parietal bones, which were attacked either in their external or internal tables, or in both conjointly.

The changes observed consist in atrophy or rarefaction at certain points upon the external or internal surface of the bone, with hypertrophy or condensation of the osseous tissue surrounding them. The rarefaction commences with enlargement of the vascular canals of the bone. Openings are found, which are the extremities of the Haversian canals of the cortical substance, and towards these converge radiated furrows, which are formed by the canals parallel to the surface. Thus small star or funnel-shaped depressions are formed, which gradually increase somewhat in size. When existing on both the external and internal aspect of the bone they sometimes, though rarely, correspond to each other, and *may* produce complete perforation.

At the same time osseous tissue of new formation is being deposited at the periphery of these points of atrophy; it is first seen as a thin, soft, and very vascular pellicle, which rapidly ossifies, and unites with the original bony structure, constituting a simple hyperostosis or periostosis, and not an exostosis. A similar hypertrophy also occurs around the extremities of the funnel-shaped depressions, whereby the medullary cavities of the diploë are obliterated, and sclerosis of the whole affected portion is produced. Unlike ordinary caries, this affection never exhibits the slightest trace of pus.

In several instances Virchow has found the depressions above described filled with a conical-shaped mass of tissue of new formation, which he regards as syphilitic tubercle originating partly in the pericranium (upon the external surface) or the external layer of the dura mater (on the internal surface) and in the bone itself; and he arrives at the conclusion that this form of atrophy is "intimately allied to the formation of gummata, and that the sensible depression of the cortical layer of the bone only occurs after the absorption of the gum, which takes place more readily upon the external than upon the internal surface of the cranium."[1]

Syphilitic Cicatrices in the Bone.—It remains for us to inquire whether such syphilitic lesions as involve a loss of substance of bony tissue leave behind them any peculiarity in the cicatrix, which may enable us, if not always to determine, at least strongly to suspect, their nature. Observation answers—yes.

Under other circumstances, as, for instance, after the removal of a portion of one of the cranial bones by trephining, the opening is, to be sure, never entirely filled again by a new formation of osseous tissue, yet there is an attempt in this direction, since we find the hole contracted by means of a bony outgrowth from its edges. Now, in the loss of substance from syphilitic necrosis, it is entirely exceptional to find anything of the kind take place.

"*A syphilitic cicatrix of the bones is distinguished by a want of productivity of the centre, and by an excess of productivity of the periphery.*" In a word, we have here on a larger scale what we have just seen to obtain in the depressions of dry caries or inflammatory atrophy. Still, supposing one of the cranial bones to be the seat of the lesion, "the dura mater becomes thickened from the outset, and, when the necrosed portion has been eliminated, a cicatrix is produced, the edges of which are formed by the union of the skin and the soft parts covering the cranium with the bones and the dura mater; towards the centre is found a callous, uniform, whitish mass, which is very compact and poorly supplied with vessels, and which gradually thickens and contracts; the natural arching of the cranium finally disappears at this part, and is replaced by a depression of the whole cicatricial surface.

"The peripheric portions of the bones undergo quite a different change; they are affected with sclerosis, often in combination with considerable hyperostosis. The medullary cavities are gradually filled with an osseous substance; the bone becomes hard, thick, heavy, and at last quite eburnated, and on its surface there are smooth prominences, either aggregated or mammillated; but there is this decided peculiarity about these new formations, viz., that they form slowly and in small quantity, and that the periosteal collections are totally unlike the porous, voluminous masses resembling pumice-stone, which are so abundantly produced in mercurial or phosphoric necrosis of the maxillary bones, and which are also met with, although to a less extent, in all other forms of necrosis."[1] These changes therefore closely resemble those occurring in inflammatory atrophy without suppuration or necrosis, and the diagnosis must sometimes be made from the history of the case and an examination of the surrounding soft parts.

If any portion of a bone has been entirely destroyed, as, for instance, the vomer or a part of the hard palate, nature does not attempt to supply the deficiency, at least with osseous tissue.

Several authors have mentioned extreme fragility of the bones in general as one of the effects of syphilis. A patient who was under my care a few years since for syphilitic necrosis of the bones of the head, fractured his thigh while simply turning in bed. Death ensued from exhaustion in the course of a few weeks, but no opportunity was offered for a post-mortem examination. It is not probable, however, in this and other similar cases that have been reported, that a condition of mollities ossium exists, but rather that the bones at the point of fracture have had their integrity impaired in one of the modes previously mentioned.

