

V. *Observations on Necrosis.* By M. Bouffelin; M. D. Surgeon Major of the Polish Army, &c. —Vide *Memoires de la Société Royale de Médecine*, Vol. IV. 4to. Paris, 1785. ✓

WE now know, that, in the long bones of the human body, a portion of the bony cylinder may be deprived of the living principle; and that, in such cases, nature gradually separates the living from the dead part. While this separation is taking place, a new cylinder is formed by an effusion of bony matter, so as to inclose the old bone, as it were, in a case; and the new bone connecting itself with the extremities of the old, the limb retains its original shape, and, after a certain time, when the bone has acquired the necessary degree of solidity, becomes as firm, and as capable of motion, as before.—The experiments by M. Troja, of which we formerly gave some account\*, prove that this regeneration of the long bones may be produced by destroying their marrow.

Instances of this disease are to be found in the writings of Ruysch, Scultetus, and others †; and

\* Vol. III. page 357.

† M. Bouffelin refers for cases of this sort to the *Mem. de l'Académie de Chirurgie*, Vol. V.; to a Latin Dissertation de *Necrosi*,

and a very curious case of it is described and accurately delineated by our countryman, Mr. Cheselden\*, who seems to have been aware of the utility of extracting the detached portion of dead bone, in order to relieve the patient in this disease. But it seems to have been only within these few years that surgeons have ventured to assist nature in these cases, by making an opening in the new bone large enough to extract the loose portion of the old.—In a former volume

*Necrosi*, by M. Chopart; and to the first volume of the Edinburgh Medical Essays: but the case mentioned in the last of these works, of a part of the tibia taken out, and afterwards supplied by callus, cannot properly be quoted as an instance of the disease in question; for in that case no new bone appears to have been formed till after the old one was removed.

\* In his *Osteographia*, chap. vii., where, after speaking of a case, “in which all the internal hard part of a cylindrical bone having been separated from the rest, and drawn out through the place where the external caries made a vent, the patient received a perfect cure,” he observes, that, “in another case of this kind, (delineated in table lv.) where the internal part which contains the medulla was also separated from the rest, and there were holes through which the matter was discharged, but none sufficient to take out the exfoliated bone; the matter continued to flow in great quantity till it destroyed the patient.” “And possibly,” adds Mr. Cheselden, “if this case had been rightly known, the

Volume \* we gave an account of such an operation, as described by the late M. David.

The paper now before us contains eight cases of Necrosis, which have fallen under the author's observation; together with some judicious remarks on the nature and treatment of the disease.

From the circumstance of his having seen twelve instances of it during a residence of two years in the Hotel Dieu at Lyons, M. Bouffelin supposes it to be a disease of more frequent occurrence than has hitherto been imagined. Ten of these twelve patients were between thirteen and twenty years of age; and in eight of the twelve either the tibia or the os femoris was affected. These observations lead him to imagine that young persons are more liable to the disease than old, and that the lower extremities are more frequently affected by it than the upper; but such conclusions are hardly allowable from so small a number of facts.

The first case related by M. Bouffelin is that of a young man aged eighteen years, who was

“ the internal exfoliated part might have been taken out, and  
 “ the patient cured.” — These observations have escaped the notice of M. Bouffelin.

\* Vol. III. page 369.

admitted into the hospital in April, 1781, with several ulcers in one of his legs, which was swelled throughout the whole length of the tibia.

When the eschars sloughed off, a fistulous opening was discovered towards the upper part of the tibia, through which a probe could be introduced into the cavity of the bone.

The disease, it seems, had begun about a year and a half before, by a very acute pain of the leg, followed by a swelling of the soft parts, and soon after by external inflammation, which terminated in several small abscesses, the discharge from which removed in a great measure the swelling. Some of these ulcers, after discharging a whitish pus, and occasionally minute portions of bone, for five or six months, healed, and were succeeded by similar abscesses in different parts of the leg.

