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EXTRACTED FROM THE

NORTHERN JOURNAL OF MEDICINE

FOR DECEMBER 1844.

ON SANGUINEOUS TUMOURS ON THE HEADS OF NEW-BORN INFANTS.

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(*Read before the Glasgow Medical Society, October* 15, 1844.)

Having met with several cases illustrative of a rare form of infantile pathology, regarding which British authors are almost entirely silent,* I think it may be interesting to the society to hear the details of a few of these cases, and a summary of my gleanings from the medical works and medical friends whom I have consulted on the subject.

All medical men engaged in obstetric practice are familiar with the occurrence of soft tumours on the heads of new-born infants. These tumours we generally ascribe to the protracted detention of the fœtus in the passages, and to the pressure, especially when long continued, which surrounds all parts of the head, except that which presents. By the presenting part is meant that region of the child's head which is advanced towards the os uteri. The circulation being here interrupted, the overloaded capillaries throw out a considerable quantity of the serous portion of the blood, which, becoming diffused through the loose texture of the free or presenting portion, occasions a soft doughy swelling, of a livid colour, which pits deeply on pressure being made with the finger. Such a tumour, which is larger or smaller according to circumstances, generally disappears within the first few days after birth, and requires no treatment, or if treated at all, it may with safety be left to that of the grandmother or other skilful matron who presides on the occasion, and who may be observed stroking and fashioning with grave assiduity the child's head, so as to accord more closely with her ideas of natural form. It sometimes, however, happens that inflammation attacks a simple swelling of this kind, giving rise to an abscess. I once saw a case of this nature after a first labour, where the

* Burns, Campbell, &c., contain the merest allusions to these sanguineous tumours.

head had been long subjected to compression. But such examples are rare, and form rather an exception to a general rule.

This simple tumour or swelling has received from the Germans, without any reference to its pathology, the name of *caput succedaneum*, by which name it is commonly known in this country. On account of its frequent occurrence and of the comparative rarity of another class of tumours found under similar circumstances, many practitioners have not extended their information beyond the simple form; and when they meet with a case of the rarer kind, they generally regard it either as an anomalous affection, and unworthy of serious attention, or mistake it for some other and very different pathological state.

Almost all that we know of the rarer class of tumours we owe to the French and German writers, who have devoted much attention to the subject. They have written regarding these under a great variety of names, applied according to the several ideas entertained of their pathology.*

For all these names Nægelè† has substituted that of *cephalhæmatoma*, from the Greek Κεφαλη, "the head," and *αἱματωμα*, "a bloody tumour;" and the expression *cephalhæmatomata* is now becoming of general use in signifying bloody tumours or swellings on the heads of new-born infants.

Cephalhæmatomata may exist in three forms, viz., under the aponeurosis, under the pericranium, and under the bone.

The *first* kind, viz., that wherein the blood is effused under the aponeurosis formed by the expansion of the occipito-frontalis muscle, is generally considered to be of a simply contusive character, as evidenced by its mode of production as well as by its external and internal anatomical characters. I have seen but one example of this variety; but as it was a consequence of external violence occurring after birth, and not arising in the course of labour, it would be out of place to do more than allude to it. The pathological condition was, however, identical with, and the case illustrative of, the causes which give rise to the affection we are considering. This is the simplest but at the same time the rarest form of the cephalhæmatoma. In about 500 infants carefully examined by M. Valleix,‡ only two cases were met with, one of which was evidently owing to very con-

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* Baudelocque calls them "bloody tumours of the cranium." Paletta employs the terms "abscessus capitis sanguineus recens natorum." Carus uses the expression "ecchymoma capitis;" to which Plenck adds the term "cariosum." Osiander makes use of the word "ecchymosis;" while Dugès and Gölis have adopted that of "thrombus." The Germans generally speak of the Kopfblutgeschwùlst or "head blood-swelling."

† C. F. Nægelè, Erfahrungen und Abhandlungen, &c., p. 247. Manheim, 1811.

‡ Maladies des Enfans nouveau-nés. Paris, 1838.

siderable external violence. MM. Baudelocque,* Velpeau,† and Dubois, speak of its occurrence, and MM. Vernois and Billard‡ have each given a case confirmed by dissection. Dr Black§ describes a case which I think he was warranted in considering a sub-aponeurotic cephalhæmatoma. Many others merely allude to and admit the possibility of its formation; but some, as Nægelè, Zeller, and Höre,‖ deny altogether its existence. There can be no doubt, however, of its occasional occurrence, nor indeed does it differ materially from the bloody effusions which are sometimes met with in older children¶ and in adults. In general it disappears rapidly, and requires only mild discutient treatment.

