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OSTEO-LIPOMA OF THE BRAIN ARISING FROM THE INFUNDIBULUM.

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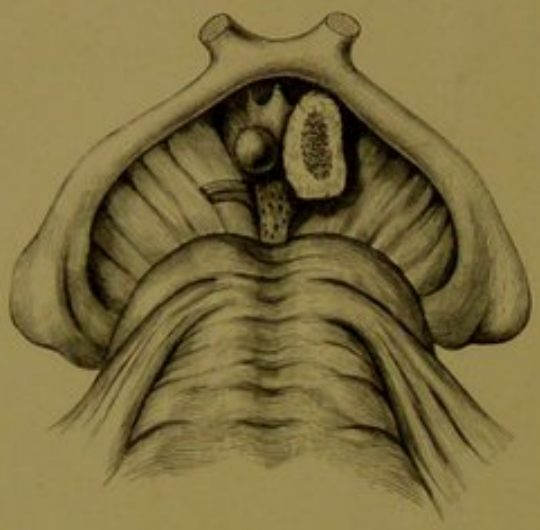
By F. Parkes Weber and Paul Daser.

The tumour in question was discovered at the base of the brain of a woman who died recently of cardiac failure and chronic interstitial nephritis. In shape and size it resembled a small bean, measuring 15 by 10 by 10 mm. It lay behind the optic chiasma and between the optic tracts, arising from the back of the infundibulum cerebri close to the attachment of the pituitary body (hypophysis cerebri). It had a smooth surface, and on rough examination (Fig. 32 shows the position of the tumour) it appeared to be composed of pale yellow fat, enclosed in a fibrous capsule, which included, on one side of it, a darker and harder nodule, about the size of a small pea, which later examination showed to consist of cancellous bone. The pituitary body was carefully removed, and as it appeared quite normal it was not examined microscopically. Nothing noteworthy was found in the rest of the brain with the exception of a small softening infarct in the cerebellum.

The tumour had produced no symptoms during life and there was certainly no optic neuritis, the eyes having been ophthalmoscopically examined shortly before death. The patient was a woman, aged 29 years, whose first pregnancy (terminated artificially) six years ago, was complicated by kidney disease

and followed by puerperal mania. Some albuminuria and cardiac enlargement persisted till she again became pregnant in 1906. This second pregnancy was, like the first one, artificially terminated at about the eighth month, but she suffered from cardiac weakness, œdema, thrombosis in one lower extremity, and pulmonary embolism, and a deep bed-sore formed in the sacral region. She died shortly after her admission to the German Hospital. The necropsy showed the presence of chronic interstitial nephritis (kidneys of the "mixed" type of nephritis), an adherent thrombus in the proximal portion of the left

Fig. 32.



Showing the situation of the tumour described. (Nat. size). A small area of cancellous bone appears in the centre of the surface of the growth.

internal saphenous vein, and many pulmonary and splenic embolic infarctions; but nothing was found which could in any way be connected with the small tumour at the base of the brain.

