POTT'S PUFFY TUMOUR WITH DESCRIPTION OF A CASE.

By T. HOLMES SELLORS, D.M., M.Ch. (Oxon), F.R.C.S.

(Assistant Surgeon to Queen Mary's Hospital for the East End, to the Royal Waterloo Hospital and to the City of London Hospital for Diseases of the Heart and Lungs.)

The name of Percivall Pott has been appropriately linked in surgery with at least three well-known conditions. The fracture and spinal disease associated with his name are all too commonly seen in practice, but the puffy tumour whose description is almost equally famous is not, at the present time, very frequently encountered.

In a treatise published during the latter part of the eighteenth century Pott* writes as follows:—

“If the symptoms of pressure; such as stupidity, loss of sense, voluntary motion, &c., appear some days after the head has suffered injury from external mischief, they do most probably imply an effusion of a fluid somewhere: this effusion may be in the substance of the brain, in its ventricles, between its membranes, or *on the surface of the dura mater*: and which of these is the real situation of such extravasation is a matter of great uncertainty; none of them being attended with any peculiar mark, or sign that can be depended upon, as pointing it out precisely; but *the inflammation of the dura mater, and the formation of matter between it and the skull*, in consequence of contusion, is generally indicated and preceded by one which I have hardly ever known to fail; I mean a *puffy circumscribed, indolent tumor of the scalp*, and a spontaneous separation of the pericranium, from the skull under such tumor.”

Among the cases quoted in illustration is one concerning “a lad about twelve years old, who, standing by a man who was playing at cricket, received a blow from the bat on his forehead.” He was knocked senseless and later developed fever, headache, giddiness and so on for which he was “let blood and purged” on several occasions “and when I saw him at noon, on the twentieth, his forehead appeared somewhat tumid and puffy . . . I was almost certain there was mischief on or under the skull; I therefore divided the scalp, to examine the bone; and found between it and the pericranium, which had quitted its adhesion for more than the breadth of a crown piece, a small quantity of a thin discoloured fluid . . . I therefore applied the trephine immediately, and gave discharge to matter formed between the dura mater and bone.” It is pleasant to add that “by proper care, and taking freely of the decoct. cortic. peruv. he got well.”

Pott was careful to divide his cases into those with wounds and those without wounds and it is only in the latter class that the clearly defined description of the puffy tumour appears. There is little indication as to how he thought that infection developed on top of the contusion, but considering the state of medical knowledge at that time this omission is not altogether surprising.

*Observations on the Nature and Consequence of those Injuries to which the Head is liable from External Violence. By Percivall Pott, F.R.S. (London 1711).

Author's Case.

The facts of the case now recorded relate to a man of 59 years who was employed as an engine-driver. He was a heavily built man and the initial relevant feature in the history was the knocking of the left side of his head against a projection. He vomited immediately, but did not lose consciousness or even feel dazed and next morning felt fit enough to carry on with his work, a headache which went off in a day or so being the only sequel that he could recall. It may be noted that there was no bleeding or suggestion of an open wound to the scalp. This accident occurred early in July, 1933, and its apparent triviality was borne out by the fact that the man made no mention of it until closely questioned several weeks later.

The next point was the development of a carbuncle on the left buttock and it was this that brought the man under medical supervision. The carbuncle was incised and within ten days was well on the way towards healing. It was now nearly four weeks since he had had the blow on his head.

While attending hospital for dressing of the buttock wound the man casually mentioned that he had a little pain in the head, this being worse at nights. Examination revealed a small fluctuating swelling in the left parietal region over which tenderness could be elicited by deep pressure. On inquiry the patient gave no history of any previous injury and nothing further abnormal was noted. Blood taken for a Wassermann reaction at this time was in due course returned negative.

The patient was carefully observed and after two abortive attempts at aspiration of the parietal swelling a third needling yielded pus and at the same time the skull surface felt rough to the needle.

The man was admitted for observation and events progressed rapidly in that the temperature was raised and his mentality became dulled. This latter passed rapidly into drowsiness and it was clear that he was suffering from an increase in intra-cranial tension.

The patient was not actually comatose, but required rousing before he could answer questions, which he did after a long latent period. Temperature 100.4° F., pulse 88, respirations 24. Sight and hearing were not obviously affected, but an advanced degree of papilloedema was present, more marked on the left side. Further investigation of the central nervous system showed nothing abnormal after careful study. Blood pressure was not beyond the limits for a man of his years and apart from some emphysema there was nothing of note in his heart or lungs. A trace of sugar was present in the urine.

Examination of the swelling on the scalp showed that it covered the anterior part of the left parietal bone, extending down and backwards into the temporal fossa. Fluctuation was present, but the most characteristic description of the swelling was that it was puffy. There was no sign of redness and tenderness was only elicited on deep pressure.

Pus which had been aspirated from the tumour contained staphylococci.

On August 7th, 1933, under general anæsthesia, a large $\cap$ -shaped flap was turned down over the swelling, the deeper part of the scalp showing inflammatory infiltration. The pericranium had been lifted off bone and separated from it by a considerable quantity of thick pus. The skull was obviously necrotic and roughened and a trephine opening was made through the most convenient area.

The opening was enlarged and about 2 ounces of pus flowed out freely from the extra-dural space. The middle meningeal artery was thrombosed, but when the pus and clots had been cleared away the thickened and ragged dural membrane showed pulsation. The flap was closed with a large drain in each corner.

