On Sanguineous Tumours of the Head, which form spontaneously. (*Cephalæmatoma.*) By E. Geddings, M. D., Professor of Pathology and Medical Jurisprudence in the University of the State of South Carolina.

Cephalæmatoma,* (from κεφαλη, *head*, and αιματωμα, a *bloody tumour*, is a soft fluctuating tumour, containing blood, generally occupying some portion of the scalp, mostly over the parietal bone, often accompanied with hard, prominent, uneven, circumscribed borders, imparting to the touch the semblance of a depression of the corresponding portion of the cranium. Such tumours are seldom observed, except in newborn infants; yet they are now and then met with in children of a more advanced age, and in some rare instances even in adults. The disease is not one of very frequent occurrence; yet when it is considered, that there are few engaged extensively in obstetrical practice, who have not met with it, it is a little remarkable, that it should have received so small a share of the attention of practitioners, and that so few writers on the diseases of infants have noticed it. With only a few exceptions, it has been entirely overlooked, or very imperfectly described, by English, French, and American authors; and although the German physicians have investigated it with more attention, its characters still remain involved in much obscurity. Indeed, so far as our own country is concerned, the works which are in the hands of the profession generally, scarcely contain any notice of it, and as, we doubt not, there are many practitioners who have experienced more or less embarrassment on encountering a disease for the first time, which they had not seen described, we have thought we might be rendering an acceptable service to many, by offering such information on the subject, as we have been able to collect, either from our own observations, or from the labours of those who have made it an object of special inquiry.

1. *History of the disease.*—It is highly probable, that these sanguineous tumours, or abscesses, of the head, were observed by practitioners of an early period, but as they have been generally confounded, until within a few years, either with hernia of the brain, or those fluctuating protuberances of the scalp which are occasioned by external violence, the first clear descriptions of them to be found are of comparatively recent date. It will indeed be observed, by referring to most of the treatises on obstetrics and the diseases of infants of the present day, that when these tumours have been noticed, they have been imputed either to the pressure of the head of the child against some part of the bony walls of the pelvis, or to some injury sustained during delivery. Under these circumstances, it is exceedingly difficult to offer a satisfactory history of the

* Synonymes.—*Cephalæmatoma*, Naegele; *Eccymoma capitis*, Feiler and Carus; *Eccymoma capitis recens natorum cariosum*, Plenk; *Trombus neonatorum*, Gœlis; *Abscessus capitis sanguineus recens natorum*, Paletta.

disease, since from the careless manner in which most of the cases have been described, it would be impossible, after so great a lapse of time, to distinguish between such as were proper examples of the spontaneous sanguineous tumours under consideration, and those which owed their origin to violence, or some other cause. That different conditions were confounded under the appellations of encephalocele, ecchymosis of the scalp, &c. will be rendered apparent in the course of these observations; and it will likewise be shown, that cases which were unquestionable examples of sanguineous abscess of the head, were described as instances of hernia of the brain. It does not comport with the objects and scope of this paper, to enter upon a minute and elaborate history of the subject, and as we have neither time nor convenience to refer specially to all the accessible sources of information, we shall content ourselves with the references to the early authors made by Professor Naegele, who has investigated the question with much labour and attention, merely premising, that some of them not being at our command, we are unable to decide positively, whether the whole of the notices bear upon the disease in question, or if some of them may not refer to some analogous affection. The following authors are enumerated by Naegele, as having noticed sanguineous abscesses of the scalp:—Aëtius, Valentin, Mauriceau, Preus, Zwinger, Ledran, Trew, Corvinus, Störck, Bœrner, Smellie, Henkel, Gooch, Ferrane, Chopart, Desault, Camper, Baudelocque, Stein, Voigtel, and Prenke. Most of them, however, have merely considered the subject incidentally, as connected with the practice of surgery and obstetrics, or only reported isolated cases, without attempting to give a pathological exposition of the characters of the affection. It should be remarked, moreover, that by many of the individuals whose names have been mentioned, the disease was described under the name of hernia cerebri—an error which has been committed likewise, by many of their successors; and it is highly probable, that even at the present time, the two affections are sometimes confounded.

Sanguineous abscesses have been either described ex professo, or noticed particularly, by Levret,* Siebold,† Michaelis,‡ Naegele,§ Klein,‖ Paletta,¶ Zeller,** Hoere,†† Busch,‡‡ Carus,§§ Osiander,‖‖ Gœlis,¶¶

* Journal de Med. xxxvi. 410. 1772.

† Chirurgische Tagebuch. Nuremberg. 1792, Obs. xvi. xliv.

‡ Ueber eine eigene art von Blutegeschwülsten, in Loder's Jour. B. ii. S. 4. 657. 1799.

§ Erfahrungen und Abhandlungen aus dem gebiete der Krankheiten des weiblichen Geschlechtes. Manheim, 1811. Also in Journal Compliméntaire, tome xiii, p. 227. Paris, 1822.

‖ Bemerkungen über bisher angenommene Folgen des sturzes der Kinder auf den Boden bei Schnellen Geburten, Stuttgart, 1817.

¶ Exercitationes Pathologicæ, Pars i. c. x. p. 123. Cap. xii. p. 188. Mediolani, 1822.

** De Cephalæmatomate, seu sanguineo cranii tumore recens natorum; commentatio inauguralis, &c. Heidelberg. 1822. Also an analysis of the same, in Journal Complimentaire, xiii. p. 171. 1822.

†† De tumore cranii sanguineo recens natorum et externo et interno, &c. Berol. 1825. Also Ueber die äussere und innere Blutgeschwulst neugeborner Kinder, in Von Siebold's Journal für Geburtshulfe, bd. iv. Frankfort, 1825.

‡‡ Ein Beitrag zur aufklärung des wesens der schädelblutegeschwulst neugeborner Kinder. Heidelberger Klinische Annalen, bd. ii. p. 245, 256. 1822.

§§ Lehrbuch der Gynækologie, bd. ii. p. 585. Leipzig, 1828.

‖‖ Handbuch der Entbindungskunst, bd. ii. abth. ii. p. 207. Tubingen, 1821.

¶¶ Praktisches Abhandlungen ueber die Krankhieten des kindlichen Alters, bd. ii.

Chelius,* Dieffenbach,† Pigné,‡ Velpeau,§ Mombert,‖ Valleix,¶ and several others, who have reported isolated cases. We have the memoirs and observations of most of these individuals now before us, besides a number of particular cases, and from these sources, aided by our own observation, we shall endeavour to condense such a description of the disease, as will serve to put our readers in possession of its most important characters.

2. *Description of the disease.*—It is proper to premise, that we do not propose to consider those sanguineous tumours which depend upon blows or contusions of the head, nor shall we notice some other superficial ones of the scalp, which consist of dilated capillary vessels, and which have received the appellation of aneurism by anastomosis, although we shall advert to a similar kind of tumour of the bone. Our observations will be confined to such affections of this kind as take place spontaneously, and which occur chiefly upon the heads of new-born infants, though not peculiar to them alone.

These tumours are generally discovered at birth, or shortly after, but sometimes not before the expiration of several days. They likewise occur sometimes at a much later period, and have been occasionally met with at the end of several months, or even years. Such instances are, however, exceedingly rare, yet we have seen one in a child nearly two years old, and another in one between the age of five and six. There is generally but a single tumour, but sometimes two or more exist, either in a state of communication with each other, or perfectly isolated.** They are mostly small, slightly prominent, smooth and soft upon the surface, and circumscribed by hard defined borders, which in a majority of cases, when examined with attention, are found hard and elevated, conveying the sensation of a hard bony ledge, surrounding the outline of the tumour, and an intermediate excavation, as though the outer table of the skull had been removed. Sometimes they are more diffused and flattened, and less clearly circumscribed; but even when extensive, the hard prominent border can be perceived, although it is less regular, and frequently presents prolongations and sinuosities running in different directions, occasioned by the unequal power of resistance presented by the integuments at different points, in consequence of which, they yield more readily to the distending force of the blood in some places than in others. In a few instances, however, it is said by Zeller and Naegele, that the hard elevated boundary is either entirely absent, or confined to a portion of the circumference of the tumour. In all cases, when they are properly developed, a distinct fluctuation can be perceived, and by making pressure upon the part, the point of the finger can be brought to bear upon the solid bottom of the cavity. The skin is seldom discoloured, but presents a pale, shining appearance, and in a majority of instances, the part is so little sensible, that considerable pressure may be made over it without occasioning much pain. In some few cases, when the fluctuation above alluded to is not so distinct,

* Handbuch der chirurgie, bd. ii. p. 190. Heidelberg und Leipzig, 1829. Also Heidelberg Klinisch. Anallen, bd. iv.