The *third* variety in the above list, the *subcranial* cephalhæmatoma, which has its seat between the dura mater and the bone, has been but rarely observed, and very little of a satisfactory nature is known regarding it. Of the second I shall speak presently. The descriptions given of the third variety tend to throw but little light on either its causes or its pathology. Höre was the first to describe it, and since then MM. Moreau** and Dubois have each detailed a case. M. Baron†† states that he has met with several. M. Valleix has found the dura mater separated by effused blood, but not so circumscribed as to form a tumour. The *sub-cranial cephalhæmatoma* is not confined to the parietal bone, but is met with most frequently in the occipital region. The symptoms are those of cerebral compression, but it is impossible to diagnose its existence during life, and it can only be guessed at when it co-exists with an external cephalhæmatoma, which, according to M. Baron, frequently happens.

The *second* variety, or that in which the tumour exists beneath the periosteum, although much more frequent than either of the two preceding, is on the whole a rare affection. I place it last, because it is to it I mainly wish to direct attention, as being the most interesting in a practical point of view. I will briefly detail two of the best marked cases from among the few which have come under my notice, before reverting to the opinions of the authorities whom I have consulted regarding the causes, symptoms, pathology, and treatment of the affection.

Case I.—April 16, 1842. Delivered Mrs K. of a healthy male infant. Duration of labour six hours, of which the first stage occupied five. The child presented in the second or *right occipito-cotyloid position*. On the 24th I was sent for to exa-

* L'Art des Accouchemens, Part I. chap. 5, sect. x. Paris, 1815.
† L'Art des Accouchemens, p. 592. Paris, 1835.
‡ Maladies des Enfans nouveau-nés, 2d edit., p. 97. Paris, 1833.
§ Ed. Med. and Sur. Journal, No. 146.
‖ De Tumore Cranii recens Natorum, &c. Berolini, 1825.
¶ Rilliet et Barthez, Malad. des Enfans, vol. ii. p. 30. Paris, 1843.
** Dict. de Méd., art. Ceph. †† Ibid.

mine what the mother and friends called "a hole in the child's skull," and regarding which they felt much alarm. I found a small soft fluctuating tumour, about an inch and a quarter in diameter, half an inch elevated above the surrounding integuments, and situated over the superior and posterior portion of the left parietal bone. The skin covering it was smooth, glazed, and of a slightly livid colour. The tumour was circumscribed by, as I think, a sharp abrupt ridge of bone, which, on a partial examination, seemed to mark the boundary of an opening through the skull. But on a more accurate inspection, and on pressing the finger inwards from the circumference towards the centre, the bone could be felt, though indistinctly. This last circumstance, independently of the absence of pulsation and other diagnostics, sufficiently proved the non-existence of a communication with the interior of the skull. Being satisfied that it was a case of cephalhæmatoma, I gave a favourable opinion, and prescribed an evaporating lotion, conjoined with slight pressure by means of a bandage. In little more than three weeks the soft tumour had entirely disappeared, but the boss of the parietal bone felt more elevated than the corresponding one. In a few months afterwards there was no appreciable difference between the two sides of the head.

Case II.—Another tumour of the same description occurred in the practice of my friend Dr Menzies, who kindly allowed me to watch its progress along with him.

The child, a healthy male, was born May 12, 1844, after a labour of twelve hours, of which the first stage occupied ten and a half, it being a first labour. The second stage was hastened by the administration of a half ounce dose of ergot of rye. Immediately after the birth of the child, a considerable tumour, seated over the centre of the left parietal bone, was observed; but being considered one of the ordinary simple tumours, it was not examined. About a fortnight afterwards, Dr M.'s attention was called to it, the friends being alarmed at its continuance. At this period it was persistent, looked more elevated but less diffused than when first seen, and had the shape and size of half a small orange. There was a marked feeling of an aperture of the same dimensions in the bone, and several spiculæ seemed to project inwards from the circumference. From its singularity, Dr M. mentioned the case to me in the course of conversation; and on 2d June I visited the child along with him. At that date I took the following notes:—"The tumour is $1\frac{1}{2}$ inch in diameter, and is elevated fully an inch. It is distinctly circumscribed. The skin covering it is slightly tense and hot, but is not altered in colour. At the circumference there is a distinct ridge, apparently of bone, and having several spiculæ projecting towards the centre; and to the touch there cannot be conveyed a more conclusive sensation of the existence of an aperture in the

bone. The tumour is soft and fluctuates, is not transparent, and does not pulsate. Pressure causes uneasiness, but scarcely more than is caused by pressure on any other part of the head. It does not diminish, nor are the fontanelles elevated on pressure. It is limited to the parietal bone, and does not extend to the sutures. On the whole, I am satisfied it is a case of sub-pericranial cephalhæmatoma." Dr M. and I agreed to watch its progress, and trust to nature, as hitherto, unless some untoward symptom occurred.