During the next two weeks drainage was free and the general condition of the patient entirely satisfactory after a somewhat irregular temperature had settled down. The pulse-rate never exceeded the limits of 76 and 90. The papilloedema subsided rapidly and a month after operation the only residual sign was some indistinctness of the left disc.

The discharge from the wound, however, persisted and it was clear that there was considerable sequestration of bone. This was confirmed by X-rays, and as pieces of bone were coming away at intervals further intervention was thought unnecessary for the time being. The largest sequestrum discharged measured r -in. $\times$ 3-in. After several months there was no further progress and probing showed that residual pieces of dead bone were too firmly fixed to remove casually; also the edges of the skin flap showed marked signs of retraction consequent on prolonged suppuration. It was decided therefore to perform a plastic operation on the scalp in addition to removing bone, and this was carried out on March 4th, 1934.

The existing sinuses and scar from the original operation were excised and the underlying region of skull explored. Several large sequestra were removed to the accompaniment of profuse venous oozing which was only arrested after some difficulty. A longitudinal incision was then made at the level of the sagittal suture and the scalp eased down towards the original incision. The deficiency in bone was in this way covered by sound scalp sutured without undue tension, while the area of solid skull denuded of scalp was allowed to granulate up.

The wounds healed rapidly and well without further suppuration or discharge, but owing to the extensive loss of bone there was a tendency towards cerebral herniation. A curved metal plate was fitted over the "weak spot" in the skull as a measure of safety.

The ultimate loss of bone extended from within a short distance of the sagittal suture to the level of the middle fossa and involved practically all the parietal bone with margins of the frontal, temporal and occipital bones. The outline was very irregular and the average measurements were 5-in. in the long axis and $4\frac{1}{2}$ -in. in the vertical.

The patient was perfectly fit and showed no signs which could in any way be attributed to the original condition. About six months later he developed a small subperiosteal abscess on the subcutaneous border of the left tibia, but this resolved readily without recourse to active measures. The only other point worthy of comment is the fact that the gap in the skull showed definite signs of closing in. The inability of the skull to regenerate bone makes it necessary to find some other explanation for this phenomenon and it would appear that calcification had taken place in the thickened dura. This was supported by X-ray films which showed areas of irregular increased density in the gap. The resistance and firmness that now exists may be gauged by the fact that the patient feels confident enough to leave off wearing the metal plate on his own initiative.

In reviewing the case it might well be argued that the diagnosis of extra-dural abscess should have been made at an earlier stage. But though a Pott's puffy tumour was suspected soon after the swelling was recognised, there was no history

or sign to suggest intra-cranial involvement until drowsiness and papilloedema were observed. The story of the head injury was only extracted with difficulty in the later stages of convalescence.

The most probable sequence of events was as follows:—The blow on the head in addition to causing concussion, albeit of short duration, injured bone and the devitalised area was a focus of lodgement for metastatic infection originating in the carbuncle. An osteo-myelitis of the skull resulted in necrosis of bone and, in addition, the formation of pus on both sides of it. That the virulence of the infecting organism was low is obvious from the general condition of the patient, and also from the fact that survival from extensive acute osteo-myelitis of the skull is rare. The extra-dural abscess was localized satisfactorily and operation simply consisted in evacuation of the pus after removal of some bone. The chances of an infection of this order extending centrally beyond the tough dura are small, any spread tending to take place laterally over the vault until limited by the dural attachments at the sutures. With regard to the amount of bone removed at the time of the first operation it was impossible to visualise to what extent bone had been involved and it was deemed advisable to remove enough to allow exploration of the cavity below and to provide adequate drainage. There was no means of limiting the infection and sequestration had to take its course. Finally, a long interval was allowed to elapse before attempting to "clean up" the area, chiefly because there was little evidence to show exactly when the pieces of dead bone had become free. Even at operation some of them were quite firmly fixed by granulation tissue in their normal position and were not clearly demonstrated as sequestra by X-rays.

There are various points of interest that might be emphasized before conclusion. The papilloedema when first observed was advanced and, apart from drowsiness, was the only sign of intra-cranial involvement. A most careful examination of the nervous system before operation was negative in its findings, this in spite of the fact that the abscess was not lying over an entirely silent area of the brain. The rapidity with which the optic neuritis resolved was remarkable and has ultimately left no trace. The bleeding that followed removal of dead bone at the second operation was a most unpleasant feature and could not be completely arrested by pressure of hot swabs. On the other hand, it gave no further trouble once the scalp was sutured and bandaged. The final development of calcification on the surface of the thickened dura was a phenomenon as welcome as it was unexpected. It protects the otherwise alarmingly large bare area, but to what extent it will advance is uncertain.

It will be gathered that this case is set out as one of an osteo-myelitis of skull, a suggestion that is to some extent supported by the later appearance of a subperiosteal abscess in the tibia in the form of a recrudescence of infection. But there are other possibilities in the process of formation. The initial injury was almost certainly the devitalising agent or one which produced a hæmatoma, the source of infection being the carbuncle. Supposing that a small extra-dural hæmorrhage occurred and that this later became infected, would it be possible for the infection to spread outwards through the skull and infect the sub-aponeurotic space? Alternatively, could an infection under the scalp involve the extra-dural space? In the first instance it would surely be more probable that there would be definite signs of intra-cranial tension long before the surface swelling became very obvious, and in the latter case the scalp condition would in all probability demand attention before an abscess of any size within the skull could develop.