In the beginning of the disease the limb was very weak, and incapable of supporting the weight of the body; but, by degrees, it acquired more strength, and the swelling of the leg gradually disappeared, except along the course of the tibia: the patient, however, we are told, was for four months unable to walk on this leg, but after that time gradually recovered

vered the use of it, and, when he was admitted into the hospital, could walk on it almost as well as on the other leg.

The operation was performed on it on the 5th of May, by M. Bouchet, principal surgeon of the hospital. An oval incision was first made through the integuments, three inches and a half in length, and one and a half in breadth, which included several small ulcers at the upper and fore part of the tibia. When this portion of the integuments was removed, the rugine was applied to the bone; after which M. Bouchet, with a small convex saw, penetrated into the bone to the depth of half an inch, both at the upper and lower parts of the wound, and then with a mallet and chissel removed the intermediate space of bone, which was accomplished with great difficulty, on account of its uncommon hardness.

On removing this piece of bone, the surgeon found that he had not yet got into the cavity; the operation was therefore extended to a greater depth, and then a loose portion of bone was removed, three quarters of an inch long, and four tenths of an inch broad, but rendered extremely thin by suppuration.

Common dressings were applied to the wound, and suffered to remain till they were sufficiently moist to be removed with ease, which did not happen till the fifteenth day after the operation.

About the third day the patient began to complain of a slight symptomatic fever, but this soon yielded to an antiphlogistic regimen.

At the end of six months, when the wound was nearly healed, the patient quitted the hospital.

The subject of the second case was a girl, thirteen years old, and seemingly of a good habit of body, but who, for the space of a year, had several ulcers on her left leg, with fistulous sinuses on the tibia, which was considerably enlarged. Small exfoliations of bone had made their way through some of the ulcers, which afterwards healed, as in the preceding case, and were followed by fresh ulcers in other parts of the leg. No operation was attempted in this case, as two of the ulcers healed during the two months she remained in the hospital, and she recovered the use of her limb so much, that it was thought she would get well in time.

The third case is that of a young man, aged eighteen years, who, at the time he was admitted into the hospital, laboured under a hectic fever, and had three or four ulcers in each leg. Both tibias were enlarged, and a probe, introduced at the fistulous openings, passed into the bone. The sores discharged a laudable pus, but the ulcers were filled with fungus.

The patient dated the origin of his complaint from a fever, with which he had been attacked about three years before, and which had been followed by abscesses in both his legs. The discharge from these sores was very profuse, and occasionally minute portions of bone came through the wounds. Some of the ulcers gradually healed, and fresh ones appeared in other parts of his legs. While the abscesses were forming, he complained of acute pain; but when they came to discharge and ulcerate, they occasioned but little uneasiness. His legs, from being extremely weak, had gradually acquired strength, and, during the three months he remained in the hospital, several of the ulcers healed, and he went out at the end of that time much relieved.

The subject of the fourth case was a man, thirty-six years old, who was admitted into the  
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hospital with an ulcer, of six months standing, on the inner and lower part of the thigh. The whole of the limb was enlarged, and in the center of the ulcer was a fistulous sinus leading to a cavity, in which a moveable bone might be felt. — The bone was laid bare, and a sufficient portion of it removed to enable the surgeon to take out the moveable piece of bone, which was found to be part of the cylinder of the os femoris, an inch long, but somewhat thinner than in its natural state, part of its substance having been destroyed by the supuration.

The wound in this case was healed in about three months, and the patient recovered the perfect use of his limb.

The fifth case is that of a stout man, aged twenty-six years, who was admitted into the hospital with a compound fracture of one of his legs. At the end of three months he was discharged from the hospital, though he had still an ulcer on the leg. He returned again in about a month, and the ulcer was then found to have a fistulous sinus leading to a moveable piece of bone, and the tibia, at the place where it had been fractured, was observed to be considerably enlarged.

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The necessary incisions were made to bring to view the moveable piece, which was then found to be surrounded by a portion of regenerated bone. The new bone, not having acquired much hardness, an opening was easily made in it large enough to extract the loose piece, which proved to be a portion of the tibia, an inch long, and half an inch broad. The cure in this case was effected in about ten weeks.