June 9. "Tumour of a more rounded shape, and still retaining all the feeling of an aperture in the bone, well marked. Indeed a medical gentleman, who saw it along with us at this date, has almost satisfied himself that it pulsated and communicated with the brain.

June 24. The swelling has been gradually subsiding since last date, and is now entirely gone. Nothing can be felt on its site, excepting a node of bone about the size of a pea, marking the posterior boundary of the swelling."

The general health of both infants continued excellent, and did not seem to be in any way affected by the existence of the tumours. They have both been seen repeatedly since, but not the slightest trace remains of the affection.

The foregoing cases are good illustrations of the sub-pericranial cephalhæmatoma. They are rare; for Nægelè met with but 17 cases in 20 years' practice. Velpeau speaks of 5 cases, 3 of which he saw after death; and Valleix met with only 4 cases in 1937 children. But there prevails much difference of opinion regarding the frequency of the affection. Doepp* states, that at the St Petersburg foundling hospital he has met with 262 cases in 50,000 children, or 1 in 190, which is a large per centage; while Dr Burchard,† in the course of 7 years' hospital and private practice, met with 45 cases, although he does not state what proportion these bear to the whole number. The experience of the last-mentioned author, however, presents several points so much at variance with other writers, that I am inclined to believe that many of his cases must have been examples of the ordinary caput succedaneum. Indeed, it would appear from his statistics, that Breslau is singled out from the rest of the world for the frequent occurrence of cephalhæmatoma; since, while in Dresden, Wurtzburg, Marbourg, and Berlin, in 6188 children there were observed but 17 cases, there occurred in Breslau, among 1402 children born at the Clinical Institution, not less than 13 cases of cephalhæmatoma. M. Baron estimates its occurrence as one in 500 births, and this seems to accord pretty closely with general experience.

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* Oest. Med. Wochenschr., January 1, 1843.

† De Tumore Cranii recens Natorum. Breslau, 1837.

The observations made by M. Valleix on this affection are by far the best and most complete with which I am acquainted; and it is from his writings chiefly that the following description is drawn.

At birth, or very shortly afterwards, there is found a tumour situated about the posterior and superior angle of the right parietal bone, although, as in the two cases detailed, it is occasionally met with on the left. The size and form of the tumour varies much. Sometimes it may be of the size of a bean, at other times as large as the closed hand; sometimes very elevated and circumscribed, at others quite flat, and extending over a large portion of the skull. In a few cases more than one tumour is found.* The colour of the skin covering it is similar to that of the rest of the head, but from being on the stretch it may appear glazed and smooth. The temperature of the swelling is scarcely greater than that of the rest of the head. Sometimes, on laying the hand flat on the tumour, there is felt a peculiar thrilling sensation; and Nægelè states that he has detected pulsation in two or three instances,—a singular circumstance, and which Burchard confirms by the recital of a case in which pulsations were very evident. But the most striking peculiarity and practical point is the presence of a bony ridge which circumscribes the swelling, and conveys to the touch the idea or feeling of an opening through the cranium. So very evident seems the presence of an opening, that it is only by grouping the other symptoms we can forego the evidence of sense; and even men of science and experience are occasionally led into an erroneous judgment. But in general the bone within this circle can be felt uninjured on pressing the finger firmly from the edge towards the centre. The tumour acquires its full development in a period varying from a few hours to as many days, and it seldom disappears entirely within four or five weeks.

Several opinions are held regarding the cause or causes of this affection, but of these I will only allude to the most important. Some authorities believe that it is a consequence of severe labour or the use of instruments during delivery, while Paletta† saw it almost always after very easy labours. Nægelè still more decidedly tells us that he never saw it after severe instrumental deliveries, but only after those of an easy description; and with Osiander,‡ he considers that the infants came into the world with the swelling of the head upon them; and the observations of Siebold, Michaelis, Schmitt, Klein,§ and Höre,‖

* Nægelè, op. cit.

† Exercitationes Pathologicæ de Abscessu Sang. Capit., p. 123. Mediol. 1820.

‡ Handbuch der Entbindungskunst.

