PROVINCIAL MEDICAL & SURGICAL JOURNAL.

No. 30. VOL. II.] LONDON, SATURDAY, APRIL 24, 1841. [PRICE SIXPENCE.
STAMPED EDITION SEVENPENCE.

CLINICAL LECTURES

IN COURSE OF DELIVERY DURING THE PRE-
SENT SESSION,

AT

GUY'S HOSPITAL.

By BRANSBY B. COOPER, F.R.S.

(Published with permission of the Lecturer.)

MONDAY, APRIL 19, 1841.

LECT. XV. *On a case of comminuted fracture of the lower extremities, of tibia and fibula, resembling dislocation of the ankle—On a case of compression of the brain, with appearances simulating those of depressed bone—On false cartilages in the knee joint, and the operation for their removal.*

GENTLEMEN,—This morning I shall make some clinical remarks on the most important cases that have been admitted into the hospital, under my care, since my last lecture; and refer, in the first place, therefore, to a case of comminuted fracture of the lower extremities of the tibia and fibula, which resembled dislocation of the ankle-joint so closely in its appearances, that, on my arrival at the hospital, several very competent judges told me to come directly to Accident Ward to see a case of dislocation of the ankle. Here are the notes of the case.

“Edward Bartram, aged thirty-six, a strong healthy-looking man, was admitted in Accident Ward, under the care of Mr. Cooper, on the 31st of March, 1841. About two hours before his admission he was at work, building the frame-work of a factory, when a sudden gust of wind overturned the building, and precipitated him, with four other workmen, to the ground. Upon examination the foot was found to be turned considerably inwards, and presented very much the appearance of dislocation; but when Mr. Cooper arrived, he discovered there was a severe comminuted fracture of the left tibia and fibula, immediately above and apparently extending into the joint. The external malleolus was very much comminuted, and the fragments of bone were distinctly felt immediately beneath the skin. His pulse was weak, and he had not recovered from the collapse. There were no external injuries, but he complained much of pain across the loins from a blow received from a piece of timber which fell on him. The urine, however, was passed without pain; it was clear, and free from blood, and he retained his fæces quite naturally. There was no pain in the head, and respiration was unaffected. The leg was placed on a back splint, with a foot-piece, and was supported by side splints, so as to keep the limb perfectly in position. Evaporating lotions were also applied to the ankle.

April 1. Has passed a tolerable night, but complains of considerable pain in the ankle. There

is a small vesicle formed over the joint, and considerable effusion of blood over the external malleolus. The tapes which surrounded the splints were loosened, and this afforded him much relief.

3. There is a large vesicle over the external malleolus containing bloody serum. The external splint was, therefore, removed, and solution of muriate of ammonia applied as a lotion. Pulse good. Tongue clean, and bowels regular.

6. Going on favourably. An interrupted splint was substituted for the common one, in order to avoid pressure upon the vesicle, and the use of the lotion was continued.

9. He is going on well, and the vesicles have rather diminished in size. Appetite good. Tongue clean. Bowels open. Sleep undisturbed.

17. Going on very favourably.”

Such, gentlemen, is the report of my dresser, and on his remarks I may found a few observations. The great peculiarity of the case was its extreme resemblance to dislocation of the ankle-joint, and it was not until I had brought the limb into the most favourable position for reduction, by laying it, semiflexed, on the side, and slightly extending the ankle before I made extension to reduce what I considered to be a dislocation, that I felt the crepitus and the comminuted portions of the external malleolus, and knew the true nature of the case I had to treat. It then appeared that the tibia had been fractured at the situation of the union of the epiphysis, that is, about an inch above the articular extremity, and instead of the fibula being broken three or four inches above the malleolus as usually happens, its fracture was on a level with that of the tibia. It was evident, then, that we had to deal with a case more dangerous than one of simple fracture in another situation, on account of its close vicinity to the joint, because we had, therefore, to apprehend irritation of the synovial membrane, effusion of synovia, and the constitutional disturbance which would be thereby occasioned. Had there been also laceration of the anterior or posterior tibial artery, the case would, in all probability, have required amputation; because, then, as well as contusion of the soft parts, there would have been laceration, or they must have been divided to secure the artery, and then we should have had all the circumstances which are usually considered most strongly indicative of the necessity for amputation in cases of fracture, namely, compound fracture, laceration of artery, comminuted bone, and all this in the immediate neighbourhood of a joint. Had synovitis supervened, there would be fear of supuration of the membrane, ulceration, escape of synovia, and probably amputation would have been called for secondarily, or, in other words, on account of the disease set up by the injury, after the more immediate effects had subsided.

