That is why I do not employ it at first, and why I only use it after one or two unsuccessful attempts at reduction without it.

(The reduction was easily obtained by Després's method.)

LECTURE XXXIV.

TRAUMATIC ARTHRITIS OF THE KNEE.

I. Penetrating wound by a piece of glass—Imminent suppuration avoided by the occlusive and compressive cotton dressing—Two varieties of traumatic arthritis: one after wounds, the other without wound. II. Subacute traumatic arthritis after a contusion. III. Subacute traumatic arthritis after a sprain—Reasons for not fearing an articular suppuration—Congestive form—Possible termination by simple chronic arthritis or dry arthritis—Therapeutical indications.

GENTLEMEN: I. *Penetrating wound.*—A young man, nineteen years old, was admitted into the wards two weeks ago, after having been wounded by falling on a piece of glass. He had on the inner side of the right knee a wound about half an inch long, with edges quite smooth and gaping. The accident was quite recent when the patient was brought here during the morning visit. We found upon the skin about the wound a reddish liquid which had the viscid consistency of synovia, and, like it, was sticky. We had to think that this was synovia mixed with a certain quantity of blood. Further, passing a probe very carefully into the wound, I made it enter deeply enough to leave no doubt about its being in the articular cavity. The penetrating wound being recognized, what was there to be done? Exactly the same thing as for fractures complicated with a small wound: close the wound, bringing the edges together as well as possible. You remember that I made this occlusion by means of strips of muslin soaked in collodion and overlapping one another, and I completed the dressing with a thick layer of cotton and a roller bandage drawn tightly over it, extending from the lower third of the leg to the upper third of the thigh. Then the limb was placed in a wire splint.

You have doubtless not forgotten what I then said of the fears which I had for this patient, and of the object proposed in treating him in this way.

I feared articular suppuration, and I sought to avoid it. 1st. Why did I have this fear? Because experience has taught me, as it has taught all other surgeons, that suppuration comes in such a case after a very feverish, acute, or hyper-acute arthritis which greatly affects the health, and when once established it may be complicated by a purulent infection which may carry off the patient, or by a hecticity which may lead to amputation. It has taught me, on the other hand,

that, when suppuration does not take place, the consecutive arthritis remains subacute, is accompanied by a moderate fever, or may even remain without fever, does not expose the patient to any fatal accident, and only threatens him with a more or less complete anchylosis.

2d. How did I seek to avoid this acute suppuration which is almost as much to be feared as that of the large, long bones? By the same means and with the same intentions as in compound fractures (see page 105) I wished, by keeping the edges of the wounds together, to favour their immediate reunion or organization, and to protect them from suppurative inflammation which would be very likely to extend to the synovial membrane. I wished also to avoid the entrance of air into the articulation, for this air might have favoured, during the first few days, primitive septicæmia or traumatic fever, by the decomposition of the effused blood and synovia, and a formation by them of septic materials; and it might afterwards have favoured the decomposition of the pus itself, decomposition rendered easy by its retention in a large anfractuous cavity with rigid walls which cannot expel the contents by retraction.

You remember what took place. Our patient suffered very little. His pulse did not rise above 90, nor the temperature above 100½°. The very moderate fever which he had may be considered as a slight traumatic fever by reaction, while, if the arthritis had suppurated, the traumatic fever would have been intense, and probably septicæmic. Twelve days afterwards, I unrolled the band and removed the wadding as well as the strips soaked in collodion. The wound was entirely cicatrized. The articulation was but slightly swollen, and showed neither heat nor fluctuation. Nevertheless, I reapplied a roller bandage.

To-day we have reached the sixteenth day. The general health continues good. The local condition improves. The patient will begin to make voluntary movements while remaining in bed; we shall also communicate some to him every morning and evening, and if he can support this little exercise without a return of acute inflammation, he will get well, and will preserve neither rigidity nor prolonged pains. His age, as I have often told you, singularly aids this favourable termination.

