Ossification takes place in constant and definite parts of the so-called "primordial" cranium. Thus, behind the auditory capsules, four centres of ossification arise: one in the floor of the skull—the basioccipital; another in each side of the cartilaginous occipital arch—the exoccipitals; and a fourth in the upper part of the same arch—the supraoccipital.

In front of the auditory capsules, ossification takes places medianly at the sella Turcica, as the basisphenoid (which includes the anterior extremity of the notochord), and laterally as the alisphenoid, on each side—the latter appearing in the two lateral cartilaginous processes before spoken of as arising on each side in front of the auditory capsule. Anterior to these, we find another median and basilar ossification—the presphenoid (which, however, never includes the notochord), and two lateral ones—the orbitosphenoids, one on each side.

Here the brain-case ends, but in front of it we find an ossification in the median lamella, which descends from the plate overarched the olfactory capsules—the median ethmoid: also an ossification in each lateral half of the same overarched plate—the lateral ethmoid, or prefrontal.

The relations borne by the nerves and sense-organs to these parts is constant. The eighth nerve always passes out behind the auditory capsule, which latter is always placed behind the alisphenoid. The third branch of the fifth nerve also passes out behind the alisphenoid, or traverses its hindmost portion. The optic nerve passes between the alisphenoids; and, finally, the median ethmoid is always placed between the exits of the olfactory nerves.

As to the sense-capsules themselves, the sclerotic, though sometimes ossified, never enters into the formation of the skull. It is very different as regards the auditory capsule, which always constitutes an integral part of the cranial wall. It ossifies from three, sometimes from four, centres. The first of these is anterior, and is called the Prootic—this is the most constant. The second is posterior and inferior, is named the Opisthotic; the third is posterior and superior, and is termed the Epitotic. Sometimes there is a fourth ossification, situated on the outer side of the top of the capsule.

The osseous skull thus arising, occupies the floor, and more or less of the walls of the cranium; but, except in the occipital region, has no share in its roof. The bony roof is formed by another system of bones having a different origin, formed directly from membrane, instead of from cartilage. Such is the case with the parietals and frontals. Certain other membrane-bones, however, besides these, also make their appearance. These are the parasphenoid in the perichondrium, beneath the floor of the skull—the vomer, the nasals, and the squamosal.

ON THE VALUE OF PERCHLORIDE OF IRON IN POST PARTUM HÆMORRHAGE.

By HUGH NORRIS, L.R.C.P. Edin.,

Corresponding Member of the Edinburgh Medico-Chirurgical and Obstetric Societies, etc.

THE enclosed remarks are condensed from a paper read by me on the 12th of April, 1865, before the West Somerset Branch of the British Medical Association, "On the Value of Perchloride of Iron in Obstetrics, with Cases." I was requested to send it for publication in the JOURNAL; but, from various causes, I was prevented from doing so at the time. I less regret this circumstance, since the delay has afforded me opportunities of further testing the correctness of the conclusions at which I had then arrived. I have given, in an appendix, a few skeleton cases from my note book, of a more recent date than my paper, but all corroborative of these conclusions; adding merely such comments as are suggested to my mind by their individual circumstances. I have preferred sending the paper in the form in which it was originally read, since I might otherwise, perhaps, have laid myself open to the charge of plagiarism, and because, moreover, I wish to escape the disagreeable task of exonerating myself from a suspicion so groundless. On the other hand, I hope I may not be accused of presumption, when I add that I am quite sure the fact of my having used the perchloride of iron in *post partum* hæmorrhage, could never have reached the ears of Dr. Barnes, to whom I am an utter stranger. In publishing the paper, I am actuated by the desire to make more widely known an *invaluable remedy*, and I esteem myself fortunate in being able to adduce the independent testimony of so impartial a witness as the distinguished physician whose name I have taken the liberty of using.