You observe that vesicles of considerable size formed over the seat of the injury. This was merely the result of ecchymosis. Blood is effused, and presses on the cutis, so as to impede the cir-

culation through this tissue, and serum is formed between the cuticle and cutis necessarily separating them, and forming the vesicle. Now would you remove this extravasated blood? I can only say for myself, that I consider it much better to leave it to nature, whether you believe the coagulum will be subsequently organized or not. Some look upon it as a foreign body, but Hunter, as you are probably aware, believed that the serum alone was absorbed, while the fibrin might become organized, and converted into a structure of the same nature, and texture, and properties, as that from whence its blood is derived. In other words, if a fibrinous coagulum receives its blood-vessels by extension of those in cellular membrane, the fibrin is converted into cellular membrane, and if from those of cartilage, it is converted into cartilage, a subject to which I shall recur, if I have time, when speaking of the formation of loose cartilages in joints.

The man has been going on so well, that we may now look upon him as convalescent; but what has been going on about the joint? Well, for the first five or six hours after the accident, effusion of blood was probably the only occurrence, no violent inflammation having been set up, nor any muscular spasm excited by spiculæ of bone. Suppose he had been killed at this period by some other injury, we should have found increased redness of the medullary membrane of the bone, and a coagulum filling up the cancellated osseous structure, which would prevent any escape of the oily matter called marrow. Now this coagulum of fibrin, which is left after the separation of the serum, remains through the whole period of the reparation of the bone. I am convinced it is not removed. I believe it becomes vascular. I have made numerous experiments on this subject, and published their results; others can do the same, and they will find that from the first hour of fracture to the last moment of reparation, this first deposition is never removed, but that it becomes vascular. It is poured out by the vessels of the medullary membrane, not by those of surrounding structures, for if you attempt to remove the coagulum you will find that it adheres to the medullary membrane only. It also appears to coagulate more rapidly than blood from other structures; for you cannot examine the parts around a fracture quick enough after you have produced it, to anticipate the coagulation of the blood which is extravasated around it, for this is not an effusion from the small vessels which ramify in the cellular membrane, just as it is connected to the periosteum, but from the large medullary branches which are distributed over the medullary membrane. Now mark the difference between the distribution and size of these two sets of vessels, those of the surrounding cellular tissue being small and hardly traceable from any single vessel, while the supply of blood to the medullary membrane is furnished by a large vessel, entering through a distinct and lengthened canal. The coagulum fills up the cancellated extremity of the bone, closes it, prevents the escape of medulla, remains as fibrin, and becomes organized, the blood which is thrown out in consequence of injury thus, as Hunter believed, fulfilling an immediate office, and effecting, by its organization, ultimate reparation. In the first instance, it is a warm fluid, a sort of soothing fomentation to the

injured structures; then, as it coagulates, it gives stability and support to the part. As the fluid parts are absorbed the swelling is lessened, and a kind of delicate splint is formed by the contraction of the fibrin. Vessels then shoot from the cellular membrane, and cartilage is formed: and whether the effused fibrin is itself organized and converted into cartilage, or whether the vessels of surrounding parts are excited, so as to throw out cartilage, it is independent of any assistance from the periosteum, for the periosteum begins only where the temporary cartilage ends, and then, as soon as the cartilage is perfectly formed, the cellular membrane, surrounding the provisional callus becomes condensed, and then forms a limit to its growth, models it, and prevents inordinate growth or further deposition. The formation of provisional callus being thus completed, a new process is commenced, the fractured extremities of the bone become softened, the vessels of the medullary membrane shoot into the callus, and deposit earthy matter, during which process the cartilage becomes contracted, and the ends of the bone are necessarily brought into closer apposition. Thus, you see, exostosis is comparatively limited in its growth, so long as the integrity of the periosteum is preserved, but as soon as this has ulcerated, the bony growth may extend to any size. I look upon the periosteum, therefore, as giving a limit to the growth of bone, rather than being an active agent in its reproduction.