§ Bemerkungen über bisher angenommene Folgen, &c. Stuttgard, 1817.

‖ On the Outer and Inner Bloodswelling of the Skull (Schädelblutgeschwulst) in New-born Infants, &c. Siebold's Journal, vol. v. p. 220.

have led them to the same conclusions. Several cases related by them and others seem to countenance this view. In a case attended by M. Fortin,* the tumour was detected by the finger in the passages. Dr Burchard diagnosed a cephalhæmatoma before the rupture of the membranes, "to the great joy of those who waited the result of his diagnosis;" and this, according to Osiander, may occasionally be done. Dr Burchard likewise records, that in 1831 he removed by the cæsarian section 27 infants from the uteri of their mothers, who were victims of the cholera. In one of these fœtuses he found a tumour seated on the right parietal bone. On dividing it in the presence of two brother practitioners, he discovered to his surprise, in the place of the bony substance, two laminæ, which were extended into a small pouch, and contained recent, fluid, uncoagulated blood,—"in other words, a cephalhæmatoma." The vessels of the skull, he adds, even to the most minute, were filled with blood.† M. Billard found a large sanguineous effusion on the summit of the head of a fœtus at the fifth month, but he does not say whether situated above or beneath the pericranium.

It is difficult to say precisely what opinion M. Nægelè holds, but at first he considered that the affection was caused by the laceration, during labour, of the blood-vessels which ramify through the skull, and which he supposed were in a varicose condition; but latterly he is of opinion with Schmitt‡ and Feiler that there is no certainty on this point. Becker,§ Carus, Capuron, Wendt, Osiander, and others, consider that the affection may be caused by the pressure which the head receives in a small pelvis; the latter author believing that in such a case a small vessel is somewhere ruptured, and that the tumour may be viewed as a kind of extravasation. But the most important researches on this point have been made by M. Valleix, who has illustrated his views by a train of close reasoning, the result of much philosophic observation. He considers that cephalhæmatomata do not exist before the occurrence of labour, and that they are the consequence of force or pressure employed upon the child's head during delivery. For a right understanding of his views it is necessary to advert to the anatomy of the parietal bones in the infant. At birth the pericranium adheres but slightly to the bone, with the exception of a few lines at the sutures and fontanelles, and consequently a slight force is sufficient to strip it off. In doing so, numerous vessels are seen to enter the fissures of the bone. The bone itself ossifies from one

* Presse Médicale, No. 9, 1837.

† The pathological appearances, as detailed, make it doubtful if this was a real case of cephalhæmatoma.

‡ Journ. Méd. Chir. de Saltzbourg, vol. i. 1819.

§ Sur les Bosses sanguines des Nouveau-nés, &c. Journal de Hufeland, Oct. 1828.

point in the centre, *i.e.*, the parietal protuberance, and bony radii shoot from the centre to the circumference. These radii are best seen on a dried preparation. Haller* noticed that on compressing the head of an infant even slightly, after removing the pericranium, he saw springing from between these radiated fibres innumerable drops of blood, which collecting together formed a thin layer over the bone. M. P. Dubois,† after corroborating Haller's experiment, suggested that the fact furnished a probable explanation of the formation of the bloody tumours of the head. M. Valleix, after numerous observations, confirms the theory of Dubois, and concludes that if pressure, and above all, if circular pressure, is made upon a point of the cranium, blood will spring from the surface of the bone, and by its upward pressure strip off the pericranium, which is easily detached; that as the liquid blood accumulates under this membrane, new outlets will be opened up for the escape of more blood, and thus at length a tumour will arise. Assuming this as a settled point, he considers that the pressure of the child's head against the mouth of the uterus causes, according to the degree of pressure, either the simple sero-sanguineous tumour, an ecchymosis, or a sub-pericranial cephalhæmatoma. Several circumstances concur to favour this view. Among others may be mentioned the almost invariable presence of an ecchymosis between the bone and pericranium in the new-born infant, a circumstance first noticed by M. Valleix, and which I have now had repeated opportunities of confirming. It is likewise important to bear in mind that cephalhæmatomata are always seated on the parietal bones, and most frequently on the right, which is precisely what we should expect from the fact, that the position of the fœtus in utero is such, that one of the parietals is pressed against the os uteri more frequently than any of the other bones of the head, and that the right parietal presents much more frequently than the left. It may be objected that if their cause is so constant, how comes it that cephalhæmatomata are so rare? M. Valleix replies, that the most favourable cases for the production of the tumours are those in which a very large portion of the parietal, to the exclusion of the rest of the skull, presents at the orifice of the uterus, and that such cases rarely occur. Another important objection appears to lie in the statement of Nægelè and other eminent authorities, according to whom the affection occurs only after labours of an easy description. But what is understood by labours of an easy description? Is length of time to form the measure of our ideas? "Is not an accouchement," asks M. Valleix, "which lasts four, five, six hours, and more, where the pains occur in continuous succession and

* Elementa Physiologiæ, t. vi. p. 368.