Scarcely, I imagine, need I do more than advert to the anxieties attendant on a severe case of *post partum* hæmorrhage, in order to enlist the sympathies of all who are engaged in the general practice of our

profession. Whether we consider the suddenness of its accession on the one hand, or the insidiousness of its approach on the other—in all cases the imminent peril attending it, I think that few of my *confidères* will feel disposed to dispute my conviction that this complication may, with little or no warning, place a man face to face with one of the most appalling realities that can be conceived to present themselves in the practice of our art. Many precautions have been devised and recommended by the Nestors of our profession, and numerous modes of treatment have been from time to time adopted to avert the accident in question, but still, with every care—with all the skill—a man can exercise, it is notorious that even fatal cases do now and then, unfortunately, occur in the practice of our best and most accomplished obstetricians. I am not unaware that there exist practitioners who assert that "in their experience such things never happen," and that this immunity is due to some peculiar mode of proceeding, (in the vernacular some "dodge") on their part, by means of which they successfully provide against the dangers that result therefrom; but, whilst I would be the last person to defend a want of systematic carefulness, in even the most simple and most natural case of midwifery, I repeat that I do believe instances are constantly occurring in which every precaution that the highest skill, or the most enlarged experience can suggest, will not suffice to avert the perils attendant on severe flooding after child-birth; and (not to mention other causes), until that peculiar pathological condition which constitutes what is called the "hæmorrhagic diathesis" ceases to exist, we dare not expect entire immunity from the accident we are now considering.

It is not my intention to read an essay on the ordinary treatment of *post partum* hæmorrhage, or to inflict on you, at second hand, a recapitulation of rules which may, at any time, be found in books upon the subject; but, since we may feel assured that the dangerous complication referred to, will occasionally occur in the practice of some, and may force itself on the attention of all, in spite of every effort to the contrary, I beg leave, without further preface, to call attention to a local styptic, so cheaply and so easily obtained, yet withal so certain in its effects, and so harmless in its action, as to cast all others with which I am acquainted, immeasurably in the shade. I allude to the perchloride of iron, a strong solution of which, topically applied, will instantly arrest the flow from almost any bleeding surface. It is now eight or ten years* since I first became aware of the marvellous hæmostatic powers of this preparation, but it was not until the year 1859 that I used it in obstetrics; and, with your kind permission, I will relate a few cases from my own practice, which will, I think, bear me out in my encomiums on the valuable properties of the salt in question.

CASE I.—On December 25th, 1859, Mrs. A., aged about 33, multipara, aborted at the tenth week of pregnancy, immediately on which she flooded almost to death. In fact I at one time thought her dead, but I continued plugging the vagina, with a torn handkerchief dipped in a strong solution of the perchloride, and not the slightest flow occurred thereafter. The patient recovered; and although two years subsequently she underwent a similar ordeal (*vide* Case III), she is now living and as healthy as I have ever known her.

CASE II.—On May 13th, 1860, I attended Mrs. L., aged about 40, a multipara, in whom I had previously diagnosed the existence of placenta prævia. Although I had explained the case and its attendant dangers to her husband, requesting to be summoned the instant hæmorrhage occurred or labour commenced, the patient had wellnigh bled to death before I was sent for. I at once turned and extracted the child, more, I confess, in the hope of saving its life than that of the mother, whose state I feared was almost hopeless. After the labour was completed, on reaction setting in, I found that the flow had not ceased, and the uterus being large and flaccid I hastily injected into the *very fundus* of that organ, a strong solution of the perchloride of iron with the instantaneous effect of arresting all hæmorrhage, and the eventual result of restoring the mother to a condition of safety. The child is now a healthy fine specimen of humanity and the mother is in the enjoyment, I believe, of perfect health.

CASE III.—On October 20th, 1861. Mrs. A., above mentioned (*vide* Case I), again miscarried at about the eighth week of pregnancy, under circumstances precisely similar to those detailed in Case I. I again plugged with a solution of the perchloride of iron with instant good effect, and, as above stated, the patient is still alive and well.

CASE IV.—On February 28th, 1865, Mrs. C., aged about 30, pregnant for the first time, miscarried (in my absence) at the third or fourth month, and immediately thereafter appeared to be doing well. I will not detain you by relating symptoms irrelevant to the subject before us. Suffice it to say, that on the 4th of March, severe and alarming hæmorrhage occurred, as I then discovered, from retained placenta. She was,

* This paper was read in 1865.

when I reached her, apparently in a sinking state, but the placenta was removed manually and a strong solution of the perchloride of iron was injected into the cavity of the uterus, with instantaneous and perfect styptic result. This patient had secondary exhausting hæmorrhage on the 5th of April following, (presumed to be on the access of her returning monthly period) on which occasion injection and plugging with the perchloride were again had recourse to, with perfect success, and she convalesced most satisfactorily.

