left side. This was soon followed by gradually increasing difficulty in swallowing solid food, which was sure to return into his mouth unless it were thoroughly masticated; the seat of the obstruction he referred to the top of the sternum.

On admission, he was found to be a well formed and well-nourished man, but in his face were mirrored the ravages of his favourite vice. His tongue was coated with a white fur, his appetite was good, and his bowels regular, but he had great difficulty in swallowing solid food. The urine was normal. He was much troubled with cough, and bronchitic rales were audible throughout the chest, especially at the bases of the lungs. The air entered both lungs with equal freedom,

and the respirations were natural; his voice was unaffected, and the pupils natural.

On examination of the circulatory system, the heart was found to be somewhat depressed, and the left ventricle the seat of dilated hypertrophy, while a soft systolic, probably communicated, murmur was heard at the apex. At the upper part of the front of the chest, there was dullness on percussion, measuring three inches from above downwards, and extending from one inch to the right to one inch and a half to the left of the sternum. In the second left intercostal space close to the sternum, there were some fullness and pulsation, and, on auscultation, a soft systolic murmur was heard. There were also fullness and pulsation in the suprasternal notch, but no murmur was audible in that situation. The pulse was 74, regular, and of fair strength, and the pulses at the wrists and in the carotids were not unequal.

Shortly after admission, the symptoms became much more alarming, the fullness and pulsation in the second intercostal space became much more pronounced, and the dysphagia so great that he could not even swallow fluid food, and required to be supported by means of nutritive enemata. This was on January 2nd, 1874. On the 20th, it was noted that the difficulty of swallowing was not nearly so great, and he could then take fluid food as on admission. The fullness in the intercostal space, however, had so much increased, that there was a distinct appearance of tumour a couple of inches in breadth, and projecting three-quarters of an inch above the level of the surrounding chest-walls. This swelling was very soft, almost fluctuating indeed, and was the seat of expansion as well as pulsation; the murmur remained as on admission.

On January 12th, galvano-puncture was performed, an insulated needle connected with the positive pole of the battery being inserted into the most prominent part of the aneurism after the skin had been frozen with ether-spray, and a zinc plate connected with the negative being applied to the chest-wall in the vicinity of the tumour; a large piece of sponge moistened with salt water intervening, however, between the plate and the skin. The operation was continued for an hour; four cells of the battery being employed for the first half hour, and six for the second. The patient felt no inconvenience or pain during the operation, and, on removing the needle, there was no hæmorrhage. After the operation, however, there was pain in the tumour and increased uneasiness in the nape of the neck and left shoulder; this was speedily relieved by the application of iced cloths. On January 20th, the swelling was thought to be smaller and firmer, and the patient could swallow better.

On January 23rd, the operation was repeated as before, the needle being inserted a little higher up and nearer the sternum than on the first occasion, and again upon February 8th; but this time six cells were employed for the first half hour, and eight for the second, and, on removing the needle, there was a considerable jet of blood. No report seems to have been taken after the third operation until March 13th, when the swelling was stated to be much firmer, but the patient had been a little hoarse, and had been spitting a little blood.

On April 16th, galvano-puncture was repeated for the fourth and last time, and, in the beginning of May, being weary of the confinement and feeling pretty well, he insisted upon leaving the hospital, although strongly urged to remain. Before leaving, an examination showed that the aneurismal swelling, which was firm and hard, had fallen almost to the level of the surrounding surface. It still pulsated, but no murmur could be heard over it. He continued occasionally to spit a little blood, and still complained of pain in the shoulder and nape of the neck. The difficulty of swallowing had varied much latterly; sometimes he had a good deal of dysphagia, while at other times he could swallow almost anything.

From the history I have given, it will be seen that this was by no means a promising case for operation, and the improvement was all the more remarkable if we take into account his dissipated habits, and the fact that, during the treatment, through inadvertence, he frequently got up and walked about the ward for several hours.

Let me compare this case with a somewhat similar one, of which, however, I need only give a short outline, as I have already published it.