† Rust's Theoretische praktisches Handbuch der chirurgie. bd. i. p. 120. Berlin, 1830.

‡ Journal Universel et Hebdomadaire. September, 1833.

§ Ibid. October, 1833. Also, These sur les contusions dans tous les organs. Paris, 1833.

‖ Siebold's Journal für Geburtshülfe.

¶ Gazette Médicale de Paris, 13th Sept. 1834. p. 577.

** Naegele, op. cit. Also, Zeller.

the tumour is soft and spongy to the feel, and difficulty may be experienced in deciding upon its nature.

The size of the tumour is exceedingly variable, and although it sometimes remains stationary from the time it is first observed, it occasionally increases progressively, until it attains a considerable volume. It may not be larger than an ordinary hazlenut; yet in some instances it attains the volume of an orange; and cases have been reported, in which it diffused itself over the whole extent of one of the parietal bones, or even the entire surface of the top of the head. In one of the cases which fell under our observation, the disease was seated over the course of the sagittal suture, and extended itself laterally, to each parietal protuberance; anteriorly, in front of the anterior fontanelle; and posteriorly, beyond the limit of the junction between the sagittal and lambdoidal sutures. Its dimensions, however, as previously suggested, may vary according to the duration of the disease; for although the tumour may exist anterior to the period of birth, as represented by Siebold, Osiander, Michaelis, Pigné and others, and present a well defined indurated border, it sometimes continues to increase for some time afterwards, until it attains a size much beyond that presented by it at the time of its first formation. This, however, can only happen when its barrier is formed by the soft parts, because when, as is sometimes the case, its boundaries are formed by bony deposite, the same facility of extension does not exist. Another circumstance deserving consideration in connection with these tumours is, that in a few instances, a manifest pulsation can be perceived when the finger is applied to the part, showing that the cavity of the tumour communicates with one or more arteries. This phenomenon is, nevertheless, comparatively rare, and has only been noticed by a few individuals. The same thing is sometimes met with in those sanguineous tumours which form in consequence of contusions inflicted upon the head.

It is a little curious, that these tumours are in almost every instance seated over the parietal bones, and in a majority of cases, on the right side. This has been remarked by nearly all the authors who have treated of the subject. Only a few cases have been reported, in which the disease occupied the frontal or occipital regions, and Dieffenbach remarks, that he had never observed one in the temporal region, although Chelius speaks of such an event, and Velpeau observed a case, in which the tumour was spread over the left parietal and temporal, occipital, and the right parietal regions. Pigné has erroneously represented, that they are never found in the course of the sutures. This is contradicted by one of our own cases, in which the tumour formed over the sagittal suture; by one of Naegele's, in which it extended from one parietal region to the other; as well as by Velpeau's case just referred to. A very interesting case is also reported by Michel,* in which a large tumour of this kind, which presented a pulsation isochronous with that of the brain, was seated over the posterior fontanelle, and the right limb of the lambdoidal suture. Indeed, it may be affirmed, that the disease may form upon any portion of the head that is not covered by thick muscles, and even these latter situations cannot be considered as entirely exempt, since we occasionally meet with sanguineous abscesses, which are probably of the same nature, in other parts of the body remote from the head. Palettat has reported many such examples, and others might be referred to.

* Gazette Médicale, 5 Mars, 1833. p. 183. † Op. cit.

These tumours, when opened, are always found to contain blood. This fluid, however, presents various modifications, according to the extent and duration of the disease, the condition of the soft parts and of the bone, and the intimacy of the connection between the cavity of the tumour, and the small adjacent blood-vessels. It is sometimes perfectly fluid and of a florid colour, as though it had issued fresh from a divided vessel—frequently dark coloured, sometimes sanious, but in a large proportion of cases commingled with more or less serum, by which it is rendered much thinner than natural. Sometimes, indeed, it is so watery, as nearly to resemble serum tinged with the colouring matter of blood; and it is highly probable, that there is a near affinity between these bloody tumours, and some of those of a watery character, which are occasionally found in the same situation. The blood, it is reasonable to infer, becomes more and more deteriorated the longer it is confined, and should the disease be allowed to continue until the bony structures become involved, the fluid will be rendered still more unhealthy, and may acquire an offensive odour. It may even become divested of its sanguineous character, by suppuration taking the place of the hemorrhagic action, and converting the tumour into a purulent abscess. We could cite cases in confirmation of this statement, and amongst others, we might adduce the one reported by Michel, which has been already referred to.

As regards the precise situation of the fluid, and its relations with the component parts of the scalp, and the subjacent bone, much difference of opinion has been expressed. By Osiander, Naegele, Zeller, Carus, Chelius, and Pigné, it is affirmed that the fluid is always deposited between the pericranium and skull; Dieffenbach thinks that it is lodged between the pericranium and the integuments of the scalp, in which opinion some other writers concur; while Velpeau, taking a more correct view of the subject, thinks it may occupy either of these situations, or be even more profoundly situated, in the diploë of the cranium, or between the dura mater and bone, as represented by Hoere. Our own observations induce us to concur fully in this sentiment. In one of the cases which we had an opportunity of witnessing, the pericranium was not detached from the bone, but was much thickened, and the fluid was deposited between it and the aponeurosis of the occipito-frontalis muscle. In another, we are inclined to think that it was superficial to this aponeurosis, and between it and the skin of the scalp. The cases in which it occupies the diploë, or rather commences in that structure, must be exceedingly rare, notwithstanding it was contended by Michaelis, that the disease always depends upon the destruction of the outer table of the bone, and that the collection of blood is a consequence merely of that affection.* He was probably misled in some cases, by the abrupt, prominent, indurated boundary referred to above, which from its uneven hard feel, he mistook for the rugged border of the diseased bone. But although he may have been deceived in this way, there are unquestionably cases of the kind represented by him, and many who have treated of the subject subsequent to his time, have committed an equal error, in denying the existence of such an affection.† Some of them, it is true, have admitted that bloody tumours sometimes form in the diploë, but they affirm that there is no analogy between them

* Loc. cit.

† Loder's Journal fur Chirurgie, bd. ii. p. 660. Jen. 1799. And Hufeland's Journal, bd. iii. p. 81. 1804.

and the disease under consideration. This sentiment has been expressed by Osiander,* and others have described such an affection of the diploë, as a disease altogether dissimilar in its nature. It differs, it is true, in some particulars, from the common sanguineous abscesses of new-born children, as that disease has been generally described; yet when the pathological characters of the two affections are taken into account, we question much the propriety of considering them as entirely distinct. At any rate, we regard their affinities as sufficiently strong, to entitle them to be grouped under the same head, and we shall, in accordance with this view, and nearly in pursuance of the plan adopted by Velpeau, divide sanguineous abscesses, or tumours of the head, into five orders, according to the depth at which the fluid is situated.

a. *Sanguineous abscesses seated between the skin and the aponeurosis of the scalp.*—When the fluid is deposited between the skin of the scalp and the epicranial aponeurosis, as it is more superficial and least apt to become diffused, it forms the most simple of all the varieties of the disease, and does not involve any serious consequences. Such tumours are of more frequent occurrence than either of the other varieties, and may be easily confounded with others, which form in consequence of the pressure sustained by the head of the child during labour, or of injury inflicted by the forcepe or other instruments employed to assist that process. These latter swellings, however, denominated by the German accoucheurs *caput succedaneum*, are very different in their nature, and may be easily distinguished by characters to be pointed out, when we come to speak of the diagnosis of the disease. As the union betweent h integuments of the scalp and the aponeurosis of the occipito-frontalis muscle is exceedingly compact and resistent, when the blood accumulates in this situation, it diffuses itself with great difficulty, and such tumours are consequently, generally small, rounded, prominent, convex upon the surface, and surrounded by a well-defined hard elevated border, such as is felt in those bloody tumours which are so often produced by blows on the head. When the accumulation has existed for some time, the walls of the cavity become very much indurated, and sometimes acquire a consistence almost fibrous in its character. In this state, they do not suppurate readily, and after the bloody fluid has been evacuated, a kind of serous or lymph exhalation, either colourless or of a wine-lee hue, takes place into the cavity. As the deposite of fluid is not in a state of proximity with the bone, these superficial bloody abscesses are not apt to give rise to any serious consequences, and may be dispersed by proper discutient applications, or readily cured, by evacuating their contents. We witnessed a case of this kind a few years ago, in a youth of five or six years old, in consultation with our friend Professor Holbrook, of Charleston. The tumour, which occupied the parietal region, was laid open and covered with a soft poultice, after which it healed from the bottom without any difficulty.

