guide to the presence of sinusitis (*Edinburgh Medical Journal*, November, 1910).

(8) The present writers would be interested to learn the opinion of the members of the Scottish Society of Otology and Laryngology as to the scarlatiniform rash, which sometimes follows operations on the accessory sinuses. Are these true cases of scarlet fever?

In conclusion we wish to tender our best thanks to Dr. Logan Turner for his kind permission to operate on and record the great majority of the cases which have formed the subject of this paper.

DIFFUSE OSTEOMYELITIS FROM NASAL SINUS SUPPURATION.

By Dan McKenzie, M.D., F.R.C.S.E.,
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(*Continued from p.* 25.)

Symptoms and Course.

Duration.—Two varieties of cranial osteomyelitis are described by the classical writers; the rapid and the slow. The former, which merits the epithet hyper-acute or fulminating, is common when the osteomyelitis result from pyæmia or some other constitutional disease, and from trauma (non-operative). No case of fulminating nasal sinus osteomyelitis has so far been recorded, although Gerber reports one case following mastoid suppuration. The hyper-acute form lasts only a few days and is rapidly fatal.

Diffuse osteomyelitis from nasal sinus suppuration runs a more leisurely course, and an analysis of the cases as recorded has led me to divide them into two classes:

(1) The acute, with a duration of from three to twelve weeks.

(2) The chronic, with a duration of from six months to two years.

A longer experience of the disease may, and probably will, make us acquainted with cases which occupy a position intermediate between these two grades, but for the present the distinction is clear and the classification adequate.

In the *acute* form the clinical events follow one another closely. The pyrexia is for the most part continuous, although the temperature may fall to sub-febrile, and even, briefly, to normal limits

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during short lulls, and the progress of the disease is uninterrupted by any definite intervals of pronounced quiescence.

In the *chronic* form, on the other hand, the disease develops more slowly and its progress is broken. Phases of activity, with pyrexia and abscess formation, alternate with periods of rest when the temperature is normal and local signs sink into insignificance or abeyance. During the intermissions so unruffled may the calm be that the patient and his medical attendant may regard the disease as cured, but, as Sir StClair Thompson has pointed out, the calm is deceptive. Sooner or later a recrudescence sets in, and all the symptoms flare up again.

I have not been able to trace any connection between the rate of progress of the disease and its origin. Spontaneous cases and post-operative cases show, on the whole, no difference in duration.

The numbers at our disposal are scanty, but as far as they go, they tend to support our natural expectation that the prognosis in the chronic should be rather better than in the acute type. Thus, of six chronic cases, four died and two recovered; of the ten acute cases, nine died and one recovered.

Onset.—In spontaneous osteomyelitis, which, as we have seen, arises most frequently in the course of an acute sinusitis, the occurrence of the bone disease may be unsuspected until the sinus is opened surgically. This is specially so when, the sinus wall having broken down, swelling and inflammation of the soft parts are present. The appearance of an œdematous swelling at some distance from the sinus should, however, be regarded with suspicion. The onset of the grave complication is usually heralded by a rise in the temperature to a level higher than its previous readings.

In post-operative cases the onset of the disease is even more gradual and insidious. Not infrequently the skin-wound will have united, the temperature be normal, and the case seem to be progressing to a smooth recovery, when a little superficial swelling and redness, like that of a stitch-abscess, appears in a limited part of the external wound (Durand's and my cases). This may be opened by the surgeon, but the relief is not followed by healing. On the contrary, the tumefaction slowly extends, the edges of the wound gradually separate, and the discharge of pus becomes more and more plentiful. Pain usually accompanies the inflammation, and is sometimes severe; some patients, however, experience only a little discomfort, and have no real pain.

So far, there is little in the appearance of the parts to distinguish the case from one of simple re-infection of the wound area.

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But the slowness of development contrasts with the smart reaction that follows re-infection. Moreover, the character of the swelling in and around the open wound should awaken suspicion. It is pale, puffy, œdematous, and merges imperceptibly into the surrounding tissues. There is only a slight amount of redness in and around the edges of the incision, and the skin elsewhere over the swelling shows little or no change from the normal colour.