Observe, gentlemen, that if this young man has not had articular suppuration, he has, nevertheless, had an arthritis, and, as this has occurred after a penetrating wound, I am justified in adding that he has had a traumatic arthritis. I shall presently show you other examples of arthritis which deserve this name, but beforehand, I wish to put you on your guard against the signification of this word, which, in the language of some authors, has become the synonym of suppurating arthritis. You have here seen that the arthritis has been neither acute nor suppurating, and yet it is impossible not to recognize that its origin was exclusively traumatic. That simply means that traumatic arthritis may be either suppurating or non-suppurating. Now, as articular inflammations, after the occurrence of external violence, are much oftener suppurating than non-suppurating; this is a reason for not continuing to give the word traumatic

arthritis this signification of synovitis about to suppurate. We will distinguish two varieties of traumatic arthritis: one consecutive to penetrating wounds, and for which suppuration is to be feared and to be avoided; the other consecutive to lesions without solution of continuity, and for which suppuration is entirely exceptional.

II. *Contusion and sprain of the knee; Consecutive traumatic arthritis.*—Consider, for example, that which is going on in the two men, Nos. 24 and 46 of Ward Sainte Vierge. The first is a mason, 30 years old, who fell upon his left knee while walking fast. He thinks he did not twist the articulation violently, and we are not justified in believing that there has been the exaggerated tension of the fibrous tissues, which is the initial lesion of a sprain. He has probably had only an exaggerated pressure, that is to say, a contusion which has torn, if not the synovial membrane itself, at least some one of its blood-vessels. The patient has been here for three weeks; you know there have been no general symptoms, and that, as local symptoms, we found at the beginning: All movements impossible, a sharp pain when the patient tried to make or I sought to communicate any, a little heat felt by the hand on comparing the two knees, and finally a slight swelling and a fluctuation perceived by the manœuvre which I have often had occasion to show you (see page 157). By these symptoms I recognized the existence of a subacute arthritis which I did not hesitate to call traumatic, and for which I told you that I did not fear suppuration, because contusions of the knee are very frequent in the hospital, and because we never see the consecutive arthritis terminate in suppuration.

The second, No. 46, is a teamster, 42 years old, who, jumping down from the back of his horse, fell upon his knee and twisted his leg, as he himself says. He felt quite a loud crack, and was not able to get up. He was brought to the hospital a fortnight ago. We found in him the same apyrexia as in the preceding case, and the same functional and physical symptoms. Furthermore, making an assistant hold the lower part of the thigh firmly with both hands, and taking hold myself with one hand of the lower end of the leg, and moving it alternately to the right and left, I found that lateral movements took place in the articulation. Then, placing one hand above the knee to fix the femur, and the other just below, I pressed with the latter the head of the tibia alternately outwards and inwards, and felt the bone move a little in each direction. No doubt, then, there was abnormal lateral mobility. It was one of those cases of sprain in which the distension of the ligaments, instead of causing an occult or hidden lesion, as so often happens in the foot, had been followed by rupture of the lateral or of the crucial ligaments. In a word, it was a sprain with rupture of the ligaments.

I told you at the beginning that the patient would have a non-suppurating traumatic arthritis, and that in his case we had to occupy ourselves with three principal consequences of the injury: the effusion, the consecutive stiffness, and the lateral mobility. I shall return to these points in a moment, but now I wish to fix your attention upon this, that there was, as in the preceding case, a quite severe arthritis,

that this arthritis had no tendency to suppurate, and that, nevertheless, on account of its origin, and to distinguish it from rheumatismal, gouty, and scrofulous arthritis, we are obliged to name it traumatic arthritis.

Recall the arthritis of the knee, which you have known to follow fractures of the patella and femur (see pages 142 and 157); they also were traumatic arthritis, sometimes subacute, and sometimes chronic, but having no tendency to suppuration.

I should like to complete this account of the symptoms by that of the lesions which correspond to them; but on this point I am not so well informed as I should like to be, because we do not often have occasion to make an autopsical examination of articulations affected in this way. However, by making use of the notions furnished by experiments upon animals, and those which we have been able to obtain from time to time from our patients, I feel authorized to tell you this.