I would here notice the extraordinary corrugating or contractile effect of the perchloride on the superficial muscular fibres, as well as on the mucous surfaces. I have seen, in less than five minutes after injection, the sphincter vaginae, which had previously allowed the passage of the hand, so contracted by its use as barely to admit a single finger, thus rendering the operation of plugging a matter of unexpected difficulty.

I quite believe that in *post partum* hæmorrhages it thus exercises a conservative effect almost as beneficial in producing a firm contraction of the uterus, as in primarily sealing up its bleeding sinuses. My experience of this drug would therefore lead me to the following conclusions.

1.—We possess no topical styptic, in efficacy at all approaching the perchloride of iron; its effects being certain, perfect, and instantaneous.

2.—In *post partum* hæmorrhages, a solution of this salt applied in the form of an intra-uterine injection, is of the utmost value both in immediately arresting the flow of blood, and in also causing a permanent contraction of the recently emptied uterus.

3.—Its presence in the cavity of the uterus, *post partum*, is not merely not injurious, but, on the contrary, from its well-known antiseptic properties, may frequently be productive of positive benefit in more ways than one.

In concluding these observations, I would refer to the report of the proceedings of the Obstetric Society of London, as recorded in the *Lancet* of April 1st, 1865, where my experience is fully corroborated by the remarks of a no less distinguished authority than Dr. Robert Barnes, the President, who therein states that "as a means of preventing the loss of blood, as hæmorrhage undoubtedly predisposed to puerperal fever, he had found nothing of equal efficiency to the injection of a solution of perchloride of iron into the uterus, after clearing out the cavity of placental remains and clots. He had used this plan for several years, and in a large number of cases after labour and abortion, and had always had reason to congratulate himself upon the result. The perchloride of iron had the further advantage of being antiseptic. He had certainly saved several women from death from flooding, and believed these and others had been rendered less liable to puerperal fever. He usually carried in his obstetric bag a saturated solution of the salt, of which he used a dilution of one part in eight of water, although he believed that a weaker solution would be effectual."

I am glad thus to be able to instance so strong a supporter of the treatment I am advocating, but I must also plead guiltless of any plagiarism in the matter; for I had only seen or heard of Dr. Barnes's remarks whilst preparing my notes and observations (collected some time since) for communication at the present meeting. The only further remark I would venture on the subject before us is this, that, inasmuch as the perchloride iron moults everything it touches, I would recommend great caution in the handling of sheets, napkins, etc., which may become soiled during its use, for although their value is as nothing in comparison with that of human life, yet a wholesale spoiling of bed or body linen would assuredly prove a serious matter in a poor man's house, and would, most probably, be deemed a source of considerable annoyance in the establishment of his more wealthy neighbour.

APPENDIX.

CASE V.—On May 27th, 1865, Mrs. H., aged about 34, multipara, of lax habit but strong and healthy, miscarried at seven and a half months, in consequence of a long walk. The child was born in the membranes, dead, before I was called in. She had very severe *post partum* hæmorrhage. Solution of perchloride of iron was injected, which produced an instant cessation of the flow. She made a good recovery. [This is the only instance that I have seen in which pain has been caused by injection. The pain was rather smart for six or eight hours, if not more, but with no ill result.]

CASE VI.—On September 1st, 1865, Mrs. I., aged about 35, multipara, very weakly and delicate, near her full period. She had hæmorrhage from placenta prævia. She was almost moribund on my arrival. I effected manual separation of the placenta, and delivered by version. Perchloride of iron was injected: but she died. [In this case, all the horrors of placenta prævia were at their full; an attenuated frame; a poor woman, miles from a doctor; ignorant surroundings; delay; death. On detecting the nature of the case, I separated the placenta which was presenting centrally) as far around the os as my finger

could reach, gave stimulants, and, after waiting, I separated the whole placenta. Having accomplished this, I again gave brandy, and again waited for some evidence of returning power. After a time I extracted the child, injected perchloride of iron immediately, and gave largely of stimulants; the patient, however, was too far gone. She died of exhaustion four or five hours after labour was completed, but not a single ounce of blood was lost after the injection. My brother, Mr. George Norris, of Wiveliscombe, assisted me in this case, and can bear me out in the latter assertion.]