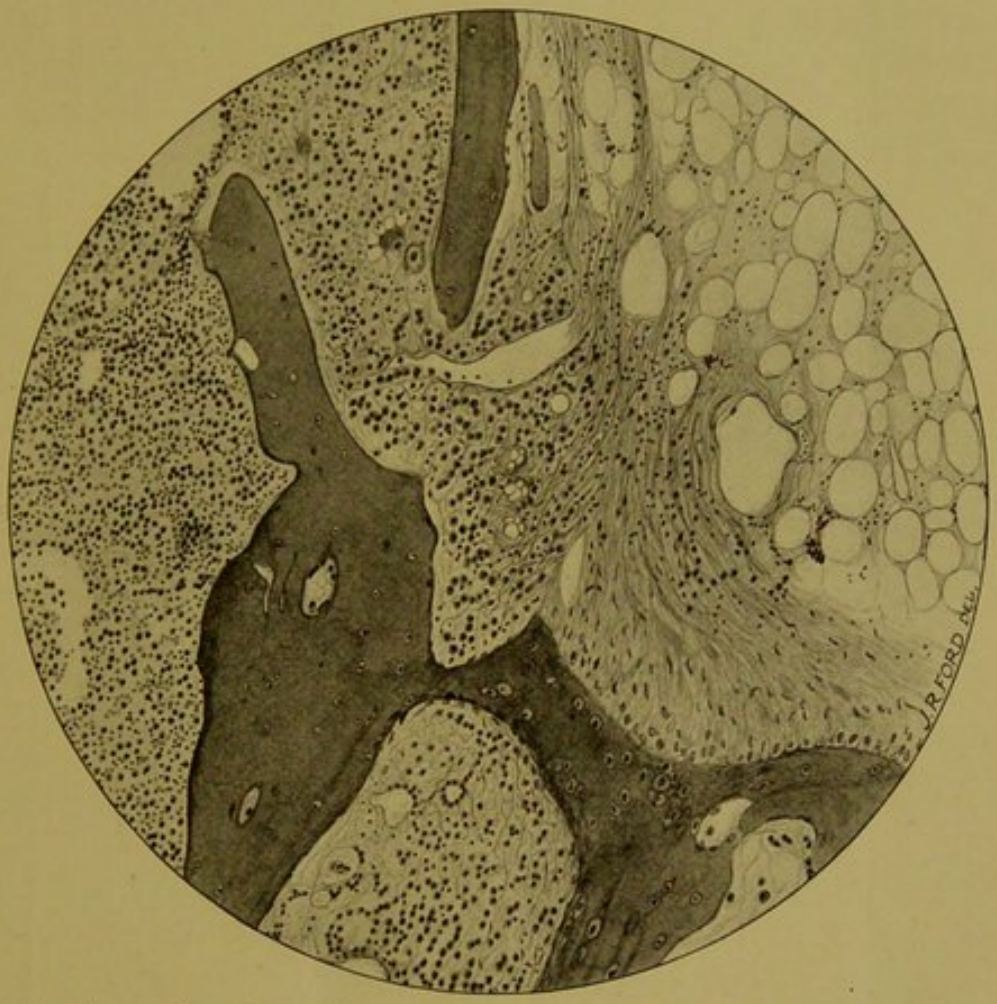
Further microscopical examination of the tumour shows it to consist of fatty tisue (ordinary vesicular fat-cells) enclosed in a fibrous capsule which also includes the nodule of spongy bone. Microscopic sections (see Fig. 33[1]) of the latter have been prepared after decalcification by Ebner's method.[2] It is found to

[1] We are much indebted to Mr. S. G. Shattock for his kindness in supervising the drawing of this illustration.

[2] Ebner's mixture for the decalcification of bone consists of four volumes of concentrated hydrochloric acid with 100 volumes of a saturated aqueous solution of sodium chloride and 100 volumes of distilled water.

be composed of trabeculæ of true bone enclosing large spaces filled with red bone-marrow containing hardly any fat. The osseous trabeculæ show the typical arrangement of lacunæ and canaliculi, with here and there an Haversian canal. At one part

Fig. 33.



A microscopic section of the osteo-lipoma, showing adipose tissue on the right side, and proper bone-marrow on the left enclosed in cancellous spaces. Zeiss A. Oc. 4.

active bone-formation is in progress, the surface of a trabecula being covered with osteoblasts; at another part osteoclasts are attached to the bone. Sections have likewise been specially stained with Leishman's and Jenner's stains in order to further examine the bone-marrow in the tumour, and though the coloration by these methods has not been quite successful, we have been able to make out that erythrocytes, erythroblasts and myelocytes constitute the bulk of the cells; scattered here and there amongst

the other cells are large giant-cells and a few fat vesicles. The bony nodule may therefore be said to consist of open cancellous tissue, containing much more bone-marrow than bone. The relative absence of fat-cells in the bone-marrow of the tumour may perhaps be accounted for by the patient's debilitating illness, that is to say, if we suppose that bone-marrow in cancellous osteomata reacts in cases of general illness just like the ordinary bone-marrow of the body does, which latter was unfortunately not examined in the present case.

Remarks on the Literature of the Subject.