Treatment.—Most of the above affections of the osseous tissues yield with great facility to the treatment appropriate for tertiary syphilis. Osteocopic pains, and nodes especially, often disappear in an almost marvellous manner under the free administration of iodide of

[1] French translation, p. 49.

[1] Virchow, op. cit., p. 62.

potassium, but they are very apt to return. As I have previously stated, I believe the greatest protection against a relapse is the combined use of mercury in the form of inunction.

In most of the supposed desperate cases of syphilitic disease of the bones that I see in consultation, the attending surgeon has been trifling with insignificant and insufficient doses of his remedies—giving for a while some ten or fifteen grains of the iodide of potassium in the twenty-four hours, and, this failing, resorting to a sixteenth or the twelfth of a grain of corrosive sublimate, three times a day, until his patient had such a diarrhœa and was so run down that he was obliged to desist, and was now at the end of his resources. At the suggestion of forty, sixty, or a hundred or more grains of the iodide *per diem*, and the nightly use of a drachm of mercurial ointment by inunction, it is often objected: "Why, I have been giving just these remedies"—as if it were sufficient to have the proper tools, and it made no difference how they were used!

In the great majority of cases of osteocopic pains, ostitis, nodes, etc., I prefer to abstain entirely from local treatment; the small benefit that it can afford is more than counterbalanced by its inconvenience and its diverting the patient's mind from his chief source of relief. If, however, any local treatment be adopted, the best is the repeated application of blisters, which may be dressed with an ointment containing morphine.

Many practitioners are altogether too prone to plunge a lancet into the tumor. Resolution may often be obtained even after fluctuation is evident, and when an incision and consequent exposure of the bone would be followed by caries or necrosis of its superficial layer. This treatment should be left as a last resource after other means have failed, in which case it is probable that there is some sequestrum that can only be got rid of in this manner.

"When suppuration or caries occurs, especially of the bones of the face, which are so often necrosed in these cases, we should never fail to remove them as soon as they can be separated from the sound parts. We must recollect that caries engenders caries; that when the organic tissue of a bone has been destroyed by suppuration or has lost its vitality, it cannot be regenerated by any constitutional or local treatment whatsoever; and that its *debris* should never be left to spontaneous evolution, since they are foreign bodies, maintaining and extending suppuration, which, by involving important parts, may occasion the most serious symptoms, or even result in death."[1]

Affections of the Cartilages.

Syphilis may attack the cartilages as well as the bones. The cartilages of the larynx are a favorite seat for tertiary syphilis, which often results in necrosis, and the sequestra are sometimes expelled in the attempts at expectoration.

[1] Ricord, Notes to Hunter, 2d Am. ed., 1859, p. 507.

Lancereaux reports a case in which the purulent collection in this region was the origin of pyæmia and metastatic abscesses; severe chills suddenly occurred, and the patient died in a week. The autopsy confirmed the diagnosis.

Bouisson speaks of a case of perichondritis of the costal cartilages in a man who also had a syphilitic tumor in the pectoralis major muscle. (Lancereaux.)

I also have seen swellings of the costal cartilages developed simultaneously with tumors of the sternum. Syphilis may therefore cause gummy infiltration of cartilage as well as of bone. When the joints are the seat of these syphilitic changes the cartilages may be eroded and crepitation may be heard. This condition is probably merely a result of impaired nutrition.

Affections of the Joints.

The joints are frequently affected by syphilis in both the secondary and tertiary stages. In some instances the morbid process begins in the joint structures, and in others inflammation of the articular ends of the bones and of the large tendons inserted near the joints involves the latter secondarily.

Arthralgia.—In the secondary stage, and frequently as early as the appearance of the first general manifestations, one or more joints may be the seat of pain. Externally there is no redness of the skin nor subcutaneous inflammation, no swelling from effusion and no elevation of the temperature of the parts; in fact very often the only evidence of disease is the pain. In some instances pressure causes no pain, but movement of the joint does, and there is more or less stiffness and inability to move the joint. The pain is slight or of a dull character during the day, but is often attended with marked exacerbation at night. After considerable motion the stiffness and pain may disappear, to return at night when the joint is in a state of repose. In other instances, however, the suffering of the patient is very great, preventing sleep until late in the night or towards morning. Not unfrequently, coincidently with the joint affection, there is marked fever, of the remittent type, and patients may also suffer from rheumatoid pains in the muscles, neuralgias and periosteal pains.