Mrs. H., aged 41, married, millworker, was admitted into the Glasgow Royal Infirmary, November 8th 1871. Two years and a half before this, she began to complain of a “violent beating at her breast”, and of hoarseness. This was followed by a feeling as if a heavy weight were pressing upon her chest, and she complained of lancinating pains between the shoulders, which extended down the left arm. Eighteen months previous to admission, she observed a swelling in the front of the chest about the size of a small hen's egg.

On inspection, the swelling was seen at the lower and inner part of the left infraclavicular space, and implicating also the upper sternal

* Read before the Medical Section at the Annual Meeting of the British Medical Association in Edinburgh, August 1875.

region: It was about three inches and a half in diameter, and its apex was about an inch and a half above the surface. Pulsation, expansion, purring tremor and dullness, and tenderness upon percussion, were well marked over it, while there was a distinct systolic murmur audible over a pretty extensive area, but most distinct in the situation of the tumour. The left ventricle was the seat of dilated hypertrophy, and the pulses in the radials and carotids were weaker on the left than on the right side of the body; but there was no alteration in the pupils, no dysphagia, no trace of spasm of the glottis although the voice was hoarse, and air entered both lungs pretty freely, although there was considerable dyspnoea.

During the month of March, the swelling gradually became more prominent and softer, and accordingly galvano-puncture was resorted to. The operation was performed four times, on the 4th, 9th, and 28th April; and, on the 27th August, in the same way as in the last case; and, on 26th October, the following was the report. "The symptoms of dilated hypertrophy of the left ventricle remain as at the period of admission; but, for some time, an apex systolic murmur has been audible, distinct from the basic one, and which was not present at an earlier date, or was obscured by the aneurismal one. The tumour is now only about a quarter of its size before galvano-puncture was resorted to; and it is for the most part very solid, even more so than the surrounding healthy parts of the chest. There is now no trace of purring tremor, and the pulsation is much diminished, especially in the central, softest part of the swelling; the systolic murmur, too, is much softer than formerly, but there is no change in the pulses. The patient feels in the most perfect health, and her only complaint is of a feeling of pulsation within the chest." She left the hospital at this time, but was seen again on the 4th March, 1873, six months after the last operation; and she was then in even better health than when the last report was taken.

Before leaving the hospital, she was warned to avoid everything in the shape of mental excitement or bodily exertion, and that she must consider herself an invalid for the rest of her life; and this is the way in which she carried out these instructions. On March 5th, she resumed work, her principal occupation consisting of carrying heavy loads of goods upon her shoulders. This she continued for four months and a half; during which time she not only worked all day, but also engaged in arduous household work at night. About the middle of September, most of her underclothing having been stolen, and having exposed herself, in consequence, without these garments, she was seized with a hard dry cough, and to this was soon added retching, which she encouraged by putting her finger into her throat. It is not, therefore, to be wondered at that she sank on January 7th, 1874, 498 days after the last operation.

On *post mortem* examination, the aneurism, which implicated the whole of the transverse and descending portions of the arch, was found to be completely filled with firm, pale, fibrinous, and stratified clots; but, at the lowest part of the tumour, the blood had forced its way between the stratified clots and the walls of the aneurism, and penetrated into the left pleural cavity, on a level with the middle of the anterior edge of the compressed lung.

Notwithstanding the ultimate result, it must, I think, be admitted that this case is an illustration of as perfect a cure of aneurism as it is possible to expect from treatment. For, had the patient been so circumstanced as to be able to avoid bodily exertion, she might have continued in comparative comfort for an indefinite period of time.

With these cases for my text, let me refer shortly to the rules which, as far as my reading and experience go, it is desirable to observe in the treatment of aneurism by electrolysis.

1. *The kind of Electricity.*—The induced, as well as the continuous, current has been employed. A successful case of this kind has been recorded by Mr. Eyre. (*Lancet*, July 30th, 1853, p. 94.) The patient, a soldier, in the prime of life, had an aneurism of the left external iliac artery, about the size of a fowl's egg, which pulsated strongly, and was the seat of a murmur. There were oedema and much pain in the limb. Two long, fine needles were introduced an inch within the sac, each being connected with the wires of a galvano-magnetic machine. The operation, which was accompanied by pain in the groin and violent agitation of the whole body, was continued for twenty minutes. It was followed by severe inflammation, which threatened the patient's life; but, in three weeks, the threatening symptoms subsided, and the patient was cured. The successful result in this case was due to the setting up of adhesive inflammation, which filled the sac with lymph, and was fraught with much danger. Now, it is infinitely safer to attempt a cure by means of chemical than by means of inflammatory action; and, therefore, in every case, the continuous-current battery should be employed; although, even then, unless we are careful, the same result may follow.