Osteomata and lipomata of the brain belong to the great rarities in the way of tumour-formation, but from time to time examples have been recorded, and we shall first of all refer to J. S. Bristowe's case,[1] which seems to be the one most nearly resembling our own. It is the only case recorded in the 'Pathological Society's Transactions,' and it seems to have escaped the attention of subsequent writers on the subject. The patient was a man, aged 44 years, who died of pulmonary tuberculosis, without having shown any signs of the presence of a cerebral tumour. At the necropsy a tumour about as large as a horse-bean was discovered at the base of the brain, having apparently arisen in the infundibulum and corpora albicantia. The tumour consisted of a central mass of true bone (showing lacunæ and canaliculi, with here and there an Haversian canal) covered by a connective tissue containing a "considerable quantity of oil." The case was therefore, both in regard to the nature of the tumour and its position, remarkably similar to the present one.

Thomson Walker,[2] at the Society for the Study of Disease in Children, described the case of a little girl, aged 9½ years, with signs of intra-cranial disease. At the necropsy a cherry-sized tumour was discovered at the anterior part of the inter-peduncular space. "Behind it was a cyst, the size of a walnut,

[1] J. S. Bristowe, "Tumour connected with the Brain consisting of True Bone," 'Trans. Path. Soc. Lond.,' 1855, vol. vi, p. 25.

[2] J. W. Thomson Walker, "Case of Primary Osteoma of the Brain," 'Reports of the Society for the Study of Disease in Children,' London, 1902, vol. ii, p. 173. See also Thomson Walker, "Osteomata of the Brain," 'Journal of Pathology and Bacteriology,' Edinburgh, November, 1904, p. 81. Thomson Walker refers to the previously published cases or to nearly all of them.

the walls of which showed calcareous and bony plates, and this communicated with a second smaller cyst, in the floor of the third ventricle, by a narrow opening. The tumour was not connected with the bones of the skull or the membranes. It was embedded in the brain substance except at its under surface, where spicules of bone projected here and there on the surface. The outline of the tumour was irregular, small processes of the bone projecting into the brain substance. It was not surrounded by a capsule of fibrous tissue or fat, as has been described in some cases. The successive stages of bone-formation could be traced as clearly as in a developing bone. . . . There were no secondary deposits in any part of the body."

The position of the tumour in the above-described cases (including our own) is almost identical, and is, as Thomson Walker points out, strongly suggestive of the origin of the tumour, according to Cohnheim's theory, from an aberrant nodule of embryonic tissue, the infundibulum being a spot in which such developmental errors might be expected to occur.

In connection with Thomson Walker's case, and in regard to his remarks on the subject, two cases described by F. Langer[1] should be referred to. They were examples of cystic tumour-formation at the base of the brain, and careful macroscopic and microscopic examination convinced Langer that in both cases the cystic development proceeded from the posterior part of the infundibulum cerebri.

The next case to be mentioned is one described long ago by L. Benjamin.[2] The patient was an epileptic and imbecile man, aged 32 years, and the growth occupied the posterior part of the corpus callosum, extending into both cerebral hemispheres, chiefly into the right. Though the site of the tumour was different from that in the preceding cases, it seems to have been formed of an inner portion of cancellous bone surrounded by fat and a connective-tissue capsule, much as in our own case. Benjamin regarded the tumour as an ossified lipoma.[3] Surely,

[1] F. Langer, "Ueber cystische Tumoren im Bereiche des Infundibulum Cerebri," 'Zeitschrift fur Heilkunde,' Berlin, 1892, vol. xiii, p. 57. Langer also referred to some possibly similar cases in the literature, which, however, had not been so thoroughly examined as his own two.

[2] L. Benjamin, "Beschreibung einer Knochengeschwulst im Gehirn," 'Virchow's Archiv,' 1858, vol. xiv, p. 552.

[3] In regard to mere calcification of lipomata, Benjamin points out that the process is rare in human, but not in animal pathology.

however, ordinary fibrous, bony and fatty tissues are so intimately connected with each other that there would be nothing surprising in all three of these occurring in a tumour (a kind of "mesoblastic teratoma") growing from an aberrant fragment or remnant of embryonic mesoblast,[1] and as a matter of fact, whenever true bone or fatty tissue occurs in tumours, the bone or the fat seems to be preceded by, and directly formed from fibrous (or embryonic "fibro-blastic") tissue, excepting in tumours which contain both bone and cartilage and in which the growth of the former proceeds from the latter. The occurrence of cysts in connection with osteomata of the brain would be intelligible on the "mesoblastic teratoma" theory.