At this stage, if the sinus be opened up again and examined by the surgeon, the bone which was exposed in the original operation may at once attract attention by its dead-white or discoloured appearance, and if a piece be removed with cutting forceps pus may be seen to ooze from the cut edges.

Along with these indications of local disturbance, the patient begins to show signs of toxic absorption in pyrexia, headache and general malaise; asthenia, restlessness, anorexia and anæmia—symptoms of a toxæmia which becomes more and more profound if the course of the disease is uninterrupted, deepens and lightens if it waxes and wanes, and disappears altogether if the local disturbance permanently subsides.

Sooner or later the appearance of an œdematous swelling in the soft parts at some distance from the sinus of origin testifies to the extension of the disease in the diploë. It is characteristic of osteomyelitis that the pericranial abscesses which induce these swellings in the forehead, hairy scalp, or temporal region, are discrete and separated from each other by areas of seemingly healthy, if œdematous, tissue, their confluence being prevented by the giving way of the pericranium, which we remarked in the pathological section. The disease burrows like a mole in the earth, and, like a mole, throws up mounds here and there as it goes along.

The abscess formation accompanies the disease in its extension from one bone to another, and, as the infective process may travel downwards as well as upwards, the bridge of the nose and the eyelids also become swollen and œdematous from pus collecting in these regions.

The temperature undergoes a slow rise from the normal to a moderate continued fever. Rigors, save in pyæmic cases, are unusual. Terminal hyperpyrexia may appear.

The course and development of the disease can often be considerably modified by surgical interference. The opening of external abscesses as they form, the resection of the necrosed tables of the skull and the evacuation of extra-dural collections of pus not infrequently bring the progress of the disease to a stand-

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still, in a few cases permanent, in most cases only temporary. After an interval of weeks, or even of months, the slow swelling usually reappears, and the disease takes another step forward. Again the surgeon will operate and bring the process to a term, and again, after a pause, recurrence will take place. With each attack, however, the intervals become shorter, the local and constitutional symptoms more severe. Pain, if present, becomes more and more intolerable until the septic absorption renders the patient dull, torpid, and finally comatose. Death ensues from toxæmia, asthenia, pyæmia, or some intra-cranial complication.

As we have already remarked, the complete absence of symptoms during the intervals between the attacks may deceive us into thinking that the disease has been cured. Caution, therefore, is necessary, and a considerable period—according to Sir StClair Thomson at least five months—should elapse before we release the patient from control.

In the cases which recover, when the dead bone has exfoliated or has been removed, the soft parts, which may have been freely opened up, unite again and cover over the gaps in the skull. (The comparative indifference of the soft tissues to the infection is remarkable. I have seen an incision in the soft parts unite even when the underlying necrosed bone was still *in situ*.) Convalescence, apart from the healing of the wounds and the re-formation of bone, does not seem to be unduly protracted.

In the acute form of the disease the appearance of the symptoms follows the general lines we have just laid down, the only difference being that the quiet afebrile intervals are either altogether omitted or are represented merely by a remission of the symptoms, more or less marked.

Intra-cranial complications.—As we have seen, the intervention of an intra-cranial complication may cut short the disease at any stage in its development. The complications liable to occur are: (*a*) *Extra-dural abscess*, which, being practically invariable (it was absent only in two cases, Claoué's and my own), is not really an accidental complication but a regular feature of the disease; (*b*) *thrombo-phlebitis of the intra-cranial venous sinuses;* (*c*) *cerebral abscess*; (*d*) *leptomeningitis.*

Extra-dural abscess, if moderate in size, may be latent so far as nerve disturbance is concerned. If a considerable quantity of pus collects, however, focal symptoms from pressure upon the cerebral cortex may make their appearance. Thus, in one of Luc's cases pressure upon the Rolandic area induced contra-lateral hemiplegia.