CASE VII.—December 30th, 1866. Mrs. B., aged 32, primipara, miscarried at the fourth month with more loss of blood than a delicate woman could well bear. I plugged the vagina with perchloride of iron. Her recovery was good and rapid.

CASE VIII.—May 3rd, 1867. Mrs. W., aged 26, primipara, with loud mitral *bruit* supervening on acute rheumatism, had flooding very severely after a somewhat lingering but good labour. Perchloride of iron was injected with instant good effect. She made an excellent recovery. *Query.* Does heart-disease ever predispose to *post partum* hæmorrhage? I have fancied it might from this and other cases.

CASE IX.—E. B., aged 20, unmarried, primipara, of rather full habit, was seized with convulsions on December 1st, 1867. Labour, at full time, was impending. She was bled to thirty ounces; cold was applied to the head; calomel and croton oil were given as purgatives. Turpentine enemata, etc. The forceps was used to effect delivery. Copious *post partum* hæmorrhage took place. I injected perchloride of iron, which produced a cessation of the flow. Death followed from exhaustion. [In this case, hæmorrhage occurred in my absence some hours after the child was born, and the patient was exceedingly exhausted before I could reach her, which, however, was almost immediately. I at once injected the perchloride, which was thoroughly efficacious in stopping the flooding and in causing uterine contraction, but the poor girl died of exhaustion thirty hours after the first convulsion, and about twenty-four hours after delivery.]

CASE X.—June 16th, 1868. Mrs. A., aged over 30, primipara, had a very good confinement, but from some imprudent act, I believe, flooded two hours after labour, *ad syncope*. I injected the perchloride solution, and she made a good recovery.

CASE XI.—September 26th, 1868. Mrs. C., aged about 33, multipara, delicate, but of a very tranquil temperament, was confined after a short but good labour. She had internal hæmorrhage some hours afterwards. Perchloride of iron was injected. There was prolonged exhaustion, but she had a rapid convalescence. [This patient was the subject of Case IV; and her diathesis I should class amongst the hæmorrhagic. After confinement she appeared to be doing well for fully two hours, when very severe after-pains set in, which all that I could do failed to relieve. The uterus, though high in the pelvis, was apparently contracted, and there was no external flow of sufficient amount to cause anxiety, but the pulse went down so rapidly, and to such an alarming extent, as to lead me to suspect internal hæmorrhage. On examining, *per vaginam*, and finding my suspicions confirmed, I at once removed the clots and injected the perchloride solution. All bleeding immediately ceased, but the delicately organised system had received so rude a shock that, for upwards of thirteen hours, the patient was in the most imminent danger, and no amount of stimulant that could be administered roused the pulse for an instant. During this time, I am satisfied that the loss of even a few ounces of blood would have sufficed to turn the scale. At length, a full dose of morphia enabled the stomach to retain nourishment, and the patient thereafter made an uninterrupted recovery. My friend Mr. Mules, of Ilminster, was present at this case, in consultation, soon after the perchloride injection, and could bear his testimony to the correctness of my report.]

I have no desire to magnify cases or results, but I can safely say that during a practice of more than twenty years, I have never seen peril so imminent, and so prolonged after childbirth, recovered from as in this case; and I would here especially call attention to a result which, though not the primary one to be considered, can scarcely be deemed secondary amongst the advantages accruing from the use of the perchloride injection. I allude to the security a man feels in attending to other matters: such as administering nutriment, altering position, rousing the vital powers, or, perhaps, resuscitating a still-born infant (whose life may be a most valuable one) when he is satisfied that the immediate cause of danger has been removed. This advantage would be especially appreciated by country practitioners, who, from their isolated position, may be miles, or, what is of far greater consequence, hours from any assistance in a case of the greatest emergency; and it is to my rural brethren that I would more particularly address the foregoing imperfect remarks, assuring them that, whatever may be their shortcoming critically viewed, they are thoroughly truthful, practical, and easy of application, by any one who will take the trouble of providing himself with a Higginson's

syringe, and a small bottle of a saturated solution of perchloride of iron, and of including them in his obstetric armamentarium.