b. *Sanguineous abscesses situated between the aponeurosis of the occipito-frontalis and the pericranium.*—It is more particularly to this variety of the disease, that Naegele and Zeller have appropriated the appellation cephalæmatoma; although, as previously remarked, they affirmed that the fluid is deposited between the pericranium and bone. We are

* Handbuch der Entbindungskunst, bd. ii. abth. 2. p. 214. Also in Abhandlungen und nachrichten, p. 235. 8. beschreiben. tab. 1. fig. 5. Tubingen. 1787.

inclined, however, to think with Dieffenbach, that the affection to which their description applies, is seated between the aponeurosis of the muscle and the pericranium. There are here several circumstances to impress upon the tumour different characters from those which appertain to the first variety of the disease. The strong aponeurosis of the occipito-frontalis muscle is spread out upon a considerable portion of the top and lateral parts of the head; it is so loosely attached by cellular tissue to the pericranium beneath, as to glide upon it with great freedom; and the proximity of the disease with the surface of the bone, renders it much more liable to give rise to serious consequences, than when it is situated more superficially. In proportion as the blood accumulates beneath the aponeurosis, it is resisted by it in its tendency to protrude towards the surface; but in the direction of the circumference, it dissects up the loose cellular tissue which unites the aponeurosis to the pericranium with great facility, and diffuses itself extensively between the two structures, and over the surface of the head, until its further progress is arrested by a solid barrier, in form of the indurated border already adverted to, which is set up by the process of adhesive inflammation. In consequence of these conditions, such tumours are more flattened and expanded than the preceding, less prominent, and very often less accurately defined; for although they are generally limited by the hard prominent boundary described, this is not constantly the case, and instances sometimes occur, in which, as represented by Naegele and Zeller, no such barrier exists, or if it is present, it is confined to a limited portion of the circumference of the collection, so that the fluid may continue to diffuse itself where it meets with the least resistance, until it becomes spread out, irregularly, over a large extent of the top or lateral part of the head. The interposition of the aponeurosis, likewise, renders the fluctuation more obscure, and when the fluid is allowed to remain too long, the same influence disposes the mischief to extend to the pericranium and bone, and to give rise to caries and exfoliation of the latter, and sometimes to the death of the patient. Before these changes are induced, others take place in the structures which form the immediate walls of the cavity. They become thickened and indurated; undergo, in protracted cases, considerable transformations of texture, acquire an imperfect pseudo-membranous lining, and occasionally take on the character at some points, of fibro-cartilage, or even bone. In a very afflicting case which we had occasion to attend a few years since in consultation with our friend Dr. Steuart, of Baltimore, and which terminated fatally, the abscess had the tendinous aponeurosis of the occipito-frontalis muscle spread over its surface, and was diffused over nearly the whole top of the head. The inner surface presented an uneven mammillary appearance, apparently produced by a compact, yet somewhat spongy, vascular substance, apparently of adventitious development. The cavity was likewise lined by a thin adventitious membrane, such as forms in common abscesses of long standing, upon which the vessels of the new substance just adverted to, seemed to ramify. The aponeurosis could be distinctly traced over the whole surface of the tumour, and to its lower face, the peculiar product which formed the principal part of the walls of the cavity adhered very intimately.

It is this mammillary texture, that in more advanced cases sometimes becomes transformed into a kind of ligamentous, fibro-cartilaginous, or even a bony texture; and cases have been reported, in which the last transformation was observed upon the cranial surface of the cavity at birth, or a

very short period subsequent, thus corroborating the opinion of Siebold, Osiander, Michaelis, Pigné, and others, that sanguineous tumours, in some cases at least, form anterior to the time of delivery. The hard prominent contour which so generally surrounds the whole circumference of the tumour, is also sometimes of a bony consistence; and if we are to believe the assertions of Michaelis, Naegele, Zeller, and many others, it very generally presents this character. We are inclined to think, however, that their inferences have been drawn more from the sensation imparted to the touch, than from absolute dissections, and that although it is sometimes osseous, it is far more frequently a mere condensation, or consolidation of the adjacent tissues. This is rendered probable by the facility with which it disappears after the tumour has been opened, which would not be the case if it were of an osseous consistence. It should nevertheless be remarked, that the aponeurosis of the occipito-frontalis muscle sometimes becomes ossified, converting it into a thin bony arch, extending over the whole surface of the abscess, which is situated beneath. The only well authenticated case of this kind which we have met with, is one reported by Chelius.* He represents, that the *pericranium*, which was elevated by the tumour, when pressed, imparted to the finger the sensation of an elastic metallic plate, and a manifest feeling of crepitation. The pericranium, which is here represented to have been the seat of the transformation, could not have been separated and elevated from the bone to such an extent, without rupture, consequently, could not have been the part involved in the change. It is much more likely, that the part affected was the tendinous aponeurosis of the muscle, the situation and texture of which would render it much more liable to experience such an alteration. The case, at all events, is one of great interest, since it shows how an affection of this kind might be readily mistaken for a disease having its origin in the diploë of the skull, and separating the outer from the inner table of the bone. It is indeed not improbable, that both Michaelis and Osiander may have been deceived in this manner, in some of the cases which they have reported.

As the pericranium, in this variety of the disease, is interposed between the fluid and the bone, the latter does not generally become much affected, except where the tumour has existed for a long time, and an early opening is not made to evacuate the blood. The protective influence of the pericranium is, indeed, sometimes augmented, by its acquiring increased thickness, and undergoing other changes. Still the outer table of the skull is occasionally affected with necrosis or caries, and if the disease be allowed to continue, the walls of the cranium may be completely perforated, exposing the parts within, and imparting to the disease a fatal character. Michaelis, as has been previously remarked, pretended to have found disease of the bone in all cases; but although he was certainly wrong in making this sweeping inference, several such cases, well authenticated, have been reported by others, some of which, no doubt, were examples of this variety of the affection.

c. *Sanguineous abscesses between the pericranium and the bone.*—It was remarked above, that Osiander, Naegele, Zeller, Carus, Chelius, and Pigné, considered this the proper seat of the abscesses in question in all cases; at least, only a few of them admit that the fluid may be deposited

* Handbuch der Chirurgie, bd. ii. p. 193. Leipsig, 1829, und Heidelberger Klinische Anallen, bd. iv. heft. 4.

elsewhere. Velpeau, on the contrary, influenced by the intimate connection of the pericranium with the bone, and its liability to rupture, rather than yield to the distending influence of the accumulation, thinks this form of the disease must be exceedingly rare, although he does not deny its existence. We have no doubt that many of the cases supposed by the individuals, whose names have been mentioned, to be of this character, were examples of the variety last described; yet when we consider the numerous minute vessels which pass from the pericranium into the substance of the bone, we can easily conceive how sanguineous deposites may form here, more readily than supposed by Velpeau. Such a variety of the disease would of course be much more formidable than either of the preceding, because of the immediate contact of the fluid with the denuded bone, and the almost inevitable implication of the latter in necrosis or caries in consequence of these relations, especially when the fluid is not early absorbed, or when a timely puncture is not made to allow it to escape. Some of the cases observed by Michaelis may have been of this kind, and it is highly probable, that in many of the examples observed by Paletta, Osiander, Naegele, Zeller, Chelius, Dieffenbach, and others, in which the bone was found diseased, the fluid was deposited between the pericranium and the bone. Still, it does not necessarily follow, that this was the case in all of them; because, the bone may likewise become affected in some of the other varieties of the disease. The extent to which the bone may be involved in such cases, is variable. Sometimes the affection is very slight, consisting, merely, of superficial caries and exfoliation; occasionally the outer table becomes necrosed and is thrown off; and in some rare instances the entire thickness of the skull is detached, and exposes the dura mater beneath. Examples of this kind have been reported by authors, and were it necessary, several which terminated fatally might be referred to. It is evident, that much difficulty would be experienced, during the life of the patient, in distinguishing this variety of the disease from the preceding, or even from that which originates in the diploë. Fortunately, this is not often a matter of much moment so far as the first is concerned; but it may be sometimes important to discriminate between this form of bloody tumour and those which form in the diploë, because, as we shall have occasion to explain, there are some of the latter which it would be unsafe to puncture.