In this case we must expect some irregularity of the limb to ensue, for the outer part of the fractured portion being bone, the inner cartilage, bone is only deposited from the outer part, and therefore a greater quantity is required on the outer part than if it were from both sides, and some irregularity must necessarily follow. Then, in six or eight weeks, the fracture will be considered to be united; but this is merely the ossification of the provisional callus, for it is some months before the ends of the bone themselves are united by bone, and twelve or fourteen months before the bony medium of union is converted into cancellated tissue.

In a few words, I should say that the effects of a simple fracture of bone are—first the effusion of a greater or less quantity of blood; next the absorption of its serum and red particles: inflammation of the bone, and of all the surrounding tissues, next takes place; this leads to a deposition of lymph, which soon becomes hardened into cartilages, which if not different in character seem at least to perform two distinct offices:—that secreted by the cellular membrane of the surrounding soft structures produces, by its hardness and contraction, an approximation, or even contact, of the fractured portions; and this proving a fresh source of excitement to the cartilage secreted by the vessels of bone, leads to its ossification; whilst that thrown out by the soft parts is, in the end, either absorbed or converted into a structure, the same with that which effused it; showing that the vessels of each part are capable of appropriating their blood to the reproduction of the particular structure from which it was derived.

INJURY TO THE HEAD. TREPHINING.

The next case to which I shall allude, is one of some interest, not only because it points out some of the difficulties which beset us in practice, but

as it in some degree implicates the propriety of my practice, strengthened though it was by the concurrence of my colleagues. I will read you the notes of the case.

"John Camron, aged fourteen, admitted April 1, 1841, into Cornelius Ward, at 5 P.M. About half an hour previous to his admission he fell from the mast of a brig, about seventy-two feet from the deck. He was immediately taken up quite senseless, and was bled largely by a practitioner in the neighbourhood, although he was then in a state of collapse, and had bled profusely from a wound in his arm. On his admission into the hospital there was found considerable ecchymosis just above the left eye, with appearances which were supposed to indicate fracture and depression of the bone, and there was bleeding from the nose and meatus auditorius. The breathing was stertorous, the right pupil contracted, the left dilated, and sensation and motion were entirely gone. The pulse was slow and labouring, and respiration imperfectly performed. He could not be roused for a moment. Besides the above-mentioned injury, there was a compound comminuted fracture of the humerus, rather below the junction of the superior with the middle third. The elbow-joint was severely injured, and there was simple fracture of the radius and ulna about the middle of the fore-arm. There were no other external marks of violence about the person. Mr. Cooper was sent for, and arrived a little before seven. In the mean time Mr. Callaway and Mr. Cock saw the patient, and ordered the arm to be put up in splints. Both these gentlemen believed that there was fracture of the frontal bone, with depression; and when Mr. Cooper saw the boy, he decided upon performing the operation of trephining, which he did about half-past seven, the symptoms having previously become much more marked, the pulse quicker, and intermitting at intervals of about sixty beats. After making a crucial incision through the integuments, and raising the periosteum, no fracture was found, but Mr. Key and Mr. Cock concurred with Mr. Cooper in the propriety of proceeding with the operation, as the inner table might have been fractured, or there might be effusion underneath. On removing the portion of the bone, this was not found to have taken place, and the symptoms went on without alteration until half-past ten, when death took place, being six hours after the accident."

Now gentlemen, here was a pure case of compression of the brain, as evidenced by the great symptom, namely, complete abolition of sensation and volition. In concussion, the patient may be roused by calling sharply to him; sensation and volition are only suspended, and may be restored; while, in compression, no means short of removing the cause of the compression will restore either. The pulse was labouring, full, hard, and intermitting, while in concussion it is natural until the patient is roused, and then it rises to 100 or 120. In this case it could not be thus altered. Then there was stertor, bleeding from the ear, mechanical injury to the head, and evidence that he had fallen from a great height. As to the feeling of depression, I know perfectly well, and have pointed out to you in my Clinical Lectures this session, how the effusion of blood in the scalp may simulate depression of bone on careless examination, the finger sinking

into a well its own pressure produces by forcing aside the blood. But on firmer and firmer pressure the larger surface of bone do you feel, more blood, either fluid or coagulated, is displaced, and you feel nothing like a sharp edge of bone. I remarked before operating, to the bystanders, that I could feel nothing like a sharp edge of bone, but, on comparison with the opposite side, depression appeared so evident both to the fingers and eye, that we determined to trephine. However, on cutting into the bone, this was found perfectly sound, and it became a question whether or not to desist from the operation. It was thought better, however, after full consideration in consultation, to trephine, as the symptoms were so very urgent, and it was possible that the internal table might be depressed, or that there might be sanguineous effusion between it and the dura mater. You might suppose that it was not very likely for the internal table to be fractured, the external remaining sound, but you must remember that their textures are different; the external, being more fibrous and tough, might yield under pressure, and, being forced into the internal more brittle lamina, might, and sometimes does, propel this latter upon the brain. However, nothing of the sort had occurred—the parts were all perfectly sound, and as no post-mortem examination was allowed, we can only say, looking at all the circumstances of the case, especially the height of the fall and the bleeding from the ear, (though this is not an *experimentum crucis*,) that in all probability there was a fracture of the base of the skull.

OPERATION FOR THE REMOVAL OF A FALSE CARTILAGE FROM THE KNEE-JOINT.

The time is now so nearly expired, that I must be brief in my remarks on the case on which I operated last Tuesday, and which operation proved so tedious and painful. It is generally a very simple matter to remove a loose cartilage from the knee-joint; and I have done it three times before this with complete ease and safety. All that is required is to extend the knee, bring the cartilage to the inside of the joint, and make an incision, when the body jumps out with a considerable impetus. Indeed, in one case in which I performed this operation, the cartilage bounded to such a distance that it was only after a long search it was found among the sawdust. There were circumstances in this case which led me to anticipate unusual difficulty, and this I explained to the patient, but he was very anxious to have the operation performed, and I accordingly did it. You can generally move the loose body to the inside of the joint, and then, by extending the limb, the tibia and fibula are brought into perfect apposition, so as completely to close the joint, and prevent the cartilage from slipping away. You then press it against the edge of the internal condyle of the femur, divide the skin, and an aponeurosis derived from the vastus internus, having previously drawn the skin well forward, so that the opening into the joint shall not correspond with the external incision. On dividing the synovial membrane, out jumps the cartilage. In this case, instead of being able to get it to the inner, we could only get it to the outer side of the joint, which is much farther from the surface, on account of the vastus externus being so much more thick and fleshy low down than the vastus internus. Then, to increase the

difficulty, we could only get the cartilage into the position necessary for its removal when the joint was flexed instead of being extended, so that there was plenty of room left for the cartilage to slip away into the interior of the joint. Well, I cut through the tendon of the vastus externus and the synovial membrane, passed my finger into the joint and felt the cartilage, but when I withdrew my finger the tendon closed, so that no opening was left for the body to pass through. I repeated this attempt at extraction, but without success, and therefore divided the upper portion of the tendon, after which I got my finger into the cartilage, and easily removed it. Severe inflammation came on the next day in the joint, accompanied by dangerous constitutional disturbance, and it was only by the use of free bleeding, full doses of opium, attention to the secretions, and maintaining the most absolute quietude of the limb, that we have ultimately placed him out of danger, and in a fair way for recovery.

It may be a question whether this operation should be performed when it is impossible to retain the body in situ, excepting when the limb is flexed, especially as, under the most favourable circumstances, it is by no means free from danger. Some have lost their life, and many have recovered only with an ankylosed joint. You must be guided very much by the peculiar circumstances of the case, and in forming your judgment will do well to bear in mind the case of which I have been speaking, the difficulties which presented themselves, and their origin.

COURSE OF CLINICAL LECTURES

ON

SURGICAL DISEASES.

DELIVERED AT THE HOSPITAL OF LA CHARITÉ,
BY PROFESSOR VELPEAU.

LECTURE III.

CONSECUTIVE ILL EFFECTS OF CATHETERISM.

AMONG the ill effects which occasionally follow the operation of catheterism, there is a most dangerous one which nevertheless has not fixed the attention of practitioners, and a description of which is not to be found in any author. It is of this accident which I wish to speak to-day, as it is important that you should be made acquainted with it. The pathological specimens which you have seen, opportunity has furnished me with, and, interested in your instruction, I ought not to allow them to pass without notice. They were taken from a young man afflicted with contraction of the urethra, and who died two days ago. Many years since, I had treated this young man for the same complaint at the hospital of La Pitié; he left this hospital pretty well cured; he passed his urine with facility, and had, for a long while after his dismissal, the habit of introducing from time to time a bougie into the canal when he experienced any difficulty in making water. In this manner, he passed several years without being much incommoded. But having for some time neglected to dilate the canal by means of bougies, the contraction re-appeared, and in order to be

treated again, he came to see me. I had him received into the hospital. He was now unable to sound himself, and I sounded him some few days ago. I entered the bladder without much difficulty or embarrassment, and he himself could pass a bougie as he had formerly done. The day after the last catheterism, I found him labouring under high fever. This fever had been preceded by great shivering and trembling, which continued a long time before the commencement of the reaction, which was also violent, and followed by abundant perspiration. The febrile symptoms continued. I had the patient frequently bled, and placed him on low diet, with the use of diluents. The fever, however, continued; the right knee became very painful and greatly swelled: purulent arthritis had set in. In spite of the most active antiphlogistic treatment the disease increased, the tongue became dry, delirium came on, *adynamia* showed itself, and the patient sank on the sixth day after the invasion of the first symptoms of his disease.

Thus, gentlemen, you find a person in good health, and vigorous, who, in consequence of the introduction of a catheter without difficulty, and without pain, was suddenly seized with shivering, fever, immense swelling of the knee, followed by delirium and death. Here are the diseased parts; shall we find in them an explanation of the symptoms or of the cause of death? We shall see. The urethra presents a small recent excoriation in the fossa navicularis, and several traces of old false passages in the neighbourhood of the contracted portion: below the contraction a thick lardaceous tissue, similar to that which is often observed in other parts, but not surrounded by pus. The prostate shows us nothing, neither do the bladder, the ureters, or the kidneys: in a word, the urinary organs are perfectly healthy; but the veins which surround the prostate—the surface of the vesiculæ seminales, and which constitute a sort of cavernous tissue, are evidently inflamed. The articulation of the knee is inflamed, and contains pus. The other viscera are perfectly healthy, and no other lesion has been observed.

Gentlemen, as you see, we have here an example of a very serious disease; yet authors have passed it over in silence. You will be unable to find any description of it. I was the first who said a few words on it, under the article "Articulation," in the *Dictionnaire de Médecine*, for I there spoke of arthritis as a consequence of catheterism.

When I wrote this article, I had already seen several cases of death or serious accidents resulting in consequence of catheterism, which fixed my attention. When the surgical department at the hospital of La Pitié was confided to my care, I had under treatment a man who had gonorrhœa, with considerable contraction of the urethra. I succeeded in introducing a very fine bougie through the canal into the bladder, when he one day wished to sound himself; he succeeded, but not without causing pain and the passing of a certain quantity of blood. On the day after I found him in a high fever, which had been preceded by violent trembling. General bleeding, diet, and emollients, were unable to calm the symptoms. On the day following he experienced severe pains in the tibio-tarsal articulations, with severe swelling: the symptoms continued to increase, and on the