The sixth patient, whose case is related by our author, was a young man, aged fifteen years, who was brought to the hospital with both his legs covered with ulcers, and unable to walk. The disorder, he said, had come on about two months before with acute pain, which continued till suppuration took place and matter was discharged.

In each leg there were five or six fistulous openings, leading to the cavity of the tibia, in which were moveable pieces of bone. The tibiæ were but slightly enlarged.

It was agreed in this case that an operation should be performed on one leg first; and accordingly, about a month after his admission, a circular incision, three inches long, and one inch and a half wide, was made through the integuments. On removing this flap, several  
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openings were discovered in the regenerated bone, through which the loose portion of bone might be seen. All these openings were laid into one, by removing, with a chissel and mallet, the space between them; which was done with great facility on account of the softness of the new bone. The loose piece, which was taken out, preserved the shape of the old bone, and was three inches long, but had lost part of its substance by suppuration.

A slight symptomatic fever succeeded the operation, and continued during ten or twelve days; after which it subsided. The wound healed in about six months.

The ulcers in the other leg still continued to discharge a good deal of matter, and occasionally small portions of bone. Some of the ulcers were healed, and the limb had acquired strength; but the success of the operation on the other leg made the patient desirous to undergo a similar operation in this leg also. It was accordingly undertaken, and a flap, including all the remaining ulcers, removed; but no opening was found leading to the cavity of the bone, excepting a very small one at the upper part of the wound. A portion of the new bone, however, was removed, but not without difficulty,

as it had acquired considerable hardness, and some small pieces of loose, dead bone were found, almost wholly dissolved by the pus; so that nature had here nearly effected a cure.

The next case is that of a boy, thirteen years old, who was suddenly seized with acute pain in both legs, to which succeeded inflammation and suppuration. When he came into the hospital, in May, 1781, the disorder was of three months standing, and he had several fistulous sinuses in each leg, which led to cavity, in which a moveable piece of bone might be felt with a probe.—His legs were not swelled; but the skin at the fore part of each tibia was extremely thin, and here and there were spots which afforded less resistance than the other parts of the bone, and where the ossification seemed to be deficient. The pus discharged from the sinuses was whitish, and of a good consistence.

In this case an oval incision, six inches long, and which included all the sinuses, was made through the integuments; and when this flap was removed, the surgeon found the new bone had acquired so little solidity, that he was able to cut through the anterior portion of it with a common bistoury.—The periosteum was thic-

kened and ossified in several places. After the removal of a loose portion of dead bone, the wound was dressed with dry lint, which came off on the sixth day. The bottom of the wound was soon filled with fleshy granulations, which covered the cavity of the new bone.

In the course of the treatment, the wound was twice in a putrid state, which the author ascribes to the bad air of the hospital, and to some irregularities of diet; but by proper care the cure was completed in about six months; so that at the beginning of November the patient was able to walk without a crutch, and the limb, we are told, is not deformed.

During the whole of this treatment care was taken to keep open the sinuses of the other leg, the discharge from which was a good pus, accompanied from time to time with portions of bone, which, in general, were very small; but one piece that made its way to the mouth of one of the sinuses, and was extracted with the forceps, was nearly two inches in length.

The operation was performed on the other leg November 15th. The new bone was here found to have acquired so much strength, that the mallet and chissel were required to make an opening into the cavity of the bone, but no

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loose piece of bone was found in it; so that nature had in this instance been able to rid herself of the whole of the detached portion. The cure went on in a favourable manner, and when the account of this case was drawn up, the wound was nearly healed.

The eighth and last case mentioned by M. Bouffelin is that of a young man, eighteen years old, who hurt his knee by a fall, which occasioned great pain, and laid the foundation of an abscess in the lower and inner part of the thigh. The discharge from this abscess was very profuse for several months; he had a stiff joint, and there remained a fistulous sinus, and an enlargement of the condyles of the tibia and femur.