It only remains for me to say that the vagina and uterus should first of all be freed from "coagula and placental débris," as Dr. Barnes directs; and that the long tube of the apparatus should be introduced thoroughly within the uterus before injecting. With these precautions I have found a few ounces of the liquid answer every purpose. Should my recommendation induce other practitioners to make use of the above safe and simple remedy my end will be answered, since I am well assured that the event will be a sensible falling off in that column in which the Registrar General tells of "mortality after childbirth."

South Petherton, October 1868.

A CASE OF LIGATURE OF THE RIGHT COMMON CAROTID FOR WOUND OF THE SUPERIOR LARYNGEAL ARTERY.

By G. ANNESLEY D. MAHON, Esq.,

Surgeon Peninsular and Oriental Steam Navigation Company's Steamship *Golconda*; late Resident Registrar and House-Surgeon, St. Mary's Hospital, London.

ON December 23rd, 1868, whilst on a voyage from Aden to Bombay, I was called to see a native fireman, who had been stabbed in the throat with a pair of scissors. On his presenting himself, I found that he had received a punctured wound of the throat, about half an inch in length, opposite the upper edge of the thyroid cartilage, on the right side of the neck, about three-fourths of an inch in depth, and leading downwards. He appeared rather faint; a very little blood was issuing from the wound; and the trachea was not touched. I therefore brought the edges of the wound together with plaster, applied wet lint and a bandage, and told him to go and lie down. About half an hour afterwards, I was called to see him, as he was bleeding. I found the lint and bandage saturated with bright arterial blood, besides a quantity running down his chest. I at once removed everything; and, with my colleague Dr. Allshorn, began to search for the bleeding vessel. Not being able to see it, I enlarged the external wound to about an inch, but still was unable to find it. I then applied ice, lint soaked in perchloride of iron, tincture of matico, and all the styptics I had with me; but without controlling the hæmorrhage in the slightest. I therefore decided to ligature the common carotid. We tried to administer chloroform; but he resisted so strongly, and he was bleeding so freely, that there was no time to lose; so we operated without it.

The operation was performed in the usual way; but, the man being very muscular about the throat, the artery was deep, and the omo-hyoid muscle was larger than usual, which necessitated the division of some of the lower fibres of it before the sheath of the vessel could be seen. After having carefully opened this on a director, I passed the aneurism-needle, armed with ligature-silk, round the vessel, when the bleeding from the stab immediately stopped. I then withdrew the needle, and ligatured the vessel, and brought the edges of the wound together with one silver-wire suture and sticking plaster, applying wet lint over all. Not above half an ounce of blood was lost from the operation itself, as only a superficial vessel was cut across in the first incision through the skin.

Dec. 23rd (twenty minutes after the operation). The pulse was full, 72, slightly intermittent. The patient was rather drowsy. He was ordered to be kept quite quiet.—6 P.M. same day (six hours after operation). The patient was still rather drowsy. He complained of pain in his head. The pulse was full and strong, 102. He was slightly feverish. Cold wet towels were constantly applied to the head. The pupils were somewhat dilated. He had had a cup of beef-tea.—10.15 P.M. He appeared to have a little difficulty in swallowing. He had slept for half an hour.

Dec. 24th, 6 A.M. He slept from 10.30 last night to 3 A.M. this morning, then had a cup of beef-tea. There was still difficulty in swallowing. The pain in the head was easier. He had passed urine. Pulse 102, full and soft. Both wounds looked well. Cold wet lint was applied. The tongue was slightly furred. A teacupful of beef-tea and sago were ordered to be given alternately every four hours. The pulsations of the inferior thyroid and transversus colli arteries were very visible. The pulsation of the facial artery on the right was not nearly so strong as on the left side.—10 P.M. He had been sleeping quietly. Pulse 96; skin cool. He complained of being hungry.

Dec. 25th. He felt better; he slept pretty well. He heard equally well on both sides. Pulse regular, not so full, 90. There was no fever. The wounds were both looking well. The wound of operation had healed by the first intention, except where the ligature was.