† Dict. de Medecine, art. Ceph. t. vii. p. 88.

gradually increase, and where the head, when it does present favourably, finds a ready passage—is not such a labour an easy one? and in this accouchement does not the head suffer very considerable pressure, either in passing the os uteri (*traversant le col*) or in gliding through the pelvis? Do we not often see following such accouchements sero-sanguineous œdema, the necessary cause of which is very strong and long-continued pressure? Instead of easy labours, we should say speedy labours."

"It would go far," says Dr Black, "to strengthen the opinion of M. Valleix, if future observation can show that they occur in cases where the *first stage* of labour is tedious and difficult, or where the membranes burst at an early period." Of 41 cases observed by Dr Burchard, 29 were first and 8 second labours; at the same time, however, this predominance of cephalhæmatoma in first births is partly accounted for by the fact, that more than one-half of the accouchements at the Clinical Institution of Breslau were of primiparous females. In the few cases observed by myself, the first stage of labour was protracted; two of them were primiparous labours, of which the first stages occupied 10½ and 16 hours respectively.

There are, no doubt, some circumstances which are difficult to explain by a reference to the views of M. Valleix. I make no account of the case of M. Fortin, for in it the head had evidently undergone the pressure of the os uteri; nor does the occurrence of cephalhæmatoma in breech cases offer a serious difficulty, for the application of forceps has been frequently required after the birth of the feet and trunk. But if Dr Burchard really diagnosed a case of cephalhæmatoma before the rupture of the membranes, if he met with one case (a breech presentation too) in the second-born of twins, where it is difficult to believe that much pressure could have been exercised, and if to these be added his case of the infant removed by cæsarian section, in which this tumour existed, then it must be admitted that his facts are "stubborn things" which would require very ingenious reasoning to contravene. An attentive review, however, of the various facts and arguments brought to bear upon this point, inclines me to regard M. Valleix's conclusions as the most correct, or at least the most plausible and rational yet propounded.

With regard to the morbid anatomy of the affection, there prevails some contrariety of opinion and observation. M. Valleix says that the hairy scalp generally preserves its natural aspect, although some authors, and among them Osiander, speak of its being of a deep red or livid colour. The aponeurosis is always uninjured. The pericranium preserves its natural transparency, but is somewhat thickened,—a fact first observed by M. Dieffenbach* and

* Rust's Handbuch der Chirurgie, vol. i. p. 125. Berlin, 1830.

confirmed by Valleix. Its under surface presents a smooth, polished appearance, like that of a serous membrane, thus contrasting with its ordinary roughened appearance caused by adhering cellular filaments. It adheres to the bone with a certain degree of force, at the circumference of the effused blood, but it may be easily and completely stripped off. At the line of attachment of the pericranium to the osseous ring (*bourrelet*), exists a fimbriated prominent border, caused by the rupture of a thin membrane that lined the pericranium and covered the bone within the limits of the tumour. Paletta describes it as a tough gelatinous membrane adhering to the bone. M. Valleix did not find, in four dissections, that this adventitious membrane presented the same appearance in every case. In a portion which he showed to M. Velpeau the latter recognised the characters of condensed cellular tissue, while in another it had more of a mucous character. In each instance its cranial and pericranial portion, though distinctly continuous, were of a different structure. Its exact nature has not been ascertained, but it is more than probable that it is an exudation of coagulable lymph condensed or modified according to circumstances. Chelius* speaks of having found the pericranium ossified; but he only adduces in proof, the crackling noise and sensation given to the finger on making forcible pressure over the part. In the case seen by Dr Menzies and myself, it seemed, towards the latter stages of the case, as though the finger nail could be inserted beneath a leaf of bone. But M. Valleix has never found the pericranium ossified; and while he does not deny the possibility of such an occurrence, he thinks it should be classed among the cases of accidental ossification of the periosteum, as described by Lobstein, Howship, and others. The vessels of the pericranium do not present any lesion.