d. *Sanguineous tumours of the diploë of the skull.*—It may admit of a question, how far bloody tumours which are developed in this situation agree in their fundamental characters with those described above. Michaelis affirmed, that the affection which is the special subject of these observations, always consists in a destruction of the outer table of the cranium by necrosis or caries, and that the accumulation of blood beneath the pericranium is a consequence merely of this condition. Osiander likewise, while he objects to the inference of the author just quoted, alludes to a form of bony tumour of the cranium, which is sometimes congenital, in which a morbid growth takes place in the diploë, altering the structure of the outer table, and elevating that portion of the bone, but never destroying it.* Chelius, however, in considering these cases, remarks; that the first have been mistaken by those who have observed them, and that although apparently situated in the diploë of the bone, they in reality occupy the space between it and the pericranium, and what was mistaken for the

* Handbuch der Entbindungskunst, bd. 2, th. 2, p. 214.

outer table was the pericranium in a state of ossification. We can conceive such a mistake possible, yet there is incontestible evidence that tumours of the kind do sometimes form in the diploë, and give rise to all the consequences which have been attributed to them. Still the question recurs, are they identical in their nature with those which form in the tissues of the scalp, and between them and the bone? They certainly agree in some of their characters, yet in others they present a marked contrast. Both tend to destroy the bone; both may exist at birth or form shortly afterwards; and both are filled with blood; yet when those of the scalp are laid open, they do not continue to bleed after their contents have been discharged, while some of those of the diploë, under the same circumstances, pour out blood so copiously as to endanger or destroy the life of the patient. The organisation of the diploë explains, to a certain extent, this striking peculiarity. The reticulated structure between the two bones is not only supplied abundantly with arteries, but as has been demonstrated by Dupuytren and Breschet, is likewise traversed by numerous veins of large size, which anastomose freely with each other, and form an intricate venous plexus within the bony texture. These vessels communicate freely by numerous small branches through the two tables of the skull, with the vessels of the scalp on the one hand, and on the other with those of the meninges, and also with the great sinuses of the latter. We apprehend, therefore, that most of the bloody tumours which form in the diploë have their origin in a kind of varicose condition of these veins; that in proportion as the tumour increases in size, the tables of the bone are forced asunder or destroyed; that they are, in short, proper erectile, or aneurismal tumours, and owe to this circumstance their faculty of pouring out blood to such an alarming degree when opened. We could refer to numerous cases reported both by the early and recent writers in confirmation of this view; and if all the examples which have been recorded under the appellation of fungus of the dura mater, hernia cerebri, &c. could be carefully analysed, it is probable that many of them would be found to be instances of erectile tumours, or aneurisms developed within the diploë of the skull. This affection of the bones of the head has not, so far as we know, been properly described by writers; but tumours of the kind are not peculiar to this class of bones: they likewise form in the bones of the trunk and extremities, and the records of the science contain numerous examples, the nature of which has not until recently been understood. To this class ought probably to be referred the cases reported by Fabricius Hildanus,* Ruysch,† Pearson,‡ Else,§ Lassus,‖ Freer,¶ Boyer,** Pelletan,†† Scarpa,‡‡ Lallemand,§§ and several by Breschet,‖‖ the last of whom has published a very able memoir on the subject of sanguineous tumours of the bones. Some of the cases reported by Paletta ought,

* Observat. et curat. Chirurg. Cent. ii. Obs. xxvi.
† Observat. Anat. Chir. Observ. lxxxi.
‡ Medical Communications. Vol. xi. p. 95. 1700.
§ Medical Observations and Inquiries. Vol. iii. p. 169. 1769.
‖ Pathologie Chirurgicale, tome i. p. 489.
¶ On Aneurism, p. 28.
** Traité des Maladies Chirurgicales, tome iii.
†† Clinique Chirurgicale, tome ii. p. 14.
‡‡ Sull' Aneurism.
§§ In Breschet Repertoire d'Anat. et de Physiologie, tome ii. p. 137. 1826.
‖‖ Ib. p. 142—178. From this we select the above references.

perhaps, to be included under the same head,* but as our observations are intended to be confined to those which affect the head only, we shall not discuss this point.

Assuming the proposition, that a majority of those sanguineous tumours which are developed in the diploë, consist of a dilated condition of the venous or arterial plexus of that structure, we can easily comprehend why they bleed so profusely when punctured; the free communication between these veins and the great sinuses of the brain, as well as their intimate connection with numerous other vessels, being amply sufficient to account for this hemorrhage. The great facility, moreover, with which these veins become distended, the enormous extent to which they are capable of being dilated, and the encroachment which they must consequently make, when thus affected, upon the tables of the skull, and after these have been destroyed, upon the scalp, the meninges, and the brain itself, likewise explain the general phenomena of the disease and its fatal tendency. Should the outer table of the cranium first give way, the tumour will protrude outwards, and may attain a very great size, by forcing the pericranium and scalp before it; and in some cases of this kind, especially when the inner table of the bone is likewise destroyed, the tumour will present a pulsation isochronous with that of the brain. A pulsation is, moreover, sometimes perceptible, even though the brain may not be exposed; but this pulsation corresponds with that of the arteries. Should the inner table of the skull give way first, or yield more readily than the external, then the tumour by protruding inwards, will encroach upon the brain and its coverings, and give rise to convulsions, paralysis, and death. Sometimes, indeed, when the walls of the cranium become completely perforated, and the tumour attains a considerable size, it assumes all the appearances of congenital hernia cerebri, may, like that disease, be forced into the cranium by pressure, and cannot be easily distinguished from it.

In some instances, however, the diseased growth does not succeed in breaking up the bony tables, but forces them asunder, and forms for itself a bed in the interstice. An interesting case of this kind is reported by Velpeau, on the authority of Lauth. It was that of a young man, who received a blow with a cane on the parietal region. The immediate effects subsided in a few days, but two months subsequently, he was seized with violent pains at the opposite point, and the trepan was applied without discovering any thing. On examination after death, which speedily followed the operation, a flattened fungous mass, of the size of a nut, was found encysted, as it were, in the diploë corresponding to the point upon which the blow had been received.†

e. *Sanguineous tumours which form between the cranium and dura mater.*—That variety of these tumours which has received the appellation of fungous of the dura mater, has been more particularly described than either of the preceding. Yet there are many affections to which this term is applicable, that do not fall within the scope of our observations, they being of a character entirely different from those tumours which it is our object to describe; nor does it comport with our plan to consider those extravasations of blood which take place in this situation in consequence of violence inflicted upon the head. Velpeau, however, seems to think, that deposites of blood not unfrequently form at this point during labour, and

* See Exercitationes Pathologicæ, Pars ii. 188—213.

† Journal Universel et Hebdomadaire. Octobre, 1833.

subjoins that he had himself witnessed two examples. If the assertion of Cruveilhier be well founded, that at least one-third of those infants which, healthy and vigorous previous to delivery, die of apoplexy during that process, the opinion of Velpeau would seem to be entitled to confidence.

It is likewise possible for erectile tumours, analogous to those already described, to have their origin in the space between the cranium and dura mater, and it is highly probable, that many of the cases which have been described as examples of fungous of the dura mater, and congenital hernia cerebri, were instances of such erectile tumours. In some rare instances, those tumours have been found in a state of communication with the sinuses of the brain internally, and with the scalp externally, through one or more apertures in the cranium. A very singular case of this kind has been described by Dr. Flint.* It was in a child three weeks old, upon the posterior portion of the head of which, a circumscribed fluctuating tumour was discovered, of the size of a pullet's egg, which, increasing in size, and threatening to rupture, was punctured with a lancet. Blood flowed from the puncture, and in a few minutes it ceased to bleed; but hemorrhage took place from the part at intervals during the ensuing night, which could not be suppressed, and the child died from loss of blood. On laying open the scalp, a dense coagulum of blood was discovered, covering the occipital bone, and thinly spread beneath the expansion of the occipito-frontalis muscle. The middle of the occipital bone was found denuded, rough, and spongy, to the size of a cent piece, and was perforated, immediately under the base of the tumour and opposite the point at which the longitudinal divides to form the two lateral sinuses, by several small apertures, through which blood was made to flow freely by compressing the head. From this it appears, that the tumour was fed, through these openings, by the sinuses of the brain. Dr. Flint thinks, that the disease of the bone existed before the formation of the tumour; but this is not very probable, and it is much more likely that the tumour had its origin in a varicose state of the blood-vessels, which traversing the bone, impressed upon it the alterations presented by it after death.

A case is also described by Busch, which was observed in a child that had been some time dead and was delivered with the forceps. Situated over the occipital region was a bluish coloured bloody tumour, which, when it was opened, was found to communicate with the sinuses of the brain.† One is likewise reported by Hoere,‡ in which there were two tumours; one internal between the dura mater and the bone, the other between the latter and the pericranium, with a diseased condition of the intermediate portion of the cranium. The internal tumour was of the size of a pigeon's egg, and had formed for itself a kind of depression in the corresponding portion of the brain. The internal table of the bone, opposite to it, was diseased, and destroyed to some extent, but the process of reparation had commenced. The outer table was entire, and unaltered.