This affection is very uncertain in its duration, being sometimes very ephemeral, and at other times very persistent.

It is readily amenable to treatment when this is commenced early, but otherwise, it is obstinate and troublesome. It most commonly attacks the larger joints, either symmetrically or the opposite, and the joints of the hands and feet are not infrequently involved. The knee-joint is most frequently attacked, but those of the shoulder, elbow, wrist, and ankle are also often affected. In general only two or three of the larger joints are involved at once, and there is

not, as in articular rheumatism, a tendency to metastasis from one joint to another. When the affection involves the smaller joints, as those of the phalanges or carpal bones, several of them are generally attacked simultaneously, and the earlier it occurs in the course of syphilis, so is the tendency to its symmetrical development greater. While in most cases there is no evidence of any abnormal condition of the articular surfaces, in others crepitation may be heard, indicating some impairment of nutrition of the opposed surfaces. The lesion, which cannot be positively determined, is probably a low grade of hyperæmia of the synovial membrane and fibrous tissues.

This affection is called by Fournier both arthralgia and pseudo-rheumatism, and by Vaffier syphilitic rheumatism. The diagnosis between it and ordinary rheumatism is to be derived chiefly from the history of the case and the concomitant lesions and symptoms. The course of this affection is very subacute; there is not the same tendency for so many of the joints to be affected as in rheumatism, and there is absence of the systemic condition and of the perspiration peculiar to the latter disease. The appropriate treatment is by mercury if the affection occurs at an early stage of syphilis, and by the mixed treatment if in the late stage.

Synovitis.—There are two forms of synovitis occurring during the course of syphilis; the one simply a chronic effusion into the joint without any appreciable change therein; the other an affection, in which there is, besides the effusion, a thickening of the synovial membrane.

Synovitis of the Early Stage.—This begins slowly and painlessly. The patient experiences slight stiffness in the joint, which is found to be swollen. On examination, the usual symptoms of effusion are found, which vary according to the joint attacked. The skin covering the joint is not changed. Firm pressure may cause slight pain, and dull pain may often be felt at night, but the articular surfaces may be crowded together with impunity. The amount of effused fluid varies; in some cases it is very slight, in others copious. A peculiar feature of this affection is the intermittent character of the effusion. For example, a patient may have complained of a moderate effusion, which seemed to wholly pass away; after a longer or shorter period it returns, and reaches a certain stage, where it remains for a time; then the swelling increases; afterwards it decreases very perceptibly, and again increases to marked proportions. During this whole period the patient has suffered little inconvenience, except a slightly painful stiffness of the joint in the morning, which passes away in an hour or two, and perhaps a slight pain at night. Not infrequently such patients also suffer from periosteal pain in the course of the long bones, or from nocturnal neuralgia. The effusion may remain for a long or short period. In some, particularly those who are subjected to treatment, it passes slowly away, and the joint

is apparently left in its normal condition. In other cases, the affection is chronic and persistent, and the effusion disappears very slowly. In these cases we usually find the whole joint somewhat enlarged and indurated, and subject to frequent small effusions. There is no tendency to suppuration or destruction of the joint.

The diagnosis of this affection can be generally made out without difficulty. The history of the case, and the slow, painless, intermittent, and subacute character of the effusion, establish its distinct nature from the synovitis of rheumatism or of gonorrhœa.

Synovitis of the Late Stage.—The synovitis which occurs late in the secondary and during the tertiary stage, is also markedly subacute. It is attended with the same symptoms, and is mainly distinguishable from that of the earlier period by appreciable lesions of the joint structures. The attention of the patient is called to the affection by slight pain and impairment of motion, and the joint is then found somewhat enlarged. The effusion into its cavity takes place slowly and perhaps intermittingly, so that in many cases several months elapse before the joint is very decidedly enlarged. When the affection is fully developed we find evidence of intra-articular effusion and general thickening of the fibrous coverings and of the synovial membrane. The affection has been called by Richet,[1] who first described it, "syphilitic white swelling," and was said by him to be due to gummy infiltration into the sub-synovial connective tissue, and into the reflections of the membrane which lined the joints. This view was not generally received, but the more recent post-mortem observations of Lancereaux[2] have confirmed them. The latter in his excellent text-book gives a colored lithograph of the appearances presented by a joint thus diseased, and clearly shows masses of gummy material in the sub-synovial tissues.