The condition of the bone forming the base of the tumour has been variously described by different authors. By Paletta and Michaelis,† the affection is attributed to a disease of the bones; they think that the *external table* of the skull is ulcerated and destroyed, and that the vessels of the diploe produce the hemorrhage. I think it more than probable that they have mistaken an effect for a cause, in all likelihood from seeing some of the very few cases wherein caries or necrosis has taken place from the fluid blood being allowed to remain too long in contact with the bone. Nægelè, and after him Zeller, Höre, and many others, combat this opinion of Michaelis, and state that, in numerous cases examined by them, and in which they made incisions, they found the bone smooth and polished.

* Handbuch der Chirurgie, vol. ii. Leipzig, 1829.

† C. F. Michaelis über eine eigene. Art. von Blutgeschwülsten, in V. Loder's Journal, vol. ii. p. 657, 1799. An abstract is given of his opinion in Underwood, 9th edition, p. 488.

M. Valleix's investigations on the development of the bones of the head in new-born infants led him to results having an important bearing on this question. He found that in the process of ossification the internal table is first formed; upon that is next deposited a multitude of osseous fibres; and that lastly, at a later period, a layer of compact tissue, constituting the external table, is produced. "Thus there are three distinct stages of cranial ossification." For the first fifteen days of life, or in many instances for a much longer time, the bones attain the *second degree only* of ossification, except at the parietal prominences; they have a well-formed inner table, and a vascular diploe, *but no external table.*

M. Valleix found, in his dissections of cephalhæmatomata, part of the surface of the bone smooth, but sprinkled with many "osseous rugosities" not easily detached. He found that the bony circle consisted of a ridge placed upon the bone, and always surrounding the tumour completely, unless when it was situated near to a suture;—in this point differing from Dr Burchard, who almost always found the superior margin—that next to the sagittal suture—the most prominent. The bony ridge may easily be detached from the bone by the finger nail, and yet leave the latter uninjured. Busch,* in the absence of dissection, doubts the existence of this bony ridge altogether, and considers it "a mere optical (tactile?) illusion." But to such an opinion may be given the same credit as to that of some medical men who, from having practised for twenty-five years without *observing* cases of cephalhæmatoma, do not hesitate to set aside the experience of others, and to deny altogether its existence. The bony ridge differs in thickness and consistence according to the degree of ossification. It varies in height in different cases and in different parts of the circle, but in general it averages from a line to a line and a half. It belongs to that class of adventitious productions described by Lobstein,† and termed *osteophytes.* It is a curious fact that at the first, and so long as the tumour goes on increasing, no circular ridge can be felt, but no sooner has it formed, than the enlargement ceases,‡—a fact which proves that it is a process set up to prevent the increase of the tumour and the farther separation of the periosteum.

The contents of the tumour vary in quality and consistence. There may not be more than a scruple, and there may be nearly eight ounces. My friend Dr W. Campbell of Edinburgh informs me that in two cases which came under his notice, and in which he found it necessary to interfere by puncturing the tumour with an ordinary lancet, the one yielded a large tea-cupful, and the other half a tea-cupful of slimy, tenacious, sanguineous matter.

* Lehrbuch, &c., p. 42.

† Anat. Patholog. t. ii. p. 141.

‡ Valleix, op. cit. p. 504. Fortin, de Cephal., Presse Médicale, No. 9, 1837; and two cases of Dr Wigands, quoted by Zeller.

Before the following day the tumefaction had so completely disappeared, that, were it not for the cicatrice resulting from the use of the lancet, Dr C. remarked that its situation could not be traced. Dieffenbach states that the blood, if not absorbed or afforded an outlet, undergoes decomposition, and is converted into a bluish brown or dirty gray substance, having a foul smell. In some cases the blood may be coagulated, which will render fluctuation obscure, and in others it may be mixed with pus. But, in general, the contents are of a dark colour and liquid consistence, and devoid of any particular odour. When otherwise, it cannot evidently be owing to the state of the containing parts, unless where the bone is diseased, and results in all likelihood from the commencement of decomposition, arising from the removal and stagnation of the blood out of its natural channels.

There are but few diseased appearances occurring on the heads of new-born infants likely to confuse the diagnosis; and it requires little more than a knowledge of the existence of such affections, and of their distinguishing characters, to prevent our falling into error.

The first which may be mentioned is the ordinary caput succedaneum already described. Here the tumefaction is diffused, irregular, and loses itself gradually in the surrounding integuments. The colour of the swelling is dark red, or blue; it feels doughy, consequently never pulsates, and leaves a pit on pressure. These distinctions are sufficiently marked; but the diagnosis will be more difficult when a true cephalhæmatoma lies under the ordinary swelling, and of this occurrence Zeller has seen several examples. Here, it is evident, the proper diagnosis can only be obtained after the dispersion of the caput succedaneum, though perhaps a round firm elevation may be felt through the doughy swelling. M. P. Dubois once met with the simultaneous occurrence of the simple swelling, or caput succedaneum, along with the sub-aponeurotic and the sub-pericranial cephalhæmatoma. This complication would necessarily render the diagnosis very difficult.