In this state he was admitted into the hospital in August, 1781; at which time a moveable piece of bone could be felt on introducing a probe through the sinus, and left no room to doubt of the nature of the complaint. The operation was performed the month following, and a portion of detached bone, between three and four inches in length, and which was found to be the lower extremity of the os femoris, was extracted. The patient left the hospital about the end of November;

at which time the wound was nearly healed, but the motion of the joint was entirely lost.

After describing these instances of the disease, M. Bouffelin gives us some observations on the diagnosis and prognosis in cases of this kind, and on the method of cure.

The principal characteristic marks of the disease, which our author points out, are, 1. the situation of the fistulous ulcers which usually occupy that part of the bone nearest to the integuments, and penetrate into its cavity, where the detached portion of bone may in general be felt; 2. the discharge, in the greater number of cases, of a good pus, the quantity of which is not increased by compression, and which does not give a black tinge to the dressings, as in caries, unless, as seldom happens, we are told, the disease is complicated with caries; 3. the occasional discharge of small portions of bone that make their way through the sinuses; 4. the seat of the pain; and lastly, the circumstance of the tumefaction's being confined to the bone, and not extending to the soft parts.

The enlargement of the bone, it is observed, usually corresponds with the extent of the disease; but this enlargement is not perceptible

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till the new bone has acquired a certain degree of hardness.

On the subject of the prognosis M. Bouffelin observes, that if the disease is of long standing, if the suppuration is much diminished, if portions of bone have made their way through the sinuses, and the new bone has acquired great firmness, and is larger than natural, there will be reason to conclude that the detached bone is dissolved, or nearly so, and that nature will be able to complete the cure. If an operation were to be undertaken, under such circumstances, not only no loose bone would be found, as happened in the second operation performed on the subject of the seventh case, but the surgeon would find it difficult to get into the cavity of the bone, as this becomes obliterated in proportion as the portion of dead bone is lessened by the suppuration.

In general the cure by nature will be more or less difficult, we are told, in proportion as the disease is more or less extensive. It will likewise, our author thinks, be, *cæteris paribus*, more difficult in adults than in younger subjects. As a proof of this he refers to the sixth case, where, in a man of thirty-one years, the detached portion of bone was hardly at all diminished

minished in six months, while in the eighth case, the subject of which was only fifteen years old, the bone, in the same space of time, was almost wholly destroyed, and yet the disease in both cases was nearly of the same extent.

With respect to the mode of treatment, our author remarks, that the writers on this subject have hitherto thought only of the operation; but he is convinced that nature will oftentimes be equal to the cure, though by slower means. In some cases, he observes, six or eight months will be sufficient for her purpose; in others she may require one or two years. He acknowledges, however, that cases may occur in which the long duration of the disease, the degree of suppuration, and other circumstances, may render the operation necessary.

In cases where the disease is very extensive, and in which a great loss of substance must necessarily take place in the operation, he prefers the leaving the disease to nature, especially if the patient be young: but in older persons he gives the preference to the operation, especially if it be undertaken at an early period of the disease, because the new bone being then not sufficiently formed to inclose every part of the  
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old, the loose piece may be easily extracted, and the new bone's want of firmness will allow it to be easily cut into, if the removal of any part of it should be found necessary.

M. Bouffelin cautions us, however, not to undertake the operation till we are sure that nature has thrown off the whole of the dead portion of bone. This, he observes, may be known by the good quality of the pus, by the disappearance of inflammation on the surface of the adjacent skin, and by the firmness of the limb. This last he considers as the principal sign of the separation being complete.

The author does not attempt to describe the manner of operating in these cases; because this, he observes, must vary according to circumstances. He thinks it sufficient to remark, that the aim of the operator should be to expose sufficiently the diseased part, by cutting into or removing the soft parts, and to make the opening in the bone extensive enough to include all the sinuses in its substance. This opening, he adds, must also be proportioned to the size of the loose portion of bone,