Dec. 26th. He was progressing favourably. The bowels were open for the first time since the operation, naturally. There was very slight pain in the head. Pulse 96. The wound of the stab was discharging a little ichorous pus.

Dec. 27th, 28th, 29th, 30th. He was going on very well. I removed the silver-wire suture on the 27th. He had occasional throbbing pains in the head. Half an ounce of castor-oil was given on the 30th. He was still on beef-tea and sago diet. Pulse 96.

Jan. 1869, 1st to 4th. He was progressing favourably. Pulse 82. He was ordered his ordinary diet of curry and rice.

Jan. 5th to 10th. He continued still improving. The wound from the stab was quite healed. There was slight discharge from the rest of the ligature. Bread poultice was applied twice a day.

Jan. 13th. The ligature was removed to-day, exactly twenty-one days after the operation. No hæmorrhage followed. Unhealthy granulations at the edges of the wound, where the ligature had been, were treated with nitrate of silver, and a lotion of two drachms of carbolic acid and ten ounces of lead lotion constantly applied on a piece of lint.

Jan. 14th. The granulations were much better. He had been suffering from diarrhœa, and was ordered to take every four hours an ounce of a mixture containing 3iss of dilute sulphuric acid, 3ss of compound spirit of sulphuric ether, and 3vii of water.

Jan. 15th. The diarrhœa was stopped. He was nearly well.

Jan. 16th. He was able to go to the police-court, a distance of four miles, to give evidence against the prisoner.

Jan. 20th. To all external appearances, he has quite recovered.

REMARKS.—Ligature of the common carotid for wounds is not of frequent occurrence; and I think, as far as I know, that this artery has never before been ligatured at sea—at any rate, not board of a steamer going at the rate of eleven knots an hour. I think that the non-appearance of hæmorrhage when the case was first seen by me may be accounted for by the artery having been only punctured by the point of the scissors. Some muscular fibre or fascia must have been carried on the point of them, and formed a sort of plug in the artery, the action of the heart being at the same time somewhat lessened by the shock; but, after resting awhile, reaction came on, the plug was forced out, and uncontrollable hæmorrhage ensued. In conclusion, there were, as may be supposed, numerous difficulties to contend with during the operation.

POISONING BY WHITE PRECIPITATE.

By A. R. GRAHAM, M.A., M.B. Cantab., Weybridge.

ONE evening, shortly before midnight, I was called to see a gentleman, aged about 35, who, being much depressed in spirits, had swallowed, about half an hour previously, white precipitate powder to the amount probably of more than two drachms. He immediately became alarmed, and took an emetic of mustard, which caused copious vomiting. In the matters vomited, however, none of the white powder was visible. I ordered another emetic of sulphate of zinc to be taken immediately, and to be followed, after an interval, by a dose of opium. He passed a very restless night, with great pain in the abdomen, vomited much, and had one copious evacuation from the bowels, containing mucous shreds in some quantities, and a good deal of dark blood. The last matter vomited consisted of clear deeply blood-stained fluid. Ten hours after the poison had been swallowed, I found him almost in a state of collapse, with a cold clammy skin and much congestion of the cutaneous vessels; his tongue was covered with a thick greenish fur, and his breath was very offensive. He was ordered to take plenty of barley-water and mucilage, and small quantities of wine and water; and gentle action of the bowels was kept up by means of castor-oil.

There was no tenderness of the abdomen on pressure; and towards evening the pain very much abated, although there was constant griping, which continued through the succeeding day, accompanied by frequent slight vomiting. During this day also there were numerous scanty evacuations of the bowels, with a very large intermixture of blood. This continued until sixty hours after taking the poison. The patient had one very copious motion, consisting apparently of almost pure bile, the passage of which caused a great scalding of the anus. This occurred again after the lapse of another forty-eight hours, the evacuations in the interim containing bile, and apparently scarcely any blood. After the first three days, there was no vomiting. The abdominal pain continued after taking any, even liquid, food for more than a week; but there was uninterrupted improvement in the graver symptoms after the first twenty-four hours. There was at no time any blue line on the gums, or sponginess, or salivation. This, together with the copious discharge of blood from the bowels, are the chief points of difference between this and any other case of poisoning by white precipitate, which I have seen recorded.