These are the principal characters and varieties of this peculiar form of disease. The influence exercised by it over the general health must of course be variable, according to the condition of the tumour, its relations with the adjacent parts, and the susceptibility of the organisation. Very

* New England Journal of Medicine and Surgery. Vol. ix. p. 112. 1820.

† Heidelberger Klinische Anallen, bd. ii. p. 245.

‡ De tumore cranii recens natorum sanguineo et externo et interno, &c. Berol. 1824.

generally, there is little or no constitutional disturbance observed during the first stages of the disease; but after the tumour has continued for some time, the child is apt to become pallid, feeble, and heavy; it loses its natural sprightliness; has its digestive organs more or less disturbed; is restless and uneasy, especially during sleep; and in some cases, is affected with flushing of the face, and irregular febrile exacerbations. Gœlis remarks, that even in a recent case, he found the child affected with a kind of confusion or stupor; and it not unfrequently happens, after the disease has made considerable progress, that various nervous symptoms make their appearance, which arise either from the direct influence of the tumour on the brain, or from irritation excited by its being reflected upon the nervous centres. These symptoms may vary, from slight twitchings to violent convulsions, or even paralysis. Such cases are generally attended with active febrile excitement, associated with the phenomena of arachnitis or inflammation of the brain. It should be remarked, however, that these phenomena are seldom or never observed until towards the last stages of the disease, and it is likewise only at this period, that evidences of compression of the brain, and inflammation of the dura mater become apparent; these symptoms owing their existence in such cases to the diseased changes which take place in the bone and the adjacent structures. In some instances, nevertheless, the ravages of the affection are more insidious in their march, creating but little disturbance until a considerable portion of the bone has become destroyed, and allowing extensive perforation of the skull to be produced before death takes place. Paletta, Naegele, Osiander, Kopp and others have observed cases of this kind. But while some examples of the disease are attended with some or most of these symptoms, there are others, which, until they are far advanced, give rise to no uneasiness or derangement, either general or local. Yet it may be laid down as a general rule, that whatever may be the condition of the patient during the first stages of the disease, the constant tendency is to a fatal termination, if the fluid be not absorbed, or evacuated by art.

3. *Causes and nature of the disease.*—Those who have had occasion to observe sanguineous tumours of the head of newborn infants, have found it difficult to assign any satisfactory cause for their development. From some characters which they possess, in common with those bloody tumours or ecchymoses which form in the same situation in consequence of contusions, writers for a long time adopted the opinion that they owe their origin to some injury sustained by the head of the child during labour, either from pressure within the straits of the pelvis, from the contusion occasioned by the forceps or vectis, or some analogous cause. This opinion has been perpetuated by the neglect of many to discriminate between the proper cephalæmatoma, or spontaneous bloody tumour, described by several of the German authors, and those which are in reality only examples of ecchymosis produced by violence. This cause has been assigned by several respectable practitioners, amongst whom Dieffenbach enumerates Becker, Carus, Capuron, Wendt, and Osiander, and we may add to this list Velpeau and several others of high respectability. There are several circumstances which invalidate such a conclusion.

The tumours in question are not oftener met with in difficult labours, and those in which instruments are employed, than they are after easy and quick deliveries. Palletta* remarks, that he had never seen them after

* Op. cit. 123.

difficult labours. Naegele, who observed seventeen cases in the course of twenty years, declares, that in a large proportion of them the labour was easy, and the tumours occupied those parts of the head that was least liable to be compressed or injured in its passage through the pelvis. He observed, besides, one case, in which the child was delivered by the feet, and others have been reported which occurred in breech cases. Siebold never saw them after difficult labours; Baudelocque seldom, and such, likewise, is represented to have been the result of the experience of Feiller, Hoere, Michaelis, and Schmidt.* To this it may be added, that bloody tumours of a similar character occasionally form on the head of children at a more advanced age, and sometimes even in the adult, when no injury whatever has been inflicted. In neither of the cases which we have had an opportunity to observe, could the disease be referred to this cause, inasmuch as after the strictest inquiry it could not be ascertained that the subjects of them had received either blow or contusion, or any other injury upon the head. It is besides known, that sanguineous abscesses occasionally form in other parts of the body not exposed to the influence of violence. Paletta has reported many such examples, and several others might be referred to, which have been published by different individuals.

The facts prove conclusively that the disease cannot be properly attributed to the cause referred to above. Injuries of the kind alluded to may unquestionably give rise to extravasation of blood in the scalp, but it will be found on examination, that such tumours differ essentially from those which form the subject of these observations. They are attended with more or less discoloration of the skin; they disappear in the course of a few hours, and are not attended with the hard elevated boundary which generally circumscribes sanguineous abscesses of the head. That the long continued resting of some part of the head of the child upon the brim of the pelvis, before labour comes on, may sometimes predispose to the affection, we will not deny, yet this is a different question from that under discussion.

The hypothesis of Michaelis already alluded to, that the disease has its origin in the destruction of the outer table of the cranium, and that the collection of blood is a consequence merely of that affection, is refuted by so many facts, that it cannot be necessary to do more than advert to it. It should nevertheless be remarked, that when the tumour has its origin in the diploë, no collection of blood takes place in the scalp, until this destruction of the outer table is accomplished. But while this is admitted, it only proves, that the injury of the bone is a consequence and not the cause of the disease. Nor is the conjecture of Baudelocque, that the extravasation of blood is a salutary act, the effect of which is to protect the brain from dangerous congestion or apoplexy, entitled to more confidence. Naegele at one time attributed the origin of the disease to a varicose state of the emissary vessels of the cranium, in consequence of which they become ruptured during parturition; but he afterwards abandoned this opinion as untenable. Pigné also seems to think they are owing to a rupture of blood-vessels, but he affirms that this rupture takes place spontaneously. In proof of this, he appeals to the authority of Baudelocque and Cruveilhier, who remark, that fœtuses are often destroyed by a vessel giving way within the cranium, even before the period of delivery.

Amidst these conflicting opinions it is exceedingly difficult, without

* Pigné, Journal Hebdomadaire, Sept. 1833.

more positive data than we possess, to arrive at any very satisfactory conclusion.

4. *Diagnosis.*—The affections with which these tumours are most frequently confounded are, the extravasations of blood in the integuments of the cranium, or the puffy ecchymosis of those parts, which form in consequence of injury sustained during labour, and which the Germans have denominated *caput succedaneum.* It is by neglecting to distinguish them that many writers have been led into the error of attributing them all to contusions inflicted upon the head of the child in the act of delivery. A proper attention to the symptoms peculiar to the two affections will render it easy to avoid mistaking one for the other. In the *caput succedaneum*, or tumours which proceed from contusion, there is a kind of infiltration of blood mixed with serum; the tumour is diffused, presents a dark livid colour; is œdematous and pits on pressure, is devoid of the well defined border which circumscribes the proper sanguineous abscess, and does not present the pulsation which sometimes exists in that disease. In some cases, however, especially when the fluid is deposited between the aponeurosis and the pericranium, or between the latter and the bone, the diagnosis will be more difficult. Still, the surrounding œdema, the absence of the prominent defining barrier, the discoloration of the skin, &c. will generally furnish sufficient data to prevent, in a great degree, an erroneous conclusion. The same marks will serve to distinguish sanguineous tumours from those containing water, which sometimes form in the same situation. Purulent abscesses may be generally distinguished by the inflammation, redness, great tenderness, and other symptoms with which they are almost always associated.