The osteomata in various parts of the brain described by A. Bidder,[2] W. Ebstein,[3] F. Meschede,[4] Ranvier,[5] Robert Hooper,[6] L. Witkowski,[7] and Virchow,[8] concern us less. In Bidder's case the tumour was situated in the corpus striatum of a man, aged 59 years. The large osteoma described by Ebstein was found embedded in the left half of the cerebellum of a woman, aged 44 years, and measured 4·5 by 2·9 by 3·2 centimetres. It contained spaces filled with bone-marrow and was separated from the brain-substance by a connective-tissue capsule. In Meschede's case the patient was an epileptic and imbecile man, aged 30 years, and the osteoma, embedded in the left frontal lobe, was as large as a walnut; on its upper surface was some gelatinous myxomatous tissue. In Ranvier's case the bony tumour was embedded in the cerebellum; it was nearly spherical in shape and about two centimetres in diameter. Robert Hooper knew of two cases of apparently true bony tumour of the brain. One

[1] See Thomson Walker, *loc. cit.*, and A. Bidder, "Ein Osteom des Corpus striatum bei Hemiplegia infantilis," 'Virchow's Archiv,' 1882, vol. lxxxviii, p. 91.

[2] A. Bidder, *loc. cit.*

[3] W. Ebstein, "Grosses osteom der linken Kleinhirnhemisphäre," 'Virchow's Archiv,' 1870, vol. xlix, p. 145.

[4] F. Meschede, "Osteom der grossen Gehirns und Ventrikelbildung in Ammonshorn, beobachtet bei einem Epileptischen," 'Virchow's Archiv,' 1866, vol. xxxv, p. 472.

[5] L. A. Ranvier, "Tumeur osseuse dans le cervelet," 'Bulletins de la Société Anatomique de Paris,' 1862, vol. vii, p. 219.

[6] Robert Hooper, 'Morbid Anatomy of the Human Brain,' London, 1826, p. 29, and Plate XII, fig. 7.

[7] L. Witkowski, "Ueber Knocken-und Concrementbildung im Gehirn," 'Archiv für Psychiatrie,' Berlin, 1883, vol. xiv, p. 415.

[8] R. Virchow, 'Die krankhaften Geschwülste,' Berlin, 1864, vol. ii, pp. 97, 98.

of these osteomata was found in the frontal lobe of a blind girl, aged 10 years; the other was discovered in the left cerebellar hemisphere of an adult woman, and was about the size and form of the eatable part of a small walnut. Witkowski described a tumour of cancellous bone (that is, containing bone-marrow), which was bigger than a walnut, and was embedded in the left cerebellar hemisphere of a man, aged 79 years. Virchow mentioned three cases which he had himself observed, namely (1) a cherry-sized osteoma surrounded by a fibrous capsule in the left cerebral hemisphere of a woman, aged 27 years; (2) a small, irregular nodule of bone in the left optic thalamus of a woman, aged 40 years; (3) an ivory-hard osseous tumour of the size of a cherry-stone from the cerebellum of an old woman. It may be noted by the way that in most of these cases the patients were females.

We have not come across many records of cerebral lipomata. Taubner[1] has described the case of a man, aged 22 years, in whom a pure lipoma, of the size of a hazel-nut, was found at the necropsy in the region of the corpora quadrigemina. Other cases of lipoma of the brain have been recorded by Virchow,[2] etc. In Leichtenstern's case, brought before the Aerztlicher Verein in Köln[3] the lipoma, arising from the pia mater over the corpus callosum, was not known to have produced any symptoms during life. *June 4th*, 1907.

[1] Taubner, "Zur casuistik und Entwickelung der Hirnlipome," 'Virchow's Archiv,' 1887, vol. cx, p. 95.

[2] R. Virchow, 'Die Krankhaften Geschwülste,' 1863, vol. i, pp. 386–388.

[3] Leichtenstern, "Lipom des Balkens," 'Deutsch. med. Wochenschrift,' 1887 No. 52, p. 1128.

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