In arthritis of all kinds there exists a primitive lesion of the synovial membrane—injection of the vessels, which we may also call hyperæmia or congestion. This was well seen and described by Prof. Richet,[1] by Bonnet (de Lyon),[2] Panas,[3] and Ollier.[4] Then follows a second lesion, closely associated with the first, thickening of the synovial membrane by the exudation of plastic matter into the connective tissue which supports its epithelium, and by the deposit of false membranes on its inner surface. I shall not speak now of the other lesions of arthritis, because they occur rarely in cases of this kind.

In traumatic arthritis especially, I am authorized to believe that the dominant lesion is hyperæmia, that which made Bonnet describe the congestive form of arthritis, and that when plastic and neomembranous thickening occurs it is but slight. This belief is justified by what clinical history teaches us as to the most common mode of termination, and by comparison with what occurs in a certain number of spontaneous, acute, and subacute arthrites. This termination is complete resolution after a shorter or longer time, especially when the patients are still young. Now, I readily understand this perfect resolution and restoration of movement when there has been only hyperæmia, or when the plastic deposits are not very abundant. Moreover, you will see that this anatomo-pathological problem and the relation of the lesions to the course of the arthrites is the principal difficulty in the clinical study of these diseases.

I wish now to examine before you the question, What will be the duration and the termination of the subacute traumatic arthritis of our three patients? Relying upon what I have just said, and the analogy with the facts of the same kind which I have seen in the

[1] Richet, Mémoire sur les Tumeurs Blanches (Mémoires de l'Académie de Médecine, Paris, 1853, tome xvii. p. 37).

[2] Bonnet, Traité des Maladies des Articulations, Lyon, 1845; Thérapeutique des Maladies Articulaires, Paris, 1853.

[3] Panas, article Articulations du Dictionnaire de Médecine et de Chirurgie Pratiques, Paris, 1865, tome iii. p. 268.

[4] Ollier, article Articulations du Dictionnaire Encyclopédique des Sciences Médicales, Paris, 1867.

hospitals, I can only say that they will last at least five or six weeks, perhaps much longer, in consequence of the passage of the disease to the condition of chronic arthritis.

As to the mode of termination, it may take place in one of the three following ways:—

1st. In resolution and complete restoration of movements;

2d. By passage to the chronic condition, with possible termination ultimately either in resolution or in anchylosis;

3d. By transformation into that variety of incurable arthritis which we call dry arthritis.

I hope for the first of these terminations, that is to say, cure with restoration of functions, in the first of our patients, in him who had the penetrating wound; for he is young, and from the moment that he escaped suppuration his condition is the most favourable for the complete disappearance of the slight congestion and thickening which undoubtedly have been the principal lesions of his traumatic arthritis.

I may also hope for this termination in our second patient, who has a contusion without sprain. Still, nothing assures me that there will not here be a tendency to pass to that variety of chronic arthritis of which I have often spoken to you in connection with fractures, which leaves for a long time a little swelling, more or less hydrarthrosis, pains while walking, and returns from time to time to the subacute condition, to end finally, after lasting for several months, either in cure, or in a complete or incomplete anchylosis. If he is willing to take care of himself for the necessary length of time, it is probable, since he is not very old and is not rheumatic, that he will escape termination in an infirmity; for I presume that the principal lesion is still congestion, and that the interstitial and neomembranous exudations are not so abundant and have not the same tendency to a definitive organization as in many spontaneous arthrites, and that, therefore, they have a greater tendency to be reabsorbed.

As to the third there is no certainty, for clinical history affords me no means of foretelling the termination of subacute arthrites. But there are more reasons to fear in his case passage to dry arthritis, without anchylosis, which would still be an infirmity. These reasons are, the age of the patient, the rheumatisms which he tells me he has already had several times in the different articulations, the deterioration of his health by the use of alcohol, and the existence of a lesion (rupture of the ligaments) which is sometimes incurable, or which, to be cured, needs prolonged rest, rarely accepted by patients.