If in accordance with the plan we have adopted, bloody tumours of the scalp, and those of the diploë and parts beneath, be grouped together, it is probable that the same explanation will not hold good in reference to the formation of the whole of them. At least, there may be a slight difference in the pathological condition of the superficial and deep-seated tumours—although it may not be sufficiently great to constitute them totally distinct affections. And it may be remarked, that those which form in the diploë cannot well take place in the fœtal head, inasmuch as at that early period of life the two tables of the cranium are so close to each other that the diploë scarcely exists. Whatever may be the difference in the seat of the disease, there can be but little question that it consists primarily in a morbid condition of the capillary blood-vessels, and the cellular tissue through which they ramify. All who are conversant with the laws of the animal economy are aware, that under the influence of certain grades and modifications of irritation, the vessels pour out blood, instead of coagulable lymph, serum, pus, or any of the other products which they deposite under different degrees of the same process. It is difficult to determine, however, whether the collections in question have their origin in this manner, or whether the radicles of the veins, at the points at which the arteries inosculate with them, do not first assume a varicose condition, such as they present in erectile tumours, and afterwards give way, extravasating their contents in the meshes of the cellular tissue. We are inclined, from the general phenomena of the disease, to infer that both these explanations are correct, though applicable to different cases. The first is certainly the most rational, when applied to those tumours which are superficial; yet there are others in which it seems incompetent to explain all the phenomena. This is especially true of those which form between the pericra-

nium and bone, and in the diploë of the cranium. It has been remarked above, that in some cases a considerable pulsation or thrill can be felt in the tumour during its early stages, which disappears as the disease progresses. This cannot be very well explained upon the supposition of a mere hemorrhagic action of the capillary vessels, but is in every respect analogous with the phenomena presented by erectile tumours. The reason why the pulsation disappears at a later period probably is, that the delicate vessels being over distended, their tunics give way, and extravasate their blood, and afterwards undergo such changes as to destroy their pulsation. Such dilatations we conceive may take place in either the arterial or venous portion of the anastomosing vessels, or in both, precisely as the same thing is observed in erectile tumours in other parts of the body. But if this explanation is probable as regards those tumours which form exterior to the cranium, it is unquestionable when applied to such as are developed in the diploë. The cases reported by Flint, Hoere, and Busch, which have been already referred to, were probably of this kind, and the very valuable memoir of Breschet, previously quoted, contains numerous examples of erectile tumours or aneurisms, affecting other bones. Here the vessels are more protected by the bony casement in which they are lodged, the process of dilatation goes on more tardily, and they do not so soon give way. Hence, such tumours, when opened, generally bleed profusely, because the affected vessels have not yet had time to undergo those changes which are so speedily effected in soft parts, and which disqualify them, in the latter situation, from pouring out blood so freely.

Be this as it may, the cellular tissue also undergoes important modifications. It is destroyed, or has its meshes forced asunder at the point at which the extravasation takes place, while in the vicinity, coagulable lymph is deposited in its areolar arrangement, and becoming organised, sets up a barrier against the diffusion of the fluid, which forms the indurated circle or boundary already alluded to. This is precisely what takes place in common purulent abscesses, and it will be found, on examining the cavity of one of these bloody tumours which has existed for some time, that it, like a common abscess, is lined by a complete adventitious pellicle or membrane, which is either very vascular itself, or has a complex intertexture of minute blood-vessels ramifying exterior to it. This membrane may pour out blood, or serum, or pus, according to the degree of irritation which may happen to exist in the walls of the tumour; and all these fluids may be deposited by it in the course of the disease. Hence, when such tumour is laid open shortly after it has formed, it generally discharges pure blood; at a later period blood and serum will often be evacuated, and if it be allowed to remain unopened, it may become the seat of a purulent deposite, as in Michel's case, to which we have referred above.

Assuming these as the pathological conditions of the disease, it is not easy to explain the causes which dispose the parts to take on such changes or modifications of action. It is possible that the resting of the head of the child upon the bony parts of the brim of the pelvis, during the last weeks of gestation, may be the cause in some cases; and that in others, the pressure it experiences during labour may excite sufficient irritation to produce the disease. Many other circumstances may have some instrumentality, but as any remarks we could make in regard to them would be purely conjectural, we shall not enumerate them.

Much more difficulty will be experienced in distinguishing sanguineous tumours from congenital encephalocele, or hernia of the brain. Owing to

the uncertainty of the diagnosis between these two affections, they have been often confounded, more especially by some of the earlier writers on the latter of these two diseases, who described cases as examples of encephalocele, which, from their own representation, we cannot avoid concluding were nothing more than instances of sanguineous abscess. This mistake was committed, as Naegele and others have remarked, by Le Dran and several of his successors, especially Trew, a writer in the Gentleman's Magazine, Detharding, Chemin, Corvinus, Gaspard, Siebold, Held, Salleneuve, Thiernig, Ohme, Breiting, Richter, Rosen de Rosenstein, Bernstein, Fleisch, Plenk, Schmalz, Henke, &c. A reference to all these authorities will show that they considered the parietal region as the most common seat of congenital encephalocele, while it is well known to all practitioners of the present day, who are conversant with such affections, that they are seldom developed, except in the course of the sutures, at the anterior or posterior fontanelle, or in the situation of some of those points which, during the first periods of the ossification of the cranium, are not supplied with bone. This fact then, together with one adverted to in a preceding part of these observations, that sanguineous abscesses are developed by far more frequently over the parietal bone than upon any other part of the head, renders it highly probable that a very large proportion of the cases considered by writers as examples of what they called *lateral* congenital encephalocele, were nothing more than sanguineous tumours of the parietal region.

The difference observed in the locality of the two affections may afford some assistance in distinguishing them, but cannot be regarded as affording sufficient grounds for a positive diagnosis, since, as has been remarked, sanguineous tumours are sometimes developed in the course of the sutures, and upon other points which are liable to hernia of the brain. Far better criteria may be deduced from the phenomena furnished by handling the tumour, from the condition of its surrounding boundary, &c. Both are soft and spongy to the feel, and impart to the touch the sensation of a depression or defect of the corresponding portion of the cranium. Both are likewise often attended with pulsations which are isochronous with those of the heart; and in the one, as in the other, a hard well-defined border can be generally felt, which surrounds the entire circumference of the tumour. Thus far they seem to agree in most of their characters; but if these phenomena be carefully analysed, it will be found that there are many points of difference. Thus, when pressure is made on a congenital encephalocele, the tumour can be often forced down through the opening by which it protrudes through the cranium, upon the substance of the brain; but so soon as this is done, the individual will be affected with vertigo, dimness of vision, loss of consciousness, or even convulsions. Sanguineous tumours cannot be made to disappear by this procedure, nor do they, when compressed, give rise to the symptoms alluded to. If the march of the disease be carefully observed, there can be no danger of the hard prominent boundary leading to an erroneous diagnosis, inasmuch as in encephalocele it must always exist before the tumour can protrude—the destruction of the entire thickness of the bone being necessary to allow this event to take place; whereas in the case of the other affection, the tumour always forms first, and the hard boundary, or as it has been generally called, the bony circle, is only developed in consequence of the influence exercised subsequently upon the adjacent portion of the bone. Besides, when pressure is made upon the centre of the tumour, if it be encephalocele, the finger will

pass down without meeting with any solid resistance, while in cases of sanguineous tumours, it is soon arrested by the solid rough surface of the bone. Although pulsation is a character common to both affections, it is feeble in sanguineous tumours, and is only present during the earliest periods of their existence, whereas in encephalocele, it is much stronger, and never entirely disappears.

There can seldom be much difficulty in distinguishing sanguineous tumours from fungus of the dura mater, the latter being destitute of fluctuation, and when forcibly compressed, giving rise to those symptoms which indicate pressure on the brain. Erectile tumours, however, developed either upon this membrane, within the diploë of the cranium, or between the bone and the pericranium, cannot be so easily distinguished, either from simple bloody abscesses, or common fungus of the dura mater.

5. *Treatment.*—The treatment of sanguineous tumours of the head may be attempted by two different methods. The first has for its object the dispersion of the tumour by promoting the absorption of its contents; the second, the evacuation of the blood by puncture or incision.

The first method should always be fully tried previously to resorting to the second. Experience has proved satisfactorily, that a large proportion of these tumours will either disappear spontaneously, after the lapse of some time, or may be dispersed by proper local treatment; and as long as any hope of obtaining this result remains, an operation should not be performed. Nearly all writers on the subject have reported many such cases, and in the memoir of Zeller already referred to, a great number will be found. Out of seven cases observed by Beyerle, six were cured in a few days by aromatic vinous fomentations, and it was only necessary to open the tumour in one. Even tumours of very large size may be sometimes dispersed. Zipp reports a striking example: He was called to visit an infant, aged four days, upon the left parietal region of which he found a cephalæmatomatous tumour, as large as an adult fist. It was discovered on the day of delivery, from which time it had continued to increase, but did not seem to affect the health of the child. The mother was healthy, and had had an easy delivery. By means of frictions with aromatic substances, practised night and morning, the tumour was completely dispersed in about four weeks.*

The choice of applications should be regulated by the condition of the part affected, and of the general system. When the child is vigorous, and the scalp, as well as the constitution in general, highly susceptible, antiphlogistics should be preferred. It may be necessary sometimes to apply leeches, and even to repeat them according to circumstances; and in all such cases, cold antiphlogistic discutient lotions may be employed with more or less advantage. The best of these will be the liquor plumbi subacetatis, vinegar largely diluted with water, a solution of either the acetate or muriate of ammonia, or any of the ordinary evaporating lotions. The hair should be closely shaved, and a fine fold of linen kept applied to it constantly, wet with the preparation employed. Ice may likewise be occasionally resorted to, but is not often so efficacious as the remedies just enumerated. Indeed most of the German authorities seem to think, that applications of a somewhat exciting character should be generally preferred, their stimulating properties being thought necessary to promote the absorption of the fluid, and produce healthy action in

* Pigné, loc. cit. p. 483.

the part. Hence, they recommend aromatic vinous and spirituous infusions and decoctions, stimulating lotions and unguents, and other articles of a kindred character, either applied lightly to the scalp or administered in form of frictions. When there is great languor and deficiency of energy in the tumour, and in the system generally, such applications are certainly demanded; yet it must not be concealed, that under an opposite state of affairs, they may prove highly mischievous. We are inclined to think, that the application of the warm decoction of oak bark, cinchona, &c. or frictions with mercurial ointment, which have been recommended by Dieffenbach, can seldom or never be admissible. Nor do we think that it will be generally safe to keep up pressure by means of a compress and bandage as recommended by Chelius, although we apprehend that cases do occasionally occur, in which it may be both safe and beneficial.