With congenite cerebral hernia the cephalhæmatoma is the most likely to be confounded, and yet the characters are sufficiently distinct. Touch in both affections deceptively indicates the presence of a perforation in the bone; but in cephalhæmatoma the bone may be felt, as before described, on making strong pressure from the circumference towards the centre. The cephalhæmatoma remains the same after the strongest pressure, while the cerebral hernia can be forced down upon the brain through the cranial opening, giving rise to all the symptoms of cerebral compression, such as sickness, coma, and convulsions, &c. In hernia cerebri we have always, or with very rare exceptions,*

* Levret, Journ. de Méd., vol. xxxvii. p. 410, 1772; also a case related to the Glas. Med. Soc. by Mr Lyon, since published in the London Med. Gazette, 1844.

a pulsation synchronous with the pulse; and though pulsation has likewise been felt in some cases of cephalhæmatoma,* yet there is no doubt of the extreme rarity of such an occurrence. It is more than probable that most of the alleged cases of cure of cerebral hernia have been cases of cephalhæmatoma, the mistake originating from an imperfect examination, or from mistaking the pulsation of an artery running over the tumour, which would be a very likely cause of error. The cases related by Le Dran,† Corvinus, Trew,‡ Detharding,§ &c., as hernia cerebri, require little more than an attentive perusal to convince the reader that they were cases of cephalhæmatoma. Ferrand,‖ in his essay on Encephalocele, has already satisfactorily investigated the case related by the first-mentioned author. In it a tumour was situated on the right parietal bone—and it is important to recollect that cerebral hernia is never found at the parietals—which disappeared quickly under the use of discutients. In the case related by Trew there were two tumours, one on each parietal bone, and they likewise disappeared under the same simple treatment.

Fungus of the dura mater will be discriminated by an attention to the same circumstances which characterize cerebral hernia.

As regards certain vascular tumours, such as aneurisms, &c., they want the osseous circle, can be emptied on pressure, &c.

The existence of serous cysts in the scalp, as spoken of by Zeller, must be regarded as very hypothetical; and, at any rate, they could be easily diagnosed by their being moveable, and by the absence of the bony circle.

A possible case of error may arise from an abscess; and Valleix relates such a case, where after death, in a child of four weeks old, he found over the left parietal bone a soft, irregularly round, fluctuating tumour. The skin was nowise discoloured, and a hard well-marked edge surrounded the tumour. It was opened, and found to be an abscess. I have met with a similar case occurring at a more advanced period; but the hard edge, in these cases produced by condensed cellular tissue and lymphy deposit, did not convey the strongly marked sensation of pressing a ring of bone, as felt in cephalhæmatoma.

Flint¶ has described a very rare tumour which was situated on the occipital bone, and communicated with the sinus by an opening in the bone. The tumour was opened, and the child died of hemorrhage. Busch* relates a similar case.

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* Nægèle and Burchard, op. cit.

† Observ. de Chirurg. vol. ii. obs. i. Paris, 1831.

‡ De Hernia Cerebri, in Haller's Disput. Selectæ, vol. ii. p. 333.

§ Heustis, Amer. Journ. of Med. Science, p. 394, 1829; also Michel, Gaz. Méd. de Paris, p. 183, 1833.

‖ Mém. de l'Acad. de Chirurg. t. v. p. 47.

¶ New English Journal of Medicine, vol. ix. p. 112, 1820.

* Lehrbuch, op. cit. p. 440.

A favourable prognosis may in general be given. If, however, the cephalhæmatoma be of great size, or remain undiminished for several weeks, the bone is apt to become affected, when, from the excessive discharge, and the constitutional disturbance attendant upon the extension of the disease to the brain, death will almost inevitably result. In a limited number of cases, the destruction of the bone goes on to such an extent as to effect a real perforation. Nægelè observed one such case, where, after the long existence of a cephalhæmatoma in which absorption had not taken place, and which was late of being opened, he found, after the subsequent death of the child, a perforation of the skull one and a half German inches in circumference. Kopp, Osiander, and others, have made similar observations.