2. *As to the kind of battery*, this is of less consequence, provided it is in good working order, and has large cells, so as to increase the chemical effects. I have always employed one of Stöhrer's large-celled batteries; and, in using it, it may be as well, with the view of intensifying the chemical effect, to add to the fluid in each cell, as recommended by Althaus, two drachms of a solution of chromic acid, sufficiently concentrated to impart to it the colour of claret. (*A Treatise on Medical Electricity*, by Julius Althaus, M.D., 3rd ed., p. 294.)

3. *The needles* should not be very thick, but very sharp, and should be oiled before being introduced; and, what is of the utmost importance, they should be insulated to within about half an inch of the point: for we must aim at acting upon the blood in the aneurism only, and not upon the walls of the sac, skin, and intervening tissues. This can be done, as recommended by my friend Dr. John Duncan of Edinburgh, a gentleman who has laboured earnestly and successfully to improve our knowledge of electrolysis as a means of treatment, by coating them with vulcanite. The unsuccessful result of a case upon which I operated in 1873 (reported in the *Lancet*, June 13th, 1874), I attribute in part to the use of needles which were not insulated. These were sent to me along with a Stöhrer's hospital battery; and, therefore, it is all the more important to give a warning against their employment. I have generally only used one needle; but there can be no harm in the introduction of two or more, especially if the aneurismal tumour be extensive.

A point of much moment, and with regard to which there is great difference of opinion, now is:

4. *Whether the Needles should be connected with the Positive or Negative, or both Poles.*—The balance of opinion seems to be in favour of connecting them with both poles. "I have no doubt whatever," says Althaus (*op. cit.*, p. 651), "that the most effective application of the current is that where both poles are inserted into the sac. This mode of application is also that one employed by Ciniselli and Dr. Duncan of Edinburgh. Both poles are useful in different ways; the positive produces a small firm clot, and the negative a large soft one. Where only one pole is in the sac, the resistance encountered by the electricity is so great that a much larger galvanic power has to be used to produce any effect at all; and, even then, the effect of that pole which remains outside is lost." And yet one of the most successful cases reported by Althaus in the volume from which I have quoted was one of the cases operated upon by me, in which the needle was connected with the positive pole, and in which a weak current was employed. For my part, I prefer connecting the needles with the positive pole only, because I have found it efficient in practice; because the clot which forms at the positive pole, though small, is firm and hard, while that which forms at the negative is soft and bulky; and because, on withdrawing the needles, hæmorrhage is much more apt to occur; thus showing that the clot is not of a satisfactory character. Hæmorrhage, too, is a disagreeable complication; it frightens the patient, and excites the circulation; and, besides, serious injury to the aneurism may result from the manipulations carried out with the view of arresting it.

5. *There is much difference of opinion, also, as to the strength and duration of the current.* For my part, I am clearly of opinion that it is often used far too strong. Thus, in a case operated upon by Althaus, and many equally striking ones have been published, he says: "I applied the current of from ten to twenty-five cells of Smee's battery; so that the positive and negative pole were alternately in contact with each needle, the changes being made every five minutes, so that the whole process lasted twenty-five minutes. The patient complained much of pain, particularly when the changes were made. For the first two days, the tumour decreased considerably in size, but afterwards it increased both in size and pulsation; redness and oedema extended around it in all directions, and the patient died. At the autopsy, the whole of the cellular tissue around the tumour was found loaded with lymph, and much indurated. This diffuse inflammation extended the whole way up the neck, rendering the dissection extremely difficult." (*Op. cit.*, p. 648.) I prefer, then, to use a weak current, and one which gives rise to little or no pain, and which does not excite serious inflammation; and, in the two cases just reported, I never employed more than eight cells of Stöhrer's large battery as a maximum, and never continued the operation for longer than an hour at a time. Now, it must not be forgotten that, in using a weak current, at all events, we do not aim at suddenly coagulating the whole of the blood in the sac, but desire the formation of a small firm clot, from which, as a centre, we hope to ensure the gradual deposition of successive layers of fibrin from the blood; so that, for the first few days after galvano-puncture is practised, those who are not alive to this circumstance may fancy that the operation has failed.