These means, properly employed, will often disperse the tumour, and effect a perfect cure of the disease. Yet they will sometimes fail, and it will then become necessary to adopt a different course.

It is extremely difficult to decide how far the treatment can be safely confided to those means, the object of which is to obtain the discussion of the tumour, inasmuch as in some cases, the disease has been allowed to continue for weeks or even months, without giving rise to any very serious consequences, while in others, the cranium has become affected with necrosis or caries after the lapse of a very short period. This being the case, much injury may sometimes result from relying too long upon discutient applications, and neglecting to evacuate the fluid by a proper opening. Zeller reports a case corroborative of this principle. A child was born with a very large sanguineous tumour seated upon the left parietal region, the character of which was not understood by the surgeon in attendance, and it was consequently left to the unassisted efforts of nature. The tumour continued to increase in size, became painful, the health of the child suffered considerably, and after the lapse of some weeks, death took place. The bone was found carious, and perforated by a number of small foramina, which traversed its entire thickness.* In order not to incur the risk of these mischievous consequences, it will be advisable, when the ordinary local applications have been employed ineffectually, for eight, ten or fourteen days, to puncture the tumour and evacuate its contents, lest by suffering the fluid to remain too long in a state of confinement, it may occasion disease of the bone, or the health of the child may become endangered by the influence of the disease upon the general system. Upon this point, then, a perfect unanimity of sentiment exists, amongst all who have written on the subject. Some have even advised that an opening should be made as soon as the tumour is discovered, and Osiander thought it should never be delayed beyond twenty-four or forty-eight hours. But to this practice there are two objections. One is, that there are many cases that disappear spontaneously, or may be cured by local applications; the other, that the parts are more vascular during the first periods of the disease, the blood more fluid, and hemorrhage is more apt to take place from the cavity.

There is some difference of opinion as regards the manner in which the contents of the tumour should be evacuated; some giving the preference to the seton, some to puncture and incision, while others advise the caus-

* Pigné, loc. cit. p. 484.

tic. The seton was long since recommended by Moscati; and Paletta advocates its employment in preference to all the other methods. He represents, that it is unsafe to open such tumours by a free incision, but that when they are transfixed by a seton, a cure is easily accomplished without any bad consequences. Notwithstanding this authority, the practice has been abandoned, and has been by some writers very justly condemned.

Gœlis advises a stick of caustic to be rubbed upon the surface of the tumour, with the view of promoting suppuration, and exciting the requisite degree of action in the parts. The same plan has been recommended by Schmidt. Of all the means proposed, we hold this to be the most objectionable, and we doubt not, that if generally pursued, it would often occasion serious mischief. In this opinion we are supported by all the best authorities, who, with great unanimity, concur in condemning such a procedure.

Osiander recommends an incision of an inch in length, and down to the bone, to be made with a convex bistoury, in a direction transverse to the course of the ossific radii of the parietal bone. The object of the last rule is, to avoid the danger of inflicting injury upon the brain, by the knife penetrating between these rays, which it might do, if the incision should be made parallel with them. For the same reason, he directs that a lancet, a sharp pointed bistoury, or a trocar, should never be employed for such a purpose, because there is a great risk of puncturing the brain, on account of the extreme thinness of the bone. In prudent hands these precautions can scarcely be necessary, no do we think that any important advantages can be gained by making so extensive an opening. The crucial incision recommended by some can never be necessary, and ought not to be practised.

The best plan is, unquestionably, to make a puncture of an adequate size, at the most dependent point, to allow the contents of the tumour to escape. This is recommended by Naegele, Zeller, Chelius, Dieffenbach, and the best authorities on the subject, and while it secures all that can be gained by making an opening, it is not liable to the objections which apply to the other methods. There are, nevertheless, circumstances, in which it will be necessary to depart from this rule. Thus when the contents of the tumour have been evacuated, a probe should be introduced through the orifice, in order to explore the condition of the bone. If found healthy, a small tent of lint should be introduced into the puncture, to prevent it from closing until the fluid ceases to accumulate within. If the bone be found denuded, rough, and carious, a grooved director should be introduced, upon which the tumour may be freely laid open, if not too extensive; because it will be in vain to attempt to heal it without adopting this precaution. After an opening of sufficient extent has been made, the bottom of the wound may be dressed with a pledget of lint spread with simple cerate, or any appropriate digestive ointment, which should be secured by a compress and bandage, and renewed as often as necessity may require. In ordinary cases, where only a puncture is made, a light compress should be laid over the part, and confined by an appropriate bandage.

It generally happens, after the first evacuation of the tumour, that more or less accumulation takes place. Under these circumstances, the tent of lint should be withdrawn from the puncture, in order to allow the fluid to escape, and if adhesions have formed to such an extent as to prevent it

from flowing, they may be broken up with the point of a probe. After the first evacuation, the blood becomes more and more serous, and is finally supplanted by a kind of watery fluid, of a wine-lee colour, or suppuration takes place, and a small quantity of pus is discharged. In many cases, however, the walls of the cavity gradually adhere, without any pus being formed.

The applications to be made to the part, subsequent to puncture, must be suggested by its condition. Should inflammation and tenderness ensue, they must be combatted by cooling anodyne lotions, the application of leeches, and the ordinary antiphlogistic remedies. But where, as is sometimes the case, the tumour remains inactive, and evinces no disposition to heal, its powers must be invigorated by appropriate applications. The Germans generally prefer, for this purpose, warm fomentations of an infusion of aromatic plants in wine, an infusion of chamomile, a decoction of bark, &c. Dieffenbach proposes, also, to cover it at night with an ointment composed of from 4 to 6 parts *unguent. rosat.* and one part *unguent. mezerei.* spread on a light pledget of fine lint. It has even been proposed, when the parts are very indolent, to throw stimulating injections into the cavity, in order to excite adhesive inflammation; and it was partly with a similar view, that Paletta was induced to prefer the seton as a means of opening these tumours. A case has been reported by Lobstein, in which this practice was successfully instituted. The tumour was as large as a pullet's egg, and occupied the left parietal region. Having failed in his attempts to disperse it, the contents were evacuated by a puncture, and stimulating injections were thrown in through the aperture. Slight pressure was afterwards kept up, and a cure was accomplished in a few days.* Cases may occur to demand this practice; yet it should be resorted to with great caution.

A judicious application of these means will generally conduct the case to a favourable issue, without the occurrence of any unpleasant symptoms. The prognosis is indeed generally considered favourable in most cases of this affection, and is seldom otherwise, except where the disease has been allowed, by too long delay, to inflict extensive ravages upon the bone. Most writers, too, represent the opening of such tumours as perfectly exempt from danger, yet we could cite cases in which it was followed by death, even though the bone was not affected. Gœlis, amongst others, speaks of such an occurrence; and Braun reports a case, in which, after a few days, the child was seized with fever and died. In the course of the foregoing remarks, we alluded to a case which a few years since came under our care, conjointly with Dr. Steuart. It was the child of a medical friend, and differed from the generality of such cases in the circumstance, that the subject was about two years old. The tumour was large, and notwithstanding various means were employed to disperse it, continued to increase in size, until it was thought it would not be prudent to refrain longer from opening it. A puncture was accordingly made at one of its most dependent points, and a considerable quantity of watery blood evacuated. As the bone was found to be healthy, a small tent was introduced to prevent the aperture from closing, and cold applications directed to be made to the head. On the second day, the fluid which had accumulated was again evacuated, and the same course was continued. The child, however, became feverish, and was finally seized with violent convulsions and

* Pigné, loc. cit. p. 486.

other evidences of meningeal and nervous irritation, which, notwithstanding the free abstraction of blood, both from the arm and by leeches, the use of cathartics, cold to the head, blisters, &c. continued to recur until death took place.