You see then, gentlemen, for these patients there is one thing which is certain, that no one of the three will have that which is the most to be dreaded in arthritis, acute or chronic suppuration of the joint; there is another thing which is probable, cure after a longer or shorter time, with restoration of the shape and functions, and behind this probability a little uncertainty as to the possibility of an incomplete anchylosis or a consecutive dry arthritis.

It is now the moment to tell you that suppuration of the large articulations ordinarily takes place under three circumstances: 1st. After a penetrating wound, when suppuration of the external wound has not been prevented, or when there is a concomitant fracture, as in gunshot wounds; 2d. When the patient is scrofulous; 3d. After those dangerous fevers which seem due to an infection, and have more or less analogy with pyæmia, such as puerperal and urinary fevers are sometimes, and such as we see in the course of severe erysipelas and purulent infection, properly so called; and it is because our three patients are in none of these conditions that I am sure they will not have purulent arthritis.

Therapeutical indications.—I have already mentioned these for the first patient, the one with traumatic arthritis due to a penetrating wound. The chief indication was to prevent suppuration. I have told you how it was met.

There remains for him an indication which is the same for the two others—to prevent passage to a chronic state, and termination by an infirmity. For that we recommend, above everything, rest in bed, then compression with the cotton dressing, to be renewed every five or six days. To that we shall add occasional purging. Thus far I see no indication in the sanguinolent or sero-sanguinolent effusion. Twice during this year (1872) you have seen me make a puncture and aspiration upon patients, who, after a contusion of the knee, had a considerable effusion of blood. I then gave you my reasons for so doing. I feared that the effusion, on account of its volume, might not be reabsorbed, and that, acting as a foreign body, it might cause permanent irritation and passage to the simple chronic state, or to the form of dry arthritis. I thought that by at once evacuating the liquid, I should remove this cause of prolonged irritation, and put the patients into conditions favouring termination by resolution, rest and compression being also used, as is necessary in all cases of this kind.

In the two patients now before us the effusion is small; it was formed so slowly that I may believe it was composed of as much, and even more, synovia than blood. I count upon the absorption, which is the rule in such cases, and I shall puncture only if, three weeks hence, I find the absorption going on too slowly.

The rupture of the ligaments and the resultant lateral mobility furnish us, in the third patient, the indication to immobilize for a much longer time than in the other two. About two months will be necessary for the consolidation of the ligaments. In order not to condemn the patient to so prolonged a rest in bed, I shall put a dextrine bandage over the cotton dressing at the end of the third week, and leave this immovable apparatus in place for four or five weeks. If, at the end of this time, I still find lateral mobility, I shall renew the apparatus and leave it in place for another month. I do not disguise the fact that this prolonged immobility will favour anchylosis; but that result is far from certain, for anchylosis results from two things: special lesions, which I shall hereafter describe, and immobility. The latter, by itself, would never cause anchylosis. It only favours it by preventing us from employing at a certain moment the movements necessary to prevent its establishment. But, on the one hand, if the lesions which produce the anchylosis are not too marked,

we shall still be able, at the end of three months, to use successfully the movements of which I spoke; and, on the other hand, if permanent anchylosis should occur, such a result would be less unfortunate for the patient than persistency of lateral mobility. For the latter exposes the knee, at every moment, to new sprains and, consequently, to renewed arthrites, which are more troublesome than complete anchylosis.

There will probably be, in all three patients, a final indication, that of favouring the restoration of movements and diminishing prolonged rigidity. But as the means appropriate to that are the same as in cases of spontaneous arthritis, I will speak of them when treating of the latter.

LECTURE XXXV.

ACUTE AND SUBACUTE SPONTANEOUS ARTHRITIS OF THE KNEE.