Lastly, the number of operations, and the length of the intervals between each, must depend upon the effect of those which preceded them.

The rules which I have ventured to suggest as applicable to the electrolytic treatment of aneurism are, of course, likely to require modification as our experience of it increases; but this, at all events, may be affirmed, that the dangers of the treatment are by no means serious if they are adhered to. Thus violent inflammation is not likely to occur if a weak continuous current of electricity be employed for a moderate space of time; while slight irritation is not an unmixed evil, and may be allayed by the application of iced cloths. It naturally occurs to one that clots produced by galvano-puncture, and which at first are soft and presumably easily detached, are likely to be swept into the general circulation, and to give rise to embolism; but, as far as our experience has hitherto gone, this happily seems to be rather a theoretical than a practical difficulty, and one which appears to me all the less likely to occur if the needles be connected with the positive pole alone. The gas which is generated during the operation, no doubt, in part, finds its way into the circulation; but this takes place so slowly and in such small quantity, that no danger is to be apprehended from it. The operation, then, need not cause us much anxiety from the above points of view; but it comes to be a question—and to this the attention of medical men practising galvano-puncture should be specially directed in the future—whether the consolidation of that portion of the aneurism in particular which approaches the surface may not, in some cases at least, favour the extension of the disease in other directions, and lead to internal pressure-symptoms, and to rupture into internal organs.

HYDATID DISEASE:

AS ILLUSTRATED BY SPECIMENS CONTAINED IN THE PATHOLOGICAL MUSEUMS OF THE METROPOLIS AND ELSEWHERE.

By T. SPENCER COBBOLD, M.D., F.R.S., F.L.S.,
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I.

ALL who really desire to advance the healing art must by this time be well aware that so desirable an end can only be obtained by continuous labour, directed towards the perfecting of our knowledge of the origin, diagnosis, pathology, and mode of preventing the occurrence of the obscurer forms of disease.

As obtains in the case of hydatids, there are certain maladies affecting both man and beast which are so intimately related to one another that the physician, surgeon, scientific pathologist, and veterinary practitioner are all alike interested in their study; but in the prosecution of investigations of this kind it becomes more and more evident that the principle of division of labour requires to be exerted to the utmost. In the acquisition of the following data, I have been obliged to content myself with employing only such intermittent hours of leisure as I could gather or steal from other occupations at varying intervals during the last ten years.

The pathological collections in the metropolis abound in rare and remarkable illustrations of hydatid disease; most of the preparations being practically known only to such few members of the medical profession as have been at some time or other officially connected with the museums. Not without justice, curators often complain that their work is turned to little account; therefore, in the matter of parasites, I have resolved to utilise their labours without reserve. My past connection with the Edinburgh University Anatomical Museum, and subsequently with the collection of the Middlesex Hospital Medical College, has convinced me that few persons are aware how much solid information may be gathered by a patient study of the contents of these great store-houses of the results of disease. Valuable as the catalogues are, it is often necessary to make a close inspection of the preparation in order to arrive at a correct interpretation of the facts presented.