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Signs of increased intra-cranial pressure may also set in, simulating true cerebral abscess, but distinguishable from it when drainage of the extra-dural collection is followed by a disappearance of these signs. We may suitably mention here that changes in the optic disc are frequent in the later stages of cranial osteomyelitis.

Intra-cranial thrombo-phlebitis produces its usual symptoms, varying according to the vessel affected. It generally leads to death from toxæmia or pyæmia. In Wylie's case extensive sinus thrombosis and suppuration developed without giving rise to collateral meningitis.

Cerebral abscess, usually of the frontal or parietal lobe, and lepto-meningitis require no special description.

Summary.—The whole clinical picture is that of a low and chronic but progressive septic infection, characterised by tardy and imperfect tissue reaction, attacking the bone of a region anatomically open to fatal secondary complications, and inducing toxæmia and septicæmia more often than pyæmia.

The periodicity of the symptoms, which characterises even the acute form of the disease, is highly suggestive of oscillating defensive powers, and thus tends to support the ætiological theory of a relatively heightened microbic virulence.

Diagnosis.

The sure and certain sign of diffuse osteomyelitis, a sign which serves to distinguish it from simple septic inflammation of the operation wound and from simple peri-sinus abscess, is the appearance of an œdematous swelling over the bone some distance away from the affected sinus.

Syphilitic disease of the frontal bone may be mistaken for osteomyelitis, and should purulent frontal sinusitis accompany the gummatous disease in the bone (as in Scanes Spicer's case; see appendix), a correct diagnosis may be a matter of considerable difficulty. If pyrexia is absent, the difficulty would be less likely to arise. Morever, the diploë in the neighbourhood of the sinus, though it will be converted into granulation-tissue, will not contain pus.

Osteomyelitis of the superior maxilla in children may be mistaken for simple antrum suppuration. (Brown-Kelly.)

Prognosis.

What has gone before renders unnecessary any further insist-

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ence upon the evil prognosis of diffuse cranial osteomyelitis. Spon toneous cure can scarcely be hoped for, and all the cases whic have hitherto recovered undoubtedly owe their escape to promp surgical intervention.

We have already commented upon the great contrast shown i the records between the chances of recovery in diffuse spontaneou osteomyelitis as compared with diffuse post-operative osteomyeliti Even under modern surgical treatment a successful result in th latter class has not yet been reported as far as I can discover. It i possible, however, that early diagnosis and immediate interventio may, in the future, render the outlook even in these cases les gloomy that it is at present.

(*To be continued.*)

SOCIETIES' PROCEEDINGS.

BRITISH MEDICAL ASSOCIATION.

Meeting at Liverpool, 1912.

SECTION OF LARYNGOLOGY AND RHINOLOGY.

JOHN MIDDLEMASS HUNT, M.B., *President.*

Abstract Report by MR. HAROLD KISCH.

(*Continued from p.* 39.)

Discussion on the Treatment of Chronic Suppurative Ethmoiditis

OPENING PAPER BY **Prof. L. Hajek**—*continued.*

II.

We come now to the problem of chronic ethmoiditis, where the sup puration predominates in the clinical picture. Here we must at on differentiate between the (1) open and the (2) closed empyema, becaus the treatment is different in both kinds.

(1) *Open Suppuration of the Ethmoid.*—Here we must, first of all, l guided by the diagnosis. I should like to say that the procedur required for an exact diagnosis form at the same time an important pa of treatment. In order to fulfil the requirements, one has to remove a visible polypi and hypertrophied parts of the interior of the nose. Als the middle turbinate must be sacrificed mostly, because it is partl degenerated, and partly occludes the free view of the ethmoid labyrint At times the middle turbinate can be saved, and we should aim at savin this organ, for it possesses a functionating cavernous body. Only aft making free the middle meatus we are able to state whether an ethmoi suppuration is present alone or in combination with affections of oth sinuses. Also the extent of the suppuration of the labyrinth can b recognised only after obtaining free access to the middle meatus an repeated use of the probe.

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