There are several opinions regarding the process of cure. The following are the views of Nægelè, as given in a letter to M. Velpeau.* He says, "It is only at the end of fifteen days or three weeks that the tumour commences to diminish. Towards the fourth week it is clearly observed that it begins to resist on pressure being made. If you apply the finger on the summit, you cause a depression which disappears on the pressure being removed. It is exactly as though one pressed upon a roll of copper foil, or upon parchment. In proportion as the tumour hardens it diminishes, and becomes insensibly flatter." His opinion is, that—1st, The detached pericranium ossifies on its inner surface; 2d, In proportion as the extravasated blood is absorbed, the ossified pericranium approaches the bone, and finally unites perfectly with it; 3d, After six months, or even a year, an eminence is remarked on the spot where the tumour was seated. In children who have died at the end of six months or one year, he has found, on dissection, that the parietal bone was much thicker at the seat of the tumour than at any other part of its extent.

Valleix gives a somewhat different account. He says, "I have seen two cephalhæmatomata terminate without operation, and the following are the results. They existed on the same infant, and, though small, the osseous circle was considerable. Every day this circle made new progress from the circumference towards the centre, and the fluctuating part of the tumour proportionally diminished. At last, only a small excavated point containing fluid was to be felt at the top of the osseous protuberance; but this point never offered either the hardness or the crackling noise of parchment mentioned by some authors. In a word, the ossification took place from the sides to the middle, and from below upwards, that is to say, it took its origin from the bone." This description accords exactly with what I have myself observed in two of the cases whose progress I watched the most narrowly; but as to any *exclusive part* taken by the bone or the periosteum

* Velpeau, op. cit. vol. ii. p. 596.

in the process of cure, I feel inclined, amid the various opinions held on the subject, to think with that truly eclectic philosopher, Sir Roger de Coverley, that "much may be said on both sides."

Regarding the treatment of cephalhæmatoma there needs not much be said. In many cases—I might almost say in most cases—no treatment is required, or at least, the treatment adopted may be of the simplest description, and used principally with the view of preventing the parents or friends from becoming anxious. When the tumour is small, causing no uneasiness, and not threatening to inflame, there may be used a simple evaporating lotion, such as a solution of muriate of ammonia with alcohol, and this treatment may be conjoined with slight pressure. But when the tumour is large, and does not diminish at the end of a fortnight or three weeks, these means are likely to fail, and it may be necessary to adopt more active measures to procure absorption or evacuation of its contents. Dr Zörer* of the Foundling Hospital at Vienna is accustomed to employ cold applications, to give calomel internally when he thinks there is much cerebral congestion; and he almost invariably opens the swelling—a most injudicious practice when hastily adopted. Moscati and Paletta pass a seton through the tumour, in the belief that the bone is necrosed; but the practice is apt to create too much irritation, and, according to these authors themselves, sometimes induces an acute fever which carries off the patient. Gölis† of Vienna establishes a slight issue on the top of the tumour by means of caustic potash, with the intention of causing, by moderate irritation, a freer absorption; and he gives 32 cases cured by this treatment. But Zeller throws great doubt on some of these cases; and, moreover, shows from Gölis himself that his method has inconveniences, often causing necrosis and even death. His treatment is, nevertheless, adopted by Krukenberg and Schmitt. I am far from entertaining a favourable opinion of these last-mentioned modes of cure; for they appear dangerous, ill adapted to the tender age of the patient, and can only arise from the greatest dread of the knife. Lowenhardt recommends puncture with a trocar, and strapping; and to this plan I am inclined to give the preference, using however the ordinary knife for subcutaneous puncture instead of the trocar. Where the contents of the tumour are fluid it will be equally efficacious, and the wound will be more readily disposed to heal by the first intention. I had occasion to practise it two years ago in the case of a child who, by a fall, fractured the parietal bone of one side, giving rise to an extensive effusion of blood between the scalp and pericranium. But most authorities prefer making a simple incision proportioned to the size of the tumour; and I have been informed by several medical friends of six or seven such cases wherein the

* Med. Jahrb. des kinderkrankeiten oestr. Staat. Dec. 1842.

† Gölis, Traité pratique de Maladies particulières à l'Enfance. Vienne, 1818.

operation was not followed by the slightest bad consequence. The wound must afterwards be treated on the ordinary principles, and the simpler the dressing the better. In making the incision care must be taken to avoid the arterial vessels; for, in a case operated on by M. Valleix, death followed the division of a small branch, and Smellie* records a similar unfortunate case which happened in the hands of one of his pupils.

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* Smellie's Cases in Midwifery, vol. iii. p. 503. London, 1764.