As regards the treatment of those tumours which sometimes form in the diploë, or within the cranium itself, especially such as are of an erectile character, not much can be done towards effecting a cure. In a majority of instances, if they were to be opened, a fatal hemorrhage would be apt to ensue, particularly where the whole thickness of the cranium is destroyed, so as to deprive us of the advantages of compression. Still we are inclined to think, that in such cases as those reported by Flint and Hoere, and, indeed, in all cases in which the inner table of the skull is entire, if we possessed any positive means of distinguishing them from others, an opening might be safely made, and if alarming hemorrhage should follow, that it might be effectually commanded by a properly adjusted graduated compress. The enlarged vessels would then become obliterated, and the cavity might be healed up by granulation. But before such an operation is resorted to, there should be a certainty that the inner table of the bone is not destroyed, otherwise there will be no solid point, against which pressure can be made, and we should incur the danger of fatal hemorrhage.

This may be regarded as a general summary of our knowledge in regard to these sanguineous tumours of the head. It will be observed that their pathology is still involved in much obscurity, and we are not certain that we have added any thing to render it more intelligible. It may, indeed, be thought that we have erred, in grouping under this head, erectile tumours of the diploë, and parts beneath. We are not satisfied that we have acted with strict propriety in doing so, but we were anxious to direct more attention to them than they have generally received. This, in fact, has been our chief motive for publishing the paper. We are persuaded that most of our readers are not in possession of much of the published information which has a bearing on the subject, especially, as most of the English works scarcely contain any notice of the disease. Hence, if we have not added any thing to increase our knowledge of its pathology or treatment, we may perhaps have rendered them a slight service, by giving them a digest of what others have advanced upon these topics.

BIBLIOGRAPHY.

Levret. Journ. de Med. xxxvii. 410. Paris, 1772.

Siebold. Chirurgisches Tagebuch. Nüremberg. 1792. Obs. xvi. xliv.

Michaelis. *Ueber eine eigene Art von Blutgeschwülsten*, in Loder's Journal. Vol. II. No. 4, pp. 657-670. Jena, 1799.

——— Chirurgische und medicinische Beobachtungen. 9. *Blutgeschwulste neugeborner Kinder Kopse.* Hufeland's Journal. Vol. xviii. No. 2. p. 80—85. Berlin, 1804.

Plenk. Doct. de Cogn. et Curab. morborum infant. Vienna, 1807.

Stein, Jr. (G. W.) Annalen der Geburtshülfe überhaupt und der Entbindungsanstalt zu Marburg insbesondere. No. 4, p. 66—70. Leipsic, 1811.

Naegele, (F. C.) Erfahrungen und Abhandlungen aus dem Gebiete dem Krankheiten des weiblichen Geschlechts, &c. p. 245—253. Manheim, 1812.

——— Uebersicht der Vorfälle in der G. H. Entbindungsanstalt zu Heidelberg von den Jahren, 1817-18. Jour. Med. Chirurg. de Salzbourgh, vol. iv. p. 150—160. 1819.

——— *Ueber den angebornen Hirnbuch und die Kapfblutgeschwülste. Neugeborner in diagnostischer Hinsicht.* Hufeland's Journal, No. 5, p. 3—38. Berlin, 1822. Translated into French in the Journal Complimentaire du Dictionnaire des Sc. Medicales. Vol. xiii. Sept. 1822.

Schmitt. Uebersicht der Vorfallenheiten in dem Entbindungsinstitute der kk. medicinich—chirurg. Josephs—Academie vom ersten, Nov. 1816, bis letzten, Oct. 1818. Journ. Med. Chirurg. de Salsbourg. Vol. i. p. 327—29. 1819. Hufeland's Journ. Oct. 1823.

Klein, (C. C.) Bemerkungen über die bischer angenommenen Folgen des Sturzes der Kinder auf den Boden bei schnellen Geburten. Stuttgard, 1817.

Gœlis. Praktisches Abhandlungen ueber Krankhieten des Kindlichen. Alters. B. ii. Vienna, 1818.

Paletta. Exercitationes pathologicæ. Cap. x. p. 123, and cap. 42, p. 194. Milan, 1820.

Flint's, (J. H.) *Case of Congenital Fungus Hæmatodes*, in New England Journal of Medicine and Surgery. Vol. ix. p. 112. Boston, 1820.

Duges. *Diss. sur quelques maladies peu connues des nouveau-nés.* Thèses de Paris. 1821. No. 64.

Zeller. *De Cephalæmatomate seu Sanguineo cranii tumore recens natorum commentatio*, &c. Heidelberg, 1822. An analysis of this is given in le Journal Complémentaire. T. xiii. p. 171.

This Thesis presents the opinions of Prof. Naegele; and also contains a digest of the observations and reflections of preceding authors on the subject.

Becker, (H.) *Ueber die Kopfblutgeschwülst der Neugebornen und ihre Zertheilung.* Hufeland's Journal, Oct. 1823, p. 76—82.

Hoere, (G.) *De Tumore cranii recens natorum, Sanguineo et externo et interno*, &c. Berlin, 1824.

——— *Ueber die äussere und innere Blutgeschwülst neugeborner Kinder*, in Siebold's Journal für Geburtshulfe. B. iv. Frankfort, 1825.

Haller, (A. H.) *Diss. de tumore Sanguineo neonatorum.* Dorpati. 1824.

Lang, (J. J. L. *De ecchymomate seu de abscessu sanguineo recens natorum.* Landsh, 1825.

Brandau, (G. C. L.) *Diss. sistens ecchymomate capitis recens natorum.* Marbourg, 1825.

Busch. *Ein Beitrag zur aufklärung des wesens der schädelblutegeschwulst neugeborner Kinder*, in Heidelberg Klinisch. Annalen. B. ii. S. 2, p. 245—256. Heidelberg, 1825.

Strewe, (J. D.) *De cephalæmatomate seu sanguineo cranii tumore recens natorum.* Giess. 1828.

Hunter, (Wm.) *On the Management of Children from their Birth in England, and particularly London*, in London Medical Gazette, vol. i. p. 586. London, 1828. This is a posthumous publication from an original MS. in the handwriting of Dr. Hunter.

Suthan, (Mich.) *De cephalæmatomate.* Pesth. 1829.

Dieffenbach. *Abscessus capitis sanguineus neonatorum.* Theoretisch. praktisches handbuch de chirurgie, &c. v. J. N. Rust. Berlin et Vienna, 1830.

Michel. *Tumeur sanguine simulant un encéphalocèle.* Gaz. Med. de Paris, 5 Mars, 1833, p. 183.

Unger, (Karl.) *Von der blutigen kopfgeschwulst der Neugeborenen.* Beiträge zur Klinik der chirurgie. Leipzig, 1833.

Lobstein. Anat. Pathol. T. ii. p. 141. Strasbourg, 1833.

Pigne, (J. B.) *Mémoire sur les cephalæmatomes, ou Tumeurs sanguines des enfants nouveau-nés.* Journal Universel et Hebdom. t. xii. p. 461, and xiii. p. 61. Paris, 1833.

Velpeau. Thèse sur les contusions dans tous les organes. Paris, 1833.

Velpeau. *Mémoire sur les tumeurs sanguines du crane.* Journal Univ. et Hebdom. T. xiii. p. 5. Paris, 1833.

Dubois, (Paul.) Art *Céphalæmatome*, in Dictionnaire de Médecine, 2d ed. Paris, 1834.

Valleix. *Mémoire pour servais a l'histoire du céphalæmatome, ou tumeur sanguine sous-péricranienne chez les enfans nouveau-nés*, in Gazette Medicale de Paris, 13th Sept. 1834, p. 577.

——— *Des Céphalæmatomes, ou tumeurs sanguines du crane chez les nouveau-nés*, in Journal Hebdomadaire des Progres des. Sc. et Inst. Med. T. iv. p. 321, and 389. Paris, 1835, and T. i. p. 5. Paris, 1836.
This is a very interesting and elaborate monograph.

Gaussail, (A.) Note *sur un céphalæmatome sous-péricranien qui a disparu après une hémorrhagie nasale* in La Presse Médicale, 8 July, 1837, p. 429. Paris, 1837.

Wagstaffe, (M. F.) *Case of Double Cephalæmatoma*, in Lancet, 25 Nov. 1837, p. 306.

Editor.