Although the entozoal preparations in the museum attached to St. Bartholomew's Hospital are, comparatively speaking, few in number, there are some choice specimens of hydatid disease. There is a remarkable case in which hydatids invaded the right half of the bones of the pelvis; death resulting from suppurative inflammation of the cysts. This patient, a woman, had also another hydatid cyst which was connected with the ovary. Amongst the series contributed by Dr. Farre, there is a case represented where a large cyst containing numerous hydatids "occupied the pelvis of an infant and produced retention of urine", which ultimately proved fatal. There are also several fine examples of hydatids from the omentum (Dr. Farre's case); besides a good specimen of acephalocysts connected with the vesiculæ seminales. There are two other cases in which these larval entozoa were passed with the urine. At the time when I made my inspection, the entire series re-

presented twenty-five separate cases, of which only one appeared to have been published in detail (Mr. Evans's case, *Medico-Chirurgical Transactions*, 1832). In addition to the above, I must not omit to particularise also two instructive preparations illustrative of a case in which an hydatid was lodged in the right half of the cerebrum. This was from a girl in whom head-symptoms showed themselves a year before death, and in whom there was partial hemiplegia of the left side. I may add that there is also in the series a doubtfully genuine example of hydatids of the breast.

The collection in connection with the Westminster Hospital contains several highly interesting specimens of entozoa (one of which I believe to be altogether unique), but it is by no means rich in the matter of hydatids. Out of a score of preparations of parasites of various kinds, only four (apparently representing the same number of cases) are hydatids, all of which appear to have been connected with the liver. Two are certainly so; one of the latter (Mr. Holthouse's case) showing calcareous degeneration.

The museum connected with St. Mary's Hospital Medical School, in addition to several liver cases, contains one interesting example of hydatids of the lung (Dr. Chambers's case); and also three valuable preparations illustrating Mr. Coulson's remarkable case of hydatids affecting the tibia. One of the preparations shows the bone itself, which was eventually removed at the joint, the operation having been performed by Mr. Spencer Wells.

Here, perhaps, it will not be out of place to mention as a fact of special clinical interest that I have encountered records of no fewer than nine other similar cases where hydatids have chosen to take up their abode in the tibia; generally selecting the head or upper part of the bone. Some of my notes have been mislaid; but, speaking from recollection, one of the choicest specimens which I have examined is contained in the pathological museum connected with the Nottingham Hospital.

When I first went over the collection of the Middlesex Hospital Museum, I found it to contain fifty-four preparations of entozoa, of which some fourteen only were true hydatids, representing as many separate cases. There are now upwards of a score of preparations of hydatids; several of the cases having already had ample justice done to them by Dr. Murchison in his well known memoir (*Edin. Med. Jour.*, Dec. 1875). Amongst the most interesting preparations, I would especially call attention to two fine and genuine specimens from the kidney, another very large example of an hydatid situated between the bladder and rectum, a simple acephalocyst removed from the orbit (Mr. Hulke's case), and the hydatid removed from the axilla by the late Mr. Charles Moore. There is a jar containing hundreds of hydatids that were taken from the thoracic cavity of a dissecting-room subject, who was reported to have died of phthisis; and there is another preparation of an hydatid of the heart, which also proved fatal, without there having been the slightest suspicion entertained as to the true nature of the disease. For this fine preparation, the museum stands indebted to Dr. Moxon of Guy's Hospital. Several of the liver cases have a special interest of their own; but, for the present, I will only further call attention to the small bottle full of minute hydatid vesicles, all of which were removed from the interior of the tibia. The history of this case has been lost; and, unfortunately, the bone from which the parasites were taken does not appear to have been preserved.

SIX MONTHS AMONG THE BASUTOS OF SOUTH AFRICA.

By E. B. HARTLEY, M.R.C.S. Eng., District Surgeon, British Basuto Land.

I VENTURE to think that a short sketch of six months' practice among the Basutos of South Africa may not be altogether uninteresting. The Basutos belong to the Bechuana tribe, and reside along the western side of the Malutis, which range of mountains separates their country from Natal, about latitude 30 deg. S. Their doctors appear to be aware of the existence and therapeutic value of many roots and herbs growing in the country, but at this early date of my settlement in it, and on account of the secrecy observed in the collection and uses of these medicines, I am at present unable to give any information. In the setting of fractures they display much skill; but as regards the removal of tumours, necrosed bone, and severe surgical diseases, they are entirely ignorant. I was called a short ago to see a fracture of the shaft of the radius which had been put in the correct position of mid pronation and supination with the arm lying in a small mat of reeds, which, from its comfort, easiness of adaptation, and lightness, appeared to be an apparatus worthy of being copied by more civilised nations.