It is probable that this is the chief focus of the lesion, but in some cases there is a coexisting hyperplasia of the fibrous structures of the parts. This affection may remain in an indolent condition for years without undergoing any further changes. There is little tendency to complete anchylosis, though quite frequently there is more or less erosion of the articular cartilages, as shown by the crepitation on motion. We seldom find sinuses near the joints, and the stationary character of the affection is in marked contrast to the tendency to degeneration which is such a prominent feature of the strumous affections of these parts. The knee-joint is the one most commonly attacked.

The prognosis of this affection is rather more serious than that of the earlier form. If it is submitted to treatment early, it is in general curable, but if it is neglected, permanent thickening occurs, and consequently more or less impairment of motion.

The constitutional treatment consists in the administration of the iodide of potassium and of mercury. Locally, frictions with a mild

[1] De la tumeur blanche: Mémoires de l'Acad. de. méd., Paris, t. xvii., 1853, pp. 249, 250, 251, 253.
[2] Traité historique et pratique de la syphilis, Paris, 1873.

mercurial ointment, and compression of the joints by means of strips of mercurial plaster are very efficacious. In the most rebellious cases it is necessary to render the joint thoroughly immobile by means of the starch, plaster of Paris, or, preferably, the silicate of soda (so-called "glass") dressing.

In some cases in which there is a syphilitic affection of the tendons inserted near a joint, there is a coincident effusion into the cavity of the latter. This occurs slowly and painlessly, and disappears on the subsidence of the disease of the tendon.

Accompanying the osteochondritis of children, in which there is inflammation of the diaphyso-epiphyseal junction, there is also, in some instances, effusion into the cavity of the joint at the end of the affected epiphysis. This affection, which is described in the chapter on hereditary syphilis, occurs most commonly within the first year, but in some cases even as late as the twelfth year. In such cases we find a general enlargement of the epiphysis and swelling of the joint.

CHAPTER XXIV.

AFFECTIONS OF THE EYES.

A LARGE number of tissues enter into the composition of the orbit and its contents, and syphilitic affections of this region are correspondingly numerous; but a minute description of all of them would be inconsistent with the limits of this work; and I shall therefore merely allude to several of them, and dwell chiefly upon those which are the most common and most likely to fall under the care of the general practitioner.

AFFECTIONS OF THE BONES OF THE ORBIT.

These may show themselves either as periostitis, caries, or necrosis. They produce the same general symptoms and appearance as in other parts of the body, but, from the very seat of the trouble and the proximity of the inflammatory action to the delicate and complex organ of the eye on the one hand and the sensorium on the other, the symptoms are apt to be graver and the results more disastrous here than elsewhere, except within the cavity of the cranium itself.

The inflammation is very liable to be propagated from the bony walls to the contents of the orbit, and there give rise either to a superficial or deepseated cellulitis, which, if unchecked, may result in the formation of an abscess, and this, in its turn, may either seriously threaten the integrity of the eye, or cause its total destruction. Again, sinuses may be formed in different directions in the lids or their surroundings, through which the products of inflammation may be discharged for an almost indefinite period, accompanied by ulceration and contraction of the soft parts, with eversion or displacement of the lids.

The favorite seat of these troubles is the inner portion of the orbital plate of the frontal bone, the orbital border, superior and inferior, and the os unguis, in which latter they often lead to troubles in the lachrymal passages.

The results of orbital cellulitis may be the same here as in the idiopathic form, and the surgeon must be prepared, in case a deepseated abscess forms, to evacuate this with a bold free incision into the orbit, in order to save the eye, or it may be the life, of the patient.

The constitutional disturbances in these affections of the bones, especially when of a chronic form, are sometimes very great, and the patient often becomes reduced in a marked degree through pain and general