I. First patient affected with acute arthritis of the right knee, gonorrhœal, with contracture of the flexors—Straightening of the limb under ether—Afterwards, discovery of lateral mobility and crepitation—Explanation of these two symptoms. II. Second patient affected with single acute arthritis, probably rheumatic, of the right knee. III. Formation of a complete anchylosis in both cases, notwithstanding the efforts made to prevent it—Study of the lesions—Congestion—Plastic deposits, whence the name plastic or anchylosing arthritis—Explanation of the anchylosis by the establishment of adherences after a struggle between the tendency towards resolution and the adhesive tendency. IV. Therapeutical indications based upon these ideas.

GENTLEMEN: You have seen for more than six months in ward Ste-Catherine two women who have often given me occasion to speak to you of the acute and subacute forms of spontaneous arthritis of the knee. Both are now getting well with anchylosis. As cases of this kind are not rare, and raise thorny questions of science and practice, I propose to-day to recall the principal details of these two observations and the reflections which they have suggested.

I. *Acute arthritis of the right knee, gonorrhœal, with contracture of the flexors.*—One of them, 25 years old, occupying bed No. 24, ward Sainte-Catherine, was admitted the 29th of December, 1871, into the medical service of my colleague M. Pidoux. She had been taken a few days before with sharp pains in the right knee, accompanied by slight fever and loss of appetite. When she was brought to the hospital, the pains were still very severe; not only was she unable to make any movement, but the knee was flexed to a right angle with the thigh, and she was unable to straighten it, the slightest attempt to do so increasing her pain. At the same time the skin was hot, the pulse at 90, and there was sleeplessness, and very little appetite. In a word,

the intensity of the local inflammatory symptoms and the persistency of this slight febrile condition indicated that the arthritis belonged to the acute form. Furthermore, M. Pidoux had discovered that this arthritis was single, and that the patient had a purulent urethritis and vaginitis which authorized him to consider the disease as of gonorrhœal origin.[1] The 17th of February, that is, more than six weeks afterwards, the general condition had improved, but the local symptoms remained about the same, and M. Pidoux asked me to take the patient into my service. I then found that the knee was flexed at a right angle, in consequence of which the patient was forced to lie upon the corresponding side, that it was swollen and felt very hot to the hand, and that the least pressure, and of course the slightest attempt to move it, caused very severe pains. When I asked the patient to point out the chief seat of these pains, she always indicated the inner side of the knee, the part which corresponds to the passage of the internal saphenous nerve and to the insertions of the internal lateral ligament. On account of the flexed position of the limb, I was not able at first to determine whether there was any effusion of liquid; however, if there was, it was not very abundant, for I did not find any fluctuation.

I further recognized that for the moment the patient had no other joint affected, and that she was without fever. It was then a single arthritis which had at first been acute, and which, in consideration of the disappearance of the febrile phenomena, might be considered as having passed to the subacute state. Was this arthritis to be called rheumatic? Strictly speaking, yes; for by this rather vague word *rheumatism* we wish to designate a general cause, the essence of which is unknown, which affects the synovial, fibrous, and muscular tissues. Furthermore, gonorrhœa also was present, and whatever may be the way in which the production of gonorrhœal arthritis is explained, it is certain that, in its symptoms and consequences, it resembles certain forms of rheumatic arthritis, especially that in which the disease is single, or very marked and prolonged in one articulation, whilst the others are but slightly affected, and in a very temporary manner. Moreover, if any doubts might have existed as to the rheumatic nature of the affection, they would have been destroyed when, a few months later, in June, we saw this patient affected with pains in several other joints, especially those of the shoulders and left elbow. As to the right elbow, it had long been completely anchylosed by fusion in consequence of a traumatic lesion during childhood.

On making my etiological examination I noticed upon the neck the scars of two ganglionary abscesses, and upon the borders of the eyelids a little alopecia and redness coinciding with slight specks left by keratitis during childhood. The patient, although apparently of a good constitution now, had then the scrofulous temperament. The

[1] I agree with those who think that gonorrhœal arthritis is rheumatic. But clinically it deserves mention and a special description for the following reason, which is absolutely inexplicable: it is localized much more frequently than ordinary acute rheumatism in a single articulation, and there goes beyond the congestive form and takes on the plastic and anchylosing form, of which I